Development and Validation of a Multisource Feedback Tool to Assess Medical Trainee Competence in Patient Safety

by © Patricia L. McCarthy

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Dedication

I would like to dedicate my doctoral thesis
in memory of my sister,

Dolores (Dee) M. Hynes
September, 21st, 1965 – April 27th, 2016

and father,

Patrick (Pat) J. Hynes
May 23rd, 1939 – April 28th, 2008.

Both of whom had a passion for learning and
a deep appreciation for research and discovery.
You are deeply missed.

Abstract

Advances in medical sciences have led to the development of sophisticated clinical procedures and treatment modalities. Such advances are often associated with a potential for adverse events. Hence, the work environment of today's health care provider has become significantly complex and demanding. The shift in the landscape of our health care system has called for a parallel shift in how residents are trained and assessed in the area of patient safety.

Assessment is important in ensuring that future physicians are competent in the provision of safe, quality patient care. To date, there has been minimal research on the assessment of residents' patient safety competencies. Multisource Feedback (MSF) (or 360° assessment), involves rating performances within the workplace through the use of multiple raters, with whom the ratee works, and through self-assessment. The overall purpose of this study was to develop a valid MSF tool for assessing residents' patient safety competencies.

The proposed project involved a five-phase mixed method research (MMR) study consisting of a scoping literature review, environmental scan, expert and stakeholder consultations, competency mapping and development, Delphi surveys, and a pilot test. Patient safety assessment skills were rated by experts using a Delphi survey. The tool was then piloted with health professionals and residents to determine the importance, clarity, utility, and feasibility of its use in postgraduate medical education (PGME). A 75% consensus rating threshold was applied to the Delphi and pilot data, which resulted in a 53-item supervisor, resident, and co-worker survey and a 26-item MSF Patient Safety

Assessment Tool$^{360°}$ (PSAT$^{360°}$). The PSAT$^{360°}$ is regarded by experts, health professionals, and residents as a valuable and feasible tool that has broad applicability across PGME programs. This research resulted in an MSF tool that has established content validity and is grounded in principles of MSF, assessment of clinical performance, competency-based training, and required organizational practices (ROPs).

General Summary

Health care has become more complex, in part, due to innovative testing and treatments, as well as the advancement of medical science. Health care providers, including physicians, may face challenges working in such environments. This means that medical educators need to adjust the education provided to residents to ensure that they are highly skilled in providing safe, high-quality care to patients. Residents are individuals who have completed medical school and are now engaged in training to become a family physician or other specialist. Part of their training should include how to provide safe care, including how to avoid and reduce preventable harm to patients.

Medical schools need to ensure that residents have gained patient safety knowledge and skills during their training program. Medical educators determine this by carrying out an assessment of the residents' performance in a clinical, simulated, or classroom setting, and providing them with feedback on how to improve.

It is important to assess residents' safety skills before they enter practice, in case they need further education to enhance their skills before providing independent patient care. It is optimal to use assessment tools that measure residents' skills while they are training, as opposed to the end of their training, and involve feedback from other members of the interdisciplinary health team (e.g., nurses, social workers, pharmacists).

The purpose of this research was to develop an assessment tool so educators can provide feedback to residents on their patient safety skills. This work consisted of a literature review, interviews and focus groups with experts, residents, and health professionals, development of assessment items, and a pilot test with end users of the

tool. Patient safety assessment skills were rated by experts using a Delphi survey and then piloted with health professionals and residents to determine the importance, clarity, utility, and feasibility of its use in postgraduate medical education (PGME). This research resulted in an MSF Patient Safety Assessment Tool$^{360°}$ (PSAT$^{360°}$) that consists of a 53-item supervisor/co-worker survey, a resident self-assessment survey, and a 26-item patient survey. The PSAT$^{360°}$ is regarded by participants as a tool that has broad applicability across PGME programs.

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Lastly, to my little girls who are already showing signs of becoming fearless adventurers. I can only trust that my experience in all of this has somehow had a positive influence. Now that this is complete, bedtime stories and cuddles will no longer be rushed. I can now be fully present in each moment with you.

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List of Abbreviations

AFMC:	Association of Faculties of Medicine of Canada
AHRQ:	Agency for Healthcare Research and Quality
ASPIRE:	Advancing Safety for Patients in Residency Education
CAES:	Canadian Adverse Event Study
CBA:	Competency-based Assessment
CBME:	Competency-based Medical Education
CCHPE:	Center for Collaborative Health Professional Education
CIHI:	Canadian Institute for Health Information
CMPA:	Canadian Medical Protective Association
CPSI:	Canadian Patient Safety Institute
IPE:	Interprofessional Education
IPC:	Interprofessional Collaboration
MMR:	Mixed Methods Research
MSF:	Multisource Feedback
PCC:	Patient-Centered Care
PGME:	Postgraduate Medical Education
PSI:	Patient Safety Incident
$PSAT^{360°}$:	Patient Safety Assessment Tool - 360°
ROPs:	Required Organizational Practices
U.S.:	United States
WBA:	Workplace-based Assessment

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Chapter 1: Introduction

The introductory chapter will outline the rationale and background for the study, specific research questions addressed, and influential theories such as systems thinking, social learning, and deliberate practice. This chapter defines patient safety and its importance in postgraduate medical education (PGME). In PGME, trainees (medical doctors who have graduated from a Canadian or international medical school) are engaged in a predominately experiential educational journey that compromises hands-on clinical experiences, complemented with the scholarship of teaching and research. This chapter also provides an overview of how PGME has shifted towards a competency-based medical education (CBME) model, the subsequent need for competency-based assessment (CBA) tools, and those qualities that constitute good assessment in medical education. Finally, this chapter outlines assessment tools commonly used in PGME, why workplace-based assessment (WBA) tools are suitable for PGME, and sources of validity evidence for assessment tools.

1.1 Problem Statement, Rationale, and Research Questions

In recent years, there has been increased global attention on patient safety and quality improvement within the health care system. This focus has resulted from an increase in the complexity of health care systems due to advances in medical knowledge, specialization of care, medical interventions, and treatments. With advances in medicine and technology, our population is living longer. However, an aging population and an increasing number of patients presenting with chronic illnesses and co-morbidity place added pressure on health care systems with limited resources. Compounding these issues,

patients and families want increased access to services, creating a fast-paced and demanding health care work environment (West et al., 2016). Increasingly, patients are demanding a greater voice in the direction of their health care in terms of diagnoses and treatments. Following a patient safety incident (PSI), affected patients and families, as well as the general public, want to witness accountability, disclosure of that which took place, and plans to mitigate similar events in the future (Bell et al., 2011; Kachalia, 2013). This increased complexity within the health care system has influenced patient safety and how organizations manage PSIs (e.g., adopting new policies and administrative processes).

Medical professionals need to be competent in multiple domains in order to provide safe, high-quality health care. To practise safely, physicians need to have advanced clinical knowledge as well as proficiency in both technical and non-technical skills, including those that are closely connected to patient safety (e.g., leadership, communication, collaboration, scholarship, professionalism, and advocacy). The shift in the health care landscape and the intricacies associated with providing safe care have also placed greater demands on medical professionals to be experts and highly skilled, subsequently influencing how medical learners are educated and assessed. Consequently, the concept of patient safety has become situated at the forefront of medical education, including postgraduate training.

Providing patient safety education prepares medical students and residents for safe application of their clinical knowledge and enables them to recognize risks to patient safety, collaborate on the development of solutions to minimize risk, as well as report and learn from PSIs (Benn et al., 2009; Pronovost et al., 2006a; Pronovost et al. 2006b; Wu &

Busch, 2019). Both undergraduate medical education and PGME programs are critical time points when physicians can be engaged in patient safety and provided with the necessary skills to provide safe care.

A previous commissioned report (Government of Newfoundland and Labrador, 2008) called for an explicit patient safety curriculum within medical education as opposed to one that assumes the learner or trainee will pick up the correct and necessary patient safety skills informally through observation or unstructured discussions. While there is much value in those unstructured and spontaneous teaching moments, the quality of the instruction, accuracy of the information, and acquired learning cannot be directly measured.

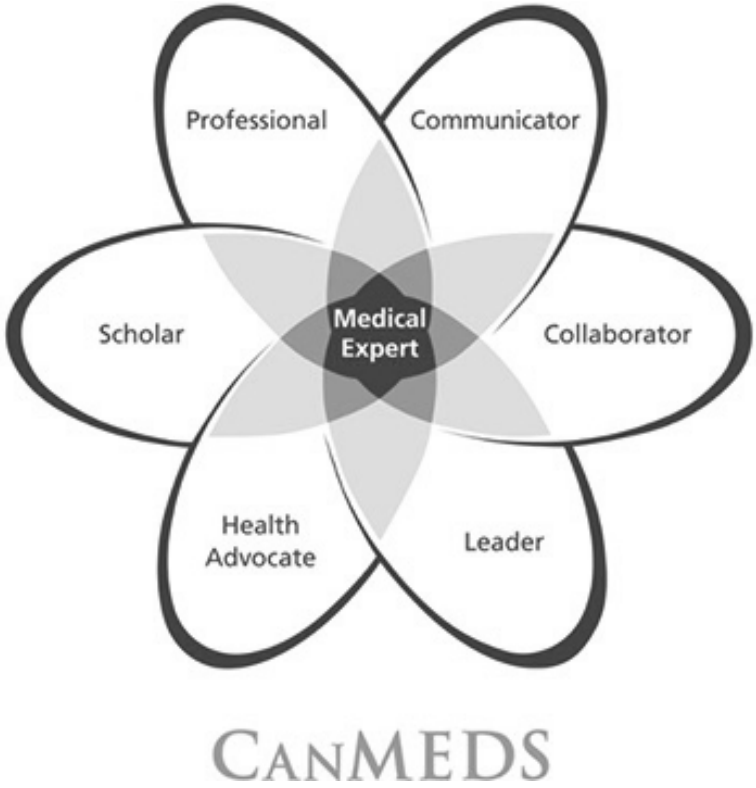
A number of reports, publications, and experts have drawn attention to the importance of educating residents on how to practise safely. The Canadian Patient Safety Institute (CPSI), in collaboration with the Patients for Patient Safety Canada, has developed an interprofessional framework for patient safety (Canadian Patient Safety Institute, 2020). The CPSI patient safety framework outlines six core domains of patient safety skills that contribute to high quality health care: patient safety culture; teamwork; communication; safety, risk and quality improvement; optimization of human and environmental factors; and the ability to recognize, respond to and disclose patient safety incidents. In addition to the competencies within the CPSI framework, Flin et al. (2008) also highlighted the importance of non-technical skill development (e.g., decision-making, coping with stress and fatigue) as pertinent to safe patient care.

The Royal College of Physicians and Surgeons of Canada (RCPSC) and the College of Family Physicians of Canada (CFPC) have also developed a set of patient

safety competencies for PGME that have been integrated into the CanMEDS competency framework. The CanMEDS framework outlines a validated set of competencies, or the knowledge, skills, and attitudes that physicians need to meet the healthcare needs of their patients (Frank et al., 2015). The competencies are organized under seven roles including medical expert, health advocate, professionalism, communicator and collaborator, leader and scholar (Figure 1).

Figure 1

The CanMEDS seven integrated roles of a Physician.[1]



[1]Note: Copyright © 2015 The Royal College of Physicians and Surgeons of Canada. https://www.royalcollege.ca/rcsite/canmeds/canmeds-framework-e. Reproduced with permission.

The CanMEDS framework is used to guide and direct the PGME curriculum and training experiences in Canada. The goal of integrating patient safety competencies into the CanMEDS framework is to graduate highly skilled and safety-oriented physicians. PGME and practising health care teams also use other influential patient safety frameworks, including Accreditation Canada's Required Organizational Practices (ROPs) and Canadian Medical Protective Association (CMPA) Good Practices Guide (Accreditation Canada, 2008; Canadian Medical Protective Association, 2016). Accreditation Canada's ROPs and CMPA's Good Practices Guide are evidenced-based standards that organizations must have in place to achieve patient safety and reduce medical-legal risks.

These frameworks and guidelines have been integrated into PGME (in Canada and other parts of the world, including the UK and the U.S.) through a competency-based education (CBME) model. This CBME model directs the expectations of medical educators and trainees in terms of the curriculum they need to teach and learn and required clinical experiences, performance assessments, and professional development (Frank, 2010; Smith, 1999). A CBME approach involves designing a curriculum around a set of desired outcomes (e.g., what is expected of the resident upon entry to practice). In CBME, trainees are required to demonstrate progressive competence throughout their program and failure to do so results in focused remediation through mentoring and coaching during their program.

Much of the literature supports the notion that it is during the first five years in practice that newly graduated physicians have exponential growth in their competence and confidence as they see more patients, are exposed to various types of health issues,

and work with various professionals (Boufford, 1977; Hawrylyshyn, 2018). Indeed, trainees would become increasingly proficient in patient safety over time as well. However, patient safety is a fundamental concept that transcends all domains of care for physicians; they will use it in all areas of clinical care they provide and their administrative responsibilities (e.g., teaching, charting, etc.). They must acquire a standard level of safety competency prior to practice. Residents are expected to develop patient safety competency by learning the relevant patient safety knowledge-based content and building patient safety skills.

For residents to achieve competence in patient safety during their program, medical educators need to observe them in practice, provide them with constructive feedback on their safety skills, and make objective judgements about their competency level. To achieve this, consistently and fairly, postgraduate training programs need to employ a formative patient safety assessment tool. However, there are limited to minimal validated tools, formative or summative, to assess residents' patient safety competency.

Formative, competency-based assessment (CBA) of patient safety competencies within PGME is most appropriate for two reasons. First, residents may acquire patient safety competencies at variable rates, therefore, some residents may need individual coaching (using documented feedback) on how to build their skills. Measurements of their competency levels can be compared over time to determine if progress is being made or not. Secondly, residents in a CBME program train in order to meet an expected competency level and then continue to train to further master those skills. Therefore, formative or frequent monitoring of residents' skills helps to focus and tailor their learning towards needed competency development or improvement (Shah et al., 2016).

Competency assessments in a postgraduate setting can be challenging since residents have distinct learning paths and experiences. In some instances, supervisors may only spend a brief period of time with a resident (e.g., a four-week rotation) and therefore only have a snapshot of residents' performance and competence. Also, supervisors may not frequently observe and assess senior residents who are more independent and perform specific tasks unsupervised. Therefore, PGME assessment models based on a single perspective (supervisors making judgements about a resident's competency) may not provide a complete picture of what a resident is, or is not, capable of doing.

Use of WBA tools, including Multisource Feedback (MSF), can help circumvent the concerns associated with having only supervisors make judgements of a resident's competency level (Dijksterhuis et al., 2009; Moonen-van Loon et al., 2013). Multisource feedback (also referred to as a 360° assessment) involves rating specific domains (e.g., communication skills, safety skills) of an individual's performance by multiple raters (including coworkers, patients, supervisors, subordinates who interact with the ratee) and through self-assessment (Sargeant, 2006).

In PGME, raters (residents' supervisors, health professionals, and patients) may perceive each performance indicator on an MSF tool differently. Each population of raters (e.g., nurses) may also view residents' abilities through a different lens, depending on their clinical interaction with residents. Also, since multiple raters are involved in an MSF assessment process, it is likely that what one rater cannot assess, another rater(s) may be able to assess. For these reasons, MSF in PGME is likely to provide a more complete picture of the resident's competence in comparison to the perceptions of a single rating by his or her supervisor (Bracken et al., 2001; Tornow & London, 1998).

The impetus behind this research is the value and importance placed upon the inclusion of patient safety within residency education and the concurrent shift towards CBME. These two changes require a valid CBA tool fitting for PGME, CBME, and assessment of patient safety skills. There is a lack of valid MSF tools to formatively assess residents' patient safety competency levels, and one that has been generated through rigorous methodological approaches. The main intent of this research study was to develop an MSF Patient Safety Assessment Tool ($PSAT^{360°}$) that will provide a comprehensive measure of and formative feedback on medical residents' patient safety skill level.

This product would add value to PGME and patient safety, and contribute to the literature on assessment, WBA, and MSF. There is a dearth of literature on patient safety perceptions among health care providers, residents, and patient safety experts. There is limited literature that describes: (i) what patient safety means in regards to the roles of health care providers, educators, and learners; (ii) residents' tasks that require demonstration of patient safety competency; (iii) the competencies that should be captured in a formative patient safety assessment tool for residents; (iv) stakeholders' perceptions on the use of MSF to assess patient safety competency. In addition to developing an MSF patient safety tool, a secondary outcome of the study was a synthesis of key stakeholders' perceptions towards the concept of patient safety in practice and PGME, patient safety competency, and assessment thereof. These outcomes were achieved by addressing the following research questions:

i. How do key stakeholders perceive patient safety as health care providers and as educators?

ii. What major patient safety themes are reflective of the skills residents need to provide safe, high-quality health care?

iii. What are the specific knowledge, skills, and attitudes associated with residents applying and demonstrating patient safety in a clinical setting?

iv. What is the evidence of utility, clarity, feasibility, and validity associated with a Multisource Feedback instrument designed to measure residents' patient safety skill level?

v. What are the challenges, strategies, and enablers associated with the use of a Multisource Feedback instrument to measure residents' patient safety skills?

The project involved a five-phase mixed methods research study.

Phase I (Literature Review and Environmental Scan) entailed a comprehensive Literature Review and Environmental Scan to aid in the construction of the PSAT$^{360°}$. *Phase II (Key Expert and Stakeholder Consultations)* involved consultations with key experts in MSF to determine their perceptions of the tool's design, development, and implementation. Consultations with patient safety experts were also conducted to gain their perspective on assessing residents' patient safety skills – what competencies would be assessed and if MSF would be an appropriate approach. *Phase III (Competency Mapping and Development of Assessment Items)* involved mapping of competencies from various sources (peer-reviewed and grey literature, key experts, and stakeholders). Competencies were compared and contrasted using an in-depth, iterative process involving extraction and analysis of competencies from existing frameworks, guides, and

ROPs. This was then compared to competencies from the literature and environmental scan, and data extracted from interviews and focus groups with key experts and stakeholders. A draft list of competency statements was generated through this comparison. *Phase IV (Delphi Round I, II, III – Patient Safety Experts)* involved inviting key experts in patient safety and PGME to review the patient safety competencies and provide input on the clarity, wording, importance, structure of the PSAT$^{360°}$, and its feasibility. *Phase V (Pilot test – Key Stakeholders)* then followed with development of the PSAT$^{360°}$, using the results of the Delphi surveys. The PSAT$^{360°}$ was then piloted with key stakeholders (raters from various professions and disciplines and residents) to determine the tool's importance, clarity, and perceptions of feasibility.

1.2 Patient Safety

Since Hippocrates first enunciated the admonition of "first do no harm" over two millennia ago, patient safety has become a central tenet of medical education and practice. However, during Hippocrates' time, this principle was relatively easy to apply given the limited amount of medical interventions, primitive medical knowledge, and a less complex health care system. Since that time, advances in medical sciences have led to the development of innovative and sophisticated clinical procedures and treatment modalities. However, as with any medical improvement, such advances are often associated with an inherent potential for technical mishaps, human errors (both in judgment and in the performance of medical procedures), and systematic failures that may ultimately cause harm to a patient (Henriksen, 2008).

Regrettably, unanticipated or undesired patient outcomes do occur and can negatively impact a patient's health and quality of life. Such outcomes occur as a result of a PSI - an event or situation resulting in harm to a patient. These PSIs are due to deterioration of a patient's underlying medical condition (unrelated to the health care provider or the system) or health care delivery due to treatments or investigations; health care provider performance; or a breakdown in policies, processes, and infrastructure (e.g., technology, human resources, communication) (Canadian Medical Protective Association, n.d.; Disclosure Working Group, 2008). Patient safety incidents also occur because of inefficiencies or failures in health care delivery that do not reach the patient and therefore does not result in harm to the patient (a near miss), or it does reach the patient, but without harm to the patient (a no harm incident) (Disclosure Working Group, 2011). Therefore, incidents either reach the patient and cause harm, or are detected early and corrected without harm to the patient (Runciman et al., 2009).

Thought leaders within the health care industry and patient safety started to challenge assumptions held about how and why PSIs occurred. These leaders argued for others to start thinking about PSIs from a multifactorial and system failure perspective (e.g., failures in technology, teamwork, communication, polices), as opposed to just being the result of human error. Historically, organizations performed an investigation following a PSI that resulted in individual blame and accountability (Dekker & Hugh, 2010). These individuals were often regarded as incompetent and offered some form of remediation (Leferink et al., 2018). When the focus is on productivity, individual blame, and denying system deficiencies, organizations are prone to the "vulnerable system syndrome" and increase their chances for additional PSIs (Reason et al., 2001).

It is now recognized that many harmful incidents occur due to multiple system failures, as opposed to the ineptness of one individual. This opened the acceptance that physicians are human beings who are fallible and capable of making mistakes (Harris, 2004; Nash, 2000). The belief that well-educated health professionals do not make mistakes has led some professionals and organizations to blame and avoid system-level accountability and vulnerability, such that harmful incidents were downgraded or ignored, and key individuals were not made aware (including patients). If an incident does occur because of a lack of experience or incompetence, reporting should not lead to punishment, but an opportunity for further education and learning from the incident so appropriate measures are taken to prevent such incidences in the future.

Much of the literature proposes that many PSIs, human and systemic, are preventable. Implementing preventative measures means identifying and minimizing the latent failures or "weaknesses" in a system's protective barriers. Reason (1990) expressed, through his conceptual "swiss cheese model", that these protective barriers (e.g., teamwork, interprofessional communication, technology, health care providers) are not always perfect and have "holes" or weaknesses within them (e.g., inefficiencies in team communication, poor technological design, health care provider distraction, fatigue, or low competence). Typically, these holes open, close, and shift in such a way as to prevent harm from reaching a patient. When there are several weaknesses in the protective barriers at the same time (such as poor communication, broken equipment, and unclear policy), then harm may reach the patient (Keller et al., 2009).

Systems thinking is a harm reduction approach that focuses on whole system improvements, including the protective barriers, and the enhancement of health care

provider's knowledge and skills (Canadian Medical Protective Association, 2018). Therefore, building health care providers' competence and maintaining the protective barriers within the system (e.g., consistent review of policies, adherence to the use of efficient communication tools, reporting poor functioning equipment, and avoiding workarounds that allow continued use of such equipment) (Canadian Patient Safety Institute, 2017a) is critical to minimizing PSIs and enhancing patient outcomes.

Making improvements and reducing harm is not accomplished by making individual changes in isolation of each other, but rather by looking at the dynamic interplay between elements within the system (Wachter, 2012). For example, reducing medication prescribing errors can be accomplished by educating residents about safe prescribing practices, related policies, technology, and collaborating with pharmacists and primary care physicians, to name a few (National Steering Committee on Patient Safety, 2002). Applying systems thinking to patient safety does pose challenges for many, given that staff and learners have been educated and acculturated to believe in individual responsibility in caring for the sick.

Given the most recent CanMEDS framework and adoption of CBME, PGME programs are required to provide residents with the opportunity to build patient safety skills, including the ability to use a systems thinking lens to analyze their environment for safety risks; analyze, report, and disclose PSIs; complete patient assessments, care and discharge plans; and engage in interprofessional communication and collaboration. Patient safety skills such as these will enable residents to contribute to the prevention of PSIs and positive patient outcomes during their training and practice. Postgraduate medical education programs should offer relevant training opportunities to ensure that residents

have attained the necessary skills before they graduate, further impressing the need for patient safety CBA tools within PGME.

Although the need to include patient safety education is evident, its integration at the PGME level within Canada has been inconsistent. The gravity of the patient safety issue worldwide ignited numerous improvement initiatives and the release of reports that called for integration of patient safety competencies and education programs within teaching hospitals.

In the 2002 Canadian report, *Building a Safer System – A National Integrated Strategy for Improving Patient Safety in Canadian Health Care*, the National Steering Committee on Patient Safety put forth the following recommendations for improving adverse event management through education and professional development:

1. Develop and implement health care education and professional development programs for improving patient safety.
2. Develop educational and continuing professional development programs to improve patient safety in collaboration with national accrediting bodies, academic institutions, provincial licensing authorities (for peer assessment reviews), and health-care facilities/organizations/scholarly societies. (p. 20-21)

In May of 2007, the Government of Newfoundland and Labrador established a Task Force on Adverse Health Events. This task force was established to conduct a review of measures taken by Newfoundland and Labrador's health care system in response to a local PSI resulting in numerous women not having received the proper form of breast cancer treatment and hence, many women died or had a reduced life expectancy. This task force made several recommendations to target improvements to patient safety

within this province, including education on quality improvement, reporting of adverse events, and developing strategies to learn from mistakes (Government of Newfoundland and Labrador, 2008). Following the release of the task force report, Memorial University's Centre for Collaborative Health Professional Education (CCHPE) established an interprofessional patient safety curriculum across the undergraduate medical education and pre-licensure health sciences education curriculum at Memorial University.

In 2010, Health Canada funded the Future of Medical Education in Canada Postgraduate (FMEC-PG) project that was led by the Association of Faculties of Medicine of Canada (AFMC), CFPC, RCPSC, and the Collège des Médecine du Québec. This project aimed to review the current state of PGME in Canada and formulate a set of recommendations. This project included a review of the PGME competencies to ensure that physicians are prepared and committed to provide safe patient care, which is one of the four guiding principles upon which the FMEC-PG group made their recommendations. Under the third recommendation, "*Create positive and supportive learning and work environments*", the FMEC-PG group called for PGME programs to research and address factors that impact patient safety.

While these recommendations and competency frameworks are valuable, the uptake of patient safety competencies in teaching and assessment would remain limited unless they had an explicit presence in medical education. One of the barriers to integrating patient safety competencies in PGME includes the challenge of translating the high-level CPSI framework into teaching and assessment activities. Other barriers include programs that do not have the capacity to teach patient safety due to faculty's lack of

expertise and patient safety-oriented attitudes, or the lack of a safety culture within health care and medical education.

These are some of the reasons why the new RCPSC competency-based framework made patient safety explicit and highlighted its importance in medical education. Over time the culture and attitudes will likely shift and faculty development will help build capacity for patient safety teaching and assessment of residents. Within the new framework, the safety competencies are broken down into milestones. These milestones outline for residents, faculty, and curriculum developers the expected progression of residents' competence during their training and into practice. The milestones provide teaching, learning, and assessment targets and therefore act as a guide of when to teach specific content and when to schedule specific clinical experiences and assessment of specific skills. The RCPSC competency framework is a compilation of the accepted standards for specialty medical training. Subsequently, in 2017 the CFPC incorporated patient safety into its competency framework for family medicine.

Reports and curriculum framework updates highlight the need for integration of patient safety into the postgraduate curriculum and assessment tools. There is a slow growth in patient safety curriculum resources, including guiding frameworks and supporting literature across undergraduate and PGME programs in Canada, as well as unpublished educational initiatives (Cronenwett et al. 2007; Tregunno et al., 2014; Wong et al., 2010). Only a few medical schools have implemented a patient safety curriculum (Mayer et al., 2009; Tregunno et al., 2014; Walton, 2010). Alper et al. (2009) found through a survey of Canadian and U.S. internal medicine clerkship directors that only 25% of the institutions (n =110) had implemented a patient safety curriculum.

Studies have shown that patient safety curriculum is usually implicit and often excluded from student assessment (Armitage et al., 2011; Halbach & Sullivan, 2005). Halbach and Sullivan (2005) report numerous reasons for having an explicit patient safety curriculum, including the impact of PSIs on patients' health outcomes and the need for students and residents to learn how to prevent, mitigate, and manage PSIs. To further stimulate the integration of patient safety into medical curriculum the RCPSC, along with the CPSI, established a certificate program in 2014, called *Advancing Safety for Patients in Residency Education (ASPIRE)*, designed to provide medical educators with the necessary skills to develop and implement patient safety in PGME. It is anticipated that this program will inspire and support educators to develop sustainable patient safety curricula and assessment tools.

Availability of relevant educational resources (e.g., patient safety assessment tools, professional development programs) can motivate medical educators to teach patient safety and stimulate them to reflect on what aspects of patient safety is important to teach. A formative assessment tool will assist educators when observing and providing feedback to residents on their patient safety skills.

The most appropriate approach to assessing residents' patient safety skills will be described in the following sections. It will begin with a description of the context of PGME, including CBME and CBA, and the need for WBA tools, such as MSF.

1.3 Postgraduate Medical Education

1.3.1 Context of Postgraduate Medical Education

In Canada, the educational path to a licenced medical practice entails a graduated,

three stage process. The first stage typically involves completion of an undergraduate degree, followed by a 3-4-year undergraduate Medical Doctor (M.D.) program. The M.D. involves building upon the learners' previous science background and experiences by introducing new competencies in the classroom and complementing those with clinical experiences. The clinical experiences enable learners to gain exposure to various domains of clinical practice to understand the roles and responsibilities of health professionals who work in that area. This exposure may also help residents identify with a specific specialty in which they will further train and practise. After successful completion of their M.D. program, learners then advance to postgraduate (residency) training. During this stage, residents will focus their training and competency development in one of the 34 Canadian postgraduate programs.

Postgraduate (residency) training is the final educational stage before residents complete certification and licensure examinations in order to have an independent practice in Canada (Canadian Post-MD Education Registry, 2018). Following the completion of their postgraduate programs, residents can apply to complete a subspecialty post-graduate program. Residency training programs in Canada vary in length from 2-5 years, with Family Medicine taking 2 years and other specialty training programs spanning 3-5 years.

Family medicine residents complete their exam via the CFPC, and residents completing other specialty programs complete their exam via the RCPSC. Those who successfully complete their certification examination can start an independent, unsupervised practice in Canada that is complemented with required participation in continuing professional development activities (Canadian Post-MD Education Registry,

2018). After completing their PGME program, residents may choose to complete advanced training (e.g., an Enhanced Skilled Program, such as Care of the Elderly) or a subspecialty program (e.g., Adolescent Medicine).

Residency training programs comprise formal classroom-based curriculum and extensive clinical experiences. Both learning contexts are designed to meet the learning outcomes and competencies set forth nationally and locally at the program level. It is imperative that residency training provide experiential learning experiences that complement formal classroom-based teaching experiences. In this way, residents are given the opportunity to apply the knowledge they have acquired within a clinical context under their supervisors' guidance. Successfully bridging formal curriculum with clinical learning in residency is dependent on two caveats: having topics that are patient-centered and linking information to medical decision-making (Smith & Kohlwes, 2011).

Traditionally, residents spent a specific amount of time learning about a domain of care in the classroom and on clinical rotations, and then moved on to the next topic or clinical rotation. Typically, teaching, learning, observations, and feedback was focused on that domain of care and, in some instances, feedback and assessment was not provided until the end of a rotation or block of time. There was minimal structure and focus on the educational needs of residents (Holm, 2002). Residents who did not meet the required outcomes would then have to spend extra time at the end of that rotation, year, or program. While necessary, this form of remediation can be disruptive to the learner and the program. Learners would sometimes not find out until the end of a rotation that their advancement to another rotation or phase in their program would be delayed or extended. If remediation is needed, the program also must find the resources (faculty and location)

best suited to helping residents meet the desired outcomes. This traditional approach to PGME resulted in less frequent documentation of outcomes and formative feedback approaches, and the focus was not based on a validated list of competencies. Therefore, the traditional time-based PGME model sometimes delayed the detection of gaps in residents' abilities until the end of their program, resulting in some residents experiencing a delay of entry to practice (due to remediation) or entering practice unprepared in key areas. This approach to medical education has also been shown to create competence gaps among residents (Chen et al., 2015; Crosson et al., 2011; Matter et al., 2013).

1.3.2 Competency-based Education

The competency-based medical education (CBME) framework that is now used in Canadian PGME helps to circumvent some of the challenges associated with the traditional time-based approach and create a more effective teaching and learning experience. The CBME framework is used to establish attainment of outcomes, as opposed to the amount of time spent in a program and on clinical rotations (block of time learning various domains of care such as obstetrics, internal medicine, pediatrics) (Carraccio et al., 2002). The key components of CBME include clear expectations; coaching; and frequent observations, assessment, and feedback. A competency framework provides a clear outline of expectations for residents and faculty - what they need to learn and demonstrate and what they need to teach and assess, respectively. Competency-based medical education frameworks enhance the teaching environment by providing structure and consistency in terms of curriculum and clinical exposure across learners and programs, as well as an assessment of performance. The structure of the

environment is characterized by frequent observations of residents in the workplace, assessment, documentation, feedback, and coaching on what residents need to do to achieve competence (Frank et al., 2010; Frank et al., 2017; Lobst, 2010).

The frequent assessment of competencies allows educators to determine if residents are progressing or if there are specific gaps in their learning and clinical exposure. Frequent assessment also allows any teaching and learning gaps to be detected early and make any necessary changes to residents' learning paths through coaching, different clinical experiences, or more focused learning activities (e.g., increased readings, consultations with specific specialists, case-based learning) (Lobst et al., 2010).

A CBME model of learning takes into consideration the principle that trainees master concepts at different rates; something that might take one trainee two weeks to master, might take another less or more time. Therefore, readiness for unsupervised clinical practice is not based on the length of the training program, but the attainment of competency (ten Cate, 2017). Therefore, learning based on outcomes defies the notion that competency in this context can be achieved in a specified time period (Stodel, 2015). Prior to CBME, traditional time-based PGME may not have allowed for detection in gaps in a trainee's learning until the end of their program, resulting in some residents experiencing a delay of entry to practice (due to remediation) or entering practice unprepared in key areas.

The certification colleges (the CFPC and the RCPSC) require that programs provide evidence of competency before residents write their examinations at the end of their program. Therefore, programs are responsible for gathering that evidence by completing assessment tools that consider all facets of a resident's training program,

including research, teaching, and clinical training. Some of these CBA tools are shaped around the CanMEDS framework, such that learners are required to demonstrate mastery of the CanMEDS roles when applying their learning to patient care (Lobst, 2010).

Competency-based education within PGME requires assessment tools that are valid and reliable, reflect the CanMEDS competency framework, comprehensively assesses all tasks required of residents, and accurately reflects the context of their learning and future practice. These criteria can be achieved by following the key principles of CBA, outlined in the following section.

1.3.3 Competency-based Assessment

The pivotal need for assessment in any education program was summarized in a single phrase, "Assessment drives learning", coined by George Miller (1919-1998). Van der Vleuten (1996) suggested that an assessment process can drive learning if the content is reflective of professional reality, its delivery format provides direction, and it is administered at the appropriate time points.

Although there are numerous definitions of assessment, it is often broadly referred to as the process of gathering information about a learner's competency and performance at various intervals throughout their educational program (Gibbs et al., 2006; Mislevy et al., 2012; van der Schaaf et al., 2017). ten Cate (2017) states that assessment serves as a "dialogue between two parties—the learner and the school or the educator" (p. 736). Assessment typically begins with the instructor or supervisor and the learner, but in PGME, it should also involve input from other health professionals who mentor students or work with residents (Holmboe et al., 2010; Howley, 2004; Miller, & Archer, 2010).

Assessment in medical education does not come without barriers, but it is a critical process linked to patient safety and patient outcomes. Epstein (2007) stated that assessment of a resident's competency (what it is they can do during their training) is indicative of authentic performance (what the resident regularly does when not being observed or assessed). In medicine, competency is viewed as a lifelong learning process where assessment plays a role after PGME and helps physicians identify their continuing professional development needs (Eva et al., 2016; Leach, 2002). The purpose of assessment has been described as a motivator and a map for future learning. It also aids in identifying trainees for advanced training and those who are incompetent for practice (Batalden et al., 2002; Leung, 2002).

For residents, the progression towards or attainment of competence involves first collating evidence gathered through assessment tools, including narrative, constructive feedback. For these purposes, the content and structure of assessment tools need to be based on the competencies that residents are expected to attain. The evidence collected from residents' assessments is then compared to what is expected based on their residency year, using pre-determined benchmarks or milestones. Next, the resident and the supervisor would work together to identify any necessary changes and strategies to achieve those changes. From there, the supervisor or program lead would determine the resources and opportunities available to help meet the resident's identified needs.

When assessing residents in a clinical setting, all forms of assessments should be valued and purposeful (van der Vleuten et al., 2010). There are three broad categories of assessment; diagnostic, formative, and summative (Hanson et al., 2019). Diagnostic assessment, often referred to as pre-assessment, is sometimes used at the beginning of a

course or program to gauge entry-level knowledge of a specific topic(s). Formative assessment occurs throughout learning to provide feedback to both the learner and the instructor. The information collected from both diagnostic and formative assessments can be used to direct instructional changes and guide future learning. Summative assessment, on the other hand, is administered at the end of a unit of study, and its purpose lies in measuring a learner's level of achievement and aids in decision-making regarding a learner's advancement to the next training level or completion of a course/program (Amin et al., 2006; Moore et al., 2009; Ruston, 2005).

Ruston (2005) and Gipps (1994) reported a shift in the culture of assessment which highlights the importance of formative assessment in medical education. Historically, residency assessment primarily focused on summative testing and providing an overall score to the learner at specific time points, such as the end of a learning block, a resident rotation, or the end of each residency year, and before entry to practice. This summative approach towards assessment creates challenges with formulating a remediation plan if the assessment results are not collated until the end of a learning block or at the end of a residency program. Learner remediation could be delayed, resulting in a carryover of competency deficiencies to another clinical rotation, creating a potential threat to patient safety or a delay in entry to practice.

However, CBME and CBA that includes the provision of feedback to learners throughout their training enables them to make the necessary changes. When structured appropriately, feedback not only outlines a specific behaviour or competency that is deficient or in need of improvement, but also offers details of how to improve, build knowledge, or develop skills. Together, the competency scores and the feedback

prescribe the targeted areas the resident needs to work on and how to achieve it (Carraccio et al., 2002; van der Vleuten, 2012). For this reason, CBA is seen to propel residents' learning and optimize their performance (Rushton, 2009).

Van der Vleuten et al. (2010) propose that assessments, lacking formative value, can become ineffective and trivial since the learner may not see any learning value in the assessment. Van der Vleuten et al. (2010) state,

> We argue that whenever assessment becomes a goal in itself, it is trivialized and will ultimately be abandoned. Assessment has utility insofar as it succeeds in driving learning, is integrated in a routine, and ultimately comes to be regarded as indispensable to the learning practice. (p. 712)

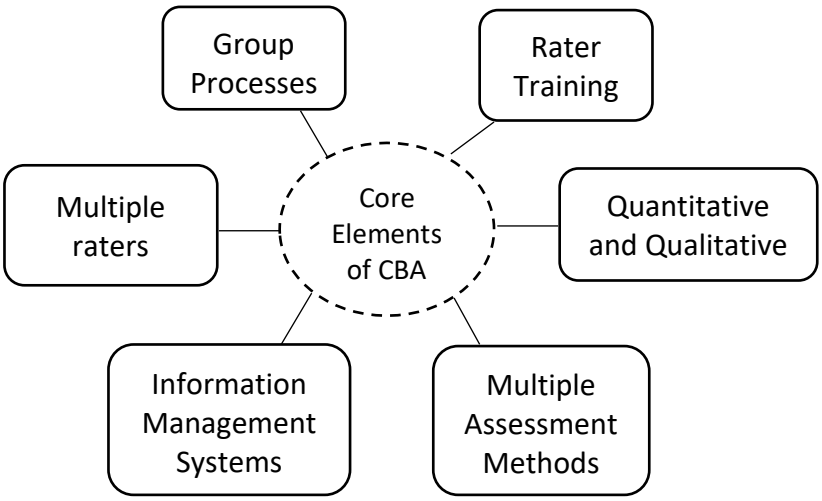
If learners value the assessment process and tools, they are more likely to use the data and feedback to improve. Hence, assessment should be designed to drive learning and competency development (formative) and determine readiness to progress within their program and into practice (summative). Here, the formative assessment serves to improve the resident's achievement in the summative assessment. A formative CBA process should have clearly defined expectations of the skills residents need to enter practice as a successful, safe physician and entail frequent measures of those expectations. Successful formative CBA involves residents seeking and being receptive to constructive feedback on how they can improve and master their skills.

A vision of CBA in medical education includes the following elements: a process of reviewing and deconstructing performance feedback with learners, timely and frequent assessments, and use of multiple methods and raters, and rater training (Archer, 2010; Hodges, 2013; Lockyer et al., 2017; Norcini et al., 2011). These elements of CBA

(Figure 2) are described by Lockyer et al. (2017) and align with the format and process of an MSF tool such as the PSAT$^{360°}$.

Figure 2

Core Elements of Competency-Based Assessment



According to van der Vleuten et al. (2010), educators should base decisions about learners on multiple assessment methods (frequent sampling), instead of a single method, and multiple raters across various contexts. These authors further state that, "Each single assessment is a biopsy, and a series of biopsies will provide a more complete, more accurate picture" (p. 708). Use of multiple methods and raters can help account for any variability in residents' performance in different contexts, differences in raters' perceptions, and any shortcomings among raters or assessment tools. Assessment of a resident's competence across various contexts, by multiple raters, is important since a single judgement (one rater's perspective) of a resident's competence within a single

setting/context may not provide a sufficient picture of that resident's abilities (van der Vleuten et al., 2010).

Having multiple people observe and make judgements can increase reliability (if inter-rater reliability has been conducted and deemed acceptable) and reduce biases, leniency, halo effects (a cognitive bias in which an overall impression of a learner influences the assessor's evaluation of his/her performance), as well as content and context specificity (Eva et al., 1998; Lockyer et al., 2017). Content and context specificity is the variability of an individual's performance in dealing with clinical problems due to his or her mastery of the associated content and differences in the context surrounding the problem, respectively. The knowledge and skills learners will use to solve a specific clinical problem in one context differs from how they may solve it in another context. Together, the data from multiple assessments and multiple contexts are likely to create a more meaningful and reliable account of the learner's competency level and how he or she is progressing (Eva et al., 1998).

Lockyer et al. (2017) highlights group processes and psychometrics as other key CBA factors. Group processes involve staff coming together to discuss their observations of residents' performance and competency levels to make group decisions regarding residents' advancement in the program. Discussing this as a group can highlight gaps in residents' competency that need to be addressed (Hemmer et al., 2000).

Lockyer et al. (2017) also recommended the use of assessment tools with strong psychometric properties, as did Norcini et al. (2018) in their description of a framework for good assessment in medical education. Norcini et al. (2018) noted that validity–coherence is central to formative assessment. Validity – coherence, is defined by Norcini

et al., as a body of coherent ("hangs together") evidence which supports the use of the assessment results for a specific purpose. Educators and leaders need evidence that an assessment tool is appropriate for the intended purpose and that decisions made are based on a well-structured, valid tool. These criteria should be used to guide the selection of assessment tools in PGME. The next section will describe appropriate assessment tools at this level, including WBA tools such as MSF.

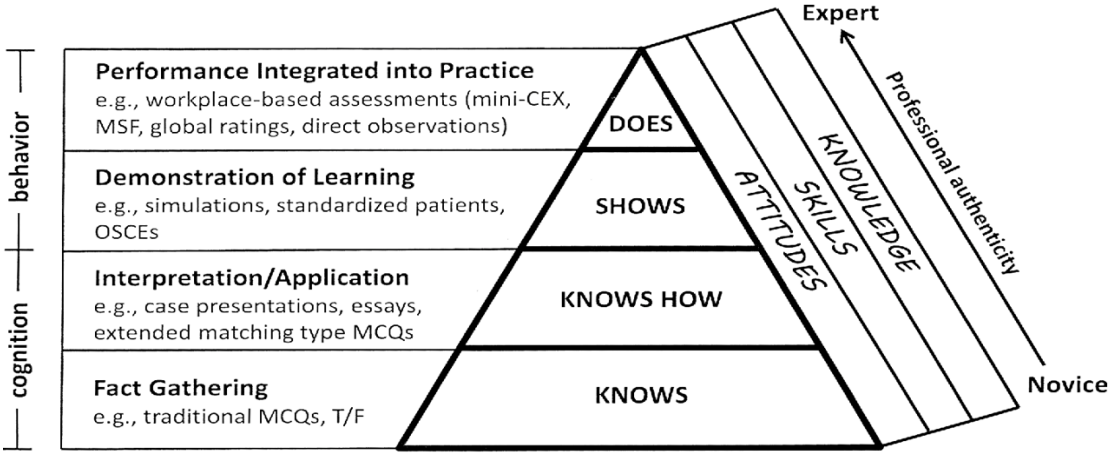
1.4 Assessment Tools in Postgraduate Medical Education

Advances in assessment methods have been driven by a move towards competency-based education, public accountability, and quality assurance (Holmboe et al., 2010; Norcini, 2005). In recent years, much attention has been given to the development and consistent use of assessment methods in PGME. Postgraduate medical education programs have a responsibility to ensure that graduates meet the mandated objectives and attain competencies associated with becoming medical professionals. However, some feel there are differences between how a physician performs within a controlled and supervised environment, and what they actually do in practice (Rethans et al., 1990). As noted by Liu (2012), in the past there was too much emphasis placed on determining if residents could pass exams or not, with little focus on how they perform in a health professional role. Hence, there is a trend towards the adoption of assessment strategies to address the gap between demonstrating competence and actual practice performance. The key is the use of assessment tools that are both competency and performance-based; thus, tools that measure competencies derived from learning outcomes reflective of a skilled physician (Rethans et al., 2002).

Miller's Pyramid for Assessing Clinical Competence (Figure 3) can be used to select appropriate tools for assessment of clinical competence (Miller, 1990). This model is based on the premise that assessment of competence should be linked to knowledge, skills, and attitudes that are pertinent to what doctors do in the workplace (PMETB Assessment Subgroup, 2003).

Figure 3

Miller's Pyramid for Assessing Clinical Competence[2]



The pyramid comprises four levels, including "knows" (fact gathering), "knows how" (interpretation and application), "shows" (demonstration of learning in a controlled environment), and "does" (performance in a practice setting). The focus of this study is at the "does" level, where residents are expected to demonstrate competency and practical application of knowledge within their everyday work environment, as opposed to an

[2] **Note: Miller's Pyramid for Assessing Clinical Competence. Adapted from "The Assessment of Clinical Skills/Competence/Performance" by G. E. Miller, 1990, *Academic Medicine, 65*(9), p. S63. Copyright 2018 by Association of American Medical Colleges. Adapted with permission.**

artificial/simulated testing environment or through written examinations. Competency at the residency level is more than knowing something or knowing how to do a task. Residents should also be able to demonstrate that they can complete required tasks safely within a clinical environment (Miller, 1990; Moore et al., 2009; Shumway & Harden, 2003). There are numerous methods for assessing performance at this level, including MSF.

In the early days of PGME, there were limited resources available to adequately assess residents' performance. Presently, there is a myriad of commonly used tools, each serving to measure different aspects of residents' competency level (Chou et al., 2008). These methods collectively meet the goal of assessing physician competence (Holmboe & Hawkins, 2008; Norcini, 2003, Rethans et al., 2002; WBA, 2005). Examples of these tools include oral exams, simulation, video reviews, procedural logbooks, field notes, and clinical observations or WBA (Chou et al., 2008).

In keeping with the principles of good assessment, WBA is seen as a tool that drives learning (described by Lockyer et al. as the educational effect) and is an appropriate approach for assessment in PGME. Workplace-based assessment maintains a formative focus by having frontline clinical staff frequently and purposefully observe residents within the workplace and document authentic, concrete examples of those observations. The documentation serves as feedback for the resident and gives them specific examples of changes they can make and what is expected of them. This documentation of WBA also serves as evidence (if competency has been achieved or not) when making decisions regarding the residents' progress and as information for other faculty who work will work with those residents in the future. Other reasons why WBA is

applicable to the PGME context is that assessments performed through multiple observations, by multiple raters, can be aggregated to provide a clearer picture of residents' competence. As well, the movement away from the use of grades attained on high-stakes exams and towards the use of evidence of competence gathered from within the workplace, has led to the use of WBA tools to assess workplace training programs such as PGME (Saedon et al., 2010). A UK study conducted in 2003 and 2004 on the use of WBA in medical education showed that it was feasible and reliable in distinguishing competence in specific areas of performance (Wilkinson et al., 2008).

The uptake of MSF, an approach to WBA, in residency programs is aligned with a competency-based education model. Multisource feedback raters observe residents' performance linked to expected competencies. The ratings and feedback noted by raters during these observations are compiled and submitted to each resident in a report. The statistical data for each resident is compared with aggregate scores of other residents who participated in the MSF process. Residents are provided with strategies for improvement and coaching by faculty to implement those strategies (Lockyer, 2003).

The challenges associated with MSF include feasibility, assignment of raters versus residents selecting their raters, collecting a sufficient number of patient surveys needed to achieve adequate reliability (which is approximately 25), issues with interpretation or utilization of the feedback by residents, and a lack of value for MSF process by residents or raters (Donnon et al., 2014). The success of MSF is based on the feedback being constructive, confidential, timely, and concrete (residents can be provided with evidence or an example to reflect negative and positive ratings) (Norcini, 2003).

Multisource feedback is seen as a valuable tool for assessing residents' competence, including patient safety skills. Residents' clinical work environment and tasks are complex and multidimensional. Residents also work with various health care providers (e.g., physicians, consultants, nurses, allied health professionals, and other learners) and potentially demonstrate different patient safety skills when they interact with each of them. Based on these unique interactions, each health care provider may have a different perspective on residents' patient safety skill level and areas that they need to develop or improve upon. Therefore, each of these health professionals play a valuable role in assessing residents' performance. Together, these health care providers can provide a more comprehensive assessment of residents' safety skills compared to an individual assessment. MSF is a model that provides structure and a process to bring all of the health care providers' perspectives and observations of the resident together (Hicks et al., 2018; Lockyer, 2017; Lockyer & Sargeant, 2013).

This study involved the development and content validation of an MSF tool, the PSAT$^{360°}$. The next section will describe key theories and frameworks which supported this work.

1.5 Supporting Theories and Frameworks

This research study was informed by multiple, complementary theoretical perspectives and frameworks. While medical education "does not have one overarching or unifying theory" (Schuwirth & van der Vleuten, 2011, p. 2), it is informed by applicable theories in contiguous fields such as psychology, education, and aviation. Reeves et al. (2010) support the inclusion of multiple theories from other disciplines to

guide one's work given that "our pluralistic stance encourages us to embrace a range of contrasting theoretical contributions…" (p. 79), and the use of multiple supporting theories can result in a complete investigation and overview of a particular concept (Reeves et al., 2010). More specifically, this study was informed by theories of systems thinking (Arnold & Wade, 2015; Stichweh, 2011), social learning (Bandura, 1977), and deliberate practice (Ericsson et al., 1993; Ericsson, 2004), and principles of Bloom's Taxonomy.

Systems Thinking

Systems thinking theory focuses on how the concept being studied interacts with and is affected by other components within the same system. It allows researchers to consider the relationships between individual parts of that system and the influences of those relationships on the whole system. Within the context of health care, systems thinking theory allows the researcher to consider individual factors that may influence the behaviours and safety skills of staff and residents (Ericsson et al., 1993; Ericsson, 2004). Health care systems are made up of many multiple interconnecting parts comprising individuals (e.g., health professionals, patients, and family members/caregivers), infrastructure (e.g., policies, processes such as teamwork), finances, resources (e.g., space), and technology (e.g., drugs, equipment,). The interaction among these parts is highly complex and can influence the occurrence of PSIs and how residents interact within the system, including their patient safety skills.

Systems thinking theory informed this research study by ensuring that parts of the system that influence residents' patient safety skills, were considered during the

development of the tool. In this study, stakeholders and experts were asked to discuss all factors or parts of the health care system that influence residents' patient safety skills. Literature related to residents' patient safety skills, including influential factors from within their immediate work environment informed the content of tool.

Social Learning Theory

Another theory that influenced this research study was Bandura's (1977) social learning theory which focuses on the interrelationship between observing and modelling how others behave, their attitudes and reactions, and the learning process (Pattalitan, 2016). This theory has relevance to performance assessment tools and has been cited by others describing studies on simulation (Goldenberg et al., 2005; Lavoie et al., 2018). Related and equally relevant theories are Vygotsky's sociocultural theory of development (Vygotsky, 1980) and expertise development (De Groot, 2014; Schmidt et al., 1990; Schmidt & Boshuizen, 1993). One of the central tenants of these theories is the link between people and the culture in which they live. Both theories describe the importance of interacting with patients, observing colleagues perform tasks, and experiencing the clinical culture in building knowledge and skills. Through these interactions, residents build problem-solving skills that facilitate quick recognition of medical conditions and subsequent diagnoses (Schuwirth & van der Vleuten, 2011). For residents, this skill development is contextual and requires interaction with patients within a clinical setting.

To appropriately assess residents' skills, the content of the assessment tool should be relevant to the environment in which the tool is used. This perspective informed the design of the study by ensuring that the content for the tool was developed using

contextually relevant literature and frameworks, and through input from patient safety experts and stakeholders (e.g., those who work within a clinical training environment) (Schmidt & Boshuizen, 1993; Schuwirth & van der Vleuten, 2011).

With these social learning theories in mind, behaviours that demonstrate a physician's patient safety competence were used to develop the content and design of the PSAT$^{360°}$. A practising physician who is competent in patient safety will demonstrate and model specific behaviours that will positively influence residents, and the types of behaviours residents might choose to emulate during their training and future practice.

Deliberate Practice

To build expertise, residents need to master those higher-order skills, and it requires what is known as deliberate practice. Deliberate practice theory purports that individuals develop and improve their competency through repeated practice of tasks, provision of feedback, and opportunities for self-reflection on their performance and skills that they need to attain (Ericsson, 2004; Sonnentag & Kliene, 2010). The PSAT$^{360°}$ is meant to prompt residents to self-reflect on their performance and patient safety skill level using their self-ratings and the feedback they receive from others. In accordance with deliberate practice, self-reflection and feedback on areas needing improvement are typically followed up with the deliberate assignment of tasks or other learning activities to build proficiency and independence in completing that task (Hashimoto et al., 2015). The PSAT$^{360°}$ is designed to prompt residents to self-reflect on their patient safety skills and formulate ideas for how they can improve in practice.

Deliberate practice theory applied within the medical context suggests that medical professionals are motivated to improve through their desire to provide high-quality patient care (van der Wiel et al., 2011). Receiving performance evaluation and feedback are key elements of deliberate practice, which overlap with the design and utility of the PSAT$^{360°}$ (McGaghie et al., 2011).

Bloom's Taxonomy

At the "does" level of Miller's pyramid, individuals (e.g., residents) are expected to demonstrate the application of knowledge within the workplace. Within the context of PGME, this expectation supports the development of higher-order thinking skills as per Bloom's taxonomy. Bloom's taxonomy is a classification system that helps educators define learning outcomes, objectives, curriculum, instructional methods, and assessment tools appropriately based on the learner level (Bloom, 1956; Krathwohl, 2002). When applying this to the development of PSAT$^{360°}$, the appropriate (higher-order) level of competencies was integrated. Therefore, the skills included in the PSAT$^{360°}$ require high-order thinking skills, or critical thinking skills, such as evaluating, interpreting, and problem-solving.

This study involved the development and validation (content) of a WBA tool for assessment of residents' patient safety competencies through an MSF process, using guiding principles of assessment.

Chapter 2: Literature Review

2.1 Literature Review Synopsis

The expansion of patient safety knowledge has resulted in the recognition of patient safety by Emanuel et al. (2008) as a "discipline, complete with an integrated body of knowledge and expertise, and that it has the potential to revolutionize health care, perhaps as radically as molecular biology once dramatically increased the therapeutic power in medicine" (p. 1). The Canadian Patient Safety Institute (2017b) and the World Health Organization (2009) also acknowledge patient safety to be a discipline with theoretical influences from psychology, engineering, and sociology. Patient Safety has the following accepted definition, "the pursuit of the reduction and mitigation of unsafe acts within the health care system, as well as the use of best practices shown to lead to optimal patient outcomes" (Henriksen, 2008, p. 6).

Patient safety is a fundamental element in the provision of quality health care services. A widespread interest in patient safety is not new, with related studies and reports noted as early as the 1950s and 1960s (Schimmel, 1964; Walter, 1951). However, concerns and actions needed to improve patient safety during this time were largely ignored. In the 1990s, there was a realization that in spite of advances in diagnostic and treatment techniques, many hospitals worldwide were unsafe and rife with risk for harmful patient outcomes (Emanuel et al., 2008; Hurwitz & Sheikh, 2009). This led to an increased global interest in the topic of patient safety.

While the patient safety movement in many countries is still in its infancy, large scale studies focusing on patient safety, the impact of PSIs on patient outcomes, and

health care provider competency and strategies to alleviate and reduce PSIs have increased over the last two decades. Landmark reports and studies include the report released by the Institute of Medicine (Kohn et al., 2000) *To Err is Human: Building a Safer Healthcare System,* which focuses on the sources of medical errors and strategies for reducing them; the Baker et al. (2004) Canadian study, "*The Canadian Adverse Events Study: The incidence of adverse events among hospital patients in Canada",* which provides the first national estimate of frequency and type of PSIs within an acute care hospital setting*;* and the release of a patient safety competency framework by the CPSI (Frank & Brien, 2008).

Experts predict that the number of PSIs in health care will continue to increase (Prosser, 2020; RiskAnalytica, 2017). Therefore, educators need to ensure that residents are prepared to work under those conditions and act to prevent, mitigate, and manage PSIs. Analysis of the patient safety literature revealed several prominent factors that influence residents' patient safety knowledge, skills, attitudes, and clinical performance. These factors include high-reliability organizations (HROs), a culture of safety, systems thinking, disclosure of PSIs, human factors engineering, heuristics and cognitive errors, interprofessional communication, and collaboration. These core factors describe the overarching landscape of a physician's workplace in terms of patient safety. Given the purpose of this study was to develop an assessment tool designed to measure residents' patient safety skills, it is important to consider how these factors relate to the assessment of residents' patient safety competence. This chapter will provide a brief overview of these factors and how they relate to residency training and assessment.

Traditionally, many failed to see the value of the assessment process and its purpose in student learning, and it was often regarded as an inconvenience and an impediment to work productivity. However, the advantages of assessment and the vast amount of information that can be gained from it are now well recognized.

There is currently a lack of valid formative assessment tools that measure patient safety competencies within the context of PGME, and those which also provide feedback on how to gain or improve skills in this area. Overall, the literature supports the importance of developing an assessment tool for residents that reflects the context in which they train, and integrates workplace factors (e.g., human factors engineering [HFE], systems thinking, heuristics) that influence the development and demonstration of residents' patient safety competence. An MSF tool such as the PSAT$^{360°}$ will help health care providers recognize that teaching and assessing residents' patient safety skills is imperative to positive patient outcomes.

2.2 Canadian Patient Safety Statistics

The Canadian Patient Safety Dictionary defines patient safety as "the reduction and mitigation of unsafe acts within the health care subsystem, as well as through the use of best practices shown to lead to optimal outcomes" (Royal College of Physicians and Surgeons of Canada, 2003, p. 12). Patient safety is a fundamental element in the provision of quality health care services. The patient safety movement is nearly three decades old, and its origins can be linked to numerous studies and reports, including one released by the Institute of Medicine (Kohn et al., 2000) titled, *To Err Is Human: Building a Safer Health System.* The authors of this report expressed that human errors

are preventable and that integrating critical safety procedures is an essential component of quality patient care.

In the early 1990s, it was well recognized that many hospitals worldwide were unsafe and rife with the risk of patient harm regardless of the advanced medical interventions capable of ameliorating and healing life-threatening illnesses (Hurwitz & Sheikh, 2009). The "To Err is Human" report released in 2000 highlighted the American perspective on hospital safety. In 2004, the Canadian Adverse Event Study (CAES) was conducted by Baker et al. to review the prevalence of PSIs in Canada. They found that 36.9% of all the PSIs were deemed preventable, 20.8% of those preventable cases resulted in death, and were associated with over 1,500 additional hospital days. Extrapolating from the CAES cases it was found that approximately 70,000 patient safety events during that time period were preventable.

The CIHI and the CPSI measured hospital harm in 2016 and found that 1 in 18 hospital stays (equates to 138,000 out of 2.5 million hospital stays) involved preventable patient harm (Canadian Institute for Health Information & Canadian Patient Safety Institute, 2016). In terms of mortality, PSIs in total (acute/home care combined) rank third behind cancer and heart disease with just under 28,000 deaths across Canada (in 2013). In this same study, CIHI and CPSI found four categories of harmful events in 2014 - 2015, which consisted of health care and medications (e.g., bedsores and getting the wrong medication), infections (e.g., surgical site), procedure-related (e.g., post-surgical bleeding), and patient accidents (e.g., falls). Acute care settings have an overall PSI and mortality rate of 5.6% and 12.5% respectively (Canadian Institute for Health Information, Canadian Patient Safety Institute, 2016). Whereas in the home care setting,

the PSI and mortality rates are 9.65% and 7.5%, respectively. So, while home care settings have a higher PSI rate than acute care settings, their mortality rates are lower. The complexity of patients' diseases, the work environment, the number of health care providers involved in care, and the communication and coordination of care within acute care settings introduce room for harm resulting in higher mortality rates.

RiskAnalytica (2017) estimated that, over the next 30 years, Canadian hospital and home care settings will experience an average of 400,000 cases of PSIs annually. Patient safety incidents still remain as the third leading cause of death in Canadian hospital and home care settings. This equates to events occurring in this country every 1 minute and 18 seconds and death as a result of those events every 13 minutes and 14 seconds (RiskAnalytica, 2017).

The 2004 CAES identified that a significant number of harmful events were happening in Canadian hospitals. After this study, considerable funding was provided to reduce PSIs in Canada through the development of training programs, competency frameworks, system improvements (e.g., policies, equipment, practice audits), and other patient safety initiatives (e.g., CPSIs Safer Healthcare Now!) aimed at building a culture of safety. Baker (2015) and his team at the Institute of Health Policy, Management and Evaluation, University of Toronto, questioned if the health care system was safer ten years after the CAES. They determined that there is little evidence supporting significant improvement and addressing critical safety issues remains a struggle within the Canadian health care system (Baker, 2015). Overall, there was a reduction in in-hospital mortality rates by 15% between 2009 and 2013; however, this rate is profoundly different across

provinces (Baines et al., 2013). Newfoundland and Labrador's mortality rate was 4% higher in 2013 than 2009, compared to the rest of Canada.

When Baker et al. investigated why the progress was delayed, they noted that Canada was slower to recognize the importance of systems thinking in preventing PSIs and failed to consider the role of other contributory factors (e.g., malfunctioning equipment or surgical room layout) aside from health care providers. Baker (2015) noted that informants felt that the CAES study did bring awareness to the discipline of patient safety and a greater understanding of patient safety issues in Canada, including prescribing errors, cognitive biases, high-reliability organizations, interprofessional teamwork, and the importance of reporting and disclosure of PSIs. It is possible that health care providers feel that safe practices increase health professionals' workload, so uptake or compliance can be low.

Safety checklists were adopted in numerous medical domains as a way to reduce PSIs and increase reliability. A study investigating the influences of surgical checklists in eight hospitals (one of which was Canadian) found a reduction in complications by one-third and mortality by almost 50% (Haynes et al., 2009). Russ et al. (2013) found that checklists improved teamwork and communication in the surgical arena since those checklists include communication checks with all team members. After this study, the World Health Organization (WHO) and others called for the adoption of checklists, including Accreditation Canada, which mandated the use of surgical checklists in hospitals. However, Urbach et al. (2014) found no significant improvement to patient outcomes following integration of a checklist. Leape (2014) suggested that despite the integration of tools (e.g., surgical safety checklists) in Ontario hospitals, there was no real

improvement to patient outcomes, including mortality rates because professionals were not using them. There are numerous reasons why staff are not engaged in the use of such tools. It is possible in this instance that change management approaches were not employed before and during the introduction of the tool, the tool was not supported by leadership, conflicted with current policies or processes, or frontline staff were not asked for input during the design of the tool.

Engaging residents and raters in MSF and valuing the PSAT$^{360°}$ was seen as an important step in the development phase, by including them at the onset of the study. During this phase, residents and raters were invited to share their perspectives on the content of the tool and their vision for how the tool could be used. This provided residents and raters with a voice regarding the design and content of the tool and created a sense of ownership.

2.3 Factors Influencing Clinical Practice and Patient Safety

While health care providers are both highly trained and committed to participating in the delivery of safe and holistic health care, they are human and, therefore, capable of making mistakes. In the realm of patient health care, safety is often described negatively and is usually linked to injury or errors arising from the unsafe acts and direction of care provided by health practitioners. However, Cook et al. (1998) argued that many physicians are not always the cause of medical errors or accidents; rather they are "…the active agents that regularly contribute to success. When they carry out their roles successfully, they are the active creators of safety" (p. 13). However, others suggest that providing safe health care is not only related to carrying out one's roles and

responsibilities, but also attitudes, beliefs, perceptions, behaviors, and competencies, including patient safety skills (Health and Safety Commission of Great Britain, 1993; Smits et al., 2009).

Vincent et al. (2000) provided a framework for factors influencing clinical practice and PSIs. In this article, the authors support the idea that acts of omissions or commission may be the immediate reason for the occurrence of PSIs. They also suggest that closer analysis typically reveals that the PSI involved a series of complex events, instead of a single event or decision, and are deviations away from safety protocols. This framework describes safety as being influenced by seven broad categories:
(i) institutional context (e.g., inconsistent policies, lack of funding), (ii) organizational and management factors (e.g., safety culture, lack of protocol implementation), (iii) work environment (e.g., staffing, health human factor resources), (iv) team factors (e.g., team dynamics, communication), (v) individual staff factors (e.g., competence, mental and physical health), (vi) task factors (e.g., availability of results, task design), and (vii) patient factors (e.g., social factors). A single PSI may occur because of deficiencies across several of these factors. Therefore, PSI investigations should include a review across all factors within this framework. This framework was endorsed in reports written by Lucian Leape (2002), a well-known physician who campaigned for patient safety improvements within health care. This framework has been used by many researchers investigating the causes of PSIs and the identification of safe medication practices. Injuries within Portuguese hospitals were deeply rooted within the task and individual staff domains of Vincent's framework (Neale et al., 2001). Another study found that

incidents occurring within two large United Kingdom hospitals were attributed to issues across all domains in Vincent's framework (Girard, 2009).

Key factors identified through a review of the literature were noted to overlap with Vincent's framework. These factors influence patient safety outcomes and relate to the environment in which residents need to work and demonstrate patient safety skills (Figure 4). Therefore, these factors (described below) should be captured in the PGME curriculum, clinical training, and assessment.

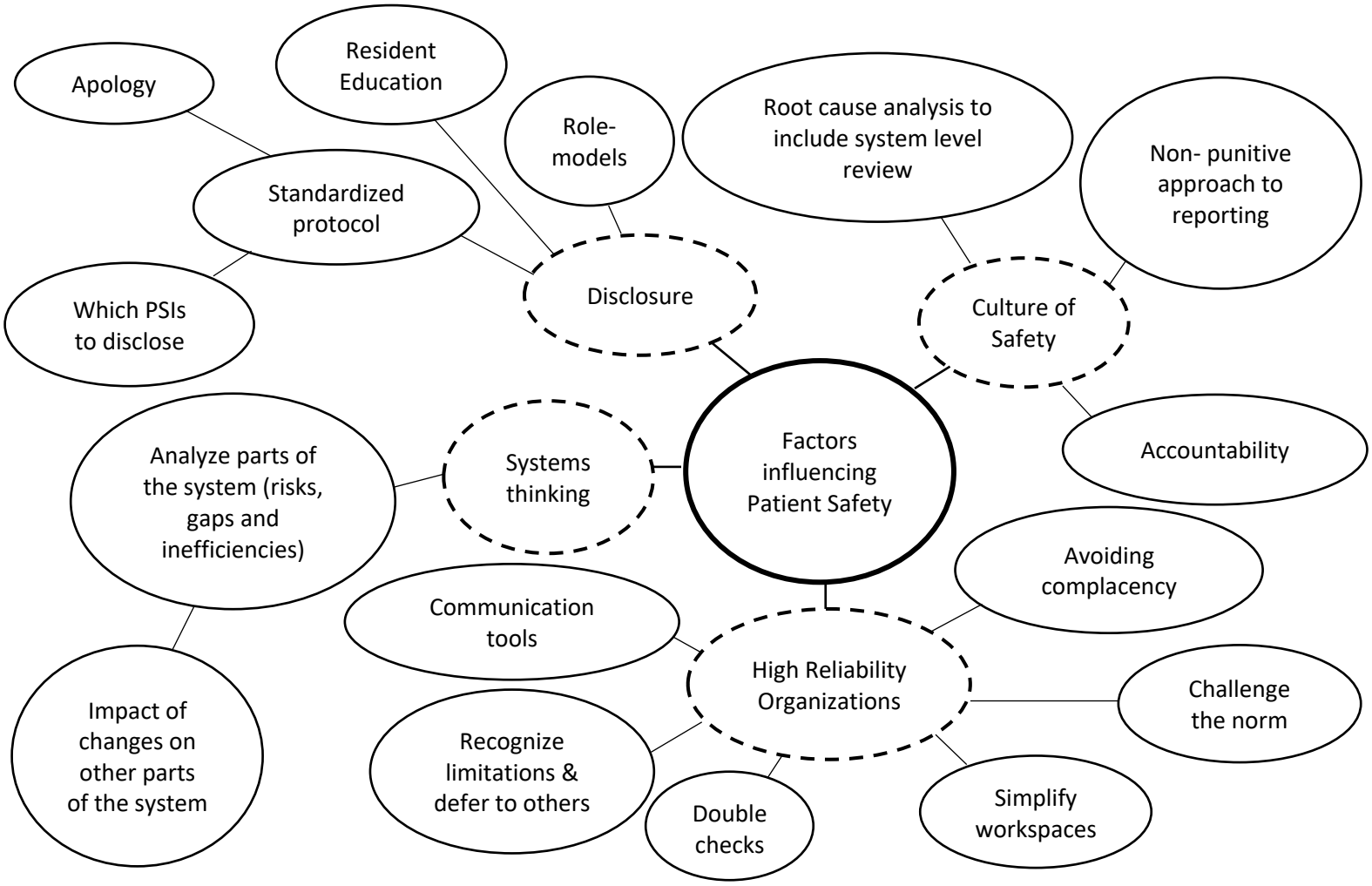
High Reliability Organizations

High-Reliability Organizations (HROs) have complex, fast-paced, and high-risk environments, yet minimize PSIs (Christianson et al., 2011; Tolk et al., 2015). Strategies to mitigate health care errors that have been adopted from HROs, such as the airline industry, include the use of communication tools such as checklists (Carthey et al., 2001; Goeschel et al., 2010). Using the principles of HROs, organizations can anticipate risks to safety and act to prevent them from becoming larger problems or causing harm to patients or staff (Christianson et al., 2011).

In 1993, Roberts analyzed a series of organizations to determine which features they embodied that gave rise to their "error free" HRO classification. These HRO features inform the qualities or capabilities that residents need to provide safe care, including the ability to provide accurate diagnoses, simplify work processes, avoid complacency, trust their instincts, be mindful, and practise situational awareness by identifying threats to safety and act to minimize their impact (Cady, 2008; Chassin & Loeb, 2013; Rochlin 1999; Weick & Sutcliffe, 2015). Other patient safety skills that are informed by HROs

Figure 4

Factors Influencing Patient Safety



include the ability to defer to other health care providers when in need (based on expertise, not hierarchical placement in the organization) and asking others to double-check work processes that can impact patient safety (Cady, 2008; Chassin & Loeb, 2013; Rochlin 1999; Weick & Sutcliffe, 2015). However, Tamuz and Harrison (2006) and Rydon-Grange (2015) argued that the act of double-checking can be redundant and counter-productive since it can breed a "diffusion of responsibility", if they know others will check it.

Frankel et al. (2006) discuss strategies for achieving a just culture and high reliability, including a commitment to good citizenship and a responsibility to open communication. The Order of Saint Francis (OSF) Saint Francis Medical Center in Illinois, for example, implemented a rule requiring staff to participate in pre-operative briefings to encourage staff to ask questions, carry out double checks, and challenge staffs' self-perceptions that they were experts and infallible. Failure to comply with this rule could result in staff dismissal (Frankel et al., 2006). This example highlights the importance of preparing residents to participate in double checks, accept their limitations, and rely on other health professionals.

To build capacity, residents should be introduced to leadership skills and opportunities to apply knowledge related to building HROs. There will always be a need for physicians who are keen to improve processes, challenge the norm, and hold their organization to high standards in terms of patient safety (Baker et al., 2006; Frankel et al., 2006; Marsden et al., 2006; McKeon et al., 2006). Some residents will be future leaders with the power to shape values, model behaviours, and enhance patient safety, yet, these

non-technical skills are not typically explicit or threaded throughout residents' program (Casler, 2014; Tolk et al., 2015; Wright, 2015). It is crucial that these skills are explicit within their curriculum and modelled by their supervisors and senior medical colleagues.

A Culture of Safety

A culture of safety is multidimensional and its description captures the importance of a blame-free culture where,

> healthcare professionals are held accountable for unprofessional conduct, yet not punished for human mistakes; errors are identified and mitigated before harm occurs; and systems are in place to enable staff to learn from errors and near-misses and prevent recurrence (American College of Healthcare Executives & National Patient Safety Foundation's Lucian Leape Institute, 2017, p. 1).

Frankel et al. (2006) emphasized that a culture of safety represents an organization's commitment to a blame-free environment, where health professionals can report PSIs without fear of being reprimanded or losing their jobs. Dr. Lucian Leape stated before the U.S. Congress, "the single greatest impediment to error prevention in the medical industry is that we punish people for making mistakes" (Leape, 2009). Dr. Leape suggested that punishing health care providers will likely silence them from sharing PSIs they have witnessed or were involved in, resulting in missed learning opportunities. Punishing staff involved in PSIs can negatively impact trust among staff and with patients, collaboration (staff may hesitate to work with others involved in PSIs), communication (disclosure and asking for help), and incident reporting.

A culture of blame is still prominent in some organizations, where the fear of punishment is perpetuated such that PSIs are underreported (only 2-3% of PSIs get reported through U.S. incident reporting systems) (Leape, 1999). As a result of underreporting, hospitals are unaware of their deficiencies and the same errors often reoccur (Copper et al., 2017; Leonard & Frankel, 2010; Leape, 1999; National Advisory Group on the Safety of Patients in England, 2013; Vrbnjak et al., 2016; Waring, 2005; Wolf & Hughes, 2008). A culture of blame and lack of a non-punitive reporting system were identified as weaknesses in some health care organizations when they measured their culture of safety using the Agency for Healthcare Research and Quality (AHRQ) patient safety culture survey (Scott et al., 2003; Sexton et al., 2006; Sorra & Dyer, 2010). Other health care organizations within the U.S. (14 hospitals, two long-term care centres, and several outpatient clinics) noted an increase in their safety culture measurements by promoting non-punitive reporting systems (Leonard et al., 2004) and performing root cause analysis (Bagian et al. 2001; Heget et al., 2002; Weeks & Bagian, 2000).

Historically, root cause analyses were done following PSIs to determine who was responsible. However, if the goal of root cause analysis is to reduce PSIs and harm to patients, the emphasis should be on how and why PSIs occur. A root cause analysis should identify what deficiencies may exist within the system, in the immediate work environment (e.g., equipment failure), or at the broader organizational level (e.g., gaps in a policy) (Institute of Medicine, 1999; Kohn et al., 2000). However, as Bell et al. (2011) pointed out, when a PSI occurs, determining accountability is often the focus, and it is typically viewed as the responsibility of individual staff or the primary physician.

Paul (2018) stated that identifying blame is a "natural reflex" (p. 1) following a PSI, but it can result in misfocused energy and gaps in the collection of pertinent information needed to make improvements. Research shows that while staff may be involved in PSIs, there are usually multiple gaps within the system that allowed harm to reach the patient. AHRQ (2018) suggests "identifying and addressing systems issues that lead individuals to engage in unsafe behaviors, while maintaining individual accountability by establishing zero tolerance for reckless behavior" (p. 1). According to Boysen (2013) and Kaissi (2006), addressing system level issues is necessary to establish preventative measures against PSIs. Some researchers have suggested considering both individual/staff behaviours and deficiencies within the system (e.g., inefficient processes and human resource shortages) when performing investigations of PSIs (Boysen, 2013; Carlton & Blegen, 2006; Kaissi, 2006). Sammer et al., (2010) refer to this as a "2-sided scale of justice" (p. 163).

Marx (2008) posited that some PSIs are due to negligent or reckless staff who take risks, fail to recognize the consequences of those decisions, and knowingly take action that put patients at risk for harm. The American College of Obstetricians and Gynecologists Committee on Patient Safety and Quality Improvement (2016) recommend that organizations should uphold a zero tolerance for reckless behaviours, whilst promoting and maintaining a non-punitive, blame-free culture to minimize preventable PSIs. A blame-free environment permits staff to report and talk about PSIs without fear of losing their jobs, damaging their professional reputations, or lawsuits (Kaissi, 2006). According to Kaissi, organizations should not only focus on the prevention of errors that

occur at the frontline (e.g., staff-patient), but also prevention of errors at the system-level, including the design, installation, and maintenance of equipment, policies, and management decisions, as opposed to only focusing on those that occur at the frontline staff level. Organizations that do so recognize the importance of correcting and preventing issues at the system level and that all errors are not the direct result of a frontline staff member; that something can go awry at a higher level to permit the error to occur at the frontline level.

According to the literature, a culture of safety means that organizations support staff who unknowingly make mistakes, but staff who knowingly introduce risk and harm to patients are held accountable for their actions (Kaissi, 2006). Lee (2004) and Kissinger (1999) indicated that physicians can introduce safety risks by creating workarounds (avenues to bypass policies or standardized processes). One solution to this problem involves working with physicians and seeking their input when developing new policies and processes that impact their workflow, and training when new policies or processes are introduced. Observations and assessment should then occur after staff training activities to ensure staff have the skills to carry out the tasks as outlined in the new policy or process.

As part of their Ontario Health Technology Assessment Series (2017), Health Quality Ontario developed a report on their incident reporting system. This process involved collating and analyzing all the reported PSIs, in an effort to learn from them, make predictions, and ensure timely investigations. Fear of blame and legal ramifications were noted as barriers to reporting PSIs that resulted in deaths or injuries that were not

linked to the patient's underlying medical condition. When junior physicians' and nurses' survey responses were compared, junior physicians reported being less knowledgeable and confident in reporting PSIs than nurses (Bagenal, Sahnan, & Shantikumar, 2016). These authors called for increased education on PSI reporting for junior physicians.

Collins (2009) indicated that blame could be projected in three different directions: (i) self-blame, (ii) blame of others, and (iii) blame of things within the system and those which are impersonal (e.g., lack of time, transfer of care, difficult case with multiple comorbidities). Physicians tend to blame themselves when they are involved in PSIs. They also analyze their competency level and behaviours for why the PSI occurred (Bosk, 2005; Jackson et al., 2005; Ruopp et al. 2005). It is often ingrained in physicians that someone is responsible if something goes wrong (Collins, 2009). Collins (2009) implied that attempts to build a blame-free culture can be futile in environments where physicians do not accept that something other than themselves may have played a role in the PSI. This is supported by a recent U.K. study where Copper et al. (2017) found that of 975 incident reports in family medicine, 45% of them had attributed blame to a single person, and of those, 36% had attributed it to someone other than themselves.

While research supports a blame-free culture, Engel et al. (2006) and Wu et al. (1991) found that blame serves as a stimulus for self-reflection by staff following a PSI, which can lead to self-improvement, learning, and development of innovative error prevention strategies. However, viewing themselves as solely responsible will not result in overall changes to the system and prevent future PSIs. While self-blame may have its benefits, it can also hinder the perception of a systems approach to viewing errors.

Unfortunately, some stakeholders believe that patient safety competencies, including those that support a blame fee culture, cannot be taught and that a patient safety curriculum cannot shape one's behaviors and attitudes (Sandars et al., 2007; Walton, 2007). Tregunno et al. (2014) found that, for some, the culture in clinical teaching settings did not support integration of patient safety teaching and perhaps served as barriers to integration. Some of the clinical teaching sites reported contentious teacher-learner relationships, power imbalances, and disrespectful treatment. It is speculated that some learners might assume some of these behaviours, if they feel this is "how it is done around here" (Lempp & Seale, 2004).

Following a review of the culture of safety literature, it was evident that training and assessing residents' ability to analyze PSIs using an individual and a system-based lens was important. The literature also supports the need for residents to have skills in reporting and discussing PSIs with colleagues and patients, supporting colleagues involved in PSIs, asking questions, and avoiding workarounds to policies and processes.

A Systems Thinking Approach

There are two viewpoints in the literature concerning the prevention and management of PSIs. One is a person-centered approach, and the other is a systems thinking approach. Rasmussen (1990), and Stalter and Jauch (2019), describe the person-centered approach as one that focuses on correcting health professionals' knowledge and skills through extra training or supervision in the face of PSIs. However, expecting an uneventful performance from staff within a complex, high-risk workplace all the time and punishing those who make mistakes will not appreciably improve safety. Conversely,

Berwick et al. (2015) and Stalter et al. (2017) suggest that a systems thinking approach accepts that health care staff can and will make mistakes. Staff who work within a system thinking oriented organization think ahead to anticipate potential sources of error and are therefore better equipped to catch human errors before they occur. These actions are much more "fruitful than ones that seek to somehow create flawless providers" (Agency for Healthcare Research and Quality, n.d., p. 1).

One of the central tenets of a systems thinking approach within health care is the recognition that human error is predictable, preventable, and a result of poorly designed systems (AHRQ, 2019). Van Beuzekom et al. (2010) state that through a systems thinking approach "attention is paid to the organizational factors that create precursors for those individual errors" (p. 52). Systems thinking is linked to Reason's (1990) insight into the nature of preventable PSIs, where multiple gaps in parts of a health care system can align in such a way that medical error can reach a patient and cause harm. Systems thinking is described by Senge et al. (1994) as a way of thinking about the interconnectedness and interdependence among the individual parts of a system instead of a linear and structured system.

Recognizing the link between systems thinking and PSIs may help residents and staff create solutions to preventable errors by encouraging them to recognize deficiencies in the system, and how these may impact and influence other parts to create a vulnerable system and potentially allow harm to reach a patient. Senge (1997, 2006) referred to systems thinking as an approach to problem-solving and working through errors in an organization that involves a balance of reductionist thinking and holistic thinking. The

reductionist thinking will investigate the error itself, the immediate cause of the error, and how it may have occurred. A holistic, systems thinking perspective views PSIs within the context of the whole system to determine if there are factors that might have given rise to that error (Atun & Menabde, 2008; Pourbohloul & Kieny, 2011; Swason et al., 2010).

Van Beuzekom et al. (2010) describe a list of factors within a health care setting that may influence PSIs (e.g., policies, equipment, training, fatigue, and housekeeping protocols) and examples of how these factors can negatively impact patient safety using a systems thinking approach. Examples include difficulty using equipment due to lack of training or poor functioning or complicated equipment. This can result in staff developing error-prone workarounds, such as using poorly functioning equipment instead of getting it fixed (Arnstein, 1997; Catchpole et al., 2008; Leedal & Smith, 2005). Lack of staff training or experience accounts for numerous PSIs. Rogers et al. (2006) reported that 41% of malpractice claims were attributed to a lack of experience and technical abilities. Other notable latent system factors that contribute to PSIs include teamwork and communication (van Beuzekom et al., 2010). Poor communication amongst teams is thought to account for 70% of errors in Canadian hospitals (Baker & Norton, 2002).

Brady et al. (2009) and The Massachusetts Coalition for the Prevention of Medical Errors (1997) reported a lack of procedural/protocol standardization and socially embedded knowledge as other system factors that can impact patient safety. Dennison (2007) found a significant increase in knowledge because of a safety education program, yet no improvement in the number of errors. These authors concluded that professional socialization (set of core values and sense of identity within their profession) and staff

readiness to learn and change are linked to making system changes. Peden et al. (1990) suggested that if staff regard the system where they work as already being safe, it can impede any educational interventions designed to strengthen the system and reduce PSIs. To enhance patient safety, it is important that staff value and have knowledge of systems thinking. One Canadian hospital attributed its successful transformation to a systems thinking approach by identifying the knowledge needed by staff, creating a long-term, systems-based vision, and fostering interdisciplinary relationships (Willis et al., 2014).

Several recommendations have been made to include systems thinking in professional development for health care providers. Dolansky and Moore (2013) suggest that this education is critical to building patient safety and quality improvement competency. Several educators and organizations suggest that the undergraduate curriculum should include foundational topics on defining systems, complex systems, and why systems thinking is better than the traditional process of analyzing errors (Gonzalo et al., 2016; Plack et al., 2018; World Health Organization, 2009). Colbert et al. (2011) recommend incorporating systems thinking in residency education by engaging them in analyzing their system for gaps and participating in safety and quality improvement activities to close those gaps.

D'Eon (2017) summarized the recommendations for Canadian post-graduate medical education by highlighting calls for formal systems thinking curriculum and training within *The Future of Medical Education of Canada (FMEC)* report (Association of Faculties of Medicine of Canada, 2012), and the CanMEDS 2015 Physician Competency Framework (Frank et al., 2015). The Association of Faculties of Medicine

of Canada hints about the teaching of systems thinking by stating the use of "a multifaceted approach that engages the full continuum of health and health care" (p. 21), and in the 'Medical Leadership' section:

> Faculties of Medicine must foster medical leadership in faculty and students, including how to manage, navigate, and help transform medical practice and the health care system in collaboration with others. (p. 31)

Some PGME programs in the UK, U.S., and Canada have successfully integrated systems thinking using simulation and a focused clinical education program to promote systems thinking. Young (2018) used simulation to help residents learn how to manage multiple errors by improving parts of the system or factors within their work environment. This simulation exercise was shown to increase learners' awareness of systems thinking and knowledge of the leadership role in preventing PSIs. Aboumatar et al. (2012) at the John Hopkins School of Medicine offered a 3-day clinically-based patient safety program that increased systems thinking.

Unfortunately, formal training in systems thinking has not been consistently integrated into health professional education. Furthermore, residency training does not adequately engage residents in quality improvement projects, where they would have the ability to apply systems thinking (Bagian, 2012; Leape, 1994; Shortell & Singer, 2008). Yet, residents need to be able to use systems thinking to analyze the care they provide, critically assess the system in which they work for threats to patient safety, voice their concerns, strategize on how to make improvements to the system, and forecast the impact of those improvements on other parts of the system. (Slalter, 2017b; World Health

Organization, 2017). Residents need education to build their skills in these areas and they need to be assessed to ensure they are doing it correctly.

Disclosure and Discussion of Patient Safety Incidents

Disclosure and discussion across the spectrum of safety errors are seen as a valuable and necessary step to proactively reduce PSIs (Barach & Small, 2000; Kaldjian et al., 2006; Nasiripour et al., 2018). Prior to 2008, practices for reporting and disclosing PSIs were not formally adopted within Canadian health care organizations, mostly because there was little knowledge on how to do it properly. The appropriate legal parameters and an organizational disclosure approach were not well defined within Canadian provinces until recently (Disclosure Working Group, 2011; Wu et al., 2017). Disclosure practices started to gain some traction in 2008 when CPSI released the Canadian Disclosure Guidelines, which was further updated in 2011 (Disclosure Working Group, 2008, 2011). Canada is now recognized as one of the few countries with well-defined disclosure policies and programs.

Shapiro et al. (2018) indicate that disclosure and reporting policies should articulate which individuals should be involved in the disclosure and what the disclosure conversation should entail. Webster et al. (2010) and Weiss and Miranda (2008) argue for disclosure of all PSIs, whether they resulted in patient harm or not, including acts of commission or omission that could have resulted in harm to a patient, but were intercepted.

The American College of Obstetricians and Gynecologists (2016) and Hughes (2008) have indicated that disclosure of PSIs can negatively impact the trust that the

patient has for those involved in the incident and disrupt the patient-physician relationship. However, trust is often restored if the disclosure includes an "apology" that is perceived to be genuine and patients feel respected (Disclosure Working Group, 2011; Iedema et al., 2011; Lazare, 2006; Mazor et al., 2013). Gallagher et al. (2003) stated that disclosure should meet patients' needs and include an apology and provide full details of what occurred. The Canadian Medical Protective Association (n.d.) stated, "An effective apology is one of the most profound healing processes between individuals, groups, or nations. It may restore damaged relationships or even strengthen previously satisfactory relationship" (p. 19).

Most Canadian provinces have adopted an apology legislation that is in place to alleviate concerns associated with carrying out disclosure and ensure that disclosures continue to take place. This legislation states that apologies included as part of the disclosure process are not an admission of fault or liability, should not be used when determining fault or liability, and should not be used as evidence of fault or liability except in the case of criminal proceedings (Canadian Medical Protective Association, 2019). Clinical safety leaders, ethics, or legal counsel may also be consulted as part of a pre-disclosure meeting to discuss the goals of the disclosure and fine-tune their message to patients and families (CPSI, 2011).

Even though there is legislation to protect medical professionals in most Canadian provinces, evidence shows that specialists struggle with the decision of what and how to disclose (Dossett, 2018). Many disclosure studies reported that physicians would apologize to patients following a PSI, but not provide details of the incident or admit that

an error had occurred (Gallagher et al., 2003; Mazor et al., 2016). Perkins (2016) and Ock et al. (2017) found that physicians tend to disclose PSIs to each other, but many of them do not disclose PSIs to their patients. This is further supported by a study involving over 2,600 physicians in Canada and the U.S., which found that while 98% supported disclosure of errors to patients, only 58% carried out the process of disclosure (Bell et al, 2017). Wolf and Hughes (2008) indicated that professionals are more inclined to disclose PSIs when their competency is not questioned. They do not fear losing their jobs and are supported by their organization when a PSI occurs.

Residents also expressed concerns about how disclosure of PSIs may impact their progression within their program if their competency level or performance comes into question (Engel et al., 2006). They fear it may slow or halt them from advancing to the next level. While residents may have some hesitation towards carrying out disclosure, they report that they want to be included in the disclosure process and view it as part of their professional responsibilities (Disclosure Working Group, 2011; Wolf & Hughes, 2008). Several studies on residents' motivation, confidence, and attitudes towards the disclosure of PSIs revealed that knowledge of the disclosure process was a motivator in completing disclosures and was linked to higher confidence levels and positive attitudes (Bell et al., 2017; Conway et al., 2011; Szymusiak et al., 2019). Conway et al. (2011) reported that the majority (64%) of students in their study wanted more education on disclosure.

Bonnema et al. (2009) suggest that many learners are unsure whether to disclose errors and what to say. Residents are likely to be ill-prepared to deliver a disclosure if

their supervisors do not role-model disclosure or do so incorrectly (Shapiro et al., 2018). Gallagher et al. (2007) argue that lack of education is the greatest barrier to improving disclosure rates. Ock et al. (2017) suggest that disclosure training may enhance medical professionals' ability and intention to disclose PSIs. Disclosure training should include knowledge of what to disclose, carrying our apologies, ethical and legal responsibilities, and a hands-on component to allow residents to gain confidence in performing disclosures (Gallagher et al., 2006). Singh et al. (2018) also support the need for a program that values faculty who role-model disclosure and include residents in the disclosure process.

There are several supporting documents and frameworks that capture the importance of formal residency training on disclosure, including the Canadian Disclosure Guidelines, Required Organization Practices (ROPs), CMPA Good Practice Guidelines, RCPSC CanMEDS framework, CFPC CanMEDS - Family Medicine framework, and accreditation guidelines (Accreditation Canada, 2008; Canadian Medical Protective Association, 2016; Disclosure Working Group, 2011; Frank et al., 2015). Some researchers have successfully implemented disclosure training in PGME. Kim et al. (2017) trialed an interactive disclosure training program involving standardized patients. Sixty-six percent of participants reported an increase in their confidence to carry out disclosures and felt an increased responsibility to provide an apology. In 2017, the CMPA developed a one-day symposium for residents to focus on CanMEDS disclosure competencies to increase patient safety and reduce medical-legal risks. Ninety-nine percent of the survey respondents noted that they intend to improve how they disclose

within their practice because of the symposium. With an increased focus on residents' disclosure competencies in training programs, there is a concurrent need for formative assessment of these competencies. Residents would then receive feedback on their disclosure approach, which is likely to build their confidence and intent to disclose PSIs to their supervisors and patients.

Human Factors Engineering

Human factors engineering is a discipline that uses knowledge about human cognition, physical abilities, workspaces, and workflow to design tools, equipment, tasks, protocols, machines, and health care systems. (Kroemer et al., 2001; Salvendy, 1997; Wickens et al., 2004). Understanding how health care providers think and act within their workspace can be used to optimize the interaction between staff and their things within their workplace, including technology (e.g., equipment design), processes (e.g., workarounds), environment (e.g., lighting, noise, and layout of the workspace), cognitive and physical demands, skills, and teamwork. Industries that have significantly reduced the number of safety incidents have done so through improvements to the performance of things within the system, not through the perfection of staff performance (Chassin, 1998; Chassin & Becher, 2002; Reason, 2000). Reason (2016) concluded, "We cannot change the human condition, but we can change the conditions under which people work" (p. 15).

Mao et al. (2015) reviewed the literature to determine the impact of HFE interventions on patient safety. Four studies that made HFE changes resulted in decreased medication errors (Rozenbaum, 2013), safer administration of analgesia (Lin et al., 1998;

Lin et al., 2001), enhanced surgical performances (Galleano et al., 2006), decreased fatigue amongst staff and quality of work-life (Mao et al., 2015). One team in the U.S. used HFE to identify challenges within their operating room (OR), which had become more complex and error-prone with the increased use of more enhanced equipment and procedures. They re-designed the layout of equipment in the OR and improved health professionals' flow and movement in the room, which enhanced patient safety within this context (Palmer, 2013).

The evidence that HFE positively impacts patient safety and patient outcomes necessitates the need for residency training and assessment on this topic. Under the RCPSC CanMEDS Medical Expert role, physicians should adopt strategies that will address human and system factors (Rust et al., 2014). In 2009, the WHO reported that little training is provided on this topic. Carayon et al. (2018) recommend education in HFE theory, methods, and its role in safe patient care, and the provision of practical training opportunities.

Burhows and Burhows (2016) reported that 80% of 27 U.S. surgery programs included HFE curricula as part of their residency training. Rust et al. (2014) described an innovative partnership between a medical center and a group of industrial engineers to deliver an HFE curriculum within a U.S. residency program. This is a novel means to integrate a HFE curriculum in residency (Varkey et al., 2008). One of the goals of this curriculum was to engage residents in analyzing the system in which they worked to identify areas that needed improvement or re-design, and then apply the HFE re-design principals.

There were several publications regarding integration of HFE in U.S. residency programs, but none within Canada. While there are few published works of explicit human factors engineering curriculum within Canada, there are numerous Canadian initiatives (training and guidelines) that promote HFE by the WHO, CPSI, RCPSC, and CMPA. An environmental scan revealed that some universities (e.g., University of Toronto) do integrate HFE into their PGME program, while others encourage residents to attend HFE workshops or webinars delivered by external organizations such as the CPSI (Frank et al., 2015; Parush et al., 2011; CPSI, 2020).

Given that HFE is explicit within competency frameworks, residents should be given the opportunity to learn, practise, and obtain feedback on it. Having HFE incorporated into assessment tools sets the expectation for residents which HFE skills they need to provide safe patient care.

Heuristics and Cognitive Errors

Heuristics are highly efficient mental maneuvers that individuals rely on to make decisions. Stripe et al. (2006) and Croskerry (2003b) describe them as mental short cuts, where the brain uses prior data to generate a quick response so that it does not have to spend time developing a new solution every time a new situation arises. Heuristics allow physicians to make quick diagnoses and avoid the overuse of diagnostic and investigative resources or over-testing. Esgate et al. (2005) explain that physicians recall interactions with previous patients (e.g., symptoms and outcomes) to make a diagnosis. In the literature, these mental shortcuts are often referred to as cognitive heuristics and, in most

cases, are helpful and enable individuals to make decisions more expeditiously and efficiently (Croskerry, 2003b).

Although cognitive heuristics can be useful in the medical field for providing a quick diagnosis, it can have dire consequences when it results in an incorrect diagnosis. Cognitive errors that impact clinicians' judgments and the diagnoses they make are known as cognitive biases, and they are prevalent in the discipline of medicine (Saposnik et al., 2016). Saposnik et al. (2016) outlined the common cognitive biases seen within the medical context, including availability and anchoring heuristics. Availability occurs when a provider makes a judgment regarding the probability of a diagnosis based on recent diagnoses that are unique or dramatic, and easily recalled. In turn, the health care provider may land on a diagnosis without considering other possibilities. Anchoring occurs when providers disregard potentially important patient information and focus on a single symptom or piece of information to make a diagnosis (Ashman et al., 2000; Kovacs & Croskerry, 1999).

Many psychologists, economists, and physicians have studied and reported on the use of heuristics in medical reasoning and decision making, including Tversky and Kahneman (1974) and Croskerry (2009). Tversky and Kahneman (1974) proposed a dual-system model to explain how cognitive biases occur. In this model, System 1 is regarded as the heuristic or pattern recognition process involved in making common decisions or determining a clinical diagnosis. This system relies on automatic and unconscious decision-making that is achieved through the accumulation of experiences that are stored in a physician's memory (Bowen, 2006). System 2 decisions are made using careful and

thoughtful efforts, “which are non-programmed, conscious, usually slow and effortful” (Tversky & Kahneman, 1974, p. 2). Several authors suggest that it is the overuse of system 1, or when system 1 overrides system 2, that cognitive biases can occur (Ely et al., 2011; Mamede et al., 2014; van den Berge & Mamede, 2013). Novice or junior professionals tend to use system 2 (referred to as intuition) primarily, while seasoned or senior professionals typically use system 1. Patients present with their symptoms and the physician will match those symptoms to patterns within his or her memory (Croskerry, 2015; Phua & Tan, 2013).

In the dual system model for cognitive biases, strategies that stimulate the use of system 2 may thwart biases, increase the accuracy of medical diagnoses, and reduce PSIs (Saposnik et al., 2016). Several cognitive debiasing techniques entail metacognition, or individuals reflecting on how they problem-solve and come to a clinical diagnosis (e.g., their clinical reasoning process) (Berner & Graber, 2008). These techniques involve taking a step back from the problem at hand (e.g., pausing before making a clinical diagnosis) to analyze one’s thinking process (Croskerry, 2003a). These debiasing techniques are intended to push a specific behaviour(s) that will likely protect the clinician from making poor or incorrect decisions that result in inaccurate diagnoses (Croskerry, 2015).

Providing physician and resident education on cognitive heuristics, biases, and debiasing techniques may help reduce diagnostic errors. It is essential to assess residents' debiasing skills to help them be more deliberate in their clinical thought processes and avoid making diagnostic errors. This assessment may be achieved by having supervisors

ask residents about their clinical reasoning steps when making diagnoses, and complimenting this with assessment of their debiasing skills and provision of formative feedback. Given the relevance of cognitive debiasing skills to PSIs, this is an important concept to consider for inclusion in competency-based assessments on patient safety.

While a cognitive bias can result in serious PSIs, there are other contributing causes of PSIs, including communication and collaboration. Much research has taken place in the last two decades to develop Interprofessional collaboration (IPC) and communication solutions to improving patient safety. The next section will provide a literature synopsis of the link between IPC and patient safety.

Interprofessional Communication and Collaboration

The link between interprofessional care and safe patient care is evident in the CPSI interprofessional competency framework and throughout the literature. Interprofessional collaboration can improve health care access, streamline procedures, improve coordination among disciplines, and facilitate knowledge transfer between professionals and recipient outcomes (Langford & Rollins, 2007; Reeves et al., 2010). Manser (2009) reported that team leaders who support open communication and participation in decision-making consequently promote team members' well-being (less likely to suffer from burnout and job dissatisfaction).

Inadequate team communication increases the risk for PSI and can occur when team members fail to solicit input from other team members (including residents and other junior learners) about treatment and interventions options. Other risks to patient safety include untimely reporting or improper documentation of results, fragmented care

or inefficient handovers between health professionals (Manser, 2008; Risser et al., 1999; Salas et al., 2008). Interprofessional handovers are critical points of care where communication errors can have a serious impact on patient safety when complicated by time constraints and the use of jargon or abbreviations (Petersen et al., 2013). Chassin and Becher (2002) indicated that team members could begin to accept faulty or incomplete exchange of information as the norm when there are no standard communication protocols or tools in place. Residents and nurses report being ill-informed about patient investigations or treatment plans, resulting in otherwise conscientious professionals not having all the information they need to provide safe care.

A lack of interprofessional collaboration and communication has been shown to play an important role in the causation of PSIs in Canada and the U.S. (Beckett & Kipnis, 2009; Greenberg et al., 2007; Teamwork and Communication Working Group, 2011). The U.S. Joint Commission for Hospital Accreditation found that communication failure was the primary cause of 70% of the sentinel events reviewed (Beckett & Kipnis, 2009). In the Canadian study by Baker and Norton (2002), 54% of survey respondents identified communication and documentation errors (miscommunication of physician orders, miscommunication between physicians and nursing staff, and lack of communication) as the main patient safety issues they were facing. Teamwork serves to reduce PSIs, yet it can add a layer of complexity when reporting and disclosing PSIs (e.g., deciding which team member is responsible for disclosing) and determining the cause of the incident. Baker et al. (2004) also found a higher number of PSIs in larger teaching hospitals than community hospitals. In larger teaching hospitals, there is a need for multiple health care

providers (including residents) due to a higher complexity of care, which increases the risk for miscommunication and lack of coordinated care.

Most Canadian teaching hospitals offer interprofessional education (IPE) curriculum, starting in the undergraduate medical education program. Interprofessional education occurs when learners from two or more professionals learn about, from, and with each other to foster collaboration and positive patient outcomes (Buring et al., 2009). It is recommended to integrate IPE in the early years of health professional education since it has been shown to improve knowledge, skills, and attitudes related to team collaboration and communication (Decker et al., 2015; Paquette-Warren, 2014). The ability to communicate and collaborate with other health professionals is one of the many key skills that residents need to have to provide safe practice. IPE interventions for health professional students in Canada have been shown to improve the perceptions of the role of other health professionals on a team and their knowledge of the benefits of IPC (Ateah et al., 2011; Bilodeau et al., 2010).

The Task Force on Adverse Events (Department of Health, Government of Newfoundland and Labrador, 2008) made 41 recommendations in response to significant estrogen and progesterone receptor testing errors within the local Regional Health Authority between 1997 and 2005. One of these recommendations was that Memorial University develop an IPE based curriculum focusing on patient safety. A blended learning curriculum involving online pre-learning (patient safety curriculum and interprofessional group assignment for case-based discussion), small group face-to-face case-based learning, expert panel interaction, and face-to-face instruction was developed

for multiple health professions through the Centre for Collaborative Health Professional Education (CCHPE) at Memorial University. Kearney et al. (2010) conducted a pre-/post-intervention evaluation and found a significant increase in attitudes towards teamwork, adverse event reporting, and documentation to enhance patient safety. Numerous IPE and IPC programs were established for undergraduate health professional learners, faculty, and administrative leaders, which showed satisfaction with the educational experience and positive attitudes towards teamwork (Curran, 2004; Curran et al., 2005; Curran, Heath et al., 2010; Curran, Sargeant et al., 2007; Curran, Sharpe et al., 2010; Curran, Sharpe, et al. 2007; Curran et al., 2008).

Over the last decade, action has been taken to build capacity in faculty who are equipped to teach, champion, coach, and role model IPC skills. Hall and Zierler (2015) described an initiative they undertook to train faculty who felt ill-prepared to teach IPE curriculum and role model IPC using a blended learning model. At Memorial University, CCHPE had developed a faculty engagement initiative to promote interprofessional teaching, professional development, and role-modelling (Center for Collaborative Health Professional Education, 2019). Through this initiative, educators received a designation (Scholar or Associate) based on their contributions to developing IPE curriculum and teaching IPC. This designation comes with the expectation that educators share and model IPC skills with their colleagues and learners within their practice.

While there are many reported benefits of IPC training initiatives (e.g., enhancement of patient safety outcomes), there are challenges to implementing and sustaining such training programs, including hierarchical culture, costs, and logistics.

Having dedicated centers within universities that help address these issues (e.g., CCHPE at Memorial University) is critical to ensuring that IPE and IPC take place and that residents build IPC competency.

Residents need to adopt an HRO approach by anticipating errors and recognizing their limitations, thereby valuing others' skills and expertise. It is important that residents contribute to a culture of safety by sharing and reporting PSIs, providing support to colleagues who experience PSIs, and valuing a non-punitive, systems thinking approach to PSIs and participating in quality improvement initiatives. Residents should also learn to use HFE to analyze and redesign workspaces and issues within their work environment to increase patient safety. Residents should take action to avoid the influences of cognitive biases when developing diagnoses and making patient care decisions. Finally, the literature supports the need for residents who can work with other health professionals based on the needs of patients. A patient safety assessment tool that captures these skills would allow educators to measure residents' ability to carry out these tasks, provide formative feedback, and it would also serve as a framework for coaching residents towards competency.

2.4 Postgraduate Medical Education

2.4.1. Competency-Based Medical Education (CBME)

Although there is a renewed engagement in CBME within the medical education community in the last decade, it dates back to almost 50 years ago (Carraccio et al. 2002; Grant, 1979; Spady, 1972) when it was sometimes also referred to as mastery learning (Block, 1970). In Flexner's 1910 report on transforming medical education in Canada and

the U.S., the quality of PGME and the competency levels of practicing physicians were questioned. Shortly after this report was released, medical education rapidly shifted towards specialty training and the development of rigorous and standardized training programs that included more clinical exposure, practical experience, and research opportunities (Duffy, 2011). After the Flexner report, numerous articles and reports arguing for the inclusion of CBME in PGME were generated, but it was never standardized, nor well defined and adopted until the last couple of decades (Christakis, 1995; Neufeld et al. 1993).

The main push for incorporating CBME into medical education has been based on the need for increased accountability and improvement of patient and population-based health outcomes (Frank et al., 2010), the need to reduce unacceptable variations in physician competence upon entry to practice (Langdale et al., 2003; Raymond et al., 2011), and to increase the safety competencies of graduates (Frank, Snell, Englander, & Holmboe, 2017). Now, CBME is standardized and mainstream in much of the Western World and is an established framework that has become part of the medical profession lexicon and discourse (ten Cate & Scheele, 2007).

Frank et al. (2010) and Harden (1999) argue that CBME is a form of outcome-based education, in which the desired learner and program outcomes drive the curriculum design and development, including assessment of learning. Competency-based medical education in the context of PGME can be described using four overarching themes, including a focus on learner outcomes, emphasis on learner abilities, the de-emphasis of the traditional time-based training, and learner-centeredness (Frank et al., 2010).

A *focus on learner outcomes* stems from the need to ensure that physicians can manage cases across the core domains of clinical care (things they will most likely see in practice). Harden (1999), ten Cate and Scheele (2007), and Wang et al. (2005) recommended identifying the outcomes (future roles and abilities of a physician) through needs assessments, practice profiling, task analysis, and review of population health needs. Learner outcomes describe the roles and tasks that physicians are expected to carry out in practice. Competencies are the knowledge, skills, and attitudes (KSAs) learners need to attain during their training to fulfill those roles and tasks. Learner outcomes and competencies serve as the starting point for program development (classroom-based curriculum and clinical experiences). Competencies are assessed formatively or summatively to help the learner meet the program expectations (Resident Doctors of Canada, 2016; Schultz & Griffiths, 2016). As part of the assessment process, learners are expected to present evidence towards meeting learner outcomes and competency attainment (e.g., using a resident portfolio, workplace performance measures, such as MSF) (Heeneman & Driessen, 2017).

A CBME program also *emphasizes learner abilities,* or the development of knowledge, skills, and attitudes. Before CBME, knowledge-based objectives were the primary focus within the curriculum, which may or may not have provided opportunities for residents to learn how to manage clinical tasks and cases that they would regularly see within their practice (Talbot, 2004). With CBME, the focus is on the application of knowledge and development of skills that are linked to a set of outcomes and competencies that collectively define a proficient physician who values life-long learning

and patient safety (Schultz & Griffiths, 2016). A CBME program requires an ongoing review of residents' ability to complete clinical tasks safely, with the goal of entrusting them to do these tasks independently before entry to practice. Achievement of competency is verified by judging the trainee's progress and performance during his or her program, independent of time spent in their program (Grant, 1979).

Carraccio et al. (2017) note that entrustment of residents to complete tasks unsupervised should not be equated to expertise. Once residents are entrusted to complete tasks independently by their supervisors, residents should engage in tasks that will further develop their confidence in making decisions and independent performance. Guidance and feedback from their supervisors are expected to help residents master their skills and confidence. Once residents have reached independent practice, competency should be viewed as a lifelong learning process, as opposed to an achievement of knowledge and skills that are never revisited once they are taught (Leach, 2002).

De-emphasizing the traditional time-based training, and emphasizing CBME, allows for flexibility in the rates that residents will develop their knowledge and skills. The focus is not on how long a resident is in their program or how much they can accomplish in a specified time, but on individualized learning that meets each resident's needs through focused observations (using a defined set of competencies) and enhanced coaching. Competency-based medical education is focused on mastery of skills, rather than how long they spend working in each clinical domain. This shift away from a time-based system and towards a CBME system coincides with *learner-centeredness*, which allows the learner to complete the program based on individual learning styles, building

expertise at their own pace (redoing and revisiting curriculum), and seeking out learning opportunities to meet their needs (Carraccio et al., 2016). It is also anticipated that residents who are falling behind will be identified earlier in their program (through frequent monitoring of their competencies) and provided with additional training to help them attain competency. In contrast, when supervisors had difficulty failing traditional, time-based learners that are struggling and not meeting competency, some residents would make it through their program and into practice.

In a CBME program, residents have a responsibility in the learning process and are empowered to identify gaps in their skills, what they need to learn, and how best to learn these skills (e.g., more readings or case reviews to address knowledge gaps, or caring for a specific group of patients to gain skill in specific clinical domains). Caccia et al. (2015) suggest that CBME fosters ownership of learning, self-determination, and motivation among residents to meet the required standards, which are positive secondary benefits of CBME. This contrasts with a teacher-focused curriculum, where residents would participate in a prescribed curriculum and have little involvement in the direction of their learning (Carraccio et al., 2016; ten Cate, 2014).

Even though there are numerous benefits to support implementation of CBME, it has been integrated at varying degrees within Canadian PGME programs due to the challenges associated with CBME, including available resources. Some programs have introduced CBME in PGME to identify gaps in residents' skills and clinical exposure, and others have included a formative feedback process using WBA (Caccia et al., 2015; Jurd et al., 2015; Stodel et al., 2015). Stodel et al. (2015) reported a successful hybrid

program of CBME and some traditional training elements, which was needed due to contextual or resource limitations. This program also allows residents to complete the program in four years, instead of the original five-year minimum set by the RCPSC, if they progressively build new skills and improve or master other skills, without requiring remediation. This Canadian program uses case-based learning that aligns with residents' clinical experiences to further support the development of competencies. Residents' progress towards competency can be tracked and reviewed using an electronic system that can be accessed across multiple training sites and supervisors.

Having a process to track residents' progress is a benefit of CBME. Medical education researchers and educators also propose that CBME is more individualized for learners, transparent (a result of outlining the expected competencies) and has increased objectivity compared to the traditional and time-based curriculum (Milne et al., 2016). Competency-based medical education also helps identify residents who are struggling (during their program) and have specific skills that need improvement. Identification of these residents and deficiencies is achieved using formative assessment tools and ongoing monitoring of competencies. Remediation can then be prescribed as soon as deficiencies are noted. In contrast, summative assessment may not identify struggling residents until the end of their program. Another reported benefit of a CBME model is that it stimulates reflection on learning, so an action plan to meet competency can be established (Milne et al., 2016).

While CBME is now a recognized framework with several benefits and many institutions are making changes to integrate it, challenges remain. Many supervisors do

not feel competent in coaching residents towards competency or making judgements of residents' expertise levels (Caverzagie et al., 2017). These judgments can be difficult for supervisors to make as it may impact their relationship with residents and residents' progression in their program (e.g., if they are not at a specific level then they need to participate in remediation before advancing) (Bansal et al., 2017; Holmboe et al., 2010).

One strategy to manage the challenge associated with assessing residents is to maintain focus on learner outcomes and competencies expected of them. These outcomes and competencies can be used to shape the dialogue faculty have with residents – letting them know that the goal of observing and making judgements on their competency is to help them become safe and successful physicians. This approach will help create an objective assessment process.

Some educators also feel that assessment adds an increased workload on professionals due to the increased need to monitor and make judgements of the learner's progress, need to participate in professional development to learn about CBME and assessment tools, and increased preparation involved in planning experiences or other learning activities to address any competency gaps (Milne et al., 2016). The other concern is that a competencies framework may miss the other important contextual factors that influence residents' learning and performance and the assessment outcome (Milne et al., 2016).

Talbot (2004) expressed that intangible factors are difficult to assess, for example a resident's ability to manage complexities of patient care and how he or she makes judgements. Brightwell and Grant (2013) stated that a CBME model diminishes the

resident's role in the workplace by focusing on the individual's skills, rather than considering their learning experiences and the influences of workplace factors. The other reported concern regarding CBME is that residents will "migrate to the minimum" (Milne et al., 2016, p. 1), where residents work towards meeting the minimum competency level requirement only. However, the RCPSC reports that learners within a CBME model strive to achieve a higher competency level (Frank et al., 2010). This issue can, in part, be countered by having a formative assessment and once residents reach a certain competency level, establishing the next level of competency that is expected of them. For example, once they reach entrustment to perform a task independently, residents should then build skills that enable them to model and teach this skill to junior learners. This expectation needs to be communicated to residents early in the program – that there is no minimum competency level, and the goal is to always strive for the next competency level and practise the skills they have attained.

All of the CBME features described in this section support the underlying purpose of this study. The proposed competency-based assessment tool, PSAT$^{360°}$, should incorporate key patient safety competencies that define what is expected of a safe physician. Such a tool may also provide a framework for observing and making decisions regarding residents' safety skill level by multiple health professionals and patients. Additionally, an assessment tool such as a PSAT$^{360°}$ could provide residents with a template to collect and log evidence of their patient safety skills. Finally, a PSAT$^{360°}$ may be used formatively so the assessment data can be documented and reviewed to determine residents' progression towards competency.

There is evidence (e.g., statistics regarding the number of PSIs in the Canadian health care system) and support for teaching residents patient safety skills through CBME that includes coaching, observing, assessing, and feedback. The next section summarizes the literature that describes what and how to incorporate patient safety into PGME.

2.4.2 Patient Safety and Quality Improvement Education

Providing safe, high-quality care to patients is the core of what it means to be a physician (Headrick et al., 2013). There are several organizations and frameworks (e.g., the CanMEDS framework and the Lucian Leape Institute [LLI]) that describe what it means to be a safe physician and therefore help inform residents and physician educational programs. The 2015 CanMEDS framework includes new topics such as patient safety, quality improvement, handovers, and eHealth that reflect physicians' current needs and requirements to fulfill new patient safety and quality improvement roles.

In the U.S., the LLI provides strategic direction for patient safety work. The LLI identified medical education reform as one of its five themes as fundamental to achieving improvement in health care safety. The LLI suggested that global medical education should deemphasize the focus on scientific knowledge and fact acquisition, and build a curriculum focused on competency-based education that includes patient safety as one of its core topics (Leape et al., 2009). In 2009, the LLI released a list of patient safety recommendations to promote a patient safety learning culture, respectful behaviour, patient safety teaching and role-modeling, recognition of patient safety attributes (e.g.,

communication) among medical school applicants, and scaffolding of patient safety curriculum (Gandhi et al., 2018; Lucian Leape Institute, 2009).

Instructional scaffolding of patient safety curriculum in undergraduate medical education should begin with foundational or introductory knowledge and begin with high faculty involvement that gradually decreases over time as the learner gains experience (Canadian Patient Safety Institute, 2015; Gill et al., 2017). The learner's level of independence in the classroom should be increased through case-based work, standardized patients, simulation, and clinical experiences (Canadian Patient Safety Institute, 2015). Naik and Brien (2013) described the use of simulation-based training to develop essential technical and non-technical patient safety skills. Technical skills are the medical and procedural knowledge, whereas behaviour-based skills such as situational awareness, teamwork, decision-making, and leadership are examples of non-technical skills. Simulation is a potentially powerful workplace-based learning tool for patient safety competency development through repeated practice of tasks in a controlled and safe learning environment, with ongoing feedback (McGaghie et al., 2009; Rosen, 2008).

Okuyama et al. (2011) expressed the need to complement patient safety curriculum with assessment tools designed to measure patient safety skills. Okuyama et al. (2011) performed a systematic review to list and categorize tools used to assess patient safety competencies. They aligned the tools captured in their study with that of Miller's Pyramid for Assessing Clinical Competence (Miller, 1990). They found that 19/48 studies used in simulation environments assessed learner performance at the "shows how" level, yet only 2/48 tools assessed at the "does" level. Using assessment tools that

align with the “does” level is most appropriate at the resident level as it most closely supports the context of their training (Miller, 1990). At this level, performance is integrated into practice and educators can provide an authentic judgement of residents’ behaviors within the actual workplace (ten Cate & Sargeant, 2011). Huda et al. (2017) concur with the need for assessment tools during residency education in relation to the provision of safe patient care. They highlighted the need to assess residents' abilities to complete on-call responsibilities, such as admission of patients transitioning care, supervision of junior residents, and ensuring safe patient care during on call duties

The Health Profession Education Patient Safety Survey (HPEPSS) is an assessment tool designed to measure patient safety confidence levels among health professionals (Ginsburg et al., 2013). A group of researchers used the HPEPSS to determine self-reported competence across six socio-cultural dimensions of patient safety for newly graduated nurses, pharmacists, and doctors. Ginsburg et al. (2013) found that doctors had reported lower confidence levels than other health professionals in handling patient safety errors. Others who used the same scale found that medical students’ self-reported patient safety knowledge scores were significantly lower than other health professional groups to which they were compared, namely respiratory therapists and nurses (Cox et al., 2009). The reported differences in levels of confidence in patient safety across different groups may reflect a variety of reasons, including the values and beliefs related to the culture of learning that is often linked to their respective professional training. Each of these health professions primarily train in silos, where beliefs and values are influenced and shaped by those associated with that profession

(Barker et al., 2005; Hall, 2005). Furthermore, physicians indicated higher confidence levels in patient safety after a clinical experience than learning in a classroom setting. This is consistent with an increase in confidence levels following an experiential learning experience in which there is time for residents to practically apply their patient safety knowledge (Halbach & Sullivan, 2005).

Some medical education programs in Canada and the U.S. responded to the need to train residents in patient safety upon release of the updated CanMEDS framework by offering explicit patient safety and quality improvement curriculum. Queen's University (Discipline of Family Medicine) and University of Toronto (Emergency Medicine) integrated quality improvement programming that required residents to complete a quality improvement project that involved practical application of their safety and quality improvement knowledge by working through challenges such as engaging stakeholders, collaborating with colleagues, and strategizing solutions to quality improvement problems (Cheng et al., 2018; Hall-Barber et al., 2015). Hall-Barber et al. (2015) reported that residents at Queen's University gained an understanding of how to improve quality of care, rather than just how to carry out quality improvement. At the University of Toronto, Cheng et al. (2018) stated that the first resident cohort showed an increase in quality improvement knowledge and its applicability in practice by nearly 20%. In the U.S., O'Heron and Jarman (2014) also reported success with their quality improvement program developed for surgical residents, which had a mandatory patient safety and quality improvement curriculum and project.

Wong et al. (2010) provided a summary of undergraduate and PGME patient safety curriculum. A total of 41 articles were included in the review. Wong et al. (2010) reported that many programs demonstrated an increase in patient safety or quality improvement following implementation of the program. Thirteen of the 41 studies captured in the analysis made local changes to patient care delivery and seven demonstrated measured improvements to specific care processes, both a result of resident involvement in quality improvement projects. While these changes were positive organizational changes, few studies provided evidence of changes in learners' behaviours (Marinopoulos et al., 2007). There are also numerous unpublished patient safety and quality improvement programs that have been implemented in Canada, including those which operate out of patient safety or quality improvement centers (e.g., University of Toronto's Center for Patient Safety). Many universities have patient safety coordinators or directors who develop programs, such as the Master of Science in quality improvement and patient safety at the University of Toronto. Some Canadian universities have implemented patient safety as stand-alone sessions and symposiums.

A few PGME programs have successfully implemented patient safety curricula, while others report unsuccessful attempts to improve resident safety skills. Finn et al. (2018) are one group of clinicians who increased resident supervision on an in-patient unit to support residents and reduce PSIs. However, they found no reduction in PSIs involving residents, and residents reported feeling less efficient and less autonomous because of increased supervision. This increased supervision can impede the supervisor-resident relationship. Residents likely want to feel trusted as they progress and expect

lower levels of supervision as they move along in their program (instruction scaffolding). If supervisors are always present when residents perform tasks, residents will feel less trusted, less confident, and begin to rely on that level of instruction and support for all tasks. Residents need to be prepared for independent practice (without a supervisor, not without a team), where they will need to determine potential risks to patient safety and develop plans for how they will respond. Finally, the goal is to entrust residents to provide safe care, and the only way to determine if residents are ready for that is to gradually let them complete things on their own. In addition to graded supervision of residents, a successful curriculum was found to be associated with programs that considered the competing clinical and academic demands of the learner, gained leaner buy-in, aligned the curriculum with the clinical context, and faculty who are proficient and experienced with patient safety and quality improvement (Marinopoulos et al., 2007; Wong et al., 2010).

Well trained, experienced, and engaged faculty are key to the success of a patient safety curriculum in residency (Tregunno et al., 2014). Residency patient safety education can be stalled or impaired if faculty are not knowledgeable, skilled, or engaged in teaching patient safety. In order to teach and assess residents' patient safety skills, faculty need to be competent in patient safety, know which skills are expected of residents, and how residents should demonstrate those skills in the workplace. To assess, faculty would need to observe residents in the workplace, make a judgement on their competency level, determine if they would entrust residents to complete clinical tasks safely, discuss their ratings and feedback with the resident, develop a plan for future

learning, and coach them on how to improve their safety skills. Faculty are expected to fulfill those roles, yet, many have not received formal training in patient safety competencies and how to assess them. This is largely because patient safety competencies were only recently included in physician competency-based frameworks (Wong & Holmbe, 2016).

Another challenge is the disconnection between the educational outcomes, clinical outcomes, and the clinical environment within PGME. In most residency programs, the educational outcomes are learner-focused and clinical outcomes are patient-learner focused (traditional approach). Nasca et al. (2014) stated that to bridge the gap, the clinical microsystem (patients, providers, support staff, electronic medical records, equipment, and clinical processes) must be integrated into the curriculum and encourage residents to think beyond the patient-provider interface. In order to enhance residents' patient safety skill. Nasca et al. (2014) suggested that it is necessary to introduce a "systems-based practice" (p. 991), so residents think about the care they provide as being part of a larger system that has numerous influences on patient safety and quality improvement.

Faculty's lack of knowledge and experiences with systems-based practice and HFE are obstacles associated with advancing patient safety and quality improvement education within PGME (Leape, 1994; Shortell & Singer, 2008). Some faculty follow traditional approaches and focus on identifying who is at fault after a PSI, which residents may emulate once in practice. What is needed are trained faculty who use PSIs as valuable teaching opportunities to explain how things within the system and the

patient's environment have caused the error. Factors at the front end of patient care (e.g., clinical knowledge, treatment options) are historically the primary focus of medical instruction, with abstract or latent factors (e.g., cognitive biases, HFE, communication, IPC) receiving little attention within the curriculum. As Nasca et al. (2014) pointed out,

> failure to do so ensures that the skill gaps seen in current medical teaching faculties will be perpetuated in the physician workforce of the future — and represents a lost opportunity to create a cadre of young physicians equipped to lead sustainable systems-based improvement in clinical care. (p. 991)

Residents have reported that they do not hear their clinical educators talk about patient safety, which may, in part, be due to lack of faculty training and lack of value in patient safety and quality improvement (Mosser et al., 2009; Shortall & Singer, 2008). Kim et al. (2010) found that even though residents are key members of the health team, they are often excluded from patient safety and quality improvement initiatives.

Medical educators in charge of developing a patient safety curriculum at their institution can complete the ASPIRE program that the RCPSC and CPSI developed. This program enables faculty and staff to build the knowledge base they need to teach and model patient safety and identify context-specific strategies for incorporating patient safety and quality improvement curriculum. The CPSI also offers professional development through programs that empower staff to use an interprofessional teaching approach to patient safety (Patient Safety Education Program (PSEP)), fosters a culture of safety, (Canadian Patient Safety Officer (CPSO) course), and another course that helps board members learn how to enhance governance of patient safety and quality

improvement initiatives (Effective Governance for Quality and Patient Safety). CPSI also offers TeamSTEPPS Canada, which focuses on improving team communication and teamwork skills among health professionals. These programs can influence and impact residents' safety skills by increasing capacity among PGME curriculum developers and leaders to develop and deliver patient safety content and assess residents' patient safety skills.

In recent years, patients have started asking for more involvement in their health care decisions and an increase in openness following PSIs. This requires residents and physicians to be prepared to work within this clinical context. Patient safety education in PGME is seen as an opportunity to provide future physicians with the necessary skills to serve as safety champions and lead the movement towards safe, quality health care (Voss, et al., 2008).

2.5 Assessment in Medical Education

2.5.1 Competency-Based Assessment (CBA) in Postgraduate Medical Education

There are conflicting thoughts on who should assess residents – professionals who teach and regularly interact with residents or other professionals/colleagues who are familiar with the expectations of residents, but do not know the residents well (e.g., another physician/faculty member that works in the same clinic as the resident but does not supervise them). Many agree that it is not appropriate for raters to assess residents' competencies unless the rater is familiar with them, their work, and has consistently observed them interact with patients and carry out other physician related duties (e.g.,

carry out quality improvement initiatives, consult with a pharmacists) (Ferguson et al., 2014; Sargeant et al., 2005; Sargeant et al., 2003; Yama et al., 2018).

Raters should therefore be familiar with residents' responsibilities and tasks they can carry out efficiently and safely. According to Yama et al. (2018), residents' acceptance of feedback from allied healthcare professionals is predicated on them providing feedback that reflects their understanding of residents' workplace context and responsibilities. Feedback should also be aligned with the raters' areas of expertise. According to Yama et al. (2018), one resident noted, "the palliative care nurses would be way better to give you feedback observing how you broke bad news than your senior cardiologist" (p. 2).

Gingerich (2011) suggests that raters tend to judge learners they are observing for the first time based on schemas formed through previous interactions with other learners. It can be challenging to translate schemas into numerical scores, and it poses threats to the reliability of those assessments. Minimizing the impact of these schemas and the subjectivity associated with raters' judgments can be achieved through the use of multiple raters and the provision of feedback to ratees (Govaerts et al., 2011; Swanson, 1987; van der Vleuten, 2010; Yeates et al., 2012).

The process of rating residents' performance is compounded by variables that might negatively influence residents' performance (e.g., loss of a patient, delivered bad news to a patient, fatigue, or experienced a personal issue). Faculty will not be acutely aware of residents' progression without frequent monitoring of their performance. Familiarity with residents' capabilities and progress allows faculty to decipher a resident

who is having an off day from one who is consistently performing poorly (Gingerich et al., 2011; Gingerich et al., 2014; Govaerts et al., 2011; Kogan et al., 2014). Trueman and Lockyer (2016) found stable and consistent reliability between MSF co-worker scores, for the purposes of feedback that is used for professional improvement. Trueman and Lockyer (2016) recommended that the co-worker - physician relationship should be carefully considered before the co-worker is invited to rate and provide feedback to the physician, as some relationships can positively bias the performance scores.

Before the introduction of CBA, the primary purpose of assessment was to measure the learner's abilities at a specific point in time and make decisions regarding their advancement in a program (summative assessment) (Holmboe et al., 2008; Norcini et al., 2011). Since the onset of a CBME model, the concept of assessment in medical education has been expanded to include resident accountability and improvement (Colliver, 2002; Cottrell, 2006). Therefore, CBA includes the trainee in the assessment and the learning process that follows, seeks to create authentic and practical learning environments, involves direct observation, and the provision of formative feedback (Carraccio et al., 2002).

Many medical educators agree that the rationale for conducting assessments within PGME includes an assessment of learning and assessment for learning (Lockyer, 2017). Assessment of learning is done for the purposes of determining the learner's level of achievement against a particular standard, typically focused at the end of a learning block or program and involves the provision of a grade or rank. Whereas assessment for learning involves gathering evidence so that educators can adjust their teaching and

learners can make changes towards attainment of competence and performance improvement (Brown, 2005). This perception of assessment for learning is a prominent component within competency-based education.

Learner-centered education is recognized as core to developing lifelong learning values and self-directed learning skills by learners (Dewey, 1974; Knowles, 1975). The development of these skills requires engagement in informed self-assessment and the use of portfolios (Sargeant et al., 2010; Tartwijk & Driessen, 2009). Informed self-assessment occurs when the learner identifies gaps or areas for improvement through self-reflection and locates credible sources to guide learning in those areas. Both self-assessment and portfolios are methods have been shown to enhance resident's performance (Lockyer et al., 2017).

Self-assessment by residents should involve an opportunity for reflection, particularly reflection in action. The act of reflecting can encourage residents to think about the tasks they perform (or are expected to perform), the challenges they face in completing those tasks, and what knowledge and skills they need to complete those tasks safely. Ideally, through self-reflection, the residents would recognize their limitations and what they can do to expand their skills (Eva & Regehr, 2007). Eva and Regehar (2008) coin this behaviour "self-directed assessment seeking" (p. 15).

Residents' self-reflections can be further stimulated through the provision of constructive feedback by one of their raters (typically their supervisor) using the results of assessment data. Kluger and DeNisi (1996) reported in results of their meta-analysis that the effects of feedback interventions (FI) on performance are variable and dependent

upon the conditions surrounding the FI. Some conditions support improvement, others have no effect, and yet others can cripple performance. Feedback interventions can have a negative effect or no effect on performance when: (i) the feedback is not shared with the intended participant or the feedback is provided, yet ignored (Kluger & DeNisi, 1996); (ii) infrequent and inconsistent observation of residents' performance, which is needed in order to document and analyze for behavioural patterns, and competency gaps (Day et al., 1990; Isaacson et al., 1995); and (iii) non-constructive feedback that is directed at the recipient as opposed to the tasks he or she completes (Hattie & Timperley, 2007).

Providing frequent and high-quality feedback is considered a paramount feature of CBA to ensure that residents are progressively building competence as they advance in their program (Frank et al., 2010). Feedback can positively affect performance when it provides the resident with direction on how to improve or correct specific behaviours, rather than just descriptions of how well they are doing (Bing-You & Trowbridge, 2009; Carraccio et al., 2002). Feedback that does not explicitly describe the actions the resident can take to improve can lead to learner frustration and dismissal of the feedback due to their uncertainty in how to respond to the feedback (Pridemore & Klein, 1995; Shute, 2008; Williams, 1997). When residents are not provided with details, they will need to self–analyze the feedback and engage in information processing activities that may result in cognitive overload and reduced learning and motivation to make the necessary changes (Kluger & DeNisi, 1996; Ashford, 1986). Pelgrim et al. (2013) found that providing

specific feedback to residents resulted in the development of action-based learning plans by residents.

The research on the impact of feedback indicates that the effects are variable (van de Ridder et al., 2015). This variability is linked to how the feedback was delivered (e.g., scheduled time to share and openly discuss the feedback), who delivered the feedback (e.g., someone they trust), if the assessment tool had qualitative or quantitative components, and if the resident actively participated in self-reflection (e.g., residents recognize areas in need of improvement and are therefore more accepting of constructive feedback) (Shute, 2008; Tekian et al., 2017). Sargeant et al. (2011) found that self-assessment, reflection, and feedback stimulate self-directed learning.

Some of the literature on self-assessment is negative – with a general conclusion that self-assessment is ineffective. Ward et al. (2002) negate this conclusion based on methodological approaches in those studies. However, even when studies were undertaken to correct methodological inadequacies, self-assessment was determined to be ineffective (Eva et al., 2004). Self-assessment scores do not often correlate with those of raters as learners tend to overestimate their competency level.

Eva and Regehr (2007) and Schön (1983) suggest that there is still power behind the self-assessment process and the value of it increases when it is used for self-regulation and reflection in action. Self-assessment then can help residents become aware of their limitations and strengths when making patient care decisions (Eva & Regehr, 2007). As per the MSF process, the PSAT$^{360°}$ has a self-assessment tool that residents complete. This tool serves to stimulate residents' reflection on their patient safety skills

and, therefore, self-awareness of gaps in their patient safety competencies and what they need to learn and practise during their residency.

Self-reflection by learners may be stimulated and supported by qualitative or narrative comments noted by raters on learner assessments, as opposed to quantitative scores alone (Pelgrim et al., 2012). Historically, selecting an assessment tool was based on the merits of the tool's psychometric properties. However, qualitative questions in an assessment tool are an example of another important consideration since they can drive learning. Narrative sections on PGME assessment tools provide raters with an opportunity to reason through their rating decisions, outline their rationale for the scores they give residents, describe concrete evidence or examples of performance, and provide strategies for improvement (Hodges, 2013; Linguard, 2009; Norcini, 2011; van der Vleuten, 1996). However, Eva and Hodges (2012) argue that qualitative sections on assessment tools introduce bias and subjectivity into a process that should have objective-based criterion only. Van der Vleuten (1996) suggests it is possible to have objective tools (e.g., checklists) that produce unreliable scores and subjective measures (use of global rating scale) that yield reliable scores. Having a group of raters discuss the assessment of residents is recommended over individual decision-making processes.

Schuwirth and Ash (2013) support the need for both quantitative and qualitative data, as well as structured and unstructured tools to meet the needs of both the program and the learner. Unstandardized tools allow for practical assessment at the "does" level of Miller's competency pyramid, or real-world experiences that are non-standardized and haphazard by nature (van der Vleuten et al., 2012). Appropriate assessment of residents at

Miller's "does" level can also be achieved through adequate sampling using multiple methods or tools, and multiple raters. This approach helps mitigate bias and potential subjectivity associated with qualitative questions and accounts for any deficiencies in any tool used (Eva & Hodges, 2012). Multiple tools should also be used to measure the same skill(s) within the same context. If different tools produce the same scores under similar conditions, then the score is a reliable indication of the learner's skill level. The use of multiple tools also helps to account for potential inadequacies of other tools used within the program.

The PGME assessment process should also involve a consistent process that uses assessment data to make decisions about residents' advancement in their program and focused areas for future learning. Surowiecki (2005) pointed out that decision-making completed via a group process is akin to using the wisdom of the masses and helps to increase reliability. For example, one group found numerous deficiencies in professionalism that were only detected when discussed by a group of raters (Hemmer et al., 2000). Schwind et al. (2004) reported that nearly 20% of surgical resident deficiencies were only noted after a committee gathered to discuss resident competencies.

Making decisions about residents' performance is supported by the availability of data that comes from multiple tools completed by multiple raters within various contexts. A list of various assessment tools and methods at the "does" level was summarized by Lockyer et al. (2017) and includes a review of resident charting/electronic medical record review, patient outcomes data, procedure or case logs, direct clinical observations, summative evaluations (e.g., end of rotation), product review (e.g., laceration repair),

MSF/360° feedback, and quality improvement or research project reviews. Entrustable professional activities (EPAs), defined as a task or responsibility to be entrusted to a resident once sufficient competence such that unsupervised practice is allowed, has also been adopted as a competency-based assessment tool (ten Cate, 2005, 2006). Entrustability implies that residents are competent and ready for increased independence during their clinical training, but a supervisory lens is maintained. The level of supervision can shift as the resident demonstrates a decreased, or an increased, need for assistance as they complete clinical tasks. Wagner et al. (2018) and Hauer et al. (2013) explained that their use of EPAs in residency assessment increased skill development and independent performance. Using a rating scale linked to entrustability was seen as potentially relevant for PGME and the PSAT$^{360°.}$ An entrustability scale was included in the list of scales rated by experts and stakeholders, including residents and faculty.

An entrustability rating scale, qualitative feedback, self-assessment, and reflection are some of the factors linked to successful CBA in PGME. There are also challenges, such as the need for multiple raters (who have complex clinical and academic schedules), faculty buy-in, and the impact of the assessment process on residents' performance (Bowen, 2006; Harris et al., 2017). Adopting a hybrid of summative and formative assessments is often faced with criticism and dissatisfaction by faculty (Harris et al., 2017). It is also challenging when residents' performance during an assessment does not match their typical clinical setting performance. Some residents are highly skilled, but do not perform well during an assessment due to fatigue, feeling unwell, or facing personal challenges. Some researchers have also questioned if residents' performance during

assessment accurately reflects their performance in practice, without the pressures of being observed and rated (Bowen, 2006; Schmidt et al., 1990). These challenges are important to the design and use of the PSAT$^{360°}$. The PSAT$^{360°}$ is an MSF tool that would require professional development to encourage buy-in and the assessment items would need to reflect tasks residents would perform in practice.

2.5.2 Workplace-based Assessment (WBA) in Postgraduate Medical Education

In their article, Norcini et al. (2018) suggested that there are principles of assessment that have greater importance for formative, WBA assessment approaches (e.g., MSF) than others. By the very definition of formative assessment, the catalytic effect; the educational effect, and feasibility are of great importance.

An assessment tool is said to have a *catalytic effect* when it motivates stakeholders to use the results and feedback to drive future learning (Norcini et al., 2018). Learners use the results to seek education/training to meet gaps and master skills. Faculty use the scores and feedback to create learning opportunities and to coach learners. It can also indirectly stimulate program improvement – aggregate scores that identify gaps can drive enhancements to curriculum and training experiences.

An assessment tool that has been selected for use should have *an educational* effect and therefore motivate faculty and learners to prepare for the assessment by participating in learning that directly matches the assessment requirements, and faculty ensures those opportunities are presented to the learner (Norcini et al., 2018). In this instance, it outlines a set of expectations for both stakeholders. It is important that all stakeholders accept and trust the assessment tool and process (another critical element of

CBA). By doing so, faculty and learners are committed to participating in ongoing assessment, giving and receiving feedback, reflecting and making meaning from the feedback and scores (e.g., cognitive load), and then using the feedback to make any necessary changes.

Feasibility (the assessment is practical and cost-effective to administer in terms of human resources and data management) is an important consideration given that formative assessments are carried out frequently and can involve large numbers of people to complete to obtain meaningful scores (e.g., MSF) and management of large data sets (Norcini et al., 2018). It also requires, or costs, significant time to prepare and deliver specific/tailored feedback reports.

Keeping the feasibility factors in mind, there is still an increased interest in employing a WBA protocol within many residency programs, yet, some do not feel there is enough evidence to justify its use in some contexts. Wearne and Brown (2014) suggested that WBA is the most appropriate approach to assessing professionals' performance. However, WBA does not come without its challenges or criticisms for being "unpredictable, unstandardized and biased" (p. 889).

Some of the criticism around WBA is linked to the tendency of experienced health professionals to make quick judgements of performance based on his or her intuition and experiences in teaching and assessing residents, rather than a deliberate reflection on each resident and analysis of the evidence before arising at a judgement (Sibbald et al., 2014). While these intuitive judgements of performance are most often correct, they may be associated with bias since the decision is not linked to assessment

data or evidence of competence. Failing to use assessment data can result in residents being inappropriately entrusted to perform tasks independently, which increases the risk for PSIs (Rethans et al., 2002). To alleviate these challenges, faculty should be asked to complete professional development that focuses on how to review and use performance data to make entrustment decisions.

Minimizing the impact of subjectivity and rater's bias can be accomplished through professional development. Govaerts et al. (2011) and Govaerts et al. (2013) suggest training raters so they have knowledge of the required competencies, how those competencies should be demonstrated by learners within practice, practical steps in observing learners, and how to complete the assessment tool. This is particularly important in the use of MSF/360° assessment, where many raters are unfamiliar with the process, including how to provide feedback to ratees. Training for users of MSF/360° is imperative to elucidate concerns they have and further engage them in the process.

Rethans et al. (2002) explain that WBA is appropriate for PGME given the context of residents' training and its focus on improvement of skills using feedback collected within the clinical setting. Singh and Modi (2013) explained that successful elements of WBA in PGME include direct observation of the resident within the workplace setting and the provision of feedback. Several studies found that WBA improved residents' communication and diagnostic skills, and attributed this success to include structured and personal feedback as part of the process (Jain et al., 2014; Nair et al., 2015; Weyers et al., 2016). It is important to take note that direct observation is highlighted as a key factor in the literature. To effectively provide the resident with

examples of specific behaviours the resident needs to improve on, the rater needs to have observed this behaviour themselves, and their ratings and feedback should not be based on someone else's opinion or interaction with the resident.

Faculty can help residents accept and effectively use the feedback they receive through coaching and fostering the social aspect of assessment. The social element involves faculty getting to know residents and building trust and a rapport with them. (Sargeant et al., 2008; van der Vleuten et al., 2010). Sometimes assessment scores can elicit negative emotional responses among residents, such as distress due to scores and feedback inconsistent with their own self-perceptions. Responses can differ depending on the source, such as a learner's supervisor versus a professional from another discipline or profession. Hence, learners may need assistance in understanding any negative or opposing feedback, and how it fits within the bigger picture and their overall learning.

Ferguson et al. (2014) found that acceptance of MSF feedback depended on the format of the feedback. Feedback that was delivered using a facilitated format was preferred over a feedback report. In a facilitated format, the rater and the resident would discuss the MSF report during a scheduled time so there would be no interruptions, the resident would be able to ask questions, and an action plan for improvement would be co-developed.

Since the feedback process is central to the success of an MSF model and CBME, using novel approaches to facilitate an efficient and meaningful feedback session is imperative. Complementing an MSF process with an R2C2 (resident, reaction, content, and coaching) model is an option. R2C2 is built on the premise of a "trusting educational

alliance" framework (Telio et al., 2015). The educational alliance is constructed based on the supervisor and resident building an alliance much like a patient and physician, where trust and agreed upon goals are established. The feedback process is not seen as a transmission of information from the supervisor to the resident, rather it is based on dialogue and negotiation of the goals. The R2C2 process involves establishing a rapport and relationship with residents, exploring the residents' reactions to the feedback (how did residents feel about the feedback they received and how they would use it), and ensuring that residents understand the feedback (Sargeant, 2016).

Multisource feedback is viewed as a valuable WBA approach to identifying and improving resident competency levels, including team collaborative and communication skills, and a means to stimulate self-directed learning by residents (Dannefer et al., 2005; Violato et al., 1997). Multisource feedback is considered most effective when it entails credible raters providing qualitative feedback (that is framed constructively) and quantitative scores, and a plan for how to improve (Norcini, 2003). Nofziger et al. (2002) reported that residents thought the MSF process was empowering and instructive when the peer assessment was timely, confidential, and useful (e.g., received helpful comments). Otherwise, the scores and feedback can be viewed negatively by the ratee and therefore destructive to learning (Epstein, 2007).

Becton and Schraeder (2004) suggested that there is value in allowing residents to participate in the selection of MSF raters to enhance engagement in the process, increase the perception of credibility and fairness, and feedback utility. One study examining the effectiveness of MSF showed that individuals choose raters based on the perceived value

of the feedback they would receive from them, personal relationships with those raters, and the practicalities of getting the tool completed (Burford et al., 2010). Sargeant et al. (2008) also found that familiarity between the ratee and the raters was an important consideration in MSF. They noted in their pilot program a positive correlation between mean ratings and familiarity between the ratee (e.g., resident) and raters (e.g., supervisor, nurse, patients). The quantitative ratings or scores were positively correlated with familiarity, yet acceptance of qualitative feedback by ratees was negatively correlated. This was an interesting finding since raters who are more familiar with residents' work and capabilities are expected to provide the most accurate rating and feedback on areas they need to improve. This raises the following questions: Is it possible that raters who are less familiar with the ratee provide more general feedback and is easier to accept? Do physicians find it challenging to receive and accept feedback from other non-physician health professionals, even if they are familiar with them?

Other studies also found a relationship between scores and familiarity (Lipner et al., 2002; Ramsey et al.,1993), while others found no correlation (Hall et al. 1999; Lockyer, 2003). On one hand, ratees want to select their raters based on how well they know them and how comfortable they feel with having that rater judge their competency level. On the other hand, they are less likely to accept feedback from them. For this reason, there appears to be great variability and no clear answer on the selection of raters based on familiarity or not within an MSF process.

There is increasing support towards allowing ratees to select their MSF raters or to be involved in the selection process. The inclusion of patient ratings as part of an MSF

process is valuable, yet not without challenges such as the high number of patient surveys needed to meet satisfactory reliability. Seriously ill patients tend to rate individuals lower than mildly ill patients, and patients cannot always relate to or make judgements on the resident/physician clinical practice environment (Violato et al., 1997).

Multisource feedback gained momentum in the early 1990s when it was employed to evaluate residents and internists on their overall performance and then was standardized for use in Canada to evaluate family physician performance. Ramsey et al. (1993) reported that the MSF method helped evaluate physicians' communication skills and humanistic qualities. Several programs have implemented MSF within residency training programs and physician performance review programs, with both successes and challenges. Sargeant et al. (2003) reported that 61% of physicians in their MSF pilot study indicated that they either had already made changes to their professional practice or were planning to do so based on the feedback they had received. One recent study demonstrated favorable acceptance by residents, indicating that while the extra burden associated with completing the surveys existed, they thought there was value-added to their assessment system (Hicks et al., 2018). This study also expressed a high participation rate and higher reliability scores than many other MSF programs.

A Canadian physician-based MSF program, the Physicians Achievement Review (PAR) program, operationalized by the College of Physicians and Surgeons of Alberta, assesses every physician in Alberta every five years (Hall et al., 1999). Patients, physician colleagues, and non-physician co-workers complete confidential questionnaires, and then physicians are provided with a feedback report of the compiled

responses. The report contains a set of individual scores for each dimension, as well as a comparison of their individual results with physicians in similar practice settings (College of Physicians and Surgeons of Alberta, 2004).

Another MSF study by Moonen-van Loon et al. (2015) reported high-reliability scores when participants engaged in two rounds of MSF (with 10 raters per round) or three MSF rounds (with five raters per round). A feasible number of raters and completion of more than one MSF round were key success factors. Feedback stemming from the MSF process was powerful in driving reflection and improvements.

The literature supports the need to develop a patient safety assessment tool that involves multiple raters, is suitable for use within the clinical workplace, and is designed to foster skill improvement and growth. Residents have specific patient safety competencies to attain, and relevant clinical training and curriculum will increasingly become embedded in PGME. To ensure residents are skilled in patient safety as they progress and upon entry to practice, there is a need for a tool that prompts self–reflection, self-directed learning, action plans, direct observation, measurement of entrustment, specific feedback, coaching, and role-modelling by health professionals.

The goal of this study was to develop an MSF, workplace-based assessment tool that incorporates these qualities. To do this successfully requires engagement with experts and stakeholders to determine their perspectives on how to design the tool, what content should go in the tool, and how it should be used (e.g., how do we prompt self-reflection and at which time points during the program should we assess residents). Equally important was determining experts' and stakeholders' perspectives on patient

safety and what it means to them given their educational role and workplace context. Hence, this study required a mixed methodology that involved talking to stakeholders and experts, and collecting data to determine agreement on which patient safety assessment items to include in the PSAT$^{360°}$.

2.6 Content Validity

Validity is recognized as a fundamental aspect of assessment, particularly high-stakes examinations or testing used to make decisions regarding promotion, graduation, and competency (McManus et al. 2013; Messick, 1995). Validity has been reported as, "the most fundamental consideration in developing and evaluating tests" (American Educational Research Association [AREA], American Psychological Association [APA], and National Council on Measurement in Education [NCME], 2014, p. 11).

Differences in how validity is conceptualized among researchers, theorists, and validity experts exist. Historically, a simplistic description of validity was provided - a property of a test concerned with how well the test measures what it is purported to measure. In the 1940s, validity of an instrument was viewed as something that was static, where it remained unaffected by the characteristics of the test takers and the context in which it was administered (Brown, 2010; Jonson & Plake, 1998). Today, most extend this view of validity to be a concept that involves a complex array of theoretical and observational elements across three separate types: content, criterion, and construct (Borsboom et al., 2004; Ghaderi, 2018; Kane, 1992; Messick, 1989). For several decades construct validity was considered the common approach to validity, until Samuel Messick suggested a unitary framework of validity. Messick (1989) purported that this unitary

framework closed the gaps that existed within the fragmented traditional view of validity, by placing value on score interpretations and the social impact, or social consequences, of using test scores on the educational system and the test taker (e.g., ratee's self-perceptions after they receive their assessment scores). This unifying view of validity was meant to bring all the different types under a single category (Ghaderi, 2018).

While there are numerous supports of this unitary validity framework, many researchers have suggested that this validity framework is impractical and an unattainable goal for many researchers and practical testers (Borsboom et al., 2004; Fremer, 2000). Messick (1989) suggested that content validity is one source of information that is required to support or refute meaningful interpretations of test or assessment scores. Ghaderi (2018) defines content validity as the "relationship between a test's content and the construct it is intended to measure" (p. 4). In the case of the PSAT$^{360°}$, content validity would be the relationship between the individual assessment items within the tool and how well they collectively represent resident's patient safety skills.

Linda Crocker (2003), in an address to the National Council on Measurements in Education, called for researchers to return to the idea of content validity and stated, "When scores are used for educational accountability, the 'load bearing wall' of that [validity] argument is surely content representativeness" (p. 7). Lissitz and Samuelsen (2007) agree with this renewed focus on content validity, reject the unitary definition of test validity, and provide an alternate approach to conceptualizing the issues associated with test validity.

Lissitz and Samuelsen (2007) proposed a taxonomy to help test and assessment tool developers determine the purpose or focus of the investigation – whether it is internal or external to the test, and if the test will be practical or theoretical. An internal focus involves test development and analysis of the test content. Whereas an external focus entails analysis of the constructs, the observable indicators, and the utility and impact of the test.

Given this renewed notion of establishing test validity, Lissitz and Samuelsen (2007) express that critical analysis of the test content should be the first step. This does not imply that theory is not an important element when developing tests, but one that should be considered separately from content validity and test development. Lissitz and Samuelsen (2007) further state that in:

> working towards content validity is a very important activity (and, for many purposes of testing, it is the most important activity). The test development phase has always been considered critical to the successful completion of test construction or assessment activity. (p. 493)

Sireci's (1998) description of content validity can be used as guiding framework in establishing content validity in assessment tools. Four elements of content validity include test blueprints or domain definitions, domain representation, domain relevance, and appropriateness of the test development process (Sireci, 1998). *Test blueprint or domain definitions* include descriptions and lists of the content and cognitive abilities the test is designed to measure. *Domain representation* refers to the representativeness of items to the construct(s) and target domain. This element of content validity involves

having subject matter experts determine if the test items sufficiently represent the test domain. *Domain relevance* involves logical or empirical analysis of the test's content and the extent to which each item is relevant to the targeted domain. In this case, subject matter experts may be asked to rate the relevance of each test item. Those that are important to the test domain would receive high ratings and those items of low importance would receive low ratings. The fourth element of content validity, *appropriateness of the test development process*, describes the processes used to ensure that the test content represents the targeted test domain, including the use of content and measurement experts to ensure the test is fair and equitable, and does not contain items that are irrelevant or significantly challenging for some individuals than for others. For this reason, it is suggested to have experts who have experience in generating and analyzing test content for relevance, structure, and wording (American Educational Research Association [AERA], American Psychological Association [APA], and National Council on Measurement in Education [NCME], 2014; Ebel, 1956; Sireci, 1998; Sireci & Faulkner-Bond, 2014).

Key principles associated with content validity, multisource feedback, workplace assessment, competency-based education and assessment, and patient safety were used to inform the development of the PSAT$^{360^{o}}$. The research design and steps taken to develop the PSAT$^{360^{o}}$ are outlined in the next chapter.

Chapter 3: Methodology

The purpose of this study was to design and validate the content of the PSAT$^{360°}$, an MSF tool for assessing residents' patient safety skills. A mixed methods research (MMR) approach was used to address the research questions for this study. This approach entailed a scoping literature review and environmental scan, a series of interviews and focus groups, analysis of competency frameworks and relevant guides and recommended practices, a Delphi survey, and a pilot test. Experts and stakeholders were asked to provide input on the content and design of the PSAT$^{360°}$ through interviews and focus groups. These data were cross-referenced with peer-reviewed literature and grey literature and documentation resulting from an environmental scan to develop a list of important patient safety skills. Using a Delphi survey method each of the skills within this list were rated for importance and clarity by patient safety experts, and a draft of MSF tools were developed. Tools were then reviewed by a sample of end-users, and the ratings and feedback were used to generate a series of multisource feedback tools for assessment of residents' patient safety skills, namely, a self-assessment survey, a patient survey, and a supervisor/colleague survey.

3.1 Methodological Approach

3.1.1 Mixed Methods Research

A mixed methods research (MMR) approach was necessary to address the research questions for this study and generate a comprehensive tool by integrating qualitative and quantitative research design elements. As Creswell and Plano Clark (2010) pointed out, the researcher questions are central to the need for and the design of

an MMR study. In this study, there was a need to explore a specific phenomenon and confirm information with key experts and stakeholders. The research problem needed to be addressed across multiple phases and using multiple research methods. For this study I adopted the definition of MMR developed by Johnson et al. (2007).

> Mixed methods research is the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the purposes of breadth and depth of understanding and corroboration. (p. 123)

Mixed methods research sits within philosophical debates because qualitative and quantitative work are associated with opposing viewpoints on the nature of reality, the nature and construction of knowledge, context, and the influences of objectivity, subjectivity, and the researcher-participant interaction (Green, 2006). Sale et al. (2002) suggested that the philosophical distinctions of the qualitative-quantitative debate have become blurred, and many new researchers are selecting methods based on the research questions. Casebeer and Verhoef (1996) proposed that qualitative and quantitative methods should be viewed as a "continuum of research" (p. 46), as opposed to being independent of each other, and selected based on the research questions.

The following section presents several criteria and axiological considerations used to select the most appropriate MMR design for this study, and articulates the function of the research and the theoretical or ideological perspectives.

3.1.2 Study Design

An MMR typology served to guide decisions regarding the study's design and ensure all facets of MMR were considered, including the purpose of MMR study design, theoretical or ideological perspective, study feasibility, and the needs of an MMR researcher. Identifying the purpose for mixing quantitative and qualitative methods is a key principle in designing a MMR study. Two prominent frameworks by Greene et al. (1989) and Bryman (2006a) help researchers justify and articulate the reasons for mixing methods. It was decided, following a review of these frameworks, that 'development' most closely aligned with the goals and purpose of this study. The primary intent of development is to use the findings from one method (qualitative in this case) to inform that of the other (quantitative in this case) (Greene & Caracelli, 1997). According to Bryman (2006a) instrument development is one of the purposes for mixing where the qualitative research is used to develop rating scale and survey items, that are then tested in a subsequent strand.

This study entailed gathering credible evidence from literary sources, regulatory bodies, patient safety and MSF experts, and end users of the PSAT$^{360°}$ as to what constructs should be in the tool to accurately reflect the resident's role and how the content should be worded, structured, and used. The qualitative strand provided information on the context in which the tool would be used, as well as the feasibility and utility of the tool. The data from this qualitative strand were used to develop the PSAT$^{360°}$. The second strand of the study was used to determine if the tool accurately

reflected the input and evidence gathered in the qualitative strand, and if the tool was comprehensive, feasible, and had utility.

Another important facet to the design of an MMR study is determining which, if any, theoretical or ideological perspective(s) will influence the research. For this study, a pragmatic perspective was maintained throughout. Elements of each paradigm were deemed to exist along a continuum, where aspects of each were represented.

There are also four core decisions that researchers need to make when selecting the most appropriate MMR design, including the: (i) level of interaction between the strands, (ii) the priority of the strands, (iii) the type of implementation process (e.g., timing of the strands), and (4) the procedures for mixing the strands (Creswell & Plano Clark, 2010; Greene & Caracelli, 1997; Tashakkori & Teddlie, 2010). How these core decisions apply to this study are outlined in Table 1 below.

Table 1

Core Decisions Used to Select a Mixed Methods Research Design and its Application to this Study

Decision	Design
1. Level of interaction between the strands	Interactive: There is a direct interaction between the qualitative and quantitative strands. The design and conduct of the second, quantitative strand was dependent upon the results of the first, qualitative strand.
2. Priority of methodological approach	Qualitative component of the study is the more dominant strand of the study, over the quantitative component: QUAL → Quan. This is a typical approach when developing an exploratory MMR design for instrument development, such as the case for a learning assessment tool (Creswell & Plano Clark, 2007).

Decision	Design
3. Type of implementation process or the timing of the strands	Data collection occurred sequentially, without data conversion. The quantitative data collection and analysis occured after the collection and analysis of the qualitative data.
4. Stage of integration	As previously described, MMR was threaded throughout the study and pragmatically driven by the research questions. In this study the qualitative data were first collected and analyzed, and were then used to inform the subsequent quantitative phase. Integration at the methods or data collection level occurred through the process of *building* – where the results of the first, qualitative phase were *connected* to and used to *build* the second quantitative phase. The second, quantitative phase tested the initial qualitative findings (Creswell & Plano Clark, 2010; Creswell, Klassen, Plano, & Smit, 2011). Items for inclusion in the survey were identified through the qualitative phase involving interviews and focus groups with study participants based on their experiences. At the interpretation and reporting level, a contiguous approach involving reporting of the qualitative findings preceded the report of the quantitative findings. This study design also involved interpreting how the quantitative results built upon the initial qualitative results.

An exploratory sequential research design was used for this study in accordance with the criteria and decision points outlined by Creswell and Plano Clark (2010), Greene and Caracelli (1997), and Tashakkori and Teddlie (2010). This explorative design can be used when measures or tools are not available, including the content or guiding framework for how they should be designed or used (Creswell, 2003; Creswell et al., 2004; Teddlie & Tashakkori, 2009). Therefore, an exploratory sequential design suited this study as its purpose was designing, developing, and testing a new instrument.

The qualitative exploratory phase entailed first exploring and understanding the concept of patient safety within PGME and how this applies to a competency-based framework and the process of assessment. It then involved discussions with participants through interviews and focus groups, and analyzing the literature and an environmental scan. These qualitative findings were used to develop the survey items and scales for the new assessment tool. The second quantitative phase was used to validate the tool. The study design was therefore qualitative dominant (e.g., QUAL → quan) since the qualitative strand resulted in information that served as the foundation for the PSAT$^{360°}$.

The qualitative strand in the study allowed for the collection and comparison of information from the literature, an environmental scan, and key stakeholders/end users of the PSAT$^{360°}$ (residents, patients, supervisors, and co-workers). This qualitative strand allowed these stakeholders to have a voice in what the PSAT$^{360°}$ should measure based on the context in which they work and how it should be used within that context. The qualitative data were analyzed and used to draft a set of assessment items and rating scale options. This information was then rated by experts in patient safety (Delphi survey), compiled into a draft version of the PSAT$^{360°}$ and piloted by end-users as part of the quantitative phase.

3.2 Establishing Content Validity

Lissitz and Samuelsen (2007) provide examples of questions that test developers should reflect on and potential sources of evidence for content validity (Table 2). This helps test developers prepare in advance of developing the tool, what they will need to establish content validity. For example, how they will acquire the test content and ensure

it is appropriate for the target audience, that the content is reflective of what is expected of the target audience, and that the items are written properly.

Table 2

Content Validity: Sample Questions to Ask and Potential Sources of Evidence

Perspective	Sample of Questions Asked	Potential Sources of Evidence
Practical – Content	1. Does the assessment encompass the full range of the content standards? 2. Does the assessment properly reflect the cognitive complexity of those standards? 3. Is the same emphasis reflected in the assessment as in the standards and in the classroom? 4. Are the items appropriate for the purpose of the assessment? 5. Are the items properly constructed? 6. Are there criteria and mechanisms in place for scoring the items?	1. Analysis of the curriculum 2. Creation of a table of specifications or test blueprint 3. Documentation of match between items and blueprint 4. Documentation that students have the opportunity to learn 5. Documentation of the qualifications of the item writers and raters (including their training) 6. Review of items and scoring rubrics for quality 7. Examination of item characteristics (difficulty, discrimination, option selection) from pretest, pilot, or field test

Note. Content Validity: Sample Questions to Ask and Potential Sources of Evidence. Adapted from "*A Suggested Change in Terminology and Emphasis Regarding Validity and Education,*" by R. W. Lissitz and K. Samuelsen, 2007, Educational Researcher, 36,* p. 441. Copyright 2018 by Sage Publications. Adapted with permission.

The collection and provision of evidence as it relates to the development of the PSAT$^{360°}$ tool, under the content domain, will be described in this chapter and the results, respectively. The purpose for developing the PSAT$^{360°}$, based on application of Lissitz and Samuelsen's taxonomy (described in chapter two), is practical with an internal investigative focus. Therefore, the first step in test validation should be focused on

content validation, determination of test characteristics independent of other tests, and the observable manifestations of the tool's content.

The purpose for developing the PSAT$^{360^{o}}$ is regarded as practical for several reasons, including the desire to provide a tool that reflected residents' needs in regards to providing continuous feedback that would guide the development and mastery of their patient safety skills. A practical, internal approach to development and content validation of the tool was accomplished by collecting, reflecting, and analyzing required competencies, curriculum, and training frameworks in the domain of interest (patient safety) and for the appropriate target audience (residents). The information extracted from all these documents were crossed-referenced (competency mapping or blueprint process) to ensure all patient safety skills were identified for inclusion in the assessment tool. A rigorous process was undertaken to establish content validity by analyzing assessment items by content and test development experts (e.g., experts patient safety and PGME assessment) and end users of the tool (e.g., supervisors, residents, nurses, and allied health professionals). In addition, well-defined scoring criteria and consensus standards were used by content experts and end users in the process of identifying assessment items.

Establishing content validity is regarded as an important step in the development of a validated assessment tool; therefore, a comprehensive content validity approach was undertaken for the development of the PSAT$^{360^{\circ}}$. There was no valid assessment tool for formative use within the context of PGME or residents' clinical workplace, prior to the development of the PSAT$^{360^{\circ}}$. There were multiple sources of content that were relevant

for the PSAT$^{360°}$ that had not been drafted or validated for this purpose of inclusion in an assessment tool for residents. Therefore, it was imperative that this study focus on confirming the content (patient safety skills) that was most important to include in the tool and clarity of that content or the language used.

3.3 Methods

This study involved a comprehensive environmental scan and literature review (Phase I), key informant focus groups and interviews (Phase II), competency mapping and development of assessment items for the PSAT$^{360°}$ (Phase III), a ranking of survey items (Delphi round I; Phase IV), a second ranking of survey items (Delphi round II; Phase IV), confirming edits to survey items (Delphi round III; Phase IV) and determining the importance, clarity, utility, and feasibility of the PSAT$^{360°}$ among a small cohort of ratees and raters (Pilot, Phase V) (Table 3).

Table 3

Outline of each Phase of the PSAT $^{360°}$ Study

Phase	Description
I	**Literature Review and Environmental Scan**
II	**Key Expert and Stakeholder** Consultations - Interviews and Focus Groups with Experts in MSF and Patient Safety - Key Informant Interviews and Focus Groups with PSAT$^{360°}$ raters/ratees (Faculty, Residents, Allied Health, Nurses)
III	**Competency Mapping and Development**
IV	**Delphi Round I, II and II** **Delphi Round I: Patient Safety Experts** First draft of Patient Safety Assessment Tool (PSAT$^{360°}$)

Phase	Description
	Delphi Round II – Patient Safety Experts Summary of round one results and second draft of Patient Safety Assessment Tool (PSAT$^{360°}$) **Delphi Round III: Patient Safety Experts** Summary of round II results and changes to survey items
V	**Pilot** Rating of the importance and provision of feedback on the clarity of wording, utility, and feasibility (self- assessment/resident survey, supervisor/co-worker survey, patient survey)

3.3.1 Phase I: Literature Review and Environmental Scan

This phase involved collecting data from multiple literary sources, including peer-reviewed literature, grey literature, and an environmental scan to help inform the list of patient safety skills to be included in the PSAT$^{360°}$, and to determine domains and competencies descriptive of the provision of safe patient care by residents and physicians. A systematic approach to the literature search and environmental scan was developed in consultation with a librarian experienced in searching in the medical education field. This process involved discussions with the librarian to determine key search terms, databases, and combinations of search terms to be used to ensure a comprehensive literature search.

A scoping literature review was performed to obtain articles that would inform the development of the patient safety MSF tool (PSAT^{360º}), including a rating scale, survey items (patient safety skills), format (e.g., online versus paper, open-ended questions), and utility (e.g., stage and frequency for use in residency). Currently, there is no universal definition for scoping reviews, but as indicated in Levac et al. (2010), many refer to scoping reviews as a "mapping [or] process of summarizing a range of evidence in order

to convey the breadth and depth of a field" (p.1). A scoping literature review is used when trying to perform broad topic searches, as opposed to a systematic literature search when addressing a specific research question(s) (Davis et al., 2009; Levac et al., 2010).

Scoping reviews are becoming increasingly popular within the health care research sector as a framework for reviewing health research evidence. Pham et al. (2014) noted that 58% of the scoping reviews they analyzed (n = 344) were conducted within the health care sector. The goal of a scoping review is not to provide an assessment or rating of the quality of the included references or studies, rather it is done to screen and review the articles for information purposes (Brien et al., 2010; Grant & Booth, 2009; Rumrill et al., 2010). Arskey and O'Malley (2005) explained that researchers complete a scoping review to carry out one or more of the following: (i) examine the breadth and nature of research activity within that topic area, (ii) determine if there is value in completing a full systematic review on this topic, (iii) disseminate the research findings or, (iv) identify gaps in the literature for that topic area.

The purpose of the scoping review for this project aligns with (i) and (iv) above; to determine the extent of the existing literature on patient safety assessment within PGME, gaps in the area of patient safety assessment tools for residents in medical postgraduate training programs, and a summary of the literature search findings. Further to this, the findings from the scoping review identified patient safety assessment or feedback tools for this target population, as well as relevant and informative patient safety curriculum. The findings from this step were then used to inform the development of the PSAT$^{360^o}$ tool.

Arksey and O'Malley (2005) described a framework for conducting a scoping review to ensure proper documentation so that the study can be easily replicated, which increases the reliability and methodological rigor. This five-stage framework as it applies to this study is described in Table 4.

Table 4

Parameters for each of the Five Scoping Review Stages

Stage	Stage Description	Scoping review parameters for this study
1	Identifying the research question that will be addressed by the scoping review.	What information regarding patient safety assessment or feedback tools, curriculum or competency frameworks within postgraduate medical education can be extracted from peer-reviewed literature that may inform the design and development of a patient safety assessment tool for medical residents?
2	Identifying relevant sources that will permit a comprehensive search that will identify articles that are central to the scoping research question.	The following sources were used to capture relevant articles: - Peer-reviewed literature in medical, health and education electronic databases including: EMBASE (2005 - March, 2016), MEDLINE via PubMed (2005 - March, 2016); ERIC (2005 - March, 2016); - Other sources including: o searching ProQuest Dissertation and Theses Global for thesis and dissertations; o contacting experts to request details of any known studies (e.g., known Canadian researchers in this subject area) - Hand searching of key journals - Reviewing the reference list of included studies
3	Study selection includes outlining the inclusion and exclusion criteria of articles. A	Peer-reviewed articles that describe the following within the postgraduate medical education context:

Stage	Stage Description	Scoping review parameters for this study
	more detailed outline of inclusion and exclusion criteria are outlined below in Table 4	- Patient safety assessment tools - Patient safety feedback tools - Patient safety competencies or competency frameworks - Patient safety curriculum with defined learning objectives - Patient Safety clinical guidelines or regulations - Patient safety and workplace or competency-based assessment - Program or curriculum evaluation studies
4	Charting key information extracted from the articles identified after stage 3	Ritchie and Spencer (1994) described an approach for synthesizing and categorizing contextual or process oriented information from each of the included articles. The following is a list of items that were charted: - Author - Publication year - Type: Descriptive, intervention or case study - Aims of the study - Methodology - Outcome measures (e.g., curriculum, tool, guideline/regulations)
5	Collating, summarizing, and reporting the results	An overview of the articles that were included, and why others were excluded, and then presented as a numerical account of the nature and distribution of the articles included (target population, a distribution of the overarching patient safety theme/category, and outcomes measures).

A set of inclusion and exclusion criteria (see Table 5) were identified before conducting the literature search in each of the databases and other sources.

Table 5

List of Inclusion and Exclusion Criteria used in the Screening of Articles and Documents Retrieved from each Source

Inclusion Criteria
1. Patient safety curriculum within postgraduate medical education, with defined learning objectives that broadly relate to patient safety competencies for this cohort (includes curriculum that delivered within a specific discipline, yet are also broadly applicable)
2. Skills, attitudes, and knowledge in relation to patient safety and quality improvement in medication education, including continuing professional development and clinical practice
3. Dimensions related to patient safety competency of residents (harm, adverse events, PSIs, disclosure, medication reconciliation, advocacy, and other CanMEDS Roles)
4. Patient safety literature arising from research projects related to postgraduate medical education, patient safety competencies and assessment, including those describing: • Patient safety assessment tools • Patient safety feedback tools • Patient safety competencies or competency frameworks • Patient safety curriculum with defined learning objectives • Patient safety clinical guidelines or regulations • Patient safety and workplace or competency-based assessment
5. Pilot programs/trials designed to measure impact on generalizable patient safety skills (e.g., safe prescribing practices trial- inform interventions with focus on behavioural changes to enhance responses to high-risk prescribing feedback)
6. Program or curriculum evaluation studies related to patient safety within postgraduate medical education
Exclusion Criteria
1. Patient safety curriculum designed, developed, or implemented for non-postgraduate, non - medical cohorts, or the curriculum is discipline specific
2. Piloting or evaluation of a discipline specific clinical program or technique (e.g. table position guide for radiology treatment, laparoscopic team training, use of ultrasound to improve Central Venous Catheter insertion)
3. Intervention involving, or a description of discipline specific (e.g., surgery, orthopedic, oncology, etc.) clinical skills, tasks, procedures, techniques, therapies, policies, protocols, or reports
4. Instructional strategies for teaching patient safety
5. Safety and efficacy related to treatment interventions

6.	Audit results or anecdotal descriptions
7.	Narratives, case studies, or case analyses detailing patient experiences with patient safety
8.	Consumption of medications or descriptions of specific medication error outcomes
9.	Financial impact, outcome measures, economic evaluations related to patient safety incidents

An initial list of significant search terms was first developed in consultation with the librarian, then a list of synonyms and alternate terms were compiled into search strings (Tables 6, 7, and 8). The literature search involved using various combinations of the search strings together within the following databases: Pubmed, Embase, and Eric (Stage 2, Table 4). Literature linked to these search strings over the last ten years was captured for review and analysis in this phase of the study.

Table 6

Search Strings with Medical Subject Headings (MeSH) and Key Terms Utilized in PubMED Database Literature Search

Concept & notes on scope	**Search String**
Patient Safety *Search may not retrieve articles about specific patient safety issues such as medication errors or pressure ulcers.*	"Patient Safety"[Mesh] OR "Patient Safety"[tiab] OR ((safe*[tiab] OR "Safety"[Mesh] OR error*[tiab] OR adverse[tiab]) AND ("Risk Management"[Mesh] OR "Medical Errors"[Mesh] OR “Safety Management"[Mesh]))
Medical Education	"Education, Medical"[Mesh:NoExp] OR "Education, Medical, Graduate"[Mesh] OR "Internship and Residency"[Mesh:NoExp] OR "Education, Medical, Undergraduate"[Mesh] OR "Education, Medical, Continuing"[Mesh] OR (("education"[Subheading] OR "Curriculum"[Mesh] OR educat*[tiab] OR "professional development"[tiab] OR curricul*[tiab]) AND ("Physicians"[Mesh] OR "Medicine"[Mesh] OR

Concept & notes on scope	Search String
	"Students, Medical"[Mesh] OR medicine[tiab] OR medical[tiab] OR physician*[tiab] OR doctor*[tiab] OR residen*[tiab] OR intern*[tiab] OR trainee*[tiab]))
Competency/ Skill Assessment	("Clinical Competence"[Mesh] OR competenc*[tiab] OR skill*[tiab] OR behavior*[tiab] OR behaviour*[tiab] OR abilit*[tiab] OR knowledge[tiab]) AND ("Feedback"[Mesh:NoExp] OR "Formative Feedback"[Mesh] OR "Educational Measurement"[Mesh] OR "Employee Performance Appraisal"[Mesh] OR "Behavior Rating Scale"[Mesh] OR "Checklist"[Mesh] OR feedback*[tiab] OR assess*[tiab] OR evaluat*[tiab] OR observ*[tiab])
Attitude of Provider	"Health Knowledge, Attitudes, Practice"[Mesh] OR "Attitude of Health Personnel"[Mesh:NoExp] OR attitude*[tiab]
Physicians and Medical trainees *Focus on physicians and residents*	"Physicians"[Mesh] OR "Medicine"[Mesh] OR "Students, Medical"[Mesh] OR medicine[tiab] OR medical[tiab] OR physician*[tiab] OR doctor*[tiab] OR residen*[tiab] OR intern*[tiab] OR trainee*[tiab]
	#2 OR ((#3 OR #4) AND #5) #1 AND #6

Table 7
Search Strings Utilized in Embase Database Literature Search

Concept & notes on scope	Search String
Patient Safety *Search may not retrieve articles about specific patient safety issues such as medication errors or pressure ulcers.*	'patient safety'/exp OR 'patient safety'/de OR 'patient safety':ab,ti OR 'patient harm'/exp OR 'patient harm'/de OR (('safety'/exp OR 'safety'/de OR error*:ab,ti OR adverse:ab,ti) AND ('risk management'/exp OR 'risk management'/de OR 'medical error'/exp OR 'medical error'/de))
Medical Education	'medical education'/de OR 'clinical education'/exp OR 'medical school'/de OR educat*:ab,ti OR 'professional development'/exp OR 'professional development':ab,ti OR

Concept & notes on scope	Search String
	'curriculum'/de OR 'curriculum development'/de OR curricul*:ab,ti AND ('medical student'/de OR 'physician'/exp OR 'medicine'/exp OR 'resident'/de OR 'medical':ab,ti OR physician*:ab,ti OR doctor*:ab,ti OR intern*:ab,ti OR trainee*:ab,ti)
Competency/ Skill Assessment	('clinical competence'/de OR competenc*:ab,ti OR skill*:ab,ti OR behavior*:ab,ti OR behaviour*:ab,ti OR abilit*:ab,ti OR knowledge:ab,ti) AND ('feedback system'/de OR 'negative feedback'/de OR 'positive feedback'/de OR 'constructive feedback'/de OR 'behavior assessment'/de OR 'individual behavior assessment'/de OR 'checklist'/de OR feedback*:ab,ti OR assess*:ab,ti OR evaluat*:ab,ti OR observ*:ab,ti)
Attitude of Provider	'health personnel attitude'/de OR 'physician attitude'/de OR attitude*:ab,ti
Physicians and Medical trainees *Focus on physicians and residents*	'medical student'/de OR 'physician'/exp OR 'medicine'/exp OR 'resident'/de OR 'medical':ab,ti OR physician*:ab,ti OR doctor*:ab,ti OR intern*:ab,ti OR trainee*:ab,ti
	#2 OR ((#3 OR #4) AND #5) #1 AND #6

Table 8

Search Strings Utilized in ERIC Database Literature Search

Concept & notes on scope	Search String
Patient Safety *Search may not retrieve articles about specific patient safety issues such as medication errors or pressure ulcers.*	(DE safety AND DE patients) OR TI "patient safety" OR AB "patient safety" OR (TI adverse N1 event*) OR (AB adverse N1 event*)

Concept & notes on scope	Search String
Medical Education	DE "Medical Education" OR DE "Graduate Medical Education" OR DE "Medical School Faculty" OR DE "Medical Schools" OR ((TI educat* OR AB educat* OR TI curricul* OR AB curricul*) AND (DE "Medical Students" OR TI medical OR AB medical OR DE "Physicians" OR TI physician* OR AB physician* OR TI doctor* OR AB doctor* OR TI residen* OR AB residen* OR TI intern* OR AB intern* OR TI trainee* OR AB trainee*))
Competency/ Skill Assessment	(DE "Competence" OR TI competenc* OR AB competenc* OR TI skill* OR AB skill* OR TI behavior* OR AB behavior* OR TI behaviour* OR AB behaviour* OR TI abilit* OR AB abilit* OR TI knowledge OR AB knowledge) AND (DE "Evaluation" OR DE "Educational Assessment" OR DE "Formative Evaluation" OR DE "Holistic Evaluation" OR DE "Informal Assessment" OR DE "Medical Care Evaluation" OR DE "Medical Evaluation" OR DE "Needs Assessment" OR DE "Peer Evaluation" OR DE "Personnel Evaluation" OR DE "Student Evaluation" OR TI evaluat* OR AB evaluat* OR TI assess* OR AB assess* OR TI observ* OR AB observ* OR TI feedback OR AB feedback)
Attitude of Provider	DE "Attitudes" OR DE "Employee Attitudes" OR TI attitude* OR AB attitude*
Physicians and Medical trainees *Focus on physicians and residents*	DE "Medical Students" OR TI medical OR AB medical OR DE "Physicians" OR TI physician* OR AB physician* OR TI doctor* OR AB doctor* OR TI residen* OR AB residen* OR TI intern* OR AB intern* OR TI trainee* OR AB trainee*
	#2 OR ((#3 OR #4) AND #5) #1 AND #6

The search followed four steps, including identification, screening, eligibility, and inclusion. Identification first involved extraction of records through the various sources using combinations of search terms and strings, and then records were screened for duplicates. Following removal of duplicates, the remaining record titles were screened for inclusion, followed by screening the abstracts. Full - text records were then reviewed for eligibility and sorted as a mixed methods, qualitative, or quantitative record. In stage 4 (Table 4), records included in the study were then reviewed in detail to extract the following: (i) overview of included studies [study author(s), year, publication type, methods, research focus (e.g., program or curriculum development, assessment tool design, policy, and goal of the study], (ii) summary of findings (study design, setting, population, data collection tools, findings/themes), and (iii) relevant patient safety competencies/constructs.

Articles included in the study were categorized as a descriptive study, an intervention or pilot study, or a case study. A descriptive study included those that described the details of the patient safety curriculum, competencies, tools, processes, guidelines, and best practices. These papers outlined the characteristics, such as the content of the curriculum, learning objectives, how the curriculum was taught, the rationale for teaching it, and what safety competencies, processes, guidelines, or best practices were relevant to the curriculum. Other papers described the impact of interventions or pilot studies on enhancing patient safety among residents and physicians. Here, the authors described the intervention, targeted competencies for enhancement (e.g., increase in knowledge of HFE or improvement of disclosure skills), methods used

to measure the impact of the intervention, and results of the measurement. The third category, case studies, described the impact of PSIs on residents and physicians. These studies outlined skills or coping strategies used by residents or physicians following a PSI.

An environmental scan was also conducted to find external, credible sources that would inform the content and structure of the MSF tool. In medical education, evidence-based work is often conducted and shared but is not published and therefore not picked up in systematic peer-reviewed literature searches. Therefore, an environmental scan of unpublished work complemented the scoping review findings. Environmental scanning as a method emerged in the business world in the 1960s to organize data and make decisions based on those data (Aguilar, 1967; Reichel & Preble, 1984). Since this time however, the use of and complexity in environmental scanning as a research and development method has increased (Graham et al., 2008).

Rowel et al. (2005) supported the use of the environmental scanning method as a useful first step in gathering information to make informed decisions about the future of an organization or a new project. The information can help identify factors key to its success, challenges to consider, and provide strategic direction. This method permits the researcher to get a "snapshot" of the environment on a particular topic. Therefore, environmental scanning is a useful method in developing an educational tool by gathering information to inform its development in terms of its structure and content. Equally important, environmental scans are a useful step in identifying if something already exists, but has yet to be peer-reviewed (Grant & Booth, 2009; Rumrill et al., 2010). If

something exists, one can consider how it can be used to inform his or her work and how to incorporate it (such as modifying or adapting and evaluating it within a different context). A variety of methods are employed when conducting an environmental scan, including focus groups, needs assessments, interviews, surveys, and searching the internet and databases. Report and document reviews are also quite common in health research (Davis et al., 2009).

Within the last couple of decades, environmental scanning has become critical in health education initiatives (Layman & Bamberg, 2005). Reichel and Preble (1997) linked the importance of environmental scans to the researcher: "By examining environmental or contextual factors, researchers can collect data to guide the design of effective health programs uniquely tailored to the needs of the communities" (p. 38).

Determining the current status of a topic is an important step when researching the design and development of new health or curricula or programs (Graham et al., 2008). It is equally important to conduct an environmental scan to determine the current knowledge base and review relevant work that others have completed when developing an assessment tool (Wilburn et al., 2016).

A passive approach (collection of existing knowledge) to environmental scanning was deemed suitable for this study since the data were collected from existing, credible sources (within the national and international medical education community) and used to inform the development of an educational tool. An active approach to environmental scanning was not suitable for this phase of the study since it did not involve updating

existing knowledge, creating new knowledge, or creating data collection tools to obtain objective data (Graham et al., 2008).

When conducting an environmental scan, a variety of internal and external sources can be explored. As outlined by Graham et al. (2008), internal sources can include memos, personal communications, minutes of meetings, or other internal documents. Given that there was no internal committee that focuses on patient safety curriculum or evaluation tools, a review of memos, personal communications, and meeting minutes was excluded. For this study, internal sources included a review of any patient safety curriculum offered and evaluation/feedback tools used within the Faculty of Medicine, Memorial University. External sources reviewed were derived from within academia and government contexts.

Environmental scans allow a researcher to consider different types of knowledge; however, this study focused on codified knowledge arising from reviews or descriptions of patient safety or quality improvement curriculum, assessment and feedback tools, competency frameworks, as well as policy and statistical documents. Specifically, this environmental scan sought to retrieve and review for relevance non-peer reviewed articles, reports, guides, curriculum, government documents (including relevant policies, government task forces/working group reports), websites dedicated to patient safety and quality improvement, and patient safety assessment or feedback tools that are in development or use but not yet published.

A strategic approach was developed in consultation with a librarian to conduct the environmental scan and literature review. First, an outline of internet search terms and

sources to search were developed (Table 9). The search terms were used in various combinations together for each possible source using an internet-based search until data saturation was achieved, and therefore no new data or informative resources were being captured. For example, one search included the terms 'patient safety + curriculum' in combination with the 'Royal College of Physicians and Surgeons of Canada (RCPSC)'. As resources were extracted and reviewed, any new search terms or sources discovered resulted in modification of the eligibility criteria and was included in future searches. To be eligible for inclusion in the study, the resource had to be captured from one of the identified sources noted in Table 9 below. Grey literature included unpublished theses and dissertations, reports, guidelines, recommendations, frameworks, conferences, symposia materials, and curriculum resources.

Each resource was reviewed and contents were entered into an Excel database using the following descriptive factors: author(s), year, location, validated (yes/no/not known), how it was validated (if applicable/known), focus of work (e.g., policy, curriculum development, commissioned or task force report), resource type (e.g., report, curriculum course, module, or program), tool (e.g., assessment, clinical, curriculum, communication tools), website, and statistics/data reports. Where available, patient safety constructs and competencies relevant to medical trainees and practicing physicians were documented. For example, titles, learning objectives, and competencies used to describe a patient safety module on a website were documented in the environmental scan database. These factors would be used in identifying the relevance and value of the resource to this study.

Table 9

An Outline of Search Terms and Sources Included in Phase I Environmental Scan

Search Terms	Sources (Canadian & International)
1. Patient safety (variations of this term including adverse events, medical error, patient safety incidents) 2. Curriculum 3. Competency 4. Frameworks 5. Evaluation/ Assessment Tools 6. Multisource Feedback/360º 7. Workplace-based assessment 8. Medical Education 9. Residency/Postgraduate Medical Education Curriculum 10. Continuing Medical Education/Professional Development 11. Quality/Health Care Improvement	1. Government sites: provincial and federal (specific attention to those that report and disseminate on health or educational work) 2. Each of the 17 medical faculties within Canada 3. Medical Education Regulating Bodies (RCPSC, CFPC, Accreditation Canada, Medical Council of Canada) 4. National competency and curriculum development organizations (CPSI, CIHC, WHO) 5. Relevant Patient Safety Associations/Councils/Organizations including Medical-legal organizations (CMPA; HQCA, CRICOA, ACSQHC, NPSF, AHRQ)

Resources obtained from the literature review and environmental scan in this phase were used in the development of the PSAT^{360º}competency statements. Phase I information extracted from the literature review and the environmental scan were integrated into Phase III. Phase III involved a competency mapping process, as described in detail below, which involved a constant comparison analysis of relevant competency frameworks and mapping of literature review and environmental scan records.

3.3.2 Sampling and Criterion Identification

Below is a description of the study population, strategies used to sample the study population, and participant recruitment strategies for each phase of this study. In keeping with the previously described MSF concept (Introduction; Section 1.4), the residents

(ratees) would receive feedback from multiple raters with whom they interacted in the workplace. Raters in this instance would include supervisors, peers/co-workers (e.g., senior or junior residents, staff physicians, allied health professionals, nurses), and patients (Berk, 2009; Caretta-Weyer et al., 2017; Donnon et al., 2014; Lockyer, 2003; Miller, 1990). In order to develop an MSF tool that was suitable for all categories of raters, this study involved recruitment of key stakeholders, namely, residents and raters (e.g., physicians, allied health professionals, and nurses) who would use the MSF PSAT$^{360°}$ tool. Patients were excluded from the development phase of the tool. It was thought that a draft of the patient PSAT$^{360°}$ items would be best captured using the literature, as well as key expert and stakeholder input, and then refined by patient input during the field test phase and in future PSAT$^{360°}$evaluation studies.

A mixed methods sampling approach was used in this study. This type of sampling can involve selecting cases for a research study using both purposive and probability sampling methods in an effort to increase transferability and external validity, respectively (Collins et al., 2007; Teddlie & Yu, 2007). In purposive sampling the goal is to gain insight on a topic or concept based on the knowledge and experiences of others. In terms of purposive expert sampling, those who have expertise in a key area(s) (e.g., patient safety, PGME, and assessment tool development) were recruited to capture their perceptions and help inform the direction of the study (e.g., what items to include in an assessment tool). When using probability sampling, the sample is anticipated to represent the population from which it was drawn, and the goal is to generalize to a broader population and similar situations (Onwuegbuzie & Collins, 2007). In this instance, each

member of the target population would have a known probability of being included in the sample population. This probability would differ depending on the type of probability sampling. This study involved simple random sampling whereby each member of the study population has an equal chance of inclusion in the study (Thompson, 2012).

Some sampling strategies are linked to potential bias and external validity. External validity is the confidence and extent to which the results or inferences can be generalized across populations, time, and situations that are external to the study (Cook & Campbell, 1979; Nicholson, 2012). Depending on the sampling strategies that are used, various biases can be introduced into the results and lower the external validity or the extent to which the results can be generalized, or applied, beyond the sample (McEwan, 2020).

One threat to the external validity is the aptitude-treatment interaction. In this study that could involve participants, who agreed to review and provide input on the survey, potentially having a specific characteristic(s) that would not exist in the broader population. These characteristics may include a desire to enhance patient safety in their practice and amongst residents, have a passion for medical education or desire to participate in research. Situation factors, such as when the sample participated, the location, the lighting of the room during focus groups and interviews, and the scope of the survey, can influence their reaction to the survey and their responses (Lynch, 1999).

Two purposeful (criterion-based and snowball) sampling techniques were used to recruit participants. Samples within qualitative studies tend to be purposeful in design, in that individuals are deliberately selected and invited based on their experiences with and

knowledge of the phenomenon of interest, as well as their availability and interest in participating and ability to articulate their experiences (Bernard, 2002; Curry & Nunez-Smith, 2014). Criterion sampling is a common purposeful sampling strategy in qualitative and MMR (Palinkas et al., 2015). It involves identifying and selecting participants based on predetermined criteria of importance (Patton, 1999). A criterion list is generated to obtain a homogenous group of experts and minimize variation. For this phase of the study, a list of criteria was identified for each cohort (Table 10). The criterion outlined below was used to identify and recruit experts, physicians, residents, allied health, and nursing participants.

Table 10

An Outline of the Sampling Criteria for each Cohort for Phase II of the Study

Key Informant	**Criterion**
Patient Safety Experts	- Work in the medical education field - Experience (>5 years) and training in patient safety - Serve in a leadership role in the area of patient safety - Experience in assessing residents - Experience in construction of assessment tools and items - Experience with workplace-based assessment - Developed and/or delivered patient safety curriculum - Published and cited in the area of patient safety
MSF Experts	- Experience (>5 years) with developing and using multisource feedback - Serve in a leadership role in the area of MSF - Experience in conducting workplace-based assessment - Developed or delivered MSF training curriculum or workshops and materials - Published and cited in the area of MSF
Residents	- Are in, or beyond, the 2nd year of their training program - Have used or participated in workplace-based feedback or assessment formats - Demonstrated engagement in medical education:

Key Informant	Criterion
	○ Sat on education advisory committees within their discipline ○ Served as the chief resident with their discipline
Physicians	- Faculty appointment - Teach and assess residents > 5 years - Demonstrated engagement in medical education: ○ Sat on education advisory committees within their discipline ○ Had an educational leadership role with their discipline
Allied Health	- Work with residents >5 years - Worked for >5 years within their discipline - Understand the roles and responsibilities of a resident within their discipline and on their team (including the scope and limitations of their practice) - Participated in providing residents with feedback in the past - Demonstrated engagement in education of health professionals by teaching other health professionals in a clinical or classroom capacity
Nurses	- Work with residents >5 years - Worked for >5 years within their discipline - Understand the roles and responsibilities of a resident within their discipline and on their team (including the scope and limitations of their practice) - Participated in providing residents with feedback in the past - Demonstrated engagement in education of health professionals by teaching other health professionals in a clinical or classroom capacity

It was important that MSF and patient safety experts had demonstrated experience in the field of patient safety or MSF through curriculum development/delivery, publications, leadership roles, and experience in assessing residents and developing assessment tools. The inclusion criteria for residents included those beyond the first year of training, because they are expected to have matured further along in their professional

program and have more experience and familiarity with the context of their work. It can take first-year residents time to acclimatize to the context of their training and expectations. At this stage of their training, residents would likely find it challenging to express which patient safety skills they should be assessed on and if MSF would be an appropriate form of assessment.

For physicians, allied health, and nurses, it was important that they have experience in teaching or working with residents on a regular basis and understand the roles and responsibilities of the resident in that discipline and on a team. Program directors from each postgraduate program were also invited to participate in the study. Any critical issues with a resident's competency (educational or clinical progression) are brought to the program director's attention. Therefore, program directors would offer specific knowledge of any relevant patient safety issues that would arise within their field and consequently influence the content of the PSAT$^{360^o}$.

3.3.3 Phase II: Key Expert and Stakeholder Consultations

Phase II involved consultations with experts (interviews) and key stakeholders (both interviews and focus groups) to get their input and perspective on the content and design of the PSAT$^{360^o}$. Expert elicitation is the synthesis and integration of perspectives, knowledge, and opinions based on their accumulated experience of a specific subject matter (Cohen & Saisana, 2014). The goal is to take experts' knowledge and wisdom about an ambiguous topic, including the limitations, strengths, and weaknesses, and make it explicitly known (Slottje et al., 2008). Drawing upon experts' knowledge and experiences is particularly important when there might be insufficient data or information

on a topic, as was the case in this study. Previous to this study and reconfirmed in Phase I (literature review and environmental scan), there was no valid assessment tool that reliably measured resident's patient safety skills, including an MSF tool. Therefore, having MSF and patient safety experts who assess residents, have experience in developing assessment tools, and work in the medical education field was an important contribution and critical step to the development of a valid and reliable tool. Key stakeholders (residents, supervisors, co-workers) were invited to provide insight into the tool's content (assessment items for inclusion) that aligned with their work environment, clinical tasks, and patient safety.

The literature supports identifying criteria and procedures when eliciting information from experts to increase the usefulness of input obtained from experts and reduce the risk of obtaining biased judgments and opinions. Having experts provide their insight on the development of new material (such as assessment tools) can be valuable, but it can also bring in irrelevant or unwanted personal interpretations and stories (Ayyub, 2001).

There are specific strategies that researchers can adopt to increase the objectiveness of the information and avoid introducing bias and cognitive heuristics. Cognitive heuristics are the rules or shortcuts that individuals use when making decisions and forming judgements (Tversky & Kahneman, 1974). Typically, these shortcuts involve focusing on one aspect of a problem and ignoring all other relevant aspects (Lewis, 2008; Nevid, 2009). Two heuristics, known as "availability" and "anchoring and adjustments", are particularly relevant to expert elicitation for this study. Availability

heuristics occurs when individuals overestimate the frequency or probability of an event based on the ease with which they can recall an event or a related idea (American Psychological Association, n.d.; Tversky & Kahneman, 1974). The anchoring and adjustment heuristic occurs when individuals are asked to indicate an estimate or probability of an event around a starting point number or percentage (called the anchor), but they do not adjust sufficiently far enough from the anchor (Baron, 2000). However, when eliciting expert input, we want to consider all relevant evidence rather than focusing on rare or single events.

When interviewing it is important to use questions that will probe thought and discussion around multiple facets of the topic. This is particularly important when expert responses seem to be focused on a specific discussion or directed at a specific event (Garthwaite et al., 2005; Morgan, 2014). Both heuristics were critical in this phase of the study and required careful attention to the wording and flow of the questions used in focus groups and interviews, as well as considering how to probe (without leading) for additional information when needed. These steps helped to reduce the effects of the availability heuristic.

Interview and focus group scripts were carefully drafted to prompt participants to think about residents' safety skills using a gradual or layered approach. Simply asking participants to list a set of patient safety skills at the beginning of the interview or focus group may not have resulted in a comprehensive list. Therefore, more general questions were asked first (e.g., what the concept of patient safety means to them; key attributes of a safe physician), followed by more specific questions related to residents' and

physicians' safety tasks and skills. Asking general questions at the beginning was intended to help participants ease into the discussion by asking them to reflect on patient safety, and how it relates to their role and that of residents within health care and their medical training program. Residents and physicians were asked specific questions about safety skills and tasks they demonstrate, or skills they aspire to achieve, during their training and practice.

Participants were provided with information about the study and a copy of the consent form in advance of the interview or focus group via email (Appendix A). The consent form was reviewed with all participants before the interview or focus group began and they were provided with an opportunity to ask questions.

Key Experts (Patient Safety and MSF Experts): Recruitment, Focus Groups, and Interviews

This phase involved consultation interviews with experts in patient safety and development of MSF surveys and assessment tools, and experts in teaching and assessing residents. Experts were first identified using the literature and the criterion outlined in Table 10. The literature was reviewed for those who had demonstrated expertise or were well published in the topic of MSF or patient safety. In addition, consultations were held with individuals involved in the design and implementation of ASPIRE through the CPSI and the Royal College of Physicians and Surgeons on Canada (RCPSC) to solicit recommendations on key experts for this study.

Together, an initial participant list was developed using the criterion list, literature, and consultations with CPSI and RCPSC. The first round of patient safety

experts (n = 7) and MSF experts (n =3) participated in individual semi-structured interviews (see appendix B for the expert interview scripts) via telephone or face to face. Interview scripts were reviewed for wording, clarity, and comprehensiveness by two external medical education researchers and two key experts (one MSF expert and one patient safety expert) before commencement of the interviews. Data were analyzed as the interviews progressed and if data saturation was not achieved, experts were contacted to recommend additional experts who met the identified criteria. This snowball sampling technique resulted in a total of 14 patient safety experts and six MSF experts.

Key experts in MSF had extensive experience in developing MSF surveys, were involved in the implementation of MSF programs, and were well recognized in the medical education and health care community in Canada, U.S., and the UK through their publications, teaching, and dissemination projects. These experts were asked to share their knowledge and perceptions of the design, development, and implementation of MSF surveys and assessment of residents. Patient safety experts were asked to share their knowledge and perceptions of assessing residents' patient safety competence and the essential patient safety competencies to include in a resident MSF tool. Table 11 outlines the number of key experts who participated in this phase of the study.

Key Stakeholders (Physicians and Residents) – Recruitment, Focus Groups, and Interviews

Since this research study was complex and involved multiple phases with various participant groups, a series of presentations was delivered for the target population to describe what the study was about, who would be involved, and expectations for

Table 11

Outline of the Number of Participants for each Key Expert Group and their Profession/Area of Expertise

Key Informant Group	Number	Relevant Affiliations/Roles/Accomplishments
Patient Safety	14	- Director of Patient safety centers, institutes, or departments - Editor of Patient Safety Journals/validated online sources - Provincial, national, and international government leadership positions - Academic positions related to patient safety - Well cited in the patient safety literature patient safety research background - Authored patient safety curriculum - Member of patient safety committees
Multisource Feedback	6	- MSF research background - Developed and implemented MSF curriculum - Designed and lead MSF programs for physicians and learners - Quality assurance for residency programs - Resident evaluations

participants. MSF literature supports the notion of providing informational sessions to raters and residents well in advance of implementation (Bracken et al., 2001). Therefore, recruitment began with a series of presentations for residency program directors and residents to outline the MSF process, benefits of participating in an MSF process, the rationale for assessing residents' patient safety skills, and what would be expected of participants in this study. A presentation was held for all residency program directors during a monthly PGME committee meeting. Program directors were provided with information sheets about the study via email after the presentation and asked to share the details of the study with their faculty.

Medical residents (trainees who have completed undergraduate medical education and have begun their residency programs) accepted into a medical residency program in the Faculty of Medicine at Memorial University were the primary target population for this study. Therefore, individual presentations were held for residents within each of the residency training programs in the Faculty of Medicine, Memorial University. Residents were provided with an informational session about the MSF process, benefits of participating in an MSF process, the rationale for assessing residents' patient safety skills, and what would be expected of participants in this study. They were provided with illustrations of how MSF worked, which health professionals would be involved, how raters would be selected, and a description of MSF reports.

Once the program directors, faculty, and residents were oriented to the study, invitation emails were sent to the program directors and coordinators asking them to provide a list of 3-4 faculty (who had experience training and assessing residents) and 3-4 residents (beyond the first year of their program) who could be approached and invited to participate in the study. Once a draft list of participants was received, individual invitations were sent to faculty and residents asking them to participate as key stakeholders in a focus group session to inform the design and content of the PSAT^{360º}. All program directors were invited to participate in the study.

The goal was to hold interdisciplinary focus group sessions so that a rich discussion of and consensus on the design of the tool and key patient safety skills relevant for all residents could be obtained. The literature supports having 8-10 individuals per focus group session (Krueger & Casey, 2009), but that was not feasible

for this study due to the hectic clinical and academic contexts in which physicians and residents work and train, respectively. Therefore, a combination of focus group sessions and interviews was necessary to ensure input from multiple disciplines. Hence, multiple focus group sessions were scheduled and if physicians could not participate in a focus group session, semi-structured face-to-face or telephone interviews were held. Table 12 describes the focus group and interview cohorts, including the number of key informants per cohort and the discipline for each focus group and interview. A total of 18 physicians (6 program directors and 12 faculty) and 10 residents participated in this phase of the study.

Physicians and residents were asked about their perspectives on patient safety and key competencies to include in a resident's patient safety assessment tool, the use of MSF as a method to assess residents, input on the scale to be used on the tool, as well as the utility and feasibility of the tool once it was developed. Focus group and interview scripts used in this study are provided in Appendix B. Interview scripts were reviewed for wording, clarity, and comprehensiveness by two external medical education researchers, two physicians (one residency program director and one physician/faculty member) and two residents (one family medicine resident and one other specialty resident) before commencement of the interviews. As part of the recruitment strategy for future phases of the study, key informants were asked at the end of the focus group or interview to review a draft of the tool during the pilot test phase.

Table 12

Description of Phase II Stakeholders by Participant Number and Discipline

	Interview(s)			Focus group(s)		
	Total #	Discipline	N	Total #	Discipline(s)	N
Residency Program Directors (n = 6)	3	Radiology Anesthesia Obstetrics & Gynecology	1 1 1	1	Neurology Orthopedics Family Medicine	1 1 1
Faculty (n = 12)	4	Medicine – Oncology Family Medicine Pathology Medicine	1 1 1 1	2	**Focus Group #1** Surgery (n = 2) Family Medicine (n = 1) Anesthesia (n = 1) Medicine (n = 1)	5
					Focus Group #2 Anesthesia (n = 1) Medicine (n = 1) Family Medicine (n = 1)	3
Allied Health (n = 11)	0	-	-	2	***Focus group #1:*** Pharmacy - (community) (n = 1) Physiotherapy (n = 1) Social work (n = 1) Dietician (n = 1) Occupational Therapist (n = 1)	5
					Focus group #2: Physiotherapist (n = 1) Speech Language Pathology (n =1) Respiratory Therapy (n =1) Psychology (n = 1)	6

	Interview(s)			Focus group(s)		
	Total #	Discipline	N	Total #	Discipline(s)	N
					Pharmacy (Hospital) (n = 1) Social Worker (Neuro-Surgery) (n = 1)	
Nursing (n = 10)	1	Emergency/ OR	1	3	***Focus Group #1*** Medicine (n = 1) Community Health (n = 2) Neurology (n = 1)	4
					Focus Group #2 Emergency/OR (n = 2) Neurology (n = 1)	3
					Focus Group #3 Orthopedics (n = 1) Surgery (n = 1)	2
Residents (n = 10)	0	-	-	3	***Focus Group #1*** Surgery (n = 1; PGY3) Anesthesia (n = 1; PGY5) Medicine (n = 1; PGY2)	3
					Focus Group #2 Orthopedics (n = 2; PGY3 & PGY5) Neurology (n = 2; PGY2) Anesthesia (n = 1; PGY4)	5
					Focus Group #3 Family Medicine (n = 1; PGY2) Surgery (n = 1; PGY4)	2

Key Stakeholders (Allied Health and Nurses): Recruitment, Focus groups, and Interviews

Focus groups and interviews with allied health and nurses were conducted to capture the different perspectives based on the context in which they work and interact with residents. Regional directors for allied health and nursing provided their staff with information on the study via email. This cohort was provided with a detailed information sheet describing the study, ethics approval, a FAQ sheet that outlined the rationale for assessing resident's patient safety skills and the use of MSF to do so, allied health and nurses' role as key informants, a reviewer of the tool (pilot test phase), and their role as raters. Two weeks after the initial email, regional directors provided a list of names of those who were willing to participate. Regional directors either released health professionals from their service to participate, or health professionals agreed to come on days they were not scheduled to work.

Once a participant list of allied health and nurses was generated, focus group sessions were scheduled. One nurse could not attend either of the focus group sessions but was keen to participate, so an individual interview was held. Like other key informants, focus groups and interview data for this cohort were analyzed as the study progressed. In the event that data saturation was not achieved, additional allied health professionals or nurses were recruited using the snowball sampling technique. Allied health professionals and nurses were asked to suggest other colleagues who they felt would be appropriate to recruit and provide input on the tool, based on the inclusion and exclusion criteria. These names were then provided to the regional director for approval.

Table 12 outlines the number of health professionals and the discipline in which they work, for each focus group and interview. A total of 10 nurses and 11 allied health professionals participated in this phase of the study. Allied health professionals and nurses were asked to share their perspectives on patient safety, key competencies to include in a resident's patient safety assessment tool from their perspective, the use of MSF as a method to assess residents, input on the scale to be used, as well as the utility and feasibility of the tool once it was developed. A focus group or interview script is outlined in Appendix B. Interview scripts were reviewed for wording, clarity, and comprehensiveness by two external medical education researchers and three stakeholders (one nurse, one pharmacist, and one social worker) before commencement of the interviews. As part of the recruitment strategy for future phases of the study, key informants were asked at the end of the focus group or interview to review a draft of the tool as part of the pilot test phase.

3.3.4 Phase III: Competency Mapping and Development of Assessment Items

Phase III involved a comprehensive competency mapping process of the data collected in Phase I and Phase II, resulting in the development of a comprehensive list of patient safety skills that was presented to key experts and stakeholders for review via the Delphi method. The Delphi method was used to gain consensus on the final list of skills for inclusion in the PSAT$^{360^o}$ tool.

Construction of the PSAT$^{360^o}$ instrument was developed in accordance with validated and long-standing competency frameworks, guidelines, ROPs, and information gathered from the peer reviewed literature and input from experts and end users of the

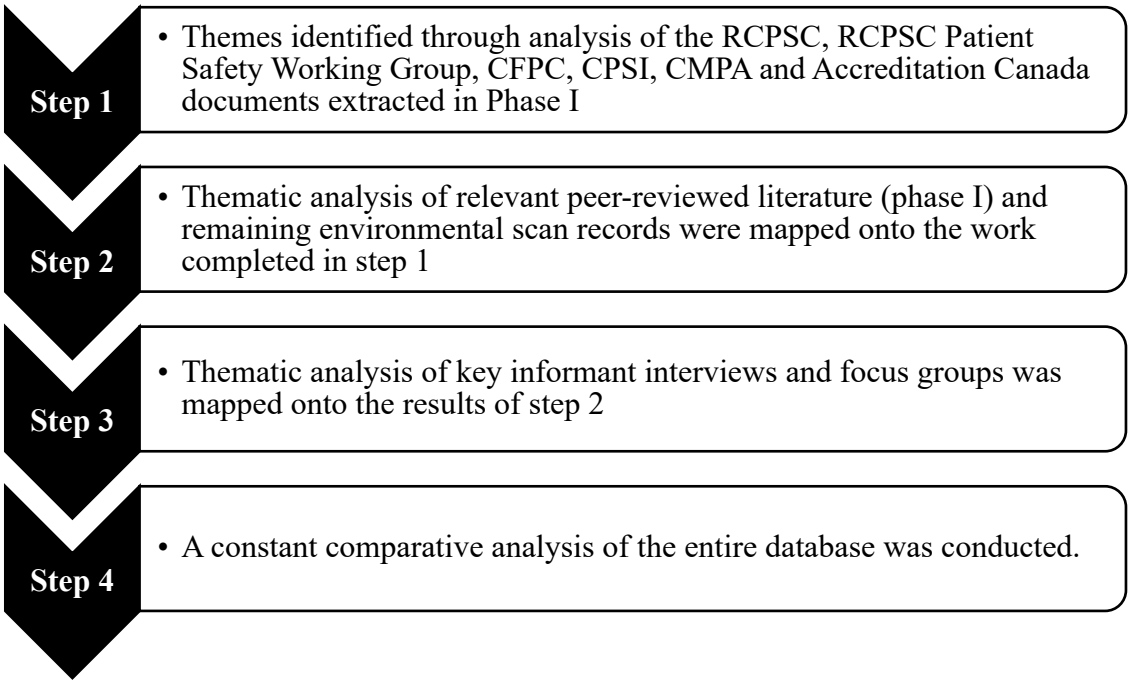
PSAT^{360º}. Competency frameworks, guidelines, and ROPs were materials developed by the Royal College of Physicians and Surgeons of Canada (RCPSC), Canadian Family Physicians of Canada (CFPC), CPSI, CMPA, and Accreditation Canada. These records have content linked to patient safety and are validated and adopted by all medical education programs across Canada. The first step in the competency mapping process involved reviewing and analyzing key frameworks so the design and development of the PSAT^{360º} tool would be grounded by a valid set of patient safety competencies and relevant organizational guidelines and standards. The content within these frameworks served as the starting point and foundation on which the PSAT^{360º} was designed and developed.

A systematic four step approach was taken to the competency mapping and development process as per Figure 5. The mapping process commenced with extracting information from the competency frameworks, guidelines, and ROPs, and inserting them into separate database spreadsheets within Microsoft Excel. The CanMEDS roles served as the overarching framework for the MSF PSAT^{360º} tool since it is familiar to residents across all disciplines and their supervisors who assess residents' clinical and academic performance.

The RCPSC, RCPSC patient safety working group, and CFPC frameworks already have the competency statements organized by CanMEDS roles. These were carried over into the Excel spreadsheet and served as the starting point for the mapping process. Then each competency statement, standard, or guideline that was extracted from the CPSI, CMPA, and Accreditation Canada (ROPs) documents was assigned to a specific CanMEDS role (using the definition of that role and other statements within it as

Figure 5

A Four Step Competency Mapping Process



a guide). Competency statements, standards, and guidelines (from RCPSC, RCPSC Patient Safety Working Group, CFPC, CPSI, CMPA, and Accreditation Canada) were then grouped based on CanMEDS roles and inserted into separate spreadsheets – one for each CanMEDS role. Under each CanMEDS role, each statement was reviewed and categorized by a specific patient safety or quality improvement concept (e.g., situational awareness, adverse event management, disclosure). Statements that were categorized under the same concept were grouped together. This step allowed for the comparing and contrasting, using the constant comparative analysis method (Boeije, 2002; Hewitt-Taylor, 2001), of statements that related to the same patient safety concept.

Step two of the mapping process involved integrating the peer-reviewed literature and environmental scan records captured in Phase II. Themes identified through analysis of the literature and environmental scan records were mapped onto the themes identified in the previous step. In this regard, themes assigned to the peer-reviewed literature and environmental scan records were compared and contrasted with the thematic analysis of the RCPSC, RCPSC Patient Safety Working Group, CFPC, CPSI, CMPA and Accreditation Canada frameworks. Each article or resource was cited under the appropriate category. In addition to noting the citation, a few key words were added to identify if the resource: (i) validated the need for assessment of a skill(s) related to that theme; (ii) outlined skills that overlapped with others extracted from competency frameworks, guidelines, or ROPs; or (iii) described a patient safety skill that was not already listed.

The third step of the competency mapping process involved taking the results of the constant comparative analysis of key informant interviews and focus groups (completed in Phase II) and mapping these results onto existing themes in the Excel spreadsheet. Key concepts, patient safety skills, suggested safe practices, and policies extracted from Phase II were added under the corresponding theme, along with identification of the key informant group (faculty, allied health professionals, nurses, resident, or key experts) that noted it during the interview/focus group and the frequency was noted.

The content mapped under each theme referred to the same overarching patient safety concept/skill. At this stage, constant comparative analysis of all the content under

each theme commenced. There were five levels to the constant comparative analysis (Table 13):

1. **First Level** - Comparing and contrasting of themes under each CanMEDS role
2. **Second Level** - Comparing and contrasting the content within each theme for each CanMEDS role
3. **Third Level** - Comparing and contrasting of content across themes within individual CanMEDS roles
4. **Fourth Level** - Comparing and contrasting of themes across all CanMEDS roles
5. **Fifth Level** - Comparing and contrasting of all content across all CanMEDS roles

Table 13

Outline of the Constant Comparative Analysis Process Utilized to Develop the Competency Statements (CS) for the PSAT$^{360°}$

Medical Expert 1			**Communicator**		**Collaborator**	
Theme 1 E.g., Disclosure Policies	**Theme 2**	**Theme 3**	**Theme 1**	**Theme 2** 4	**Theme 1**	**Theme 2**
2 **CS1** E.g., Apply disclosure policies following an adverse event	**CS1**	**CS1**	**CS1**	**CS1** 5	**CS1**	**CS1**
CS2	**CS2**	**CS2**	**CS2**	**CS2**	**CS2**	**CS2**
CS3	**CS3** 3	**CS3**	**CS3**	**CS3**	**CS3**	**CS3**

The first level involved comparing and contrasting themes per CanMEDS role to ascertain if there was overlap. Where there might be overlap, the content was reviewed briefly to see if there were differences or significant overlap to warrant collapsing of themes. The second level involved comparing and contrasting content extracted from both Phase I literature and environmental scanning, and Phase II key informant interviews and focus groups data under each theme, one CanMEDS role at a time (e.g., all content under the "Disclosure" theme within the Communicator role). This was an iterative process whereby statements were reviewed collectively (one theme at a time under each CanMEDS role) to check for redundancies and collapsed into a single statement where appropriate, or further refined and expanded.

Any outlier statements were highlighted for review during the next step. Once all statements were analyzed and redrafted (where necessary) the overarching theme (e.g. disclosure policies) was then reviewed to see if it still accurately reflected the content or statements under that theme. Sometimes the theme needed to be reworded, so it was broader or more specific; other times, the theme remained unchanged. The third level then involved comparing and contrasting the content across all themes under each CanMEDS role. This was done to check for redundancies and statements that could be collapsed, refined, or moved under another more closely related theme. Any statements that were moved to another theme or adjusted (e.g., reworded, collapsed, or expanded) were then compared again to all other statements under that theme, as per the iterative process of constant comparative analysis. Fourth level analysis involved comparing and contrasting all themes across all CanMEDS roles to check for redundancies or if a theme(s) would be more appropriately shifted to another CanMEDS role. Fifth level

analysis involved comparing and contrasting of content and statements across all CanMEDS roles to further check for redundancies and statements that could be collapsed, refined, or moved under another more closely related CanMEDS role. Fourth and fifth level of analyses went hand in hand, in that, as themes were reviewed across roles, the statements were reviewed simultaneously to determine if the statement was situated under the most appropriate CanMEDS role, if it should be moved, or if there was overlap with statements in other roles.

The following is a summary of the steps taken to develop the list of skills for the PSAT$^{360°}$. Each competency statement (CPSI, RCPSC, and CFPC), recommendation (CMPA), and ROP (Accreditation Canada) was organized by CanMEDS roles and assigned to a specific theme (e.g., disclosure of PSIs) under that role. Information from the scoping literature review, environmental scan, interviews, and focus groups were cross referenced with competency framework statements and recommended practices in an Excel file. Information from the literature, interviews, and focus groups included descriptions of patient safety skills and tasks expected of residents, descriptions of training, courses, or notable gaps in patient safety training for residents or physicians, and patient safety curriculum objectives. This information was assigned to the most relevant theme under one of the CanMEDS roles. Under the CanMEDS Communicator role, for example, one theme was related to the disclosure of PSIs to patients and families. Under this theme was a list of skills extracted from the competency frameworks, ROPs, peer-reviewed literature, and tasks and skills identified by experts and stakeholders in interviews and focus groups. All of the content under this disclosure theme was

collectively reviewed and drafted into a list of residents' skills specific to the disclosure of PSIs.

During the analysis, statements that did not refer to a skill or a measurable behaviour (e.g., knowledge and attitudinal-based statements) were removed or, if possible, reworded. Since these statements would be transferred into individual items within the assessment tool, each one was reviewed to ensure it did not have multiple performance indicators. As previously described, assessment tools should incorporate items that focus on a single, observable behavior. If individual items within the tool contained multiple performance indicators (e.g., uses appropriate language and terminology when communicating with team members and the patient), it can be challenging for the rater to identify residents' competency level for that item. In the previous example, a rater may determine that a resident uses appropriate language with team members but needs to improve on how they do so with patients. Hence, it would be difficult to indicate a competency level for this item, and this item should be further refined or broken down.

Items were also individually reviewed for appropriateness at the residency level. Items were reworded if they contained important patient safety concepts, yet, as written, they were more appropriate for practicing physicians. The RCPSC and CFPC documents were used as guides in determining the language relevant to residents. Items that were not observable or measurable were then excluded (e.g., abstract or knowledge-based statements). A final set of items was then collated into a modified Delphi survey to send to experts for review (Phase IV).

This process of developing assessment items (based on information within the literature, competency frameworks, and input from experts and stakeholders) and evaluating those assessment items for importance and relevance by experts is aligned with a two-stage content validation process (Lynn, 1986). Lynn (1986) described the need to first identify the relevant literature and content and draft the assessment statements. The second stage then involves confirmation by experts that the statements are content-valid and are representative of the domain in question.

In keeping with an MSF format, these items would be used to generate three versions of the survey: 1 - resident self-assessment of patient safety skills survey; 2 - co-worker and supervisor assessment survey of residents' patient safety skills; 3-patient assessment of residents' patient safety skills. The resident and co-worker and supervisor surveys were drafted using the items after the constant comparative analysis described above. However, patient surveys needed to be shorter (e.g., contain the most critical items relevant to a patient rater), have appropriate language, and reading levels that would be applicable across all adult age groups. Patient surveys from other MSF programs, other performance assessment programs, and the literature were reviewed to determine the appropriate number of items and language used. All items from the constant comparative analysis were reviewed, and appropriate patient items were selected from each CanMEDS role. The CanMEDS competency framework is not a document that is typically familiar, or of relevance, to the general public. Therefore, items on the patient assessment tool were not organized under the CanMEDS roles, rather they were pulled into a single document.

3.3.5 Phase IV: Expert Rating via Delphi Survey Rounds I - III

Phase IV entailed distributing the first draft of the PSAT$^{360°}$ in the form of a Delphi survey to key experts in patient safety (see Appendix C). The Delphi method permitted a check for validity, feasibility, clarity, and utility of the instrument. The Delphi was used in this study to check for the importance of each patient safety survey item, clarity of wording of each survey item, input on additional items needed, overall structure of the tool, and identification of the most appropriate rating scale given the topic and target assessment group.

The Delphi method is commonly used to obtain the opinions of a group of experts to facilitate decision-making (Broomfield & Humpries, 2001). This method entails sequential rounds of questionnaires to seek a reliable consensus of opinions from a group of experts on a specific topic. The Delphi technique is a multi-round process, therefore the data from each round builds on the previous one and informs the next (Polit & Beck, 2012). Reports indicate that consensus is typically reached by the third round, but both fewer and more rounds have been reported in the literature. Additional rounds are completed until consensus is reached.

The Delphi is a well-established and accepted method of consensus-building among experts on a specific topic (Hsu & Sandford, 2007; Keeney et al., 2011; Lofmark & Martensson, 2017). This method can be used to aid in problem-solving, planning, and decision-making using input from multiple people (Polit & Beck, 2012). The Delphi method provides a structured approach to building consensus. The Delphi method reduces

the effects associated with dominant individuals/participants, which is a concern when using synchronous, group-based approaches (Powell, 2003).

An expert consensus-based approach, such as the Delphi, is a common method used to create a blueprint, or content, for the identified construct of a tool. This process can be a critical step in establishing content validity (Ghaderi, 2018). To demonstrate content validity, there should be an empirical relationship between the tool's content and the construct. To achieve this, use of relevant literature and an expert(s) in the field of interest should be involved in developing the tool's content (e.g., assessment items) (Ghaderi, 2018).

Currently, there is no universally agreed upon standard to define consensus, yet it is something that researchers should articulate and provide a rationale for in advance of using the Delphi technique. It has become acceptable for researchers to identify a percentage or a proportional level of agreement among survey responders as synonymous with consensus (Keeney et al., 2006). Polit and Beck (2012) argue that a broad range of agreement from 51% to 70% is acceptable, while Keeney et al. (2006) recommends 75% or greater, or a certain proportion within a range (e.g., 75% of those who rated 4 (agree) and/or 5 (strongly agree) as a rigorous cut-off for consensus. Diamond et al. (2014) completed a study to explore the role of consensus in Delphi studies and how it was operationalized. Of the 98 Delphi studies that claimed to use consensus, only 72 defined their consensus level. The most common consensus definitions included a percent agreement for a single rating (e.g., > 80% with the same rating of strongly agree) or the proportion of ratings within a range (e.g., 75% of participants rated 4+ on a 5-point scale). For studies where percentages or proportions were used for the consensus definition, 75%

was the median threshold (Diamond et al., 2014). In the present study, consensus was considered to have been achieved on items for which 75% or more of respondents were in agreement for a specified proportion of ratings within a range (4 [agree] or 5 [strongly agree] on a 5-point scale).

An online survey software program, SurveyMonkey, was used to design and distribute the Delphi Survey. When key experts in patient safety were invited to participate in Phase II key informant interviews, they were asked to also commit to reviewing the draft PSAT$^{360^o}$ in the form of a Delphi Survey. For continuity and consistency, only key experts from Phase II who had expertise in the organizational practices, policies, and procedures related to residency education, patient safety, learner assessment, survey construction, and competency-based education were sent a copy of the Delphi survey.

Delphi Round I

To determine the level of importance and the clarity of each survey item, a Delphi survey (Appendices C and E) was used to gather the opinions of a pan-Canadian group of English-speaking experts in patient safety, learner assessment, survey construction, and competency-based education. The Delphi was organized by CanMEDS roles, with all the survey items identified in Phase II compiled under the respective roles. The first iteration of the Delphi survey provided an opportunity for experts to rate the validity of the survey items under each CanMEDS role using a 5-point Likert scale. More specifically, experts were asked to rate each item for clarity and importance. Key experts were also asked to provide feedback on how to improve the clarity and interpretation of individual survey

items and the open-ended questions at the end of each CanMEDS role. Key experts could offer suggestions for alternative wording of each survey item to improve clarity and interpretation. Experts were asked to identify any missing patient safety competencies and provide feedback on the overall content or design of the PSAT$^{360^o}$ tool.

Key experts were asked to provide input on four different rating scales extracted from the literature and commonly used in assessment and evaluation tools. A literature search and environmental scan was performed to capture commonly used rating scales used in workplace-based assessment or performance tools, including MSF tools, patient safety assessment tools, resident assessment tools, and self-assessment tools. Experts were asked to indicate which rating scale was most appropriate for assessing residents' patient safety skills. Experts were asked to indicate one of the following: (i) which of the four presented scales they thought was most appropriate, (ii) if either scale was appropriate (meaning, they did not have a preference and thought either scale would be suitable), or (iii) neither scale listed was appropriate. There was also an open-ended comment box for alternate wording of the scales listed on the Delphi Survey or used to provide other suggestions. Table 14 below outlines the four scales used in the Delphi.

Table 14

The Four Scales Presented to Experts for Rating within the Delphi Survey

Scale No.	Description	Scale
1	Level of Expectation	0 = Not Observable 1 = Well Below Expected 2 = Below Expected 3 = Expected 4 = Above Expected 5 = Well Above Expected

Scale No.	Description	Scale
2	Level of Agreement	0 = Not Observable 1 = Strongly Disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree
3	Entrustability	0 = No opportunity to observe or not applicable 1 = Resident cannot perform this task/skill, even with assistance 2 = Resident can perform this task/skill, but only with assistance 3 = Resident can perform this task/skill under indirect supervision 4 = Resident can perform this task/skill independently 5 = Resident can act as an instructor or supervisor for this task/skill (aspirational)
4	Performance	0 = Not Observable 1 or 2 = Well below expected 3 or 4 = Below Expected 5 = Expected 6 or 7 = Above Expected 8 or 9 = Well above expected

Delphi Survey respondents were also asked if the option of an open-ended comment field should be added to the PSAT$^{360°}$ tool to allow raters to enter examples of how the trainee does/does not demonstrate competency for that CanMEDS role. Experts were provided with a draft copy of the open-ended statement and asked to rate its clarity and importance for inclusion on the tool.

According to previous work on Delphi studies, there is no agreed-upon standard for a Delphi study response rate (Atkins et al., 2005; Shariff, 2015). This is because individuals are purposively selected based upon their expertise on a specific topic and problem. Delphi studies have sample ranges from 15 to 100. Needham and Loe (1990)

suggest a minimum of 10 respondents as anything less would be insufficient to generate ideas and valid data. De Villiers et al. (2005) suggested that the make-up of the cohort should define the Delphi sample size – if it is homogenous (15-30 individuals in total if they are from the same discipline) or heterogeneous (5-10 individuals per discipline). Additional recruitment of experts in patient safety were invited to participate in this phase to meet the De Villers et al. (2005) sample size recommendation of 15-30 individuals, if all were from the same discipline. All participants in this phase worked in and had expertise in patient safety, so a goal was to have between 15 and 30 participants. Additional experts were identified through the snowball technique and included individuals who sat on the RCPSC Patient Safety Working Group or were patient safety advisors with CPSI. A total of 18 key experts participated in the Delphi round I. Experts were offered an honorarium of $150. An honorarium was used to help engage experts and acknowledge the time they spent reviewing the PSAT$^{360°}$ and providing valuable feedback.

Delphi survey results were analyzed as described in section 3.5.3 within Microsoft Excel (Microsoft Excel for Mac Version 16) using the 75% consensus threshold. The Delphi survey results were used to identify which rating scale would be used on the PSAT$^{360°}$ surveys and to adjust the survey items. Three Delphi rounds were used to confirm the survey items for the PSAT$^{360°}$.

The BRUSO model (Peterson, 2000) for writing survey items was used to assess and improve the wording of survey assessment items during each round of the Delphi survey. This model was used to ensure that assessment items were Brief, Relevant,

Unambiguous, Specific, and Objective. Peterson (2000) stated that survey items should be:

i. Brief and to the point - avoid long, technical, and unnecessary wording (which helps the respondent to understand the item and what is being asked of them)
ii. Relevant to the dimension that is being assessed
iii. Unambiguous (such that they are interpreted in only one way, which serves to strengthen appropriate ratings by the target user and raters)
iv. Specific (so respondents can clearly rate and provide input on a specific behaviour) and avoid including items that consist of two conceptually separate items
v. Objective and therefore do not reflect the developer's or researcher's personal opinions or lead a specific response.

Applying the BRUSO model helps achieve an objective assessment of performance by raters and specific feedback on that performance. Assessment items that are not measurable can introduce variability in the interpretation of those items by raters, which can impact the reliability (e.g., inter-rater reliability). Non-specific assessment items can render the item inaccessible by raters and the inability of ratees to make specific behavioural changes. This process was applied throughout the Delphi and pilot test phases of the tool development, whereby experts and stakeholders provided input on the survey item wording. Their suggestions were reviewed using this BRUSO model to ensure appropriate survey item development.

Delphi Survey Round II

In keeping with the Delphi method, a second draft of the PSAT$^{360^{o}}$ survey (based on expert input in round I) was generated. This updated version was circulated to key experts who responded to the Delphi survey in round I (N = 18). They were provided with a report of the first Delphi survey results, including a summary of the qualitative comments. These key experts were again asked to participate by rating the importance and clarity of each item, providing suggestions for the wording of items they reported as unclear, and indicating any missing items within each domain of the tool.

Analysis of the Delphi round II data (N = 15) was carried out in the same manner as round one, where the inclusion of a survey item (importance) and clarity of the item was measured against a consensus level of 75%. If the total percent of agree and strongly agree responses to the importance of including that item in the final MSF tool was 75% or more, the item was included in the final tool. The same holds for the clarity of the survey item. If 75% or more of all experts agreed or strongly agreed that the item was written clearly, then the item was included in the final MSF tool as written. Sometimes experts did agree that the item was clearly worded but would offer feedback for further improvement.

Delphi Survey Round III

All ratings and comments provided by key experts in Delphi round II were collated and analyzed. These results were used to make adjustments to survey items where needed. A list of edited survey items and a summary of the second Delphi survey

results were sent to experts. Experts were asked to indicate if this summary of changes accurately reflected their suggestions and if additional edits were required.

The results of the Delphi method were collated, analyzed, and used to generate three sets of surveys for piloting in Phase V: the resident's self- assessment survey, the supervisor and co-worker survey, and the patient survey. Given that this is an MSF tool, the supervisor and co-worker survey would be different from the patient survey based on the differences in their interaction with the resident. Development of the patient survey was informed both by overarching concepts stemming from the Delphi and other MSF patient surveys in the literature.

3.3.6 Phase V: Pilot Test

This phase of the study involved review of and input on the PSAT$^{360°}$, namely, the resident's self-assessment survey, the supervisor and co-worker survey, and the patient survey. This review involved a small cohort of faculty, allied health, nurses, and residents who were asked about the clarity, utility, and feasibility of the PSAT$^{360°}$, and to further check the validity of the survey. The goal was to engage end users of the PSAT$^{360°}$ by asking them to rate the importance and clarity of the survey items and determine their perspective on the utility and feasibility of the tool.

The pilot test involved the completion of an on-line survey, that was provided to participants via email, and a resident focus group session. Participants were sent a SurveyMonkey link to the relevant PSAT$^{360°}$ survey (e.g., supervisor/colleague or resident survey) and the patient PSAT$^{360°}$ survey, and they were afforded two weeks to complete both surveys. Individuals were asked to indicate which scale they preferred and the level

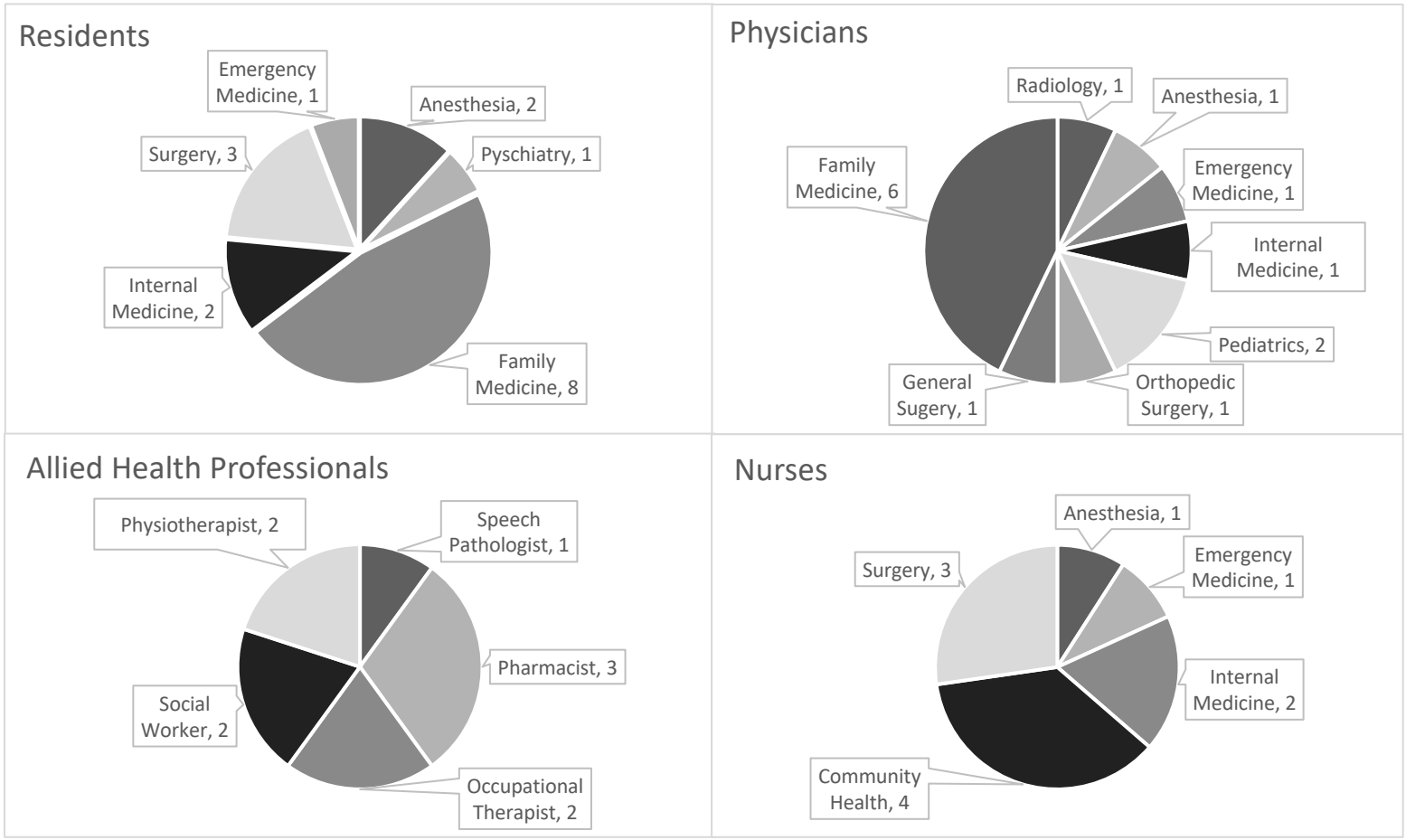
of importance and clarity of each assessment item. They were asked to indicate any missing skills or assessment items on the PSAT$^{360°}$.

To ensure representation from each of the residency programs and clinical disciplines, all residents within the Faculty of Medicine, Memorial University and raters were invited to participate in this phase of the study. Email and face-to-face information sessions (resident academic half days and faculty, committee, and team meetings) were used to share information about MSF including, what it is, how it works, the reported benefits of MSF, the PSAT$^{360°}$ study, how they could participate in the pilot, and the benefits of participating. Some of the benefits included an opportunity to voice how and what patient safety skills they should be assessed on and access to a validated, competency-based patient safety assessment tool intended to support their competency development before they graduate. One-on-one information sessions were held with chief residents and residency program directors who were unable to attend the larger information sessions.

Following this recruitment process, a total of 52 individuals participated in the pilot, which involved 17 residents and 35 health professionals. Representation from each of the rater groups (allied health, nursing, physicians) was sought and a breakdown of the number of participants by health profession and discipline is noted in Figure 6.
An honorarium was offered to residents and raters to stimulate engagement in the pilot. Honorariums are sometimes offered to residents and other health professionals who participate in research in the Faculty of Medicine, Memorial University.

Figure 6

Characteristics of Pilot Test Participants by Health Profession and Discipline



Pilot test participants were asked to provide input on the feasibility and utility of the PSAT$^{360^{o}}$ and the MSF process within their discipline. To achieve this, a series of open-ended and Likert-based questions were asked at the end of the pilot test survey:

1. Do you think the PSAT$^{360^{\circ}}$ tool will be understood by raters and the residents? Meaning, it avoids jargon and technical language?
2. Does it reflect teachable skills?
3. Does it look like the tool will be fair to residents and free of bias?
4. Does it look like it will be useful to learners in regards of performance feedback?
5. Do you feel that assessing patient safety skills using a Multisource Feedback format is appropriate for residency? In your specific program?
6. How do you see this tool being utilized in your program? (E.g. formative, annually, assessment of specific roles at specific times of their program, during resident remediation?)
7. Do you foresee any challenges in implementing this tool/process in your discipline?
8. What are the enablers of implementing this tool in your discipline?

To fully capture the input from and buy-in from the primary end user of the tool, residents were asked to participate in a focus group session following their review and completion of the online pilot test survey. Residents who had completed the pilot test survey at the end of the two-week period were emailed a link to an online polling system to set up a common time to conduct the focus group. The goal was to bring together a group of

3.4 Data Analysis

3.4.1 Literature and Environmental Scan

Relevant information charted from records extracted through both the environmental scan and literature review was reviewed in detail and used to: (i) determine if any other reliable and valid patient safety assessment tools existed for

medical trainees; (ii) aid in the development of the interview and focus group scripts; and (iii) map onto the competency statements (PSAT$^{360°}$ assessment items) developed through the competency mapping process in Phase III.

All the literature records included in the study were critically analyzed, and any key themes deemed important for discussion with the key informants were noted. Any gaps or unanswered questions in the literature related to the assessment of trainees' patient safety skills were integral to developing the interview and focus group questions used for key experts and stakeholders.

To ensure that the PSAT$^{360°}$ was comprehensive and inclusive of the required safety skills, articles and other records extracted through the environmental scan were mapped onto existing competency frameworks, guidelines, and ROPs in Phase III. To prepare for this mapping process, themes identified during the literature charting process were documented in individual columns within a Microsoft Excel database. Papers and environmental scan records that matched specific themes were cited in the database under the appropriate theme(s). These themes and records were then crossed referenced during the mapping process in Phase III.

3.4.2 Interviews and Focus Groups

Interviews and focus groups were recorded using a Sony device and transcribed verbatim. Identifying information was removed from the transcriptions, and individual speakers were assigned a unique identifier (e.g., Participant A, Participant B, etc.). NVivo 10 qualitative software package was then used to code and analyze the interview and focus group data.

Qualitative data from focus groups and interviews in this phase were coded and analyzed using the constant comparative method. It is an iterative and dual process of content analysis and coding of data. The categories that evolve during analysis take two forms: (i) those arising from the researcher perspective and insights into the study, which assist the researcher with developing an understanding or theoretical insight of the topic, and (ii) those that arise from the participant perspective and how they conceptualize and describe their individual experiences and world views (Lincoln & Guba, 1985).

This hybrid coding process involved first developing a pre-set list of categories (also known as a priori codes) stemming from the project's conceptual framework, research questions, and prior knowledge of the subject (Stuckley, 2015). Ten pre-set categories were developed in this phase based on the research questions and prior knowledge. Then emergent, or participant driven, categories were identified through reading and analyzing the transcripts. These categories represented the concepts, ideas, relationships, and meanings identified by focus group and interview participants. New categories or sub-categories were created as new themes or ideas arose during review of the transcriptions (known as opening coding).

During analysis, the incidents, or portions of meaningful text, were repetitively compared and contrasted within and across categories. This comparison was done to check for redundancy and determine if any coded text needed to be moved to a more relevant category. Categories were also compared to see if there were connections or overlap between them and collapsed appropriately (axial coding). As the relationships

between categories developed, so too did an overall understanding of participants' perspectives (selective coding).

Development of the coding structure and analysis of all transcriptions was conducted independently by a research assistant (RA) and the principal investigator (PI). Upon completion of the coding, the RA and the PI coding structures were cross referenced and compared for overlap and discrepancies (lack of coding overlap between the RA and the PI for specific sections of the transcription data). The coding between the RA and the PI was analyzed within *NVivo 10.* There was a 95% agreement between the coding done by the RA and the principal investigator. The remaining 5% was resolved by merging specific categories, re-coding text into a more appropriate category, or breaking down specific categories into new or sub-categories. Both the RA and PI discussed coding that did not overlap and concluded how best to code those specific sections of data. Once the coding discrepancies were resolved, the PI completed an additional review and comparison of categories across datasets to ensure the data were appropriately coded.

Interview and focus groups were analyzed for each cohort to determine the perspectives and input of each cohort. However, these qualitative data sets were reviewed collectively and integrated into the development of the PSAT$^{360^{\circ}}$ surveys.

3.4.3 Delphi Surveys

Delphi Survey – Round I

All the Delphi round I data were exported from SurveyMonkey into a Microsoft Excel (Microsoft Excel for Mac Version 16) file for analysis. Delphi survey experts were

asked to rate the level of importance (to include in the PSAT$^{360°}$) and the clarity of wording for each survey item. Respondents had an opportunity to provide suggestions for alternate wording in a comment field next to each survey item. Each Delphi survey item was analyzed individually to determine the level of consensus surrounding importance and clarity. Assessment items were retained and incorporated into the Delphi round II survey when a 75%, or greater, consensus level was achieved for level of importance.

The clarity of each retained item was then reviewed by first calculating the consensus level. If 75%, or greater, of respondents agreed or strongly agreed that the item was clearly written, then the item wording was not adjusted. Sometimes respondents rated the item as clearly written but provided suggestions to improve the wording to capture additional concepts or make it more general and applicable across all residency programs. In these instances, the item would be adjusted to incorporate the feedback. When fewer than 75% agreed that the item was clearly written, then any suggested feedback was reviewed and used to reword the item.

Delphi Survey – Round II

Analysis of the Delphi survey round II data (N = 15) was carried out in the same manner as in the Delphi round I where the inclusion of a statement and its clarity was measured against a consensus level of 75%. As in the previous Delphi round, expert feedback was used to further enhance the clarity of survey items, and a third Delphi survey was prepared for experts to review.

Delphi Survey – Round III

Experts did not suggest any additional edits to the survey items in the third Delphi round. Survey items generated from the Delphi method were incorporated into a set of MSF surveys for each cohort involved in the pilot test phase (physicians, allied health, nurses, and residents).

3.4.4 Pilot Test

The online pilot test survey and resident focus group data were used to further inform the development of the PSAT$^{360°}$ tools. Data analysis was carried out using SurveyMonkey and Microsoft Excel. SurveyMonkey data analysis provided levels of agreement for both clarity and importance of assessment items, for each cohort. Data were then exported to Excel to check for any differences between health professions and learner responses for each survey item.

Resident interviews were transcribed verbatim and analyzed using the constant comparative method, as perviously described in section 3.4.2.

3.5 Triangulation of Data and Member-checking

Determining if the veracity of conclusions and if the interpretations and results were in line with the participant's perspective was another important step in this research study. Since the research is meant, in part, to describe their experiences, participants had a role in judging the credibility of the results. This was achieved through detailed note-taking, triangulation, and member-checking, which helped strengthen validity.

Detailed notes describing the context in which the PSAT$^{360°}$ would be used were taken during the research process. These notes were used to prepare the recruitment information sessions and identify potential participants for the pilot test. All records related to the raw data, field notes (including those taken during the interviews and focus group sessions), and data analysis were maintained and referenced throughout the study.

This study involved maintaining a detailed log of the research process and a record of participant and researcher interactions. Steps taken to recruit study participants and challenges associated with engagement and recruitment were documented. A detailed record of the information sessions was also completed (e.g., the number of attendees, if individuals asked questions about the study, expressed concerns or potential barriers, and the level of interest or engagement).

Triangulation is the use of multiple sources and theories to gain a comprehensive understanding (Archibald, 2015; Mertens & Hesse-Biber, 2012). In this study, triangulation was achieved through the use of different sources or populations and included participants who had various levels of experiences. Additionally, this study involved inclusion of a second reviewer of the qualitative data to confirm that appropriate interpretations of the data were made.

Finally, a form of member-checking was conducted with experts and stakeholders (residents and raters) following the compilation of the interview and focus group data. Participants were provided with a detailed summary of overarching themes and findings. They were asked if the summary accurately reflected their perceptions of patient safety skills to be captured in the PSAT$^{360°}$, and the utility and feasibility of the PSAT$^{360°}$.

Participants were asked to identify their level of agreement with the interpretations made from the focus groups and interviews, if it accurately reflected their thoughts, and if any adjustments to the summary were needed. This information was incorporated into the Delphi survey. The PSAT$^{360°}$ pilot test survey was also another opportunity for participants to identify if the tool accurately reflected their perspective on the design and content of the tool. These steps and processes are suggested to increase the credibility and dependability of the data and the transferability of the research (Birt et al., 2016; Connelly, 2016; Gunawan, 2015).

3. 6 Ethics

This study was reviewed by Memorial University's Human Research Ethics Board (HREA) and received full approval. Approval was sought before each phase and required full committee review given the context and sensitivity of the study topic and that the study would potentially involve a high number of participants. All steps were taken to maximize anonymity and confidentiality throughout the study. Consent forms were distributed in advance of interviews and focus groups. A review of the consent form and the project was provided before interviews and focus groups commenced, during which, participants were asked if they had any questions or concerns. Survey, interview, and focus group data was de-identified and focus group participants were asked to not share the names of participants with others.

Chapter 4: Results

This chapter outlines the results of each of the five phases included in this study, including the scoping literature review and environmental scan (Phase I), key expert and stakeholder consultations (Phase II), competency mapping (Phase III), Delphi results (Phase IV), and the pilot test of the PSAT$^{360°}$ (Phase V). Frameworks, guidelines, and peer-reviewed literature were cross-referenced with key experts and stakeholder input to determine patient safety skills for inclusion in the PSAT$^{360°}$. Skills overlapped across all resources except skills related to attitudes and values held (e.g., remaining humble when talking to patients and working with staff), which are not measurable and therefore were not included in the assessment tool. Experts and stakeholders indicated that key factors influencing patient safety within residency programs include clinical exposure levels and the opportunity to build safety skills, as well as communication and collaboration approaches. Experts and stakeholders rated an entrustability rating scale as the most relevant for residents and the context of their training.

The results of Phase I, II and III were used to support the development of the first draft of the PSAT$^{360°}$survey items. These items were incorporated into a Delphi survey to obtain expert feedback on the relevance of the items for assessing residents' patient safety skills, clarity of the wording of each item, and input on the narrative components of the survey. Delphi rounds were completed until experts reported no further edits. A draft of the PSAT$^{360°}$ was distributed to target users of the tool for their input on the relevance, clarity, utility, and feasibility, as part of a pilot. This chapter is a synthesis of

the data that were used to develop three MSF surveys – the resident PSAT$^{360°}$(self-assessment), supervisor or co-worker PSAT$^{360°}$, and the patient PSAT$^{360°}$.

4.1 Results of Phase I: Literature Review and Environmental Scan

The goal of this phase was to conduct a scoping review of the literature to determine the status of patient safety and PGME assessment. A scoping review framework by Arskey and O'Malley (2005) was used to guide this phase of the study. This phase allowed for the identification of any knowledge gaps and a summary of evidence related to assessment of residents' patient safety skills, current patient safety assessment tools within PGME, performance expectations of physicians and residents in terms of patient safety, and supporting competency frameworks, guidelines, best practices, and regulations. The information gathered in this phase helped describe the profile of a patient safety-oriented physician and the skills residents need to fit that profile. Overall, this phase involved gathering and analyzing information from relevant articles for the purpose of informing the content and format of the PSAT$^{360°}$.

Scoping Literature Review

The results of this phase will be outlined according to the 5 scoping review stages, as described in Chapter 2. The first stage involved articulation of the specific question that will be addressed by the scoping review, which in this study is: *What information regarding patient safety assessment, feedback, curriculum, or competence within postgraduate and continuing medical education can be extracted from peer-reviewed*

literature that may inform the design and development of a patient safety assessment tool for residents?

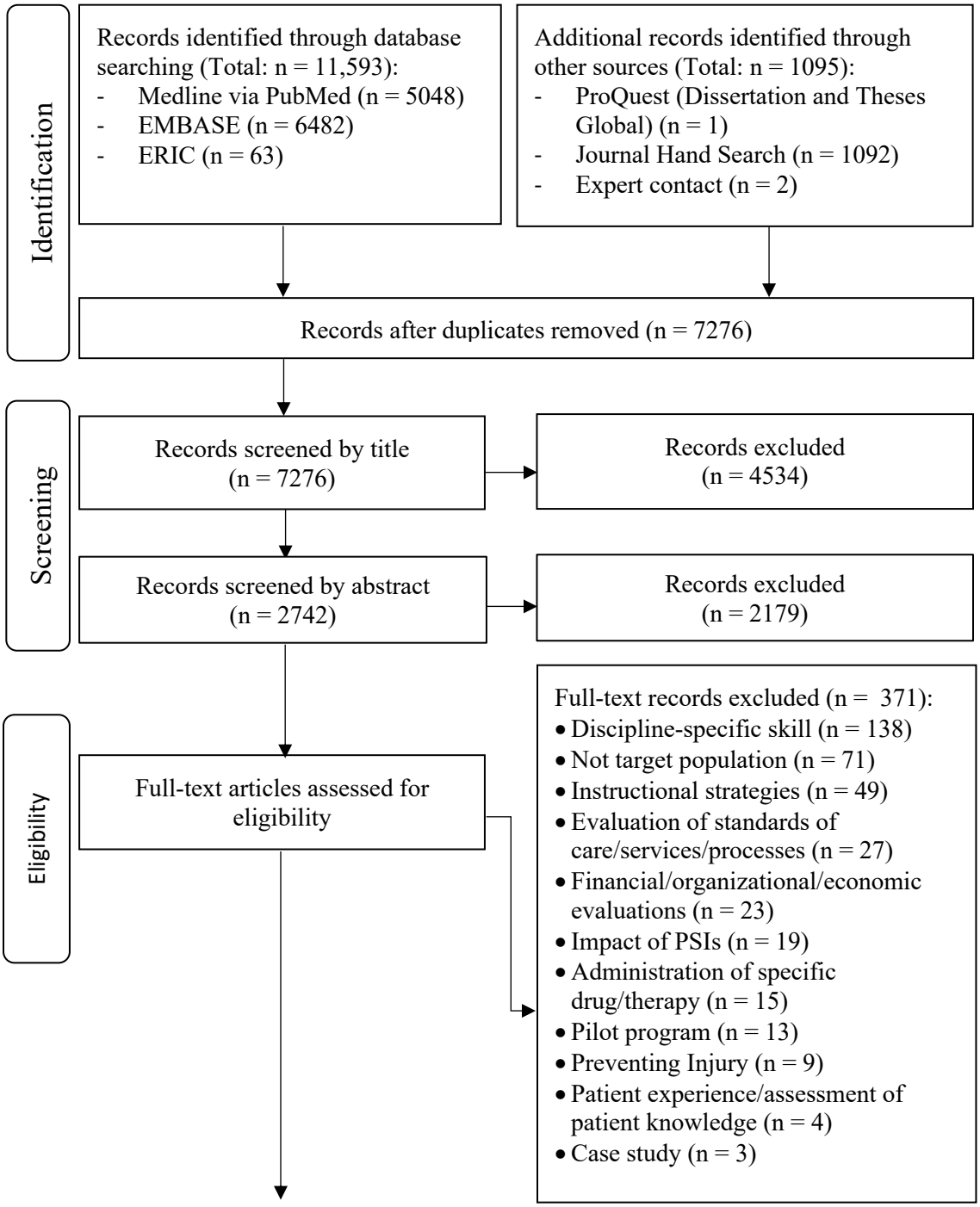
The second stage of a scoping review is the identification of relevant sources that will permit a comprehensive search of the literature. As previously described, a search strategy involving databases, specific filters, and key search terms was identified. Medical, health, and educational databases, including MEDLINE via PubMed, EMBASE, and ERIC were utilized for this study.

Other databases, such as PsychINFO and Cochrane, were not used since articles in these databases were either not of relevance, the scope of practice, or they would be captured in the databases included in this study. A total of 5048 articles were identified through the PubMed search, 6482 from the EMBASE search and 63 from the ERIC search for a total of 11,593 records (Figure 7). The search results from each of the three databases were cross-referenced, and duplicates were removed within the Mendeley reference software. (Mendeley Desktop version 1.19.4).

Hand-searching for relevant articles was also completed using a specific journal set. Table 15 below provides a list of the journals that were hand-searched between January 2005 - December 2015. Screening for relevant articles first started by searching the table of contents. Any articles retained at this stage were further screened by reviewing the abstracts, and if they were potentially relevant, the full article was reviewed.

Figure 7

PRISMA Diagram Depicting the Systematic Analysis of Peer-reviewed Literature obtained from PubMed, EMBASE, and ERIC



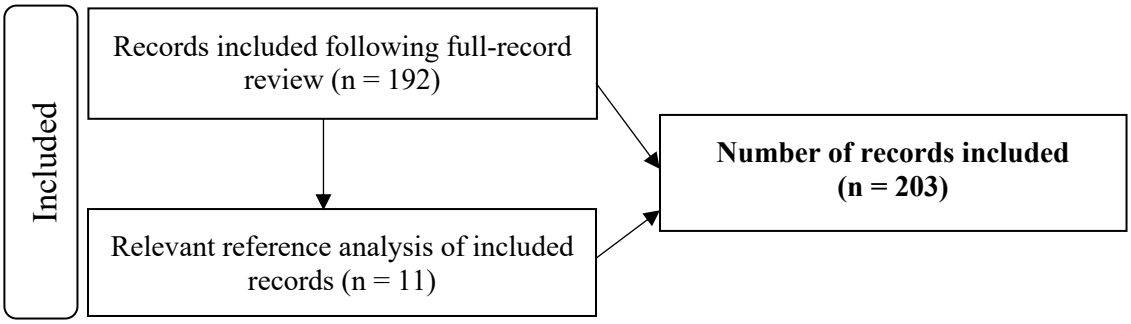


Table 15

List of Peer-Reviewed Journals included in the Hand-search and Number of Corresponding Articles Retrieved and Retained

Journal Name	**Number of articles retrieved**	**Retained after duplicate removal and review of title, abstract and/or full article**
Journal of Patient Safety	137	35
Journal Patient Safety and Quality Improvement	3	0
Patient Safety Monitor Journal	4	3
Journal of Patient Safety and Risk Management	25	1
BMJ Quality and Safety	537	23
eGEMs (Generating Evidence & Methods to improve patient outcomes)	156	0
Postgraduate Medical Journal	56	27
Journal of Graduate Medical Education	168	42
Canadian Medical Education Journal (search dates were adjusted based on earliest year available which was 2010)	6	3

ProQuest (a thesis database) was used to determine if additional relevant literature was available between January, 2005 – December, 2015 and one relevant source was located through this process. Experts in patient safety recommended an additional two references. Records extracted through hand-searching, ProQuest, and experts were

combined with the PubMed, ERIC, and Embase database search results within Mendeley and cross-referenced for duplicates, resulting in a total of 7276 records. After screening these records by title and review of abstracts (n = 2742), 563 records required full-text screening. Using the inclusion and exclusion criteria, a full-text review resulted in 192 records for inclusion. Screening of the references of these captured an additional 11 records for a total of 203 records.

Between 2005 and 2015, there was a steady increase in the number of published records related to patient safety and quality improvement curriculum and assessment, with a notable spike in 2011. This 'spike' in 2011 occurs a little over a decade after the well-known *To Err is Human* report by the Institute of Medicine (Kohn et al., 2000). After the release of this report organizations, leaders, and staff analyzed their culture, processes, and training to see what changes could be made to improve patient safety and quality of care. Regulatory and accreditation bodies started calling for explicit integration of patient safety curriculum and development, and adoption of policies and frameworks targeting enhancement to patient safety and quality improvement. These regulatory bodies were also mandating the inclusion of non-technical skills in curriculum and assessment. By 2010 and 2011, authors were reporting results of changes they made, lessons learned, pilot studies, and evaluation of patient safety initiatives that had been implemented over the previous decade.

Papers included for review arose from work primarily conducted in Canada, U.S., and the U.K.. The 203 papers included in the study were categorized by those that were (i) *descriptive* (n = 126) of patient safety curriculum, competencies, assessment tools,

clinical safety tools, clinical processes, policies, regulations, or guidelines within the context of postgraduate and continuing medical education; (ii) *interventions or pilot studies* (n = 74) describing the impact of an innovative patient safety initiative targeting residents and physicians including curriculum, training programs, assessment tools, clinical safety tools, clinical processes, policies, regulations or guidelines; or (iii) *case studies* (n = 3) representing the impact of PSIs on physicians and residents.

Of the 203 papers included in this study, the majority (n = 118) described educational interventions designed to improve or build patient safety competency among residents or physicians. Other papers recommended patient safety competencies for residents and physicians (n = 37), outlined best practices for patient safety and sharing of lessons learned (n = 27), or described patient safety assessment tools for health professionals, including residents and physicians (n = 21).

Educational Interventions

Articles describing educational interventions detailed why the intervention was developed, topics covered, targeted knowledge, skills or attitudes, instructional strategies (e.g., didactic, blended learning, online, or simulation), length of the intervention or program, and evaluation data, if they were collected. Reasons for implementing the intervention included meeting accreditation or CBME requirements (Singh et al., 2005), a notable gap in the ability of residents or physicians to complete a task(s) (Peters et al., 2008), identified by repeated PSI(s) in practice, or the desire to build a culture of safety within a discipline or organization (Sachdeva et al., 2007). Some publications reported general educational interventions that covered multiple topics; however, the majority

reported a focused curriculum on topics related to specific challenges noted within their programs. For example, Jansma et al. (2011) reported on a patient safety curriculum for residents that included multiple topics such as patient safety definitions, theories, human factors, and responding to PSIs. However, Newell et al. (2008) provided an overview of their curriculum that focused specifically on teaching professionalism and how it relates to surgical errors.

A range of curriculum topics covered in educational interventions included systems-based practice, PCC, self-efficacy when faced with PSIs, communication and collaboration with patients, health professionals, and teams, team functioning, reporting and disclosure, leadership, root cause analysis, quality improvement projects, and safe prescribing practices (Aboumatar et al., 2012; Ahmed et al., 2014; Anderson et al., 2009; Gupta et al., 2009; Holland et al., 2010; Kirkman et al., 2015; Myung et al., 2012). Albeit fewer in number, there were some reports of patient safety programming that focused on topics such as patient advocacy and scholarship as it applies to patient safety. No explanation was provided in the literature as to why topics on patient advocacy and scholarship were fewer in number. However, it is possible that the immediate focus was on educational interventions linked to introducing learners to patient safety or enhancing the ability of residents to perform clinical tasks safely.

Patient Safety Competencies

Some of the literature records overlapped with many of the well-defined patient safety competencies for residents and physicians. These include safe prescribing,

disclosure, quality improvement, root cause analysis, leadership, proper use of communication strategies, and applying systems thinking principles (Aboumrad et al., 2019; Christmas & Ziegelstein, 2009; Clarke et al., 2019; D'Eon, 2017; Frank et al., 2015; Gillespie et al., 2021; Royal College of Physicians and Surgeons of Canada, 2019; Saravo et al., 2017; Sukalich et al., 2014). Some of the literature also referenced specific personal traits that are regarded as important to workplace safety and the provision of safe, high-quality care, such as humility, honesty, conscientiousness, and intuition or listening to one's inner voice (e.g., making clinical decisions regarding investigations or making a diagnosis after taking a patient's medical history or hearing his or her symptoms) (Ahmed et. al., 2014; Christian et al., 2009; Ibitoye, 2018; Long et al., 2011). However, some personality traits (humility, honesty, conscientiousness) were noted to be least trainable in comparison to some other technical traits.

Best practices and lessons learned

Some authors expressed that one of the reasons for patient safety failures is the lack of or infrequent feedback provided to residents and physicians on their performance (Lewis et al., 2014). Support for inclusion of formative or summative feedback in a resident's training program is evident, whereby resident's patient safety skills should improve as a result of including feedback in the training program (Boyle et al., 2011; Chaou et al., 2017; Sawatsky et al., 2013).

Other shared perspectives describe health care culture as one in which poor and unsafe behaviours often go unchecked or uncorrected, and that feedback on how to correct such behaviours would help circumvent the culture of not conducting

performance checks (Stewart et al., 2011). Sometimes unsafe behaviours are adopted by residents through observations of other health professionals, including their supervisors. It is possible then that residents may assume habits or skills that could infringe upon patients' safety (e.g., poor hand hygiene or poor documentation in a patient chart) (The Joint Commission, 2008). Residents who see others carrying out tasks in an unsafe manner and do not witness any immediate consequences or harm to a patient may assume it is acceptable to adopt similar habits or behaviours (Martinez & Lehmann, 2013). Some residents believe that you should not question or report on those in authority. Residents have expressed feeling uncomfortable with reporting poor or unsafe habits and behaviours they witness, including their supervisors or those in a leadership role, for fear of repercussions on their relationships with colleagues, their grades, learning experiences, future recommendations by their supervisors, and being offered a position upon graduation (Liao et al., 2014; Martinez & Lehmann, 2013; Okuyama et al., 2014; Rabøl et al., 2011; Sinclair, 1997).

The existence of an authority gradient, or hierarchical structure, within health care, has caused some residents to believe that the most senior health professional has the best judgement, and residents report more trust and value in their supervisor’s experience and judgements than their own (Cosby & Croskerry, 2004). Residents also indicated that they would defer clinical decisions to someone in authority, regardless of the scientific worth underlying those decisions (Cosby & Croskerry, 2004). Respectfully challenging or reporting a colleague’s or supervisor’s clinical skills and decision-making is not something that is well accepted or encouraged in the health care system, including

residency (Institute for Healthcare Improvement, n.d. (b); Lyndon et al., 2012; Marshall & Manus, 2007; VanGeest & Cummins, 2005).

Some literature reported the need for more resident training and assessment of their ability to challenge the status quo (e.g., even when something is working well – can it be done more efficiently or safer) and take appropriate action when others are not performing safely, including those in a supervisory or leadership role (Bowman et al., 2013; Ulrich & Kear, 2015). Carrying out such tasks in a professional manner is a complex skill that can be challenging to incorporate into a residency program and even more challenging to assess (as it is linked to values, beliefs, and attitudes held by residents). Together, the literature points to the need for resident training and feedback on ethical and professional responsibilities associated with speaking up and reporting unsafe behaviours or judgements, regardless of hierarchical position, and that residents should be provided with feedback on those skills (Cosby & Croskerry, 2004; Okuyama et al., 2014).

Other notable best practices from the literature included frequent assessment of residents' safety skills, aligning assessment tools with CBME frameworks, and providing residents with the opportunity to practise and build patient safety skills, such as interprofessional collaboration and communication (Galbraith, Holtman, & Clyman, 2006; Gluyas, 2015; McCaffrey et al., 2012; Okuyama et al., 2011; Roediger & Karpicke, 2006), use of structured documentation and discharge (CMPA, 2016; Talwalkar et al., 2012), evidence-based decision-making, PSI disclosure and reporting (Ulmer, Wolman,

& Johns, 2009), and patient handovers (Gandhi, 2005; Gluyas & Morrison, 2013; Riesenberg et al., 2009; Singh, 2007; Ulmer et al., 2009).

Patient safety assessment tools

Context is a central element to the competence of health professionals. The competency of health professionals is linked to their ability to perform tasks within the clinical context in which they work (Klass, 2000). Since demonstration of competency is so closely linked with context, Okuyama et al. (2011) recommend that assessment of patient safety skills should be carried out in the workplace. However, to do this successfully in PGME, residents must know what they need to do (tasks) to provide safe care, what skills are needed to carry out those tasks, and how to apply their accumulated knowledge correctly. Assessment tools that are rigorously designed can serve to outline those expectations for residents. Okuyama et al. (2011) suggested that PGME should integrate a patient safety curriculum that spans throughout a residents' training and carry out competency assessments according to Miller's pyramid of competence by using tools that allow for direct observation of residents' performance in practice.

Of the 21 publications reporting on the development and use of tools related to patient safety, none were comprehensive (they did not fully capture the domains of patient safety competency) or designed for MSF. Twelve tools (57%) were at the 'shows how' level of Miller's pyramid of assessment. At this level, assessment is completed in a controlled situation using objective structured clinical examinations (OSCEs), simulation, and standardized patients. Tools at this level were primarily checklists to guide the rater's observation of residents (Gupta & Varkey, 2009; Varkey, Natt, et al., 2008; Wagner et

al., 2009). Five tools (24%) were structured for use at the 'does' level (conducted within the workplace) and three tools (14%) assessed at the 'knows' level (knowledge or factual recognition) of Miller's pyramid (Table 16).

Table 16

Characteristics of 21 Patient Safety Assessment Tools within the Literature

Characteristic	**Number of Tools**
Miller's Pyramid Level	
Multiple levels	1
Does	5
Shows how	12
Knows how	0
Knows	3
Type	
Not specified/determined	1
Self-Assessment	2
Formative	2
Summative	15
Formative and Summative	1
Multisource Feedback	0
Validity and Reliability	
Validity (Content)	7
Reliability (IC, IRR, IRA)	9
Generalizability	1
Scale used	
Not specified	4
Agreement	4
Likert - Satisfactory	2
Likert - Confidence	1
Likert - Complete	2
Global Competency Rating	7
Entrustment	1

Characteristic	Number of Tools
Organized by set of constructs[1]	
Yes	9
No	12
Number of Items	
Not specified	10
<10	2
10-50	7
>50	2

[1] Note: Organized using constructs from within competency frameworks, such as the CanMEDS competency framework, CPSI competency framework, or the Accreditation Council for Graduate Medical Education (ACGME).

Fifteen tools (71%) were either designed or piloted for summative use only and one tool (5%) was structured for both summative and formative assessment of patient safety skills. Two (9.5%) were formative assessment tools, two (9.5%) were self-assessment tools, and the utility for one tool (5%) was not specified.

One competency-based tool, the *Health Professional Education in Patient Safety Survey (H- PEPSS)*, was designed for the self-assessment of CPSI safety competencies linked to sociocultural domains such as human factors, teamwork, communication and analysis safety risks, and safety culture (Ginsburg et al., 2012). Due to the nature of the competencies captured, it was designed and recommended for use by residents near completion of their program or newly practising physicians. Another self-assessment tool, the *General Practice Educational Supervisors (GPES)* tool, was developed in 2014 for general practitioners or family physicians (Ahmed et al., 2014). This tool has 66 patient safety competencies that are not organized around a set of constructs (e.g.,

CanMEDS roles), it has not yet been piloted, and the details regarding its use either formatively or summatively were not delineated.

Eight tools (38%) were designed to measure a single patient safety domain through self-assessment or a single rater, such as a supervisor. These included tools designed to determine residents' or physicians' knowledge of root cause analysis (Wallace et al., 2009), residents' lapse in decision making or potentially dangerous actions taken during U.S. licensing exams (Harik et al., 2009), and residents' non-technical skills, such as task management, working in teams, and situational awareness (Bruppacher et al., 2010; Zausig et la., 2009). Three articles outlined the use of tools to assess communication skills focusing specifically on error disclosure using web-based strategies (Kim et al., 2011), patient handovers (Klamen et al., 2009), and diagnostic accuracy (Jain et al., 2014).

Validity and reliability are of great importance when selecting a competency assessment tool because these factors influence the trustworthiness of the assessment scores, and the degree to which they can be used to make meaningful inferences about residents' competence and decisions about future training (e.g., are residents progressing appropriately or do they need to improve and require coaching or remediation). Validity and reliability were reported for 16 of the 21 tools reviewed in this study. Five (24%) did not report validity or reliability. Five tools (24%) had established both content validity and reliability (e.g., internal consistency, inter-rater agreement, inter-rater reliability), while seven (33%) had demonstrated content validity and nine (43%) demonstrated reliability. There is a need to develop valid and reliable assessment tools that incorporate

all patient safety domains and competencies so educators can make confident and useful decisions about residents' capabilities.

Articles describing these assessment tools were reviewed to determine which rating scales were used and the rationale for their use. These scales were then integrated into the Delphi and pilot test surveys for rating by experts and stakeholders. Four tools (19%) did not report which scale was used. Seven tools used a global rating scale (e.g., a five-point scale of poor, borderline, satisfactory, good, excellent), with variable use of Likert scales such as agreement (n = 4; 19%), satisfactory (n = 2; 10%), confidence (n = 1; 5%), and completion of task (e.g., completely done, partially done, not done) (n = 2; 10%). While gaining ground for its use in medical education (e.g., the development of EPAs), only one (5%) tool reported using an entrustability scale. As described later in the Delphi and pilot test results, entrustability was the most desired scale across all health professions. Anecdotally, residents expressed this scale as the most fitting given their relationship with others who would assess them and the context of their training. They noted that this scale would serve to identify specific skills they need to work on to obtain more trust to complete independently – which is ultimately the level they need to achieve before entering practice.

The goal was to develop the PSAT$^{360°}$ using a set of constructs familiar to both residents and their raters to optimize engagement and ease of use. Patient safety assessment tools were reviewed to determine how they were organized – if any specific constructs were used (e.g., CanMEDS roles or CPSI patient safety domains). Survey items were not organized under a set of constructs for 12 tools (57%). However, nine

tools (43%) had survey items linked to domains in the CPSI framework. While many had used the CPSI framework, it was determined through expert consultations that the PSAT$^{360°}$ would incorporate constructs aligned with the CanMEDS framework. CanMEDS was seen as the most appropriate given the context in which the PSAT$^{360°}$ would be used and the target user of the tool.

The strain on survey respondents (response fatigue or burden) is influenced by several factors such as cognitive load needed to complete the survey and the length of the survey (U.S. Department of Health and Human Services FDA Center for Drug Evaluation and Research, 2006). Previous research had shown an association between survey length and response rate or survey completion (Ware et al., 1996). The concern for response burden is often a driving force behind developing shorter surveys and minimizing the number of survey items. However, this rationale is not supported by strong empirical evidence. When developing the PSAT$^{360°}$, the primary focus was on the content of the tool and making sure it contained all the skills reflective of a safe practitioner. However, minimizing the response burden by having a tool that was of appropriate length was also considered by checking for redundancies among the list of skills and having experts rate the importance of each skill. Ten (48%) had not reported the number of survey items within the tool. Of those which did report the number of survey items (n = 11; 52%), most (n = 7; 33%) were within the range of 10-50 items.

There were no reports of 360° or MSF tools designed to measure residents' or physicians' patient safety skills in the literature during this time period (Table 16). There were no valid assessment tools that met the following key criteria on which the PSAT$^{360°}$

was designed and developed, including: (i) the provision of formative feedback on residents' safety skills by multiple professionals or patients, or (ii) relevant competency frameworks.

Full-text literature records were analyzed and mapped onto competency frameworks in Phase III of this study. This was done to determine if there were any additional patient safety skills in the literature when compared to the competency frameworks, CMPA guidelines, and ROPs. Skills that overlapped between the literature and competency frameworks were viewed as important to include in the PSAT$^{360°}$.

Environmental Scan

The environmental scan served as a complement to the peer-review literature search described in the preceding section by capturing relevant skills not noted in the literature. The primary scope of this search was Canadian, in keeping with the medical education context for learning and ensuring that any documents arising would likely be reflective of how residents train and how physicians' practice in Canada (Table 17). Some well-known patient safety resources within the U.S. were also reviewed (e.g., Stalter Improvement). Development of the PSAT$^{360°}$ commenced with frameworks, guidelines, regulations, and knowledge arising from work conducted within and for the Canadian context.

Government documents included recommendations for patient safety education within the medical community, results of task force analyses following PSIs, descriptions of patient safety and quality related infinitives (e.g., British Columbia's Patient Safety and Quality Council), PSI lesson learned initiatives, and recommendations on how PSIs

Table 17

Outline of Environmental Scan Sources, Type, and Accessibility Details

Source	Item Type	No.	Objectives/ competencies/ content described	Accessibility to information
Provincial, Territorial and Federal Government	Reports	11	NA	Yes (n = 8)
Medical faculties within Canada	Individual Course	11	1/11	No
	Individual Seminar	3	2/3	No
	Course series	1	0/1	No
	Longitudinal programs	5	2/5	No
Medical Education Regulating Bodies (RCPSC, CFPC, Accreditation Canada, Medical Council of Canada)	Competency Frameworks, and Guidelines	7	3/7	Yes (n = 7)
National competency and curriculum development organizations (CPSI, CIHI, WHO)	Competency frameworks, webinars, reports, recommenda-tions	15	6/15	Yes (n = 2)
Relevant Patient Safety Associations/ Councils/ Organizations including Medical-legal organizations (CMPA; AFMC, CMA, HQCA, AHRQ, IHI, Health Canada)	Course Series	2	2	Yes (n = 2)
	Longitudinal Program	1	0	No
	Reports	3	3	Yes
	Frameworks/ Toolkits	7	7	Yes

can be prevented in the future. Documents/reports excluded were those describing action plans to address PSIs within health care organizations or discipline specific initiatives (e.g., public reporting of PSIs).

Universities within Canada offer primarily individual patient safety courses, each with a focused patient safety topic, such as the Concepts and Strategies in Patient Safety offered through the University of Toronto (Dalla Lana School of Public Health, University of Toronto, n.d.). Other patient safety education at this level included seminars, series of courses/modules, and longitudinal programs such as Master's programs in Quality Improvement and Patient Safety Leadership (Telfer School of Management, University of Ottawa, n.d.). Some universities offered courses (e.g., Certificate courses in Patient Safety and Quality Management), symposiums (e.g., Resident Symposium on Patient Safety and Medical-Legal Risk Reduction), and programs (e.g., Quality Academy that was conducted in collaboration with provincial health care authorities) (BC Patient Safety & Quality Council, n.d.; Canadian Medical Protective Association, n.d.; Telfer School of Management, University of Ottawa, n.d.). While programs such as those offered by the Canadian Medical Protective Association (n.d.) are not directly embedded within PGME or continuing education programs in Canada, residents and physicians are encouraged to attend these and are promoted on numerous Canadian university websites.

Regulatory bodies, such as RCPSC and CFPC, described patient safety educational programs (e.g., APIRE), examination objectives, and competency frameworks (e.g., CanMEDS Competency Framework) (Royal College of Physicians and

Surgeons of Canada, 2019; Frank et al., 2015). Other useful documentation that was extracted through the environmental scan came from the CIHC, CPSI, and the WHO, including the CPSI interprofessional patient safety competency framework (Frank & Brien, 2008), WHO patient safety curriculum guide (Tingle, 2011), reports (e.g., medication incident reporting in Canada), and guidelines (e.g., Canadian Disclosure Guidelines) (Disclosure Working Group, 2011).

Associations, councils, committees, and organizations that advocate for enhanced safety (e.g., Healthcare Quality Council, CMPA, Agency for Health Research and Quality (AHRQ), IHI, Health Canada, and AFMC) had useful educational materials that were reviewed for essential patient safety competencies. Some documents obtained through searching these sites included CMPA's Good Practices Guide, which are a set of practices that medical professionals can use to enhance safety in their own practice (Canadian Medical Protective Association, 2016), AFMC's Future in Medical Education In Canada Postgraduate Project which outlined a series of recommendations for integration of patient safety and quality improvement training in residency programs (The Association of Faculties of Medicine of Canada, 2012), IHI's online basic certificate in quality and safety (Institute for Healthcare Improvement, n.d. (a)), I-PASS Handoff Curriculum for residents (Starmer, 2014), and Health, Safety and Quality Councils of Alberta, Saskatchewan and BC frameworks for management of disclosure, QI and teamwork (Health Quality Council of Alberta, 2006; Saskatchewan Health Quality Council, n.d.; BC Patient Safety and Quality Council, n.d.).

In addition to these resources, information arising from the aviation industry was reviewed. Safety in aviation has often been compared to and has influenced health care safety (Thomas & Helmreich, 2002). The aviation industry has made significant accomplishments regarding safety (e.g., decrease in the number of fatalities per year), despite the complexity of the work and the number of individuals the industry is responsible for when providing their services (Boeing Commercial Airlines, 2014). Health care is comparable to the aviation industry in terms of the complexity of work processes and the number of individuals to which it provides services per year. However, some report that such comparisons are challenging given that each patient's treatment and responses are unique compared to an airplane flight experience (Sullenberger & Chesley, 2013). In his editorial response letter, Rivers (2006) explained that physicians are not afforded the ability to stop providing care if a patient has complications. In situations such as these, physicians need to assume patient care despite the risk to patient safety. However, pilots can halt a flight if specific safety checks are unmet.

Kapur et al. (2015) published a comparative review of safety in aviation and health care where they proposed critical safety elements that the health care industry should consider, including establishing a blame-free culture and setting safety as a priority. The aviation industry is said to have a stronger blame-free culture and a higher value for safety than the health care industry (Wadhera et al., 2010). Kapur et al. (2015) suggested several patient safety skills that health care should adopt from the aviation industry, including a commitment to lifelong learning, initiating and leading safety initiatives, interprofessional collaboration, managing stress, and coping with fatigue

(Harris, 2014; Seager et al., 2013). Other skills deemed important are the ability to properly use checklists, demonstrate respect for other health professional roles, develop patient care plans, and delegate tasks (Catchpole et al., 2007; Seager et al., 2013).

These skills have been accepted as behavioral indicators of patient safety in health care. However, simple communication gestures between colleagues, such as making eye contact, using first names when conversing, and introducing each other during procedural debriefings or meetings have not been well embraced (Kapur et al., 2015; Lewis et al., 2011). Other skills that could be transferable from the aviation industry include taking action to create a distraction-free environment when carrying out delicate or complex procedures (e.g., using a do not disturb sign when completing medication rounds with patients) and questioning the decisions and actions of others that may pose a safety risk to patients (Wadhera et al., 2010). These are not common practices within health care "since it is inherently hierarchical, with barriers to assertiveness" (Kapur et al., 2015, p. 5).

A total of 67 environmental scan documents and the 203 literature search records were used to inform the development of interview and focus group scripts for Phase II and the competency mapping process in Phase III to determine patient safety constructs and skills for inclusion in the PSAT$^{360°}$ tool. It was determined through the literature and environmental scan that it was important to understand the perceptions of patient safety held by stakeholders, gather contextual information related to residents' patient safety skills, identify skills that experts and stakeholder regard as important to assess, and how residents would be expected to demonstrate those skills. It was important to include these

questions in the interview and focus group scripts so that the results could be integrated into the format and content of the PSAT$^{360°}$.

Specific patient safety constructs and skills were extracted from the literature and environmental scan records and then crossed referenced with existing competency or clinical practice frameworks (CanMEDS, CPSI Safety Competencies, Accreditation Canada ROPs, and CMPA Good Practices) to check for additional skills that should be included in the PSAT$^{360°}$. Examples of skills that overlapped with competency frameworks include conducting verbal and written patient handovers, assessing the environment for safety risks (e.g., equipment not working well and layout of an operating room), carrying out a comprehensive discharge plan (e.g., communicating the needs of the patient to a rehabilitation team or family physician), carrying out disclosure of a PSI (e.g., prepares for disclosures in advance and participates appropriately in PSI disclosure events), anticipating and taking action to mitigate potential safety risks before performing procedures, and educating patients on why prescribed investigations are needed and what they can expect. Skills noted in the literature that did not overlap with competency frameworks include humility, honesty, conscientiousness, empathy, and intuition (Ahmed, Arora, McKay, et al., 2014; Flin & O'Connor, 2017; Long et al., 2011; Matlow & Brian, 2014).

Humility, honesty, conscientiousness, and empathy are attributes that underlie key PSI skills. Appropriately carrying out disclosures of PSIs to patients and families, for example, requires residents or physicians to be empathetic and humble. However, as mentioned earlier, these qualities relate to individual values, beliefs, and attitudes that are

difficult to train and assess (Ahmed et al., 2014; Long et al., 2011). While these characteristics cannot be directly incorporated into the PSAT$^{360°}$, they are indirectly captured within other skill dimensions.

4.2 Results of Phase II: Key Expert and Stakeholder Consultations

Experts in patient safety (n = 14), MSF (n = 6), and key stakeholders (n = 49) who are representatives of target end-users of the PSAT$^{360°}$ were interviewed or participated in a focus group session. Key stakeholders included residents, faculty, program directors, allied health professionals, and registered nurses.

Experts and stakeholders were invited to provide their perspective on the concept of patient safety, principles and tasks associated with a patient safety-oriented physician and resident, essential competencies for inclusion in the PSAT$^{360°}$, as well as their thoughts on the use of MSF as a tool for formatively assessing residents' patient safety skill level. Sections to follow will provide the constant comparative analysis results of the interview and focus group data for each expert and stakeholder group. Experts in MSF (n = 6) were asked to describe MSF, including fundamental principles, challenges and enablers associated with its use, and MSF as a framework for formative assessment of residents' patient safety skills. Member-checking confirmed that participants agreed with the thematic descriptions of the findings presented in the summary.

The interview and focus group results are organized based upon comparison of responses across all cohorts for each interview question. Themes arising from the analysis of interviews and focus groups are described in detail in the following sections.

The frequency by which cohorts discussed each theme and sample quotations are summarized in tables 18 - 23 below.

4.2.1 The Concept of Patient Safety

Patient safety experts and key stakeholders were asked, *What does the concept "patient safety" mean to you? As an educator? As a practitioner? As a resident? (Question 1).* Following constant comparative analysis, a total of six main themes emerged, where patient safety: (i) means harm reduction to patients, (ii) involves providing PCC, (iii) means providing high-quality care, (iv) necessitates teamwork, (v) includes quality improvement, and (vi) is related to building a culture of safety (Table 18).

Reducing Harm

All cohorts described patient safety as a reduction in harm to patients. The concept of patient safety is seen as a physician's responsibility to be aware that harm to patients can occur and that they should take every possible action to avoid or reduce harm when providing care to patients. As one expert pointed out, *"Patient safety concerns itself with preventing problems associated with the care people receive"* [Patient safety expert #7]. Patient safety involves assessing the workplace and tasks for preventable risks of harm and implementing processes to prevent harm from reaching the patient. Further to this, physicians need to take the appropriate course of action to mitigate patient harm linked to the care they provide.

Table 18

Themes, Frequency of Themes, Representative Quotes of Constant Comparative Analysis from Question 1 – Defining Patient Safety

Theme	Frequency (# references to that theme)					
	Experts	**Program Directors**	**Faculty**	**Nursing**	**AH**	**Residents**
Reducing Harm	**13**	**4**	**12**	**8**	**10**	**10**
- Preventing Harm	10	2	2	8	7	7
- Mitigating Harm	2	0	0	0	1	0
- Double Checks	1	2	10	0	2	3
Patient-Centered Care	**9**	**7**	**12**	**6**	**10**	**6**
- Putting patients first	6	1	5	0	1	0
- Holistic care	0	3	5	2	5	2
- Educating Patients	3	3	2	4	4	4
High-quality Care	**0**	**7**	**2**	**3**	**3**	**0**
- Positive patient outcomes	0	4	2	3	3	0
- Patient follow through	0	3	0	3	0	0
Teamwork	**2**	**2**	**1**	**1**	**4**	**3**
- Comprehensive care	2	2	1	1	4	3
Quality improvement	**5**	**0**	**0**	**0**	**0**	**0**
Culture of Safety	**4**	**3**	**4**	**0**	**0**	**0**

Meaning, when patients are harmed, the physician's role is to take a course of action that results in less injury or hurt onto the patient (e.g., providing medicine to counteract the incorrect one that was administered). One expert noted,

> *I'm just writing an actual glossary of terms, right, so patient safety means to me that you're reducing unsafe acts in health care, you're mitigating harm if it does occur so if harm reaches the patient or client, the effects are less catastrophic all around…less impact on the patient, and staff and families and the organization. [Patient Safety Expert #6]*

A double-check is a protocol that health care staff can use to catch problems before they reach and cause harm to patients, for example, checking that the right patient is receiving the right surgery (Hewitt, Chreim, & Forster, 2016). Many faculty discussed the importance of performing double checks to minimize preventable harm. Examples include reviewing a patient's current medication history before administering a drug or having a colleague check the prescription to ensure the five rights of medication use have been met – the right patient, the right drug, the right time, the right dose and the right route (Grissinger, 2010). One physician reported,

> *So with any prescriptions or orders that are written, those are written by maybe the resident. Then the nurse or pharmacist who is taking those orders off is also then double-checking and ensuring that they are the correct doses and what the patient was on before in hopes of alleviating those errors. [Faculty #4]*

Double checks are important to preventing PSIs before procedures are performed, where physicians should confirm that the patient is about to receive the right procedure. Participants indicated that double-checks help to catch errors before they reach the patient and cause preventable harm. These checks can help prevent PSIs from occurring due to physician fatigue or being rushed when drafting medications or at the onset of a procedure.

Patient-centered care

Patient safety also requires a patient-centered approach which involves building a care plan around the patient by listening to their needs and involving them in decisions. Patient-centered care requires effective communication skills and making care decisions based on the patient's wishes. These skills ensure that patients can make informed decisions and safe patient care is provided. As two participants expressed, "*I think patient safety is about first and foremost putting patients first and really the idea of patient-centeredness" [Faculty #2].*

All cohorts perceived that the process of listening to patients and gathering critical information about their medical history is part of safe patient-centered care. For example, health professionals need to know when patients have had an adverse reaction following a previous procedure or treatment so they can make modifications to the care plan (e.g., use a different procedure or treatment) and avoid a PSI(s). They need to listen and document information that the patient offers to them about previous care they received. A health care provider who asks patients about their relevant medical history demonstrates patient safety skills, in part, through their PCC skills. Some patients need prompting when collecting this information. Other times this information can surface through discussions between the patient and the health professional. Cohorts expressed that to practise safely, health professionals need to talk to patients about what is happening to them (their diagnosis and prognosis, what tests or treatments they need and why, and what they can expect) and ask if they have questions. Allied health and nursing cohorts described the impact of not informing and involving patients,

> *We need to do a better job of letting the patient know what happening. Most times they never spoke to the doctor after being admitted or after their surgery. They don't know what is happening next…what the plan is or been asked what they need or prefer. [They] haven't been given any options. We need to include to the patient more, if we can. [Allied Health, Focus Group #2]*
>
> *The other thing is that they have the information, the patient has the information they need to make decisions. I find communication is a huge, huge issue. Patients don't understand why they're getting tests done, they don't understand what their diagnosis is, what it means when they leave us. [Allied Health, Focus Group #1]*

Many cohorts perceived holistic care, or considering the whole patient (the patient's physiological, psychosocial, and cultural needs) as important to patient safety. Holistic care involves getting to know patients beyond their disease, for example - what supports and resources they have at home or in the community, do they have the financial means to maintain proper nutrition or home care, do they have any equipment needs to live at home safely, and if they have specific religious or cultural preferences surrounding their care. One allied health group expressed that safe care means understanding the context surrounding the patient's disease: "*Holistic care, so the notion that you cannot manage any individual disease without understanding the full context" [Allied Health, Focus Group #2].*

High-Quality Care

Program directors, faculty, nurses, and allied health noted that providing high-quality care is linked to patient safety. A high-quality care approach can help achieve positive patient outcomes, including patients feeling better after entering the system and receiving care. As one nurse summarized: "*Patient safety is ensuring that the patient*

leaves your interaction as well as, if not better, than they were when you met them" [Nursing, Focus Group #2].

High-quality care was also seen by program directors and nurses to include following up on the patient care plan by ensuring that investigations get completed, results get reviewed, and patients are informed of those results. Updating the care plan helps other team members, who are providing care to the same patient, to have access to the most up to date information on which they will base their care decisions. High-quality care also involves following up with patients to see how they are doing after treatments or procedures and ensuring that they attain timely access to resources and services. One program director suggested,

> *…if a patient's coming for care, that they're going to get care and that all the steps, as you started to you outline at the start, are going to be looked at, that somebody is going to be making sure that all of those are in place. [Program Director, Focus Group]*

High-quality care requires coordination and teamwork skills. A patient's health status, test results, and discussions with their health care provider can influence changes to a care plan. Teamwork helps ensure that the care plan and any updates are shared with other team members.

Teamwork

Teamwork was not discussed as frequently by interview and focus group participants in comparison to other themes. However, all cohorts agreed that patient safety requires a comprehensive and multidisciplinary approach to care. Communication, a culture of safety, and quality improvement principles were concepts that participants

expressed as being linked to patient safety. Experts, program directors, and allied health participants expressed that physicians enhance safety when they participate in teams and value the role of teamwork in patient safety. Teams should have clear communication with each other on care decisions and investigations, and communicate with the patient in a timely fashion the results and care options. Teams also need to establish shared goals and a coordinated approach to care is key to patient safety. One program director explained that when teams share their perspectives and knowledge based on their role, harm can be reduced or prevented.

> *Safety should be improved when we participate, and want to participate on teams in health care. This is where all professionals get to express how care should be provided based on their role and can delegate based on who can do what, their scope of practice. If everyone comes to the table to talk about their patients and share their findings and decisions so we are all in the know, we shouldn't miss anything that could cause harm to our patients. [Program Director, Focus Group]*

Patient safety can be compromised when there is a lack of teamwork or coordinated care between physicians and other team members. An allied health professional explained in the following quote how inefficient teamwork can have negative consequences (e.g., a diet plan not identified on discharge paperwork – which impacts their health and healing at home).

> *There often is a gap there between what the allied health team would see and be planning to do as opposed to a physician. We've actually had patients and the physician will say they're ready to be discharged. It's like, well, you can't send them home if they don't have a diet…if we [don't] have the food texture identified or let them know what they can have. [Allied Health, Focus Group #2]*

Experts and program directors noted that using patient handover protocols and sharing pertinent patient information with other health professionals can help close

communication gaps among health professionals and reduce PSIs. Patient safety incidents can occur when physicians fail to communicate and discuss their decisions and clinical findings with other health professionals. Consequently, health professionals may base their care decisions on incomplete information. Physicians who do not value teamwork may also fail to include other health professionals in patients' care, resulting in a gap in care and PSIs. One faculty member expressed the need to share information with others on the team,

> *To prevent errors the team needs to identify what they bring to the table, what they will do for the patient and try to agree on a shared plan and goals going forward. Need to update others when decisions are made or if the care plans need to change. You know, the nurse needs to know if the patient no longer needs to go for a test, so they can plan the patient care and we ensure a patient doesn't get a test they no longer need, the social work needs to be notified if the patient got unwell overnight and is not able to go home now, so they can coordinate the timing of items they might need at home upon discharge, like oxygen. If there is a deviation from the initial plan, others need to know. These all are critical to patient safety. [Faculty #4]*

Teamwork is a critical element to continuous quality improvement, where health professionals work together to discover new and improved ways of providing patient care. The following section describes experts' and stakeholders' perspectives on the importance of quality improvement to patient safety.

Quality Improvement

Experts reported that health professionals can enhance patient safety by engaging in quality improvement processes. Experts believe that quality improvement requires health professionals to consistently monitor and analyze clinical tasks and the work environment for areas in need of improvement. As one faculty member stated: "Q*uality*

improvement is all about learning and seeing what you're doing and evaluating what you're doing and improving it and having an objective. So, to make improvements in patient safety requires a quality improvement approach." [Faculty #3]

Experts, faculty, and residents reported that a patient safety-oriented organization means having the ability to talk about PSIs and mistakes freely without fear of being penalized. In the words of one expert, "*Patient safety really speaks to a culture in the organization where people are free to put the patient first and feel free to talk about errors, talk about mistakes." [Patient Safety Expert #8]*

For residents, patient safety means a culture where health professionals' fallibility is accepted, and the focus is learning from PSIs (e.g., what, not who, gave rise to the incident).

They need to know that we make mistakes during training. That we may make them after we finish, too. I think more people are talking about it [mistakes] more now - what we can do to correct it… learn from it. What caused it? Not necessarily who caused it. [Resident, Focus Group #3]

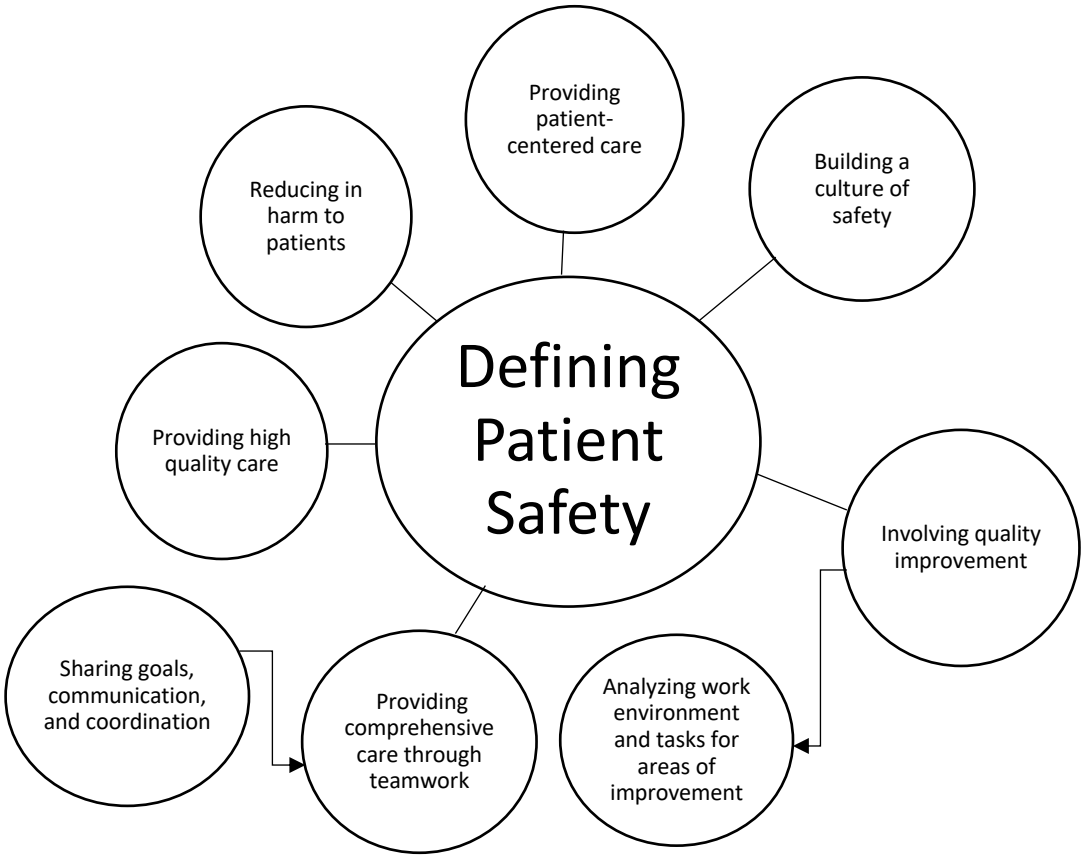
Figure 8 below summarizes the key themes that emerged from constant comparative analysis of question 1 (defining patient safety).

4.2.2 Key Attributes of a Patient Safety-Oriented Physician

Patient Safety experts and key stakeholders were asked, *What are the key principles you would associate with being a "patient safety"- oriented practitioner? (Question 2).* Six main themes describing the attributes of a patient safety-oriented physician arose from discussions with these participants, which include (i) being diligent

Figure 8

Themes arising from Constant Comparative Analysis of Question 1 Data – Defining Patient Safety



and making an effort to consider all of the patients' needs, (ii) building expertise in critical areas related to patient safety, (iii) providing clear communication to the team and the patient, (iv) reflecting on abilities to provide care and ask for help, (v) being assertive and confident in challenging the norm, and (vi) having respect for patients (Table 19)

Table 19

Themes, Frequency of Themes, Representative Quotes of Constant Comparative Analysis from Question 2 – Key Attributes of a Patient Safety-Orientated Physician.

Theme	Frequency (# references to that theme)					
	Experts	**Program Directors**	**Faculty**	**Nursing**	**Allied Health**	**Residents**
Diligent						
- Conscientious when providing patient care	10	5	11	3	0	2
An expert in						
- Best practices	10	2	3	1	2	2
- Risks within the system	2	0	0	0	0	0
- Systems thinking	1	2	2	0	0	0
- Types of harm/errors	1	0	0	0	1	0
Communicator						
- Provide clear communication	11	2	0	1	0	4
Intuitive and reflective						
- Recognize their limitations and ask for help	3	1	4	3	4	2
Assertive and confident						
- Challenge the norm and query decision-making	2	1	1	0	1	1
Respectful of the patient						
- Respect for patients' involvement in their health care	5	1	5	1	2	4

Diligence

All cohorts, except allied health, reported that patient safety-oriented physicians are diligent, take pride in their work, and practise patient-centred care. Diligent physicians are thorough when determining a diagnosis and treatment plan, anticipate patient outcomes and forecast their needs, strategize to circumvent potential risks, and follow policies and practice standards. As one faculty member commented,

> *Well, I would say you have to be diligent, careful, thoughtful, dedicated to the patient, keeping their needs in the forefront…Residents and physicians should want to do a good job, not just do the job. We want to prepare residents to always think about possible threats to plans they make, and think what if x happens when we do this treatment, what if y happens when we do this surgery, etc.. they think ahead. Sometimes we get residents who do this without prompt. Most times we need to teach the resident to do this. [Faculty, Focus Group #3]*

Participants also described safety-oriented physicians as individuals who perform safety checks before and during a procedure as a way of anticipating any issues that may arise to prevent and mitigate patient harm. Physicians who demonstrate patient safety also incorporate other health professionals' expertise into their decisions, update care plans as new information arises, and educate patients about tests and next steps.

Expertise

In addition to discipline-specific knowledge, all cohorts spoke to the importance of physicians having general knowledge and theory related to best practices in patient safety, risks within their work environments, systems thinking, and awareness of common errors that arise. Such principles and knowledge can help physicians think broadly and beyond their area of expertise in patient care and how they can work with others to help mitigate preventable harm.

One faculty member expressed,

> *As an educator, it [patient safety] means making sure that the students have the safety knowledge to safely deliver the care in the hospital in the setting. They have the theory, the hands-on experience, and they know the rationales to why they're doing something the way they should be doing it. [Faculty #2]*

Effective Communicator

In keeping with the literature on the link between communication and patient safety, four of the six cohorts (experts, program directors, nurses, and residents) suggested that a safety-oriented physician is one who effectively communicates patient information using structured handover tools. As one expert described, handover tools can help physicians communicate patent information that can be critical to management of patient care.

> *Then of course there's all of the numerous errors related to handovers. We didn't fail to communicate – well, we failed to communicate some key bits of information that if you had known you would have used a different management [plan]. [Patient Safety Expert #5]*

Nurses reported that respectful communication between physicians and other health professionals is important to patient outcomes. Frontline staff work closely with patients – they have the opportunity to know the patients' needs and have valuable information to share based on their work experiences and expertise. The information that others provide can impact patient safety; therefore, nurses believe that physicians should listen to what other health professionals have to say about their patients and consider that information when making decisions and planning care. Nurses also suggested that physicians should respectfully communicate when there are differences of opinion about patients' care. In the words of one nurse,

> *Sometimes the way things are communicated can get lost – doctors need to be respectful of others that they work with. Sometimes we work with the patient a lot and we may know what will work, what won't work. If nurses make a suggestion and they do not agree, they should do it respectfully. Should at least listen to what we say. When we disrespect each other and don't listen, it is the patient that may suffer. [Nurse, Focus Group #3]*

Assertive and Confident

Experts, program directors, faculty, allied health, and residents noted the importance of a physician having a voice to speak up and question unsafe behaviours. It is vital to query behaviours and decisions that conflict with the physician's values and training. Illuminating poor habits and behaviours that place patients at risk is seen as important to advancing patient safety in health care. While this is recognized as a challenging task for residents within a hierarchical and high-stake learning environment, it is essential to build those skills during their training. As one program director explains below, some residents need to be encouraged to speak up.

> *Every now and again, I think we get a resident who's able to free think on their own and ask questions of health professionals. It's very difficult in a hierarchical authority gradient driven system to speak up when things aren't quite right. And so, patient safety requires a lot of courage sometimes in the practice environment. Sometimes it's easier to look the other way. Sometimes people don't feel they're empowered to be able to speak up. [Program Director, Focus Group]*

Intuitive and Reflective

All cohorts suggested that residents reflect on tasks they perform and their knowledge level associated with completing those tasks (e.g., are they performing at the level they should, do they need help or coaching to complete the task). Residents should intuitively ask for help when they do not have the skill or knowledge to safely complete a

task. Even if they feel uncertain, they should seek guidance. As one allied health professional suggests, "*When you're not confident about dealing with the particular task, you should seek help" [Allied Health, Focus Group #1].*

Residents asking for assistance or input before completing a task may require residents to be confident or assertive. It can require confidence to admit that you are unsure of something (e.g., which test to order, how to complete a procedure, which medication to prescribe). It is therefore essential that residents know it is safe to ask questions, even if residents feel they should know something at a specific stage, without any judgement or impact on training. Residents asking questions that will enable them to practise safely should be a part of the residency training culture. This requires the support of supervisors and other health professionals, which has implications for professional development. Health professionals with whom residents work should be knowledgeable about the benefits of residents reflecting and asking questions, and foster these skills among residents.

Respectful of the Patient

Nurses agreed that physicians who are safety-oriented have respect for patients' involvement in their care, which overlaps with the concept of patient-centered care. Patients can provide information (e.g., patients' needs and goals of care) that may be helpful to health care professionals when planning a safe care plan. It should be explained to patients why investigations or procedures are being recommended, so they can make informed decisions. Respecting the need to involve patients in their own care can engage

them in their treatment process and compliance with the prescribed treatment plan. As one nurse explains,

> *Having patients involved, too, just to elaborate on that. Probably institutionally we could do better with that, where patients are actively involved. They should have some sense of why they're here, as opposed to just seeing someone in clinic who doesn't know why they're seeing the surgeon that day. So getting patients a little bit more actively involved I think is good. [Nurse, Focus Group #2]*

Other important notes

The following were also noted as important non-technical qualities of a safe physician: the desire to learn (Experts; Allied Health), becoming a champion of patient safety (Experts, Program Directors), serving as a role model for learners (Experts), demonstrating a passion for teaching (Experts), situational awareness (Experts), and one who serves as an advocate for the patient (Resident). Most of these characteristics were noted by experts. There were no comments related to these themes from faculty or residents. Therefore, there may be a difference in expectations that experts have of safety-oriented physicians and how faculty and residents perceive or value these safety characteristics (e.g., they may not equate a desire to learn with being a safe physician). With respect to the desire to learn, one expert commented that being safety-oriented is about acquiring new knowledge that might impact the safety of your practice.

> *The concept of lifelong learning is that the system evolves and as a system evolves providers have to be evolving with it and they need to incorporate new knowledge into their practice. And I think people always assume that means like medical discoveries but it is also learning about how the health care system works and how their immediate environment works. And so, as I said, there's often an immediate assumption that CME equals reading about the latest medical discovery but it could also be learning about the new funding policy or the new policy for discharging patients from your unit or whatever. [Patient Safety Expert #9]*

Another expert expressed the importance of learning from PSIs and extending that learning by sharing lessons learned with others (e.g., sharing via safety huddles or morbidity and mortality rounds): "*Realizing that errors are an opportunity to learn and to improve; and sharing those errors with others allows others to improve and for systems to be improved to prevent errors from happening again" [Patient Safety Expert #6].*

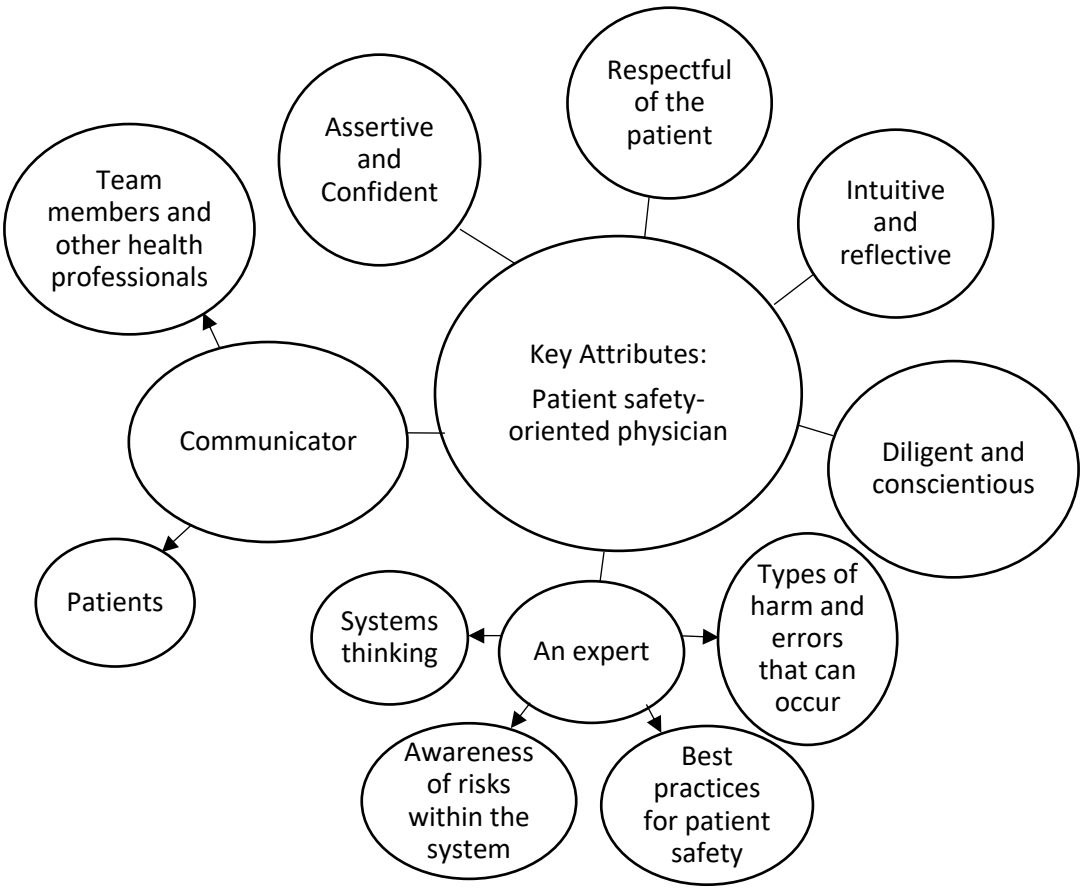
Acting as a scholar by seeking out safety training opportunities and then passing that knowledge and skill along to students, residents, and other professionals reflects a champion of patient safety. Champions are those who strive to improve the safety of the care they provide and the safety within their workplace. As one faculty member noted: "*It is not just about reading about how to be safe. A scholar or champion of safety acquires knowledge and skill and passes it along to other to build capacity around safe care in their workplace" [Faculty, Focus Group #2].*

As suggested by experts and faculty, humility helps residents in building relationships with patients and other professionals. Residents who are humble are likely to ask others for help and welcome suggestions that might help them provide safer care. Those who demonstrate this quality recognize that there is more than one way to do something. They are receptive to openness and transparency, and are likely to report and disclose PSIs. All these qualities align with a just culture and a culture of safety and systems-based thinking. This humility attribute overlaps with that suggested in the literature.

Figure 9 below summarizes the key themes that emerged from a constant comparative analysis of question 2 (Key Attributes of a patient safety-oriented physician).

Figure 9

Themes arising from Constant Comparative Analysis of Question 2 Data – Key Attributes of a Patient Safety-oriented Physician



4.2.3 Key Physician Tasks Requiring Patient Safety Skills

Patient safety experts and key stakeholders were asked, *What types of tasks do*

you perform on a frequent basis that require you to apply or demonstrate patient safety? Non-physician groups were asked: *What types of tasks do you perform on a frequent basis, in collaboration with physicians, that require application or demonstration of patient skills? (Question 3).* A total of 11 main themes emerged through analysis of responses to tasks associated with the demonstration of safety skills by a physician (Table 20).

Non-technical skills

Non-technical tasks, including roles that physicians or residents assume, communication, and collaboration were seen as important in the provision of safe patient care by all cohorts. Effective teamwork requires understanding health professionals' roles and scope of practice to collaborate and appropriately utilize members of a team.

Collaborating or depending on other health professionals to carry out tasks helps to minimize gaps in patient care, and therefore PSIs, by providing a more comprehensive and coordinated care approach. In the words of two participants,

> *That's something that it took us a long time to convince people, for example, that we require pharmacists to be part of the care of these patients. I say, well, the radiation oncologist needs a million-dollar machine to deliver the radiation; I need skilled pharmacists to be able to help in not only overseeing the preparation of these drugs…but also when we do a lot of our treatment in the regions, making sure the nurses and the physicians and the pharmacists in the regional cancer centre, for example, are familiar if it's a new drug. And we need pharmacists to ensure proper education, safe prescribing of it, and monitoring of the effects, etc.. [Faculty, Focus Group #1].*

> *If they do not understand what we do or how our services can benefit the patient, there can be issues for the patient. If doctors don't bring us in, it can create more problems for the patient and delay their recovery. [Allied Health, Focus Group #2]*

Table 20

Themes, Frequency of Themes, Representative Quotes of Constant Comparative Analysis from Question 3 – Tasks Associated with Physician Patient Safety

Theme	Frequency (# references to that theme)					
	Experts	Program Directors	Faculty	Nursing	Allied Health	Residents
Roles:	**16**	**4**	**20**	**18**	**22**	**11**
Collaborator	6	1	6	12	13	5
Communicator	10	3	1	6	1	6
Educator	0	1	13	0	8	0
Evidence-based medicine	5	3	4	2	2	4
Central Focus	1	3	4	6	3	6
Prescribing	3	1	3	6	2	2
Procedures	6	5	2	8	0	8
Assess workplace hazards and risks	4	4	5	1	0	3
Patient history and information gathering	4	0	5	4	0	4
Use of standard reports, forms and check lists	1	6	5	0	0	1
Patient re-assessment and follow-up	1	5	0	7	0	0

In keeping with the literature, collaborating and communicating effectively with others keeps everyone informed on changes to patient care plans that might impact other professionals' decisions about care for that patient. Communication also needs to flow between junior and senior members of the team and across different health professionals.

Junior members (e.g., residents) need to communicate with those in senior roles critical information that might influence patient safety and outcomes. Health professionals cannot assume that physicians will have all the answers or rely on them to come up with the answers. Health professionals need to be skilled in recognizing when key information is being missed and effectively communicate that information to others (e.g., help fill in the care gaps). This speaks to the importance of minimizing the perceptions of an authority gradient and the interdependence of health professionals to provide safe patient care. Experts and allied health professionals report that communication should also flow up from residents to their supervisors and collaboration should take place between various health professionals.

> *Residents and other junior staff need to pass along information to their supervisors and other staff on their team. If they have info that will be helpful, help prevent errors then they need to know how to communicate that. They also need to know it is safe to do that, that there won't be any repercussions. [Patient Safety Expert #5]*

> *Physicians don't always know how to help a patient. They need our expertise. We need to share what we know and physicians need to accept input from other professionals….they need to open to that. So, it would be good if residents learn about that as they go through [their program]. [Allied Health, Focus Group #2]*

Program directors, faculty, and allied health professionals agree that physicians assuming an educator role is important to patient safety. As an educator, they share best practices and theories of patient safety with residents and other junior learners, which helps to create a common language within their discipline. Physician educators also provide opportunities for practical hands-on experience so trainees can build their patient safety skills. One program director explained,

> *Many of us work in a teaching hospital, so teaching is another task. Many physicians in the classroom and the clinic have to teach residents the foundational stuff and the practical stuff – how to be safe and prevent errors. You know, when they are doing a procedure, they need to observe them and guide them through it. Show them how to do it correctly and keep the patient safe. [Program Director #2]*

Another non-technical task that all cohorts agreed as important to patient safety is patient-centered care. Physicians increase safety by extending care beyond the physical treatment of patients' conditions by respecting the patient's preferences, providing emotional support, alleviating barriers to access, and educating them about procedures or other care they will receive (patient educator). One participant expressed, "*You ask the patient what was their expectation of the visit today? What were they hoping? Have we met their needs and what they were hoping to get out of the visit?" [Nurse, Focus Group #1]*

Evidence-based medicine

A safe physician is also seen as someone who uses evidence to inform the treatments and procedures he or she will carry out. The evidence should be scientifically warranted to provide the best possible outcomes for the patient. A safe physician will practice evidence-based medicine using the patients' values, clinical expertise, and the literature. As one program director explained,

> ***…****it's very evidence-based practice because there are so many grey zones. It's not a set procedure for a given diagnosis. There's lots of interpretation. So it's a physician obligation to ensure things are done in an evidence-based fashion that serves the patient most appropriately. [Program Director #1]*

Patient Safety as a Central Focus

All cohorts reported that patient safety should be the central focus of physicians' and residents' responsibilities, recognizing that safety underlies all cognitive and physical tasks they carry out. Patient safety should be first and foremost when providing patient care and was viewed by all cohorts as something that should be integrated into every clinical task or decision. As one physician indicated,

> *I guess it's something that's engrained in us in all that we do every single day, from the start of the day to the end of the day. It is part of the whole Eastern Health philosophy…Everything you do is geared toward patient safety. [Physician #3]*

Technical tasks

Participants agreed that there are specific technical tasks linked to patient safety, including prescribing the right medications, the right dose, recognizing the risks associated with those medications, and potential adverse effects. Participants stated that this requires reviewing and updating a patient's medication list upon admission and before discharging them from an acute care setting and communicating this to a patient's family physician. One allied health professional referenced the importance of safe prescribing.

> *I think as you mentioned before, the simple thing, for example, knowing the side effects of medications before prescribing would be a simple task that they would have to know. And updating inpatient lists of mediations they were prescribed while in hospital. Knowing some patients may not fully understand or remember to give the copy to their family doc. So, they need to consider those things too in terms of safe prescribing. [Allied Health, Focus Group #1]*

Technical skills also include procedural specific tasks, such as positive patient identification by identifying the right patient before performing a procedure, carrying out

a series of checks and re-checks for equipment and workspace hazards, thinking through the procedure step by step, and cross-referencing the procedural steps with the patient's history for any potential safety risks. The majority of participant groups perceived safe pre- and post-procedural tasks as safety nets (detecting risks to safety) by triggering physicians to reflect on all facets of the procedure. These tasks would include pre-procedural or peri-operative checklists (e.g., surgical call-outs) and post-procedure checklists (e.g., rehabilitation needs post-surgery, community supports, medications). Checklists help communicate care information to other team members who will resume patients' care after the procedure (e.g., physiotherapists, pharmacists, wound care specialists). One faculty member noted these checklists or surgical time-outs serve to communicate the details of what is being done, roles, and anticipating risks and patient needs.

> *The classic one for us in the OR is the preoperative time out when we review everything. Is this the patient? Is this the procedure they're supposed to be having? Is this the side they're supposed to be having their procedure on? I need to read it, the head nurse needs to read it, and anesthesia need to read it all at the same time, and we check it off and then we start our procedure. What risks are there? Will we possibly need blood or certain equipment? They will need rehab as in patient and I need to refer this right away so there are no delays for the patient. What, if any, support does the patient have at home? This is how it's supposed to work. [Faculty, Focus Group #2]*

Other tasks noted at a lower frequency and by fewer cohorts include reporting and disclosing PSIs, hand hygiene, quality improvement, and serving as a patient advocate. These tasks are well recognized as being closely associated with patient safety. Two residents reported that while the importance of reporting and disclosing errors is not an explicit part of their curriculum, they regard it as important patient safety skills.

> *We've not be taught how to disclose, but I was part of a disclosure, so I got to see if play out. It was hard, but I think it is important. I can't say I am confident in doing it on my own if I had to. I'd need help for sure. Would be good to do this through simulation or something. Maybe a case study. [Resident, Focus Group #3]*

Advocating for a patient to receive a specific test or treatment may translate into positive patient outcomes and prevention of PSIs. As such, an advocate role can be quite critical to patient safety. One resident described advocacy as being related to patient safety by stating,

> *One other thing, and that's a CanMEDS role I do think is a principle of patient safety: the advocacy one. You're an advocate for your patient, so speaking with other specialists. For example, today a patient's clinical picture had changed and is waiting on a lung biopsy. So calling the specialist and advocating that they need to be seen on a more urgent basis, that if you were to wait for the actual appointment in three weeks, they might not be able to travel then and that kind of thing. [Resident, Focus Group #2]*

Finally, participants stated that physicians need to employ elements of HROs, systems thinking, and HFEs by assessing their workplace for potential risks to patient safety. Here, physicians would identify work processes that could be improved and simplified to create consistent and safe care. In the words of one faculty member,

> *All of those things fit under patient safety, too. First, immediately people think procedures and things like that because that's the biggest task you're doing, but there are structural, infrastructural limitations, things in the workplace that can also have an impact on patient safety. [Faculty #4]*

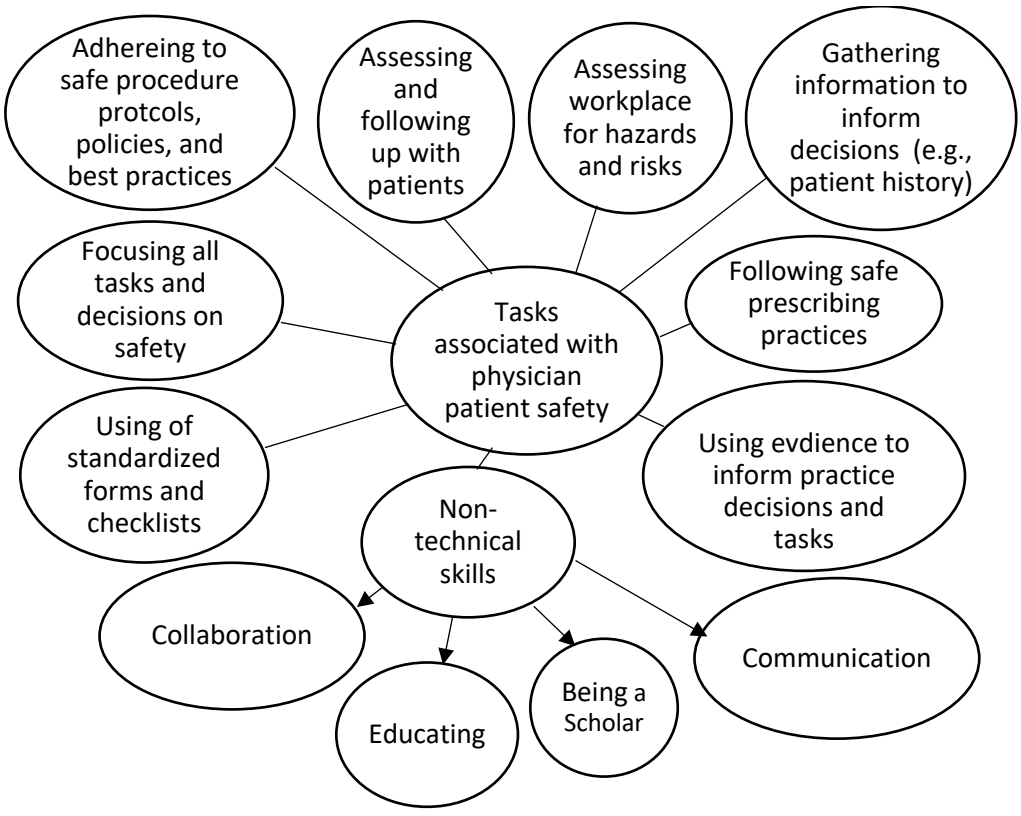
Figure 10 below summarizes the key themes that emerged from constant comparative analysis of question 3 (tasks associated with physician safety) data.

4.2.4 Key resident tasks requiring patient safety skills

Patient Safety experts and key stakeholders were asked, *What tasks would a resident perform on a frequent basis that requires application and demonstration of patient safety skills? (Question 4).* When asked this question, all cohorts reported that physician tasks previously noted (Question 3) were also applicable to residents. However,

Figure 10

Themes Arising from Constant Comparative Analysis of Question 3 Data – Tasks Associated with Physician Safety



residents would build those skills gradually as they progress through their program. An

additional three themes emerged when asked about resident safety tasks. Participants expressed that tasks requiring patient safety skills included the need for residents to have strong clinical reasoning and problem-solving skills, being thorough when completing patient admission, and being thorough with discharge plans (Table 21).

Table 21

Additional Themes, Frequency of Themes, Representative Quotes of Constant Comparative Analysis from Question 4 – Tasks Associated with Resident Patient Safety

Theme	Frequency (# references to that theme)					
	Experts	Program Directors	Faculty	Nursing	AH	Residents
Clinical reasoning and problem-solving	3	2	6	1	0	4
Patient admission	4	0	3	4	2	6
Discharge planning	2	0	6	3	0	4

Clinical Reasoning and Problem-Solving

Clinical reasoning and problem-solving are cognitive processes and skills that underlie many tasks that residents perform. All cohorts, except allied health, noted that clinical reasoning and problem-solving are skills needed to triage and diagnose patients accurately and evaluate patient outcomes. Physicians need to problem-solve and make decisions while carrying out complex tasks. Physicians may get interrupted when caring for one patient and need to immediately perform a different task or care for another patient. It requires physicians to mentally switch their focus from one patient or task to

another and quickly engage in cognitive tasks, like clinical reasoning. In the words of one program director,

> *We have to change gears all the time. We get called for consults in the middle of seeing patients, on rounds…and have to go see someone else or talk to someone about another patient to doing well. That can leave things undone or things can get missed. It can be hard letting go what you were working on and quickly turn on those reasoning skills and be accurate. But residents get a sense of what this looks like early on and it is important to bring your resident along when you're called so they get exposure to it. [Program Director #3]*

From a nursing perspective, not all residents are skilled enough to respond to patients' needs in a timely fashion; yet, they are often instructed to contact the resident when patients' needs change. During one focus group session, nurses indicated that residents sometimes respond to their calls to see patients but are unsure of what to do and may even ask the nurse. One nurse offered her perspective,

> *We see it often – residents [who] are not able to manage the patient when we page them. We're told to call them first. Residents sometimes look to us [nurses] to help them and sometimes we don't have the answers. What will happen if residents try things on their own and don't call for help themselves? If they don't know, then patient care is delayed. There needs to be protocol for when we know [the] resident can't manage the call that we can request the supervisor or ask them to call their supervisor. Some will call on their own, just right now I see it happening too much where they don't. [Nurse, Focus Group #2]*

Nurses concur that to practise safely, residents need to be trained to handle situations that require immediate decision-making using complex clinical reasoning and problem-solving skills. One potential safe means of exploring this in training is through patient simulation and feedback, but with follow-up assessment and further feedback in the workplace.

Patient Admission

The patient admission process is typically a standardized process that involves a complete medical history, including details of medications that the patient is taking. Yet, most cohorts reported that some physicians and residents dismiss key steps in the admission process resulting in poor or incomplete lack of documentation in the patient's chart. Incomplete or missing information can lead to preventable and unsafe decisions, inappropriate investigations, and treatments that can potentially result in poor patient outcomes. As one resident explains, "*Right now on admission we do a history and physical. There's some standardized of history and physical that we all learned in medical school that get more lax about as we progress through"[Resident, Focus Group #1].*

Admission is one point of entry for patients into the system. At this stage of the patient journey, initial care plans for investigations and medications are devised. Sometimes the admitting physician or resident is not familiar with the patient's medical history, therefore imposing risks. Obtaining a detailed account of the patient's symptoms, changes in health, medication list (including medications prescribed in the emergency room before admission), and any cultural and psychosocial information are critical to physicians who will assume the patient's care upon admission. This information is essential to staff who will be treating the patient and making care decisions once the patient is admitted. One resident offered his perspective,

> *The problem is that you're going to be admitting all the time for a team that's not your own team. So, you're going to admit that patient and you're never going to see them again. The communication is going to be critical to handover and the documentation when you're admitting. [Resident, Focus Group #2]*

Not following the standard protocols for admission that are in place and consulting with supervisors lends itself to the potential for misdiagnosis, ordering unnecessary tests or treatments, or not ordering necessary tests or treatments. Not having a detailed admission history can prevent or delay specialized professions or teams from being involved in the patient's care. Therefore, this can result in incomplete care, unmet needs of the patient, and ultimately poor patient outcomes.

Patient Discharge

Patient safety experts, faculty, nurses, and residents also noted safety issues associated with patient discharge. Effective and safe discharge involves residents and physicians talking to staff and patients to see if any changes in the patients' health status have occurred or if there are any special considerations for the patient that they may not have considered. Often these are considered as an afterthought when the patient is ready to go home, instead of thinking ahead - what the patient will need to go home safely and in a timely fashion (e.g., physiotherapy consult, transfer to a rehabilitation unit, respiratory resources at home, alterations in home care, mobility equipment). Articulation of a treatment plan (that has been documented and communicated with staff and patients and their family/caregivers) that explains when the patient will have a follow-up appointment is also important. These care plans need to be thought of and documented in advance of the patient being discharged to avoid delays in patient discharge and fragmented care once they are back in the community. Not doing these tasks in advance can increase patient safety risks, such as hospital-based infections related to delayed

discharge. Additionally, ill-defined discharge notes can increase the risk for negative patient outcomes (e.g., fall risk, not following proper steps for his or her treatment, missing important follow-up appointments). One faculty member noted,

> *Personally, when I do my issue list on admission, my last issue is always discharge, thinking about whatever we need to do to get this person home or wherever they're going. Sometimes we're very bad at that and we only plan discharge when they're already well enough to be out the door, and then they haven't walked for twenty days and now they need to go to a nursing home. [Faculty #3]*

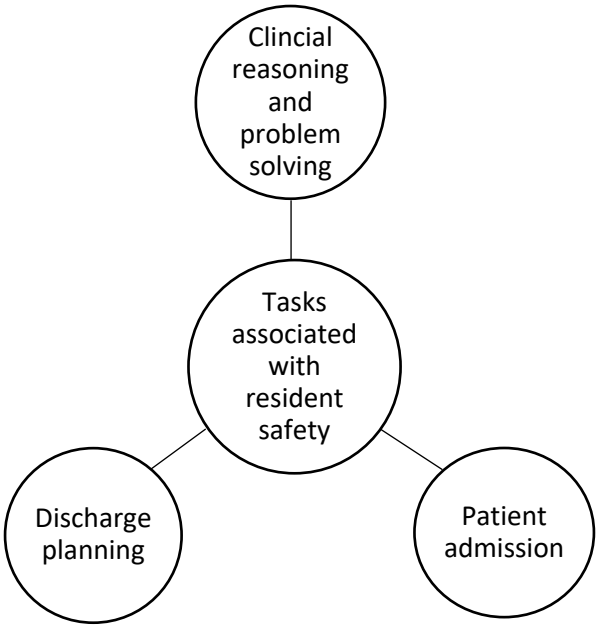
How residents gain their safety skills

Experts (frequency = 4), program directors (frequency = 3), and faculty (frequency = 6) discussed how residents acquire their safety knowledge and skills. Residents are expected to practise safely at the onset of their training. However, participants believe that residents will build their safety skills throughout their training with increased exposure, observing and carrying out procedures, asking questions to get clarity, and collaborating with other professionals to learn from them and seek help. Formative assessment aligns well with this context of graded learning and skill development over time. Initial assessments of patient safety skills can serve as an educational diagnosis to determine areas where the resident practises safely and areas where improvements are needed, then re-assessments are a follow-up to determine progress and provide guidance.

A summary of key tasks that participants reported as being associated with residents practicing safely are illustrated in Figure 11.

Figure 11

Themes Arising from Constant Comparative Analysis from Question 4 Data – Tasks Associated with Resident Patient Safety (in addition to those previously noted)



4.2.5 Factors Influencing Patient Safety

Patient Safety experts and key stakeholders were asked, *What are the key factors that influence patient safety in your clinical practice? How does this relate to a resident's training within that practice setting?* (Question 5). A total of seven main themes arose following analysis of responses to these questions (Table 22).

Table 22

Themes, Frequency of Themes, Representative Quotes of Constant Comparative Analysis from Question 5 – Factors that Influence Patient Safety

Theme	Frequency (# references to that theme)					
	Experts	Program Directors	Faculty	Nursing	Allied Health	Residents
Lack of standardized protocols and policies	4	0	6	3	9	12
Insufficient clinical exposure	2	1	6	3	2	4
Insufficient Education	2	0	5	8	5	4
Poor communication	8	3	6	8	7	4
Lack of or delay in patient re-assessment	6	0	4	7	3	0
Lack of Collaboration and Teamwork	6	5	7	6	5	3
Appropriate amount of time with patients	0	0	4	1	2	3

Standardized protocols

All cohorts, except program directors, noted that not following standardized protocols can lead to unsafe practices and poor outcomes. Policies and protocols can serve as a checklist of safety items that physicians need to consider when dealing with specific types of care or conducting procedures. For example, a surgical protocol may require physicians to confirm the patient's name, surgery, and consent, confirm that the oxygen and anesthesia equipment are in working order, and if the patient has any

allergies or risks for airway management. If residents do not see their supervisors or other health professionals follow protocols, residents will assume the same future practice behaviours. Faculty also need to assess residents' ability to follow and integrate protocols when carrying out clinical or administrative tasks. As one faculty member noted,

> *People [are] not following standard procedures, standard operating procedures when they're doing things. So if you have a central issues, or let's say you're putting central lines in, the best way to prevent central infections is to make sure you follow the policy - that ensures that the person putting in the line knows how to do it and that they're using very sterile technique every single time they do it and that when it's in the central line is taken out as soon as possible and when it's in, it's looked after meticulously. And so if you have this checklist or standardization of that protocol and it is followed, then the risks of harm have been demonstrated in many places to go way down. We need to model [it] for residents and make sure they are able to follow it. [Faculty, Focus Group #1]*

Lack of clinical exposure

All cohorts agreed that residents need clinical exposure that corresponds with their practice. It poses a considerable risk to patient safety when residents are not given the opportunity to build the skills they need in practice. Without the appropriate exposure, residents may assist with or complete tasks they are not yet skilled in performing. Residents progressively acquire knowledge and skills throughout their training that enables them to practise safely, referred to as graded knowledge and skill development. In the words of one program director: "*You know, your abilities per year increase rapidly, but obviously again the junior residents wouldn't have as many of those skills as the seniors." [Program Director #3]*

As one faculty member described, the structure of the training program can sometimes restrict the clinical exposure that residents need to build the required skills.

> *We have an in-patient service and we have an out-patient service. About 95 percent of what we do is out-patient. We have a very small percentage of in-patient. The way things are currently structured is that more residents have the opportunity on the in-patient service and have less…it's not mandatory for them to do the out-patient, which is really where you learn to be a true oncologist, is really more in the out-patient than the in-patient setting because clearly that is the largest part about what we do. [Faculty #1]*

However, concern for patient safety arises when residents are given more responsibilities or tasks that are beyond the resident's knowledge and skill level. Presumably, the resident will reach out to a senior staff person for help in these situations. However, patient safety can be compromised when residents do not recognize their limitations and ask for help. Senior residents may perform tasks without having sufficient skill to do so if they believe they should know how to do it given their level of training. In essence, lack of exposure to essential tasks can place residents in difficult situations that might increase the PSI risk. A resident expressed that it is important to recognize when you do not have the skills needed to complete a task(s) and seek assistance and training to build those skills.

> … you have to be competent, and I think you have to know your limit. So, there are going to be things that are going to come up that you are asked to do or required to do that you haven't been trained in or are competent in. I think it's important that you know that and address it. Talk to the supervisor, someone experienced to get help, and get training. [Resident, Focus group #2]

Insufficient Education

Another safety risk is when the knowledge that residents gain through clinical exposure is incorrect or insufficient. Residents may assume unsafe behaviours and incorrect methods through observation of others in the workplace. One allied health professional stated,

> *They're expected to learn on the job. So wherever they do their rotation is where they pick up all that knowledge. That's dangerous in itself because as they're picking up that knowledge, you don't know if that's actually…good knowledge or bad knowledge. [Allied Health, Focus Group #2]*

However, residents who are not provided interprofessional learning during their training may have insufficient knowledge and skills to practise safely. Critical patient safety knowledge and skills may be attained when residents work with professionals from other disciplines. Residents need to understand other health professionals' roles to know whom to consult when faced with an unfamiliar or challenging task. Residents should consult with a pharmacist, for example, when they are unsure of which drug to prescribe or are unfamiliar with the proper dosing of a drug. If residents have never consulted with a pharmacist or observed their supervisor or colleague do a pharmacy consult, they may not know that they should do this. The resident may make assumptions and incorrectly prescribe a drug resulting in a preventable PSI. When IPC does occur, it is less likely that things will get missed. One patient safety expert noted,

> *Teamwork, definitely. I think errors are a lot more likely to occur when people are working outside of teams. Different perspectives and different professions would bring important information to a situation and can identify risks that one individual may not. [Patient Safety Expert #13]*

Poor Communication

Poor communication among health professionals and patients is closely associated with PSIs. All cohorts agreed that effective communication is important to patient safety within their workplace. One nurse shared her perspective: "*I would think that's probably one of the, if not the most important, factors - the communication factors, and that's what*

the patient, what the disciplines, with the team itself because a lack of communication leads to poor care." [Nurse, Focus Group #1]

Effective communication should include timely information about investigations or tests patients will have done, the results of those tests, and diagnoses. Participants reported that often patients are not told which tests have been ordered, why the tests are needed, and when they will be done. Providers should provide this information so their patients can inform them of their wishes with respect to their care. If alternate test or treatment options are available, these should be presented to patients so they can decide which they prefer. Physicians should inform their team when tests are ordered so they can build or alter their own treatment plans accordingly. Physicians need to document which test is being recommended and why in the patient's chart and verbally confirm the order with necessary staff (e.g., nurses) so they can prepare patients for the test (e.g., fasting, stop a specific medication). Physicians should take appropriate steps to ensure that the test request is received since such requests can get missed or delayed and cause avoidable distress for the patient and subsequent PSIs (e.g., UTI symptoms not tested and confirmed, resulting in sepsis). As noted by one nurse,

> *The majority of our things is just errors on stuff or stuff that they say to a patient that they're going to order and then the patients come to you. He said he was ordering this for me, and I still don't have it, and blah. I don't know, I never heard him say it. I can't even take [the physician's order] as a verbal. [Nurse, Focus Group #2]*

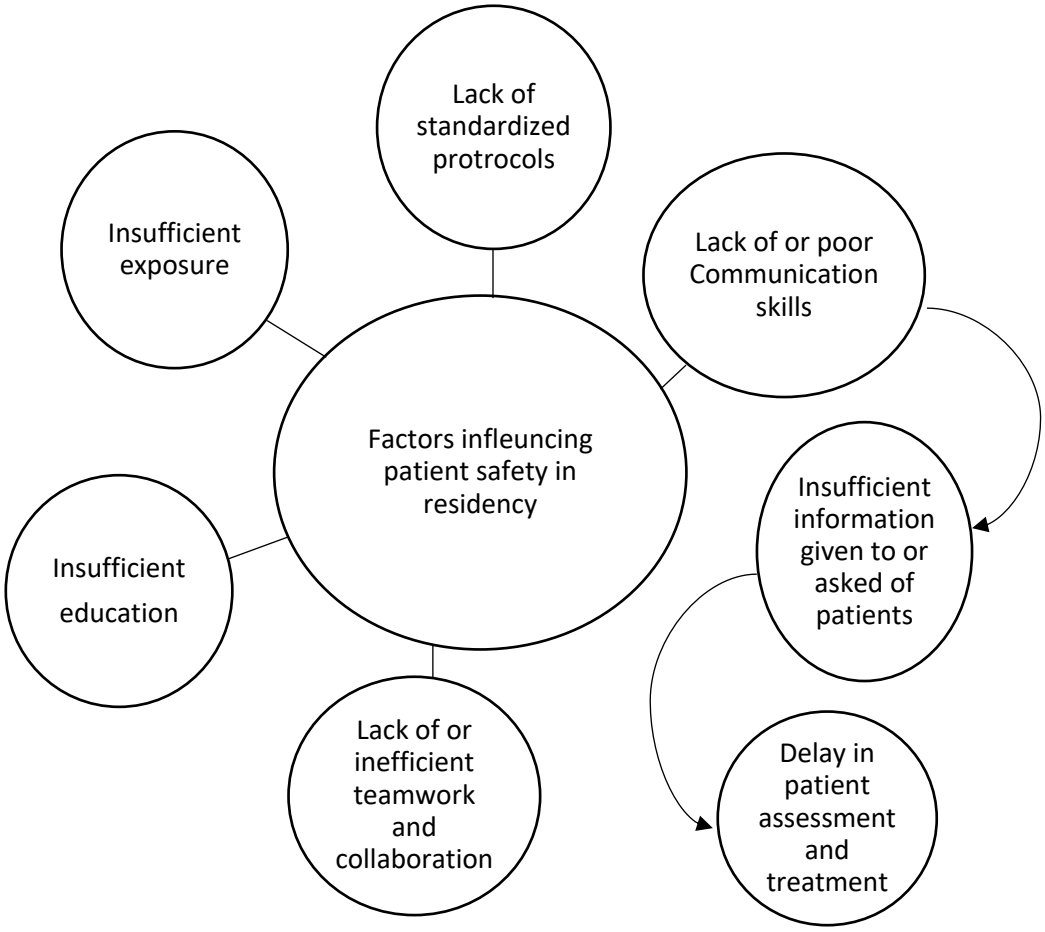
Other notable factors that inform patient safety include residents and physicians spending the appropriate amount of time with patients (e.g., not rushing) to collect all the information needed to determine a course of action or care plan, educate the patient, and

build a rapport. Participants reported that prevention of PSIs requires practising interprofessional teamwork and reassessing patients to see if updated care plans are needed (e.g., change in a patient's status while waiting for a test or surgery, now requires investigations and an updated care plan).

Figure 12 below summarizes the key themes that emerged from constant comparative analysis of question 5 (*factors that influence patient safety*) data.

Figure 12

Themes arising from constant comparative analysis from Question 5 – factors that influence patient safety



4.2.6 Resident Patient Safety Competencies

Patient Safety experts and key stakeholders were asked, *How would you describe the specific areas of knowledge, skills and attitudes (competencies) associated with a resident applying/demonstrating patient safety in your clinical practice? (Question 6)*. Four attitudinal themes, four knowledge-based themes, and five skill-based themes emerged through analysis of experts' and stakeholders' responses (Table 23).

All cohorts agreed that patient safety-oriented physicians should use feedback and self-assessment strategies to identify relevant learning opportunities. Such learning experiences should help physicians practise safe, evidence-based medicine, aimed at improving patient outcomes. In addition, it is hoped that physicians would share and role model newly acquired information with others for the purpose of improving patient safety and clinical outcomes. Residents should test their newly acquired knowledge in practice (with assistance or supervision) and re-evaluate. One faculty member explained that residents should strive to fulfill their competency requirements by seeking out learning opportunities and improving their skills by listening to the feedback of others.

> *In order for residents to function safely, they need to take input, constructive feedback from other professionals, sometimes other people that are in the job or in the actual situation. They need to determine gaps in their knowledge and determine how they can fill those gaps. Supervisors should link them to the necessary clinical experiences. Residents should look for other learning opportunities. Is there a webinar or articles on that topics they can read, for example? [Faculty #2]*

Allied Health and Nurses also shared their perspectives on barriers to residents' learning through feedback. While both cohorts expressed that residents should be open to receiving interprofessional feedback, some residents are not receptive to feedback. As

Table 23

Themes, Frequency of Themes, Representative Quotes of Constant Comparative Analysis from Question 6 – Residents' Patient Safety Competencies

Theme	Frequency (# references to that theme)					
	Experts	Program Directors	Faculty	Nursing	Allied Health	Residents
ATTITUDES						
Passion for learning	9	2	6	3	9	1
Compassion and empathy toward the patient	0	5	3	12	2	0
Values an interprofessional care	6	2	6	5	1	5
Receptive to feedback	5	11	2	4	2	7
KNOWLEDGE						
General and specific medical expertise	17	10	18	16	9	8
Awareness of relevant resources	3	1	3	1	6	3
roles of team members	3	1	3	2	5	0
SKILLS						
Performs safe and appropriate procedures	7	12	11	6	2	4
Collaborates with others	10	17	6	13	7	9
Manages practice efficiently and effectively	0	3	2	0	0	4
Uses effective communication strategies	16	1	3	4	11	4
Seeks additional information	0	0	11	0	0	8

one allied health professional expressed, "*I remember there's one I've encountered over the past couple of years who really had a bit of an attitude and didn't want other people's advice. That's important. So one, being accepting of other peoples' advice" [Allied Health, Focus Group #1].*

Some participants noted that some residents are not open to interprofessional collaboration and do not value clinical input from others outside of their own discipline. One program director described his/her experience,

> *The interactions I see or the things I get complaints about is: Are they being receptive to input they're getting? When I get complaints, usually it's because a nurse or somebody went to one of the residents and said they were concerned about a patient for this or that and the resident blew them off and didn't do something about it. [Program Director, Focus Group]*

Showing compassion and empathy was regarded by all cohorts as representing positive attitudes towards patient safety. Having compassion and empathy for a patient are also essential to providing safe care as health professionals with these attributes likely involve the patient in the decision-making processes and listen to their needs and wishes.

Cohorts also reported that a safe practising resident should have general and discipline specific medical knowledge, and awareness of relevant resources and roles of various team members and consultants. Residents acquire general medical knowledge that they apply regardless of their specialty area. However, cohorts also thought that residents need to have repeated exposure within the context of their specialty area. Residents need to reflect on tasks they perform, apply discipline specific knowledge to determine safety risks, and plan for how they will mitigate those safety risks.

> *Part of that is being vigilant, but before you can be vigilant you really have to have knowledge about what you're doing and aware of what the risk are surrounding that [Faculty, Focus Group #1].*

Participants noted that knowledge of relevant patient resources is necessary in preventing negative patient outcomes and fragmented care, the latter of which is linked to knowing the roles of your team and those of consultants. Delegating and sharing patient care with other health professionals who are experts in their discipline allows the patient to receive the most appropriate resources and information. In order for residents and physicians to delegate and share care with other professionals, they need to know their roles. As one expert explained,

> *It would also be the understanding of team roles, so that they understand the importance of nursing, OT, physio, social work and other disciplines… [where] a patient is going to and therefore can impact patient safety. Knowing the roles is necessary to refer the patient to the right person. [Patient Safety Expert #1]*

Not having that knowledge can potentially result in patient care gaps. Residents and physicians might also make assumptions regarding health professionals' roles and responsibilities and delegate care that is beyond a health professional's scope of practice, which can lead to lower quality of care or a PSI. One nurse provided an example of how safety could be compromised if the right professionals are not consulted or included in patients' care.

> *[Residents] should know the different scope of practice for people. We can't give those drugs because people need to be on cardiac monitor and we don't know how to read a cardiac monitor. We don't have the training to read the different rhythms and stuff like that. [Nurse, Focus Group #1]*

Experts and stakeholders perceived a safe resident to be one who can safely complete procedures, which includes developing plans for managing potential PSIs

before completing the procedure. After the procedure and upon discharge, the needs of the patient should be documented and shared with others on the team.

> *When they're a senior and getting ready to go out into practice on their own, if they're doing some sort of procedure, they need to be understand the complications and they need to be able to deal with those complications in a safe manner, or refer appropriately to someone who can. That sort of stepwise approach to dealing with complications. [Faculty, Focus Group #2]*

Collaborating effectively with a team to ensure comprehensive care will be provided was seen as an important patient safety skill. Residents need to facilitate discussion with or ask questions of other health professionals so that all patient care aspects are covered. One resident described her perspective on this,

> *You need to be able to tell them: This is what I'm thinking is going to be the plan for this patient. Do you see barriers to that? Where can we get you involved? What's your overall plan for this person? So if you're not willing or able to partake in that discussion, then safety gets compromised*. [Resident, Focus Group #1]

There are communication mechanisms and tools that enable physicians and residents to pass along critical patient information to others in a timely fashion so there are no delays in patient care. Some tools allow health professionals to share information pertaining to PSIs that have occurred, so that people can learn from them. Faculty thought that residents need to communicate patient care plans and the details of PSIs effectively: "*Skills around handover, reporting incidents and disclosure…those are the types of competencies from a patient safety standpoint that I think are some of critical ones to assess" [Faculty, Focus Group #2].*

Communication is also required in order to confirm that care plans have been completed by other health professionals, to determine the outcome(s) of that patient care

and make plans as a result of that outcome(s) (e.g., more investigations, treatment options, patient discharge).

> *Also, as far as competence in daily work and tasks, yeah, constantly using mechanisms to ensure interprofessional collaboration. So, good communication practices. So, closing the loop. When something is sort of ordered or initiated, going back to the professional colleague, and saying, did we get that done? is it in place? So, a constant ebb and flow of communication in the team milieu. [Patient Safety Expert #9]*

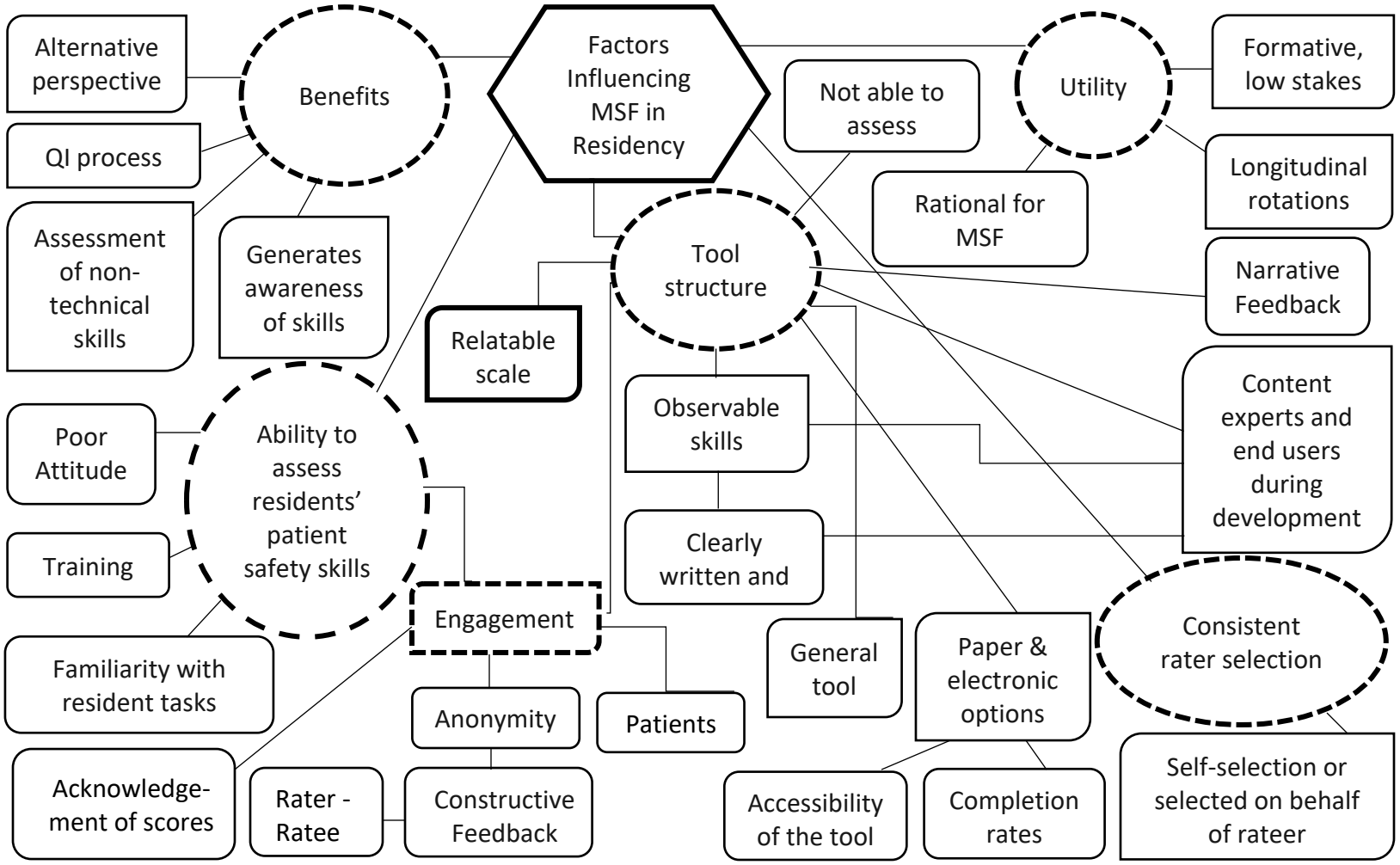
4.2.7 Multisource Feedback as a Method to Assess Patient Safety Skills

The first step in determining the format of the PSAT$^{360°}$ tool and strategies for implementation within a PGME context involved seeking input from MSF experts and end users (residents and raters). The goal was to use lessons learned from experts who have implemented MSF and residency assessment frameworks and obtaining feedback from end users on how the tool should be structured and implemented within their programs. MSF experts shared their perspectives on the benefits of MSF and key features of a successful MSF process and tool. The results were used to help inform the design and proposal for implementation of the PSAT$^{360°}$. Asking end users about the use of MSF to assess residents' patient safety skills was a valuable step to initiate ownership in the tool development and stimulate adoption of MSF and the use of the PSAT$^{360°}$ within their setting.

Analysis of expert and stakeholder responses were integrated into a concept map (Figure 13). As noted by participants, overarching factors that influence MSF in PGME are described under the following categories: utility, benefits of MSF, rater selection process, tool structure, and engagement.

Figure 13

Concept Map of Factors that Influence s MSF in Residency



Utility of MSF in PGME

Participants were asked about the utility of the PSAT$^{360°}$ - how frequently the tool should be used, its integration into existing assessment processes, and whether it should be incorporated as a low or a high-stakes assessment.

All participants articulated that the PSAT$^{360°}$ should be used in a formative, low-stakes approach. The tool could then be used to monitor progression and advise residents as they progress throughout their program. Multisource feedback aligns with the goals of formative assessment, as opposed to summative assessment. In PGME, MSF and formative assessment help residents build and improve their skills by outlining specific skills or behaviours that need improvement and accompanying this with coaching and improvement strategies. However, with summative assessment, residents are not provided with feedback on how to improve their safety skills (e.g., assessed at the end of their program). A formative approach allows residents to tailor their training experiences and seek out additional learning opportunities to improve their skills. Sometimes, it is not a matter of a resident's inability to master a skill, but the lack of opportunity to practise and master it. Faculty, nurses, and allied health stated that providing residents with feedback on their safety skills at the end of their program is too late.

> *I think some stuff is going to be more important and more difficult to change. Potentially, if you pick that up earlier, you got more, hopefully, opportunity to do something about it, as opposed to saying at the end of your training, this guy…doesn't want to get any feedback from anybody and thinks he knows it all. Well, it's almost too late then. This person's waling out the door and you're saying they need to change. [Faculty #4]*

Completing an assessment of residents' patient safety skills early in their training allows for the establishment of a baseline. However, PGME should conduct an

MSF assessment after residents have had some clinical exposure and time to become familiar with their workplace and competency expectations and build relationships with raters. The MSF process is not conducive to short rotations where residents may rotate through various disciplines (e.g., one month with surgery on an inpatient unit, then two months focusing on pediatrics in a rural community). On short rotations it can be difficult to assess, provide feedback, allow time for the residents to improve their safety skills, and then reassess their progress. Since residents may rotate through different disciplines within their first year, residents suggested to use the PSAT$^{360°}$ when they are on long-term rotations that focus on their specialty area (e.g., family medicine, surgery, pediatrics).

> *I think once we move into the (inaudible) curriculum, which is this new longitudinal, horizontal curriculum where you're in one place for a long period time, getting some feedback as to how to everyone thinks you're doing at midpoint is useful always because you always want to know before the end what you need to improve on or what you need to do in order to become more competent. [Resident, Focus Group #3]*

MSF experts (n = 3) also emphasized the importance of explaining to residents and raters the rationale for inclusion of MSF in the residency program. Residents should be reassured that the primary purpose of conducting an MSF assessment is to help residents improve and build the necessary patient safety skills, rather than providing them with a grade or score for program or organizational reporting purposes. Two experts described the need for sending a clear message regarding the purpose of MSF assessment in a residency program.

> *Another barrier can be having lack of clarity, as a barrier around the purpose of the MSF because it can be perceived as being a bit punitive. Like anything, getting a report card – it's like getting a report card. This is what we've heard in*

> *our research and working with residents and others who have been involved in it, and physicians, that it just feels like getting a report card. We all know that getting a report card can feel like a negative experience sometimes. So then how to turn it into a more positive experience. [MSF expert #5]*

Another expert suggested that any messaging used to describe how MSF will work within PGME should explain that support will be provided to help residents improve and that MSF is a process designed for their benefit.

> *Of course, the message needs to be followed up by action so that it is actually visible, that residents can see, yes, this is for formative purposes. It is for my own learning and my preceptors or my attending [inaudible] will work with me to help me improve in this area, et cetera. [MSF expert #2]*

This message can be promoted by providing information on residency program websites, resident orientation materials, hosting MSF information sessions, recruiting senior residents who can serve as champions of MSF by providing junior residents with examples on how MSF has benefited them, and involving residents' discussions on how to improve the MSF process.

Benefits of MSF

Two MSF experts reported that the PSAT$^{360°}$ could be used to articulate desirable behaviours and skills associated with a safety-oriented physician. In any educational program, it is essential to provide learners with a list of expected outcomes – what they should be able to do upon completion of their program. In residency, these learning outcomes define what they will do once they are physicians in practice. Residents' training programs are then constructed around these learner outcomes, where classroom and clinical learning experiences are designed to help the resident attain competency and meet these outcomes. Residency assessment tools that are linked to a set of competencies

and outcomes serve as an outline of expectations they need to fulfill during their training. One expert suggested that the PSAT$^{360°}$ may serve to generate residents' awareness of the patient safety skills and behaviours expected in practice and engage them to seek training and feedback to build those skills.

> *You should look at it as an opportunity to create aspirational behaviours. We expect you to do these things that you may not even be aware. In many ways, just filling the survey out themselves becomes a value-added exercise because they learn things they might not have realized they needed to be doing. [MSF expert #5]*

Experts (n = 2) reported quality improvement as another benefit of MSF. Residents can use the PSAT$^{360°}$ scores and narrative feedback to improve their safety skills by exploring targeted learning opportunities. Experts further expressed that MSF can prompt reflection and action to fill the gaps between where residents are (in terms of their patient safety skills) and where they need to be before they enter practice. One expert reported: "*The whole purpose of the multisource feedback, it really is a quality-improvement initiative. It's a way to give really constructive feedback that's going to be positive – hopefully it will act in a positive way and help the residents improve" [MSF expert #5].*

As described by three experts, one of the other purported benefits of MSF in residency is the ability to assess non-technical skills that are otherwise difficult to measure. Colleagues and patients may offer valuable insight and data about residents' communication, collaboration, and professionalism skills that impact patient safety. These professionals may provide an alternate perspective on these skills that would not necessarily come about through a single supervisor assessment. One expert shared their

opinion on the use of MSF to improve these specific skills: "*Where multisource feedback is particularly helpful is in the areas like communicative, collaborative, professional, which are hard to get at through any other assessment means, particularly in residency education" [MSF expert #6].*

A consistent rater selection process

All six MSF experts reported that MSF should have a consistent rater selection process and how the assessment data will be reviewed and reported. The selection process should either allow residents to be involved in the selection of their raters, or raters should be chosen by the supervisor and therefore unknown to the resident. The data should be reviewed with the supervisor to discuss a learning plan. Variability in these processes can pose threats to engagement and how residents perceive the credibility of the assessment scores and feedback. One expert commented that residents who have different levels of involvement in the MSF process may perceive it as unfair treatment and refrain from participating or disregard the feedback they receive.

> *Sometimes that type of inconsistency is another thing that threatens the health again of the program when people say, jeez, this person over here got to pick their own raters, but my boss told me who I was going to have as my raters and that's not fair. This boss over here made me share my results, but this person over here didn't have to share their results with anybody… [MSF expert #1]*

While the literature is conflicting, there is increasing support for self-selection of raters by ratees. Experts (n = 4) noted that residents may be more open to receiving and acting on the feedback received by raters they have selected. Allowing residents to select raters can also reduce the time it takes to plan MSF.

> *I've been involved in, invariably, the assessors are chosen by the doctor themselves on the basis that often people quote Ramsey's paper from 1993 and say it doesn't make any difference if you choose the raters or if somebody else does. But, the reality is that people do that because it's just more feasible and argue that an individual knows who they work with, they know who observes them in the workplace, and therefore, they're best placed to choose. [MSF expert #3]*

Experts indicated that it is important to preserve rater anonymity and allow self-selection of raters by the resident. The challenge is finding a way to resolve the conflict between the two of these. If residents are permitted to choose their raters, then that reduces anonymity. While MSF reports do not explicitly identify which professional provided each score or feedback, the resident may be able to identify raters based on the type of narrative feedback. Again, one way to manage this is to have residents provide their supervisors with a list of potential raters and then the supervisor makes the final selection. This way residents are involved in the process, but they do not know the final list of raters. Additionally, scores and feedback should be collated, and any identifiable information within the feedback could be removed to help protect rater anonymity.

Structure of an MSF tool

Five experts recommended that the MSF survey items should be clearly written and observable by raters. Items that are unclear, ambiguous, or not observable would prevent raters from accurately assessing the resident on those items. For example, a rater cannot make a judgement on residents' attitudes towards IPC, but they can assess how well they interact and collaborate with other health professionals in team meetings (e.g., do residents seek input from other health professionals, include other professionals in discussions, share information that may be pertinent to other health professionals' tasks).

One expert suggested: "*Content should be based on observable items that are relevant to their training and easy for raters to assess and guide residents' assessment" [MSF expert #5].*

To achieve selection of relevant, well-defined, and clearly written survey items, end-users of the tool and content experts should be involved in this step of tool development. For this reason, experts in patient safety and development of assessment tools, as well as end users were involved in the development of the PSAT$^{360°}$.

> *A classic way of developing multisource feedback items is to hold focus groups with groups of both the target audience and perhaps even those who are going to be assessing them or reviewing them, especially in this case the target audience. So, to ensure that residents are part of the planning committee, perhaps holding a few focus groups with a number of them to get their input either from the beginning or perhaps to respond to a draft list of competencies to see if they resonate with them and that they would agree that these are important and related to patient safety. [MSF expert #4]*

Experts in MSF (n = 3) agreed with key stakeholders that the rating scale should reflect the purpose of using an MSF process within the residency program. Raters will likely be able to clearly discern residents' competency level when the scale is appropriate and relevant to residency training and the purpose of the assessment. Faculty suggested that the rating scale should be descriptive, relatable and avoid negative language such as not competent. The hope is that residents will progress from doing tasks safely with guidance, to performing them safely and independently. One faculty member shared their thoughts on the rating scale,

> *...whole below average or above average, what is it telling you, really about those? If you could be more descriptive in your scale, then you might get people to actually think about more. Does this mean this person is needing supervision or can they do it on their own? Something more tangible and practical in the scale*

might actually give you more information than average, above average, below average" [Faculty, Focus Group #2].

When MSF experts were asked about an appropriate rating scale, one expert noted,

> *I'm not sure I can give you any really good advice, other than I would suggest you look – you have to decide what the purpose is… it really depends on what you're trying to do….Are you trying to give them a point so that they know where they go from and to? How are you going to use the data? It's not so simple as just saying, oh, one to five. It really depends on what your intention is. [MSF expert #5]*

MSF experts and stakeholders reported that narrative feedback was necessary to improve residents' safety skills by providing them with concrete examples to complement the quantitative ratings they received. Respondents therefore thought that the structure of the PSAT$^{360°}$should include a place for raters to document their observations of residents' behaviours that need improvement.

> *The opportunity for specific comments could add another layer of clarity for the recipients so they would know exactly. For example, if they were ranked low on that, they would know, well, you left out several steps or you mumbled or you didn't look the person in the eye, whatever it was about that communication that wasn't clear. That's a positive side. We've heard, again I think all studies report, that narrative comments are the most helpful in combination in the numerical results. [MSF expert #6]*

To help residents, respondents thought that raters should also provide specific examples of how they can improve. Respondents suggested that in the narrative section of the PSAT$^{360°}$ raters should document observations of specific skill deficiencies, the reason behind specific scores they assigned (e.g., particularly if the score was low), and provide specific directions on how to improve their skills. Faculty also noted that it was important to remove any personal or opinion-based wording in the narrative comments

and keep them strictly objective based (e.g., narrative comments should be aligned with their learning objectives and their CanMEDS competencies). Respondents also discussed their preference for an electronic or paper-based process, the need for a general tool suitable across all disciplines, and a set of instructions on how to use the tool.

There were mixed reviews about an electronic versus paper-based format of the tool. Nurses, program directors, and residents recommended offering both electronic and paper-based options to increase uptake by staff with lower computer skills and those with access to a computer while at work. One nurse commented,

> *I think you need both options. It all depends on where the person is and how accessible people have to computers. If the form is given to you, it may be a lot easier to just check it off and hand it back in versus trying to find a computer to log into. [Nurse, Focus Group #2]*

One resident felt that having a paper copy makes it less likely to forget about it. They suggested that it was possible to by-pass the information in an email or residents and raters may forget to return to the email and complete it. Others, allied health and faculty, believe that having an electronic version would increase the privacy and confidentiality of the process, allow for comparison of residents' scores over the course of their training, and make it easier to collate the data. One faculty member suggested: "*Electronic, I think, is a lot easier in many ways. It makes it easier to collate and everything else" [Faculty #3].*

Program directors suggested developing a general tool that would be useful across all disciplines, and then each discipline could adapt the tool by adding specific content at the end of the tool. Faculty, residents, and allied health suggested adding a 'not applicable' option in case raters were unable to assess a specific survey item. Experts also

suggested that raters should be permitted to opt from scoring the resident on domains they cannot adequately assess (e.g., raters who feel comfortable in assessing the communicator and collaborator skills only).

> *Some people will not feel comfortable assessing all of the skills, so there needs to be an option or checkbox that allows them to say I cannot assess these. So they do not feel forced to give a rating. It won't be unauthentic and valuable if they are forced to complete all of it. [Faculty #1]*

Engagement

Experts and key stakeholders described some engagement challenges, including the provision of constructive feedback and the impact on the rater-ratee relationship, anonymity, the ability to assess residents' patient safety skills, acknowledgement of residents, and patient engagement.

Experts, faculty, allied health professionals, and nurses expressed that residents would need to receive authentic feedback to drive their learning and competency development. Faculty, allied health professionals, and nurses explained that raters would be more reluctant to provide constructive or negative feedback if the resident could identify them. One allied health professional described his concerns,

> *So I think that's going to be the biggest challenge. When things go well, I don't think most of us will have an issue. I don't think many of us will have an issue in terms of giving back feedback when it's positive, but when it's negative and we know it may potentially result in them not passing the rotation. [Allied Health, Focus Group #1]*

Raters indicated that if they are identifiable by the resident, then any negative feedback they provide could adversely impact their relationship with the resident. The resident can negatively perceive constructive feedback that is intended to be helpful. As

one nurse described: "*We interact so much with residents that I think we would be scared of [the] implications - if that would affect the relationship, especially if there was a negative review." [Nurse #1]*

To alleviate these concerns, nurses, allied health, program directors, and faculty suggested that the feedback could be discussed as a group (e.g., all nursing raters would meet and discuss the feedback for each resident) and collated before adding it to the assessment tool. In this example, raters would not submit their feedback individually, but as a professional group.

Preserving anonymity was also noted by all MSF experts (n = 6) as essential to creating an engaging MSF process and preserving the rater-resident relationship. Therefore, the process should include protective measures for raters, and how that is accomplished should be communicated to raters. One MSF expert provided their perspective on this below.

> *I think all 360 systems are based on preserving anonymity. The assumption is people will be more honest if they're truly anonymous. Every step along the way we need to reinforce that and then try to monitor and find out if people are feeling if their honesty has been threatened in some way that that is addressed. [MSF expert #3]*

Respondents noted other factors that may impact engagement in the MSF process and the ability to assess residents' patient safety skills. These include attitudes, training, and familiarity with resident tasks.

All cohorts reported that engagement may be affected if residents have poor attitudes towards assessment in general. Some residents may not be open to having non-medical professionals assess them. These residents may not feel confident in the ability of

other professionals to assess them or residents may have negative attitudes towards other professionals giving them feedback, such as, *"who are you to advise and rate me"* [Faculty #4]. Faculty reported that often residents who are most in need of feedback give a lot of pushback against assessment. Residents who need feedback may not recognize they need to improve and question why they need to be assessed. One nurse expressed her thoughts,

> *I'm not sure if some of the residents we interact with, the ones that seem like they're a little bit egotistical, I don't know how they will respond to it. Will they think they need it? It will be interesting to see. [Nurse, Focus Group #2]*

Experts, program directors, faculty, nurses, and residents suggested that providing training for raters and residents about MSF and how to complete the tool would help with engagement and sustainability. As one expert suggested,

> *I think you need to provide training on multisource [feedback] – what is it, the benefits and how to give feedback. I think you can have information sessions. You sit down and say, you use a case-based example, and say how you complete it and how to provide feedback. [MSF expert #3]*

Raters need to have knowledge of the MSF process, how it is of benefit to residents, and how it can support their teaching or coaching of residents. For example, supervisors can use low scores and constructive feedback to focus their teaching and residents' clinical experiences to help them improve or achieve competency. Raters are likely to provide useful feedback to residents if they have knowledge of the MSF process and know how to give feedback to residents. One expert explained,

> *Training reviewers by giving them some tips on how to give honest feedback, because we all know the saying: garbage in, garbage out. If someone isn't taking the time to think about it and give authentic and engaged feedback, then it's not really very helpful. [MSF expert #2]*

Residents expressed in the focus group sessions that it is best if the raters are those who work with them on a regular basis and understand their roles and tasks well. Residents expressed concern for the utility and acceptance of feedback provided by raters who are not familiar with the tasks they complete or have not worked with them consistently to know residents' abilities. If raters have observed residents' complete tasks (e.g., communicate within a team meeting) only a few times, then it is possible that raters only have a snapshot of residents' competency. As one resident comments,

> *I think careful choice of who you're asking to evaluate is really important. Part of the problem that a nurse who you worked with on the floor one time is not competent to assess your capacity based on that one encounter. [Resident, Focus Group #2]*

Respondents expressed that acknowledging residents and patient engagement are key elements of the MSF process. Experts, faculty, and program directors suggested acknowledging residents who achieve specific goals, scores, or feedback in an effort to encourage residents to participate in the MSF process again, inspire them to strive for improvement, and potentially stimulate others to get involved (e.g., engagement from those who see their peers obtaining high scores and receiving acknowledgement). As one faculty member suggested,

> *Residents who achieve a level that is worthy of mention should receive an email or letter, or even a broader level acknowledgement to leaders in the postgrad office. Maybe they can be mentors to others. Thanking all of them for their involvement, faculty too, is needed, but this is…I mean, [this] would let them know that we feel you are doing a very good job in such and such area. Keep it up. Maybe others would see this and think they can do that too. [Faculty #4]*

According to experts, patient engagement is an equally important factor to implementing MSF in PGME since patients represent an important cohort within the

residents' workplace and a valuable resource for providing feedback to residents. How MSF is explained to patients and how they are selected are key to the success of MSF. Part of patient engagement involves informing patients about their role and what is expected of them. Multiple communication modes can be used to engage patients (e.g., radio/TV, information sheets at clinics, public information sessions, and one on one explanations between residents or supervisors with their patients) in MSF. In the words of one MSF expert,

> *Multiple methods need to be used to bring the patients into this. Residents can help their supervisors explain it [MSF] to patients and then use other means to educate that population. They provide vital feedback and they are the reason, or the end point of all this, why we do this – why we assess residents to make sure they can safely provide patient care. [MSF expert #5]*

4.3 Results of Phase III: Competency Mapping

The competency mapping process involved cross-referencing all sources of data (literature records, environmental scan documents, interviews, and focus groups) with competency frameworks (RCPSC, CPSI), practice guidelines (CMPA), and ROPs (Accreditation Canada, 2008). This mapping process determined if the literature or experts and stakeholders had referenced patient safety competencies in addition to those within the competency frameworks and practice guidelines.

As described in the methodology chapter a thorough and iterative approach was taken to map the competencies. All skills extracted from the data sources overlapped with the competency frameworks and practice guidelines, except for attitudinal skills such as honesty, approachability, and humility. While these skills are difficult to measure and were not explicitly defined in frameworks, they do underlie key patient safety skills.

These attributes were regarded by experts and stakeholders as important to patient safety in terms of communicating well with patients and co-workers, transparency regarding involvement of PSIs, and reporting and disclosure of PSIs.

4.4 Results of Phase IV: Delphi Surveys Round I, II, and III

After the mapping process was complete 201 survey items were incorporated into a modified Delphi Survey and sent to experts for review (Appendix C). Twenty-six experts in patient safety, residency education, resident assessment, and survey development experience were invited to participate. Eighteen individuals responded to the first Delphi survey (69% response rate).

The Delphi survey provided the details of the research project and the rationale, expectations of Delphi survey participants, the concept of MSF, and how the Delphi survey items were generated. Survey respondents were asked to provide input on the rating scale to be used, narrative sections within the survey, and the skills/assessment items arising from the mapping process in Phase III. Three rounds of the Delphi survey were used to reach consensus on the rating scale, survey items, and the wording of the narrative comments.

4.4.1 Delphi Round I: The rating scale

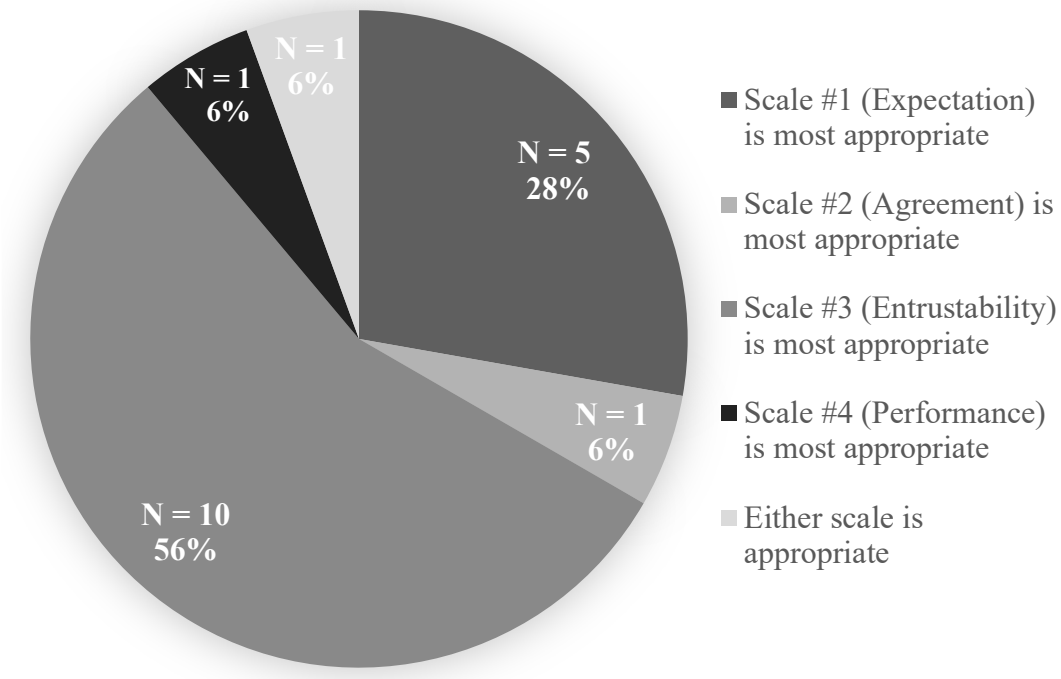
Delphi survey respondents were asked to rate and provide feedback on an appropriate rating scale based on the context and goal of MSF, as well as something that was fitting for residents and the competency area of patient safety. The list of rating

scales provided within the Delphi survey was based on existing MSF surveys and the advice of MSF experts (Table 16).

Of the 18 individuals who responded to the Delphi survey (round I), ten (n = 10) indicated that scale #3 (Entrustability) was the most relevant and appropriate (Figure 14). The Level of Expectation, Level of Agreement, and Performance Level scales were rated as appropriate by five (n = 5), one (n = 1) and one respondent(s) (n = 1), respectively (Figure 14). One (n = 1) respondent thought that either of the four scales would be appropriate to use for this purpose.

Figure 14

Expert Ratings for the Most Appropriate Assessment Scale



This result aligns with the input received from MSF experts regarding the most appropriate scale to use in the PSAT$^{360°}$. MSF experts suggested a rating scale that reflected the purpose of the tool and the context in which it would be used. Entrustability is a scale that would resonate with residents and raters as it is becoming more widely adopted within the medical community with EPAs. The wording of the entrustability scale also reflects the goal of preparing residents for safe, independent practice.

There may be instances where residents have not had the clinical exposure to build all of the skills included in the PSAT$^{360°}$. For example, at the time when the assessment is carried out, some residents may not have had the experience of participating in or carrying out disclosure of a PSI. When this happens, raters should be instructed to select the 'no opportunity to observe' option. As noted by stakeholders in interviews and focus groups, residents tend to have a graded acquisition of skills through increased exposure and practice, and the concept of entrustability is in keeping with this. In this manner, through coaching and "entrustment" by their supervisor and team, residents will build their skills over time. Residents will be given more responsibilities and opportunities to practise their skills with increasing independence. A red flag during assessment would occur when the resident has had significant exposure and practise, and should be able to demonstrate the skill but cannot do so.

4.4.2 Delphi Round I: Importance and Clarity of the Narrative Components of the PSAT$^{360°}$

Raters can use narrative or open-ended sections on the PSAT$^{360°}$ to explain concerns they have about a residents' patient safety skills. Delphi respondents concurred

with MSF experts and stakeholders regarding the inclusion of a narrative section within the PSAT$^{360°}$. These narrative sections complement the tool's quantitative or rating section by: (i) providing evidence for the rating choice and (ii) helpful strategies for improvement. Since the tool will be structured around the CanMEDS roles, these open-ended sections would be placed at the end of each CanMEDS role. The first narrative section will ask raters to provide concrete examples of the resident's patient safety performance. Experts suggested that examples raters provide in the narrative section should be based on their direct observation of the resident instead of second-hand information obtained from other team members, colleagues, or patients. The second narrative section allows raters to suggest how the resident could improve on skills where they scored poorly. Delphi respondents rated their level of agreement with the inclusion of both narrative sections in the tool and the clarity of the wording. See appendix C for a copy of the Delphi survey used in this phase of the study.

Fifteen out of 18 (83.3%) respondents agreed or strongly agreed that it was important to include a narrative section for concrete examples of how they can improve (Figure 15). Thirteen out of 18 (72.2%) respondents agreed or strongly agreed that the wording of this question stem was clear (Figure 16).

Some Delphi respondents (n = 3) suggested that the instructions should be more succinct. One person indicated that they appreciated the reminder that the example had to be observed by the rater themselves, as opposed to something they may have heard second hand. This same respondent suggested to bold some words in the instructions to specifically highlight that aspect.

Sixteen of the 18 (88.9%) respondents agreed or strongly agreed that it was important to have a section on the MSF tool that allows raters to describe how the resident can improve in specific areas (Figure 17). All 18 (100%) respondents agreed or strongly agreed that the wording of this open-ended section was clearly written (Figure 18). However, one individual suggested asking raters to provide one or more strategies for improvement under each CanMEDS role, so raters do not feel they should provide a strategy for every skill listed. Another respondent expressed that this section would help the resident create a learning plan (which is a typical resident task within most residency programs and is reviewed in concert with his or her supervisor). Respondent feedback was used to refine the instructions for this second narrative section of the PSAT$^{360°}$.

Figure 15

Level of Agreement to include a Narrative Section for Concrete Examples (Delphi Round I)

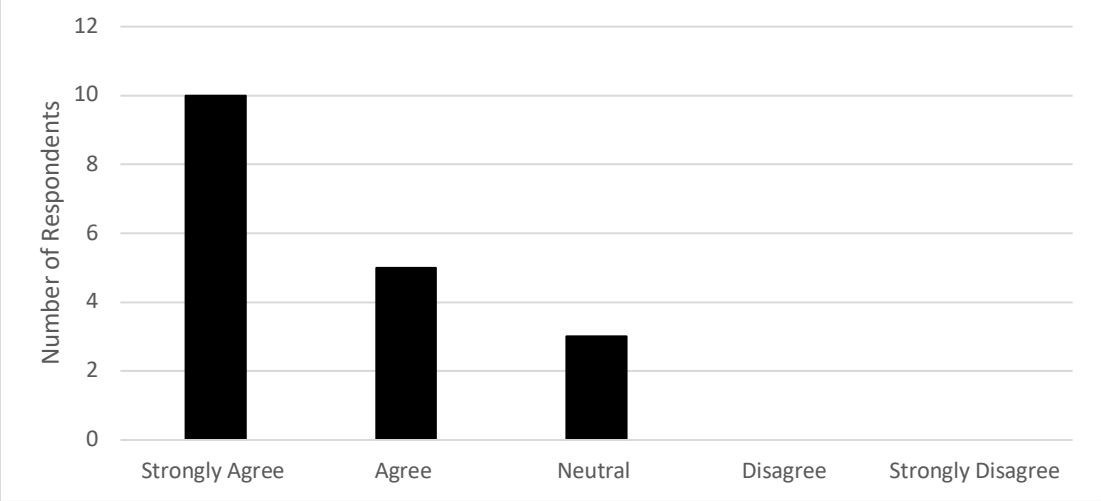


Figure 16

Level of Agreement Associated with the Clarity of the Wording for the Concrete Examples Narrative Section (Delphi Round I)

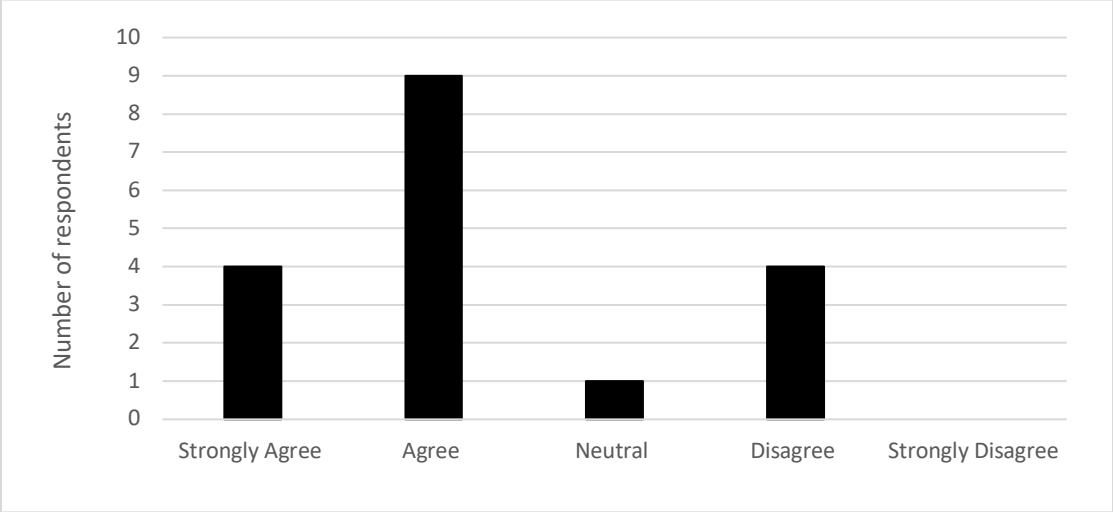


Figure 17

Level of Agreement to include a Narrative Section for Improvement Strategies (Delphi Round I)

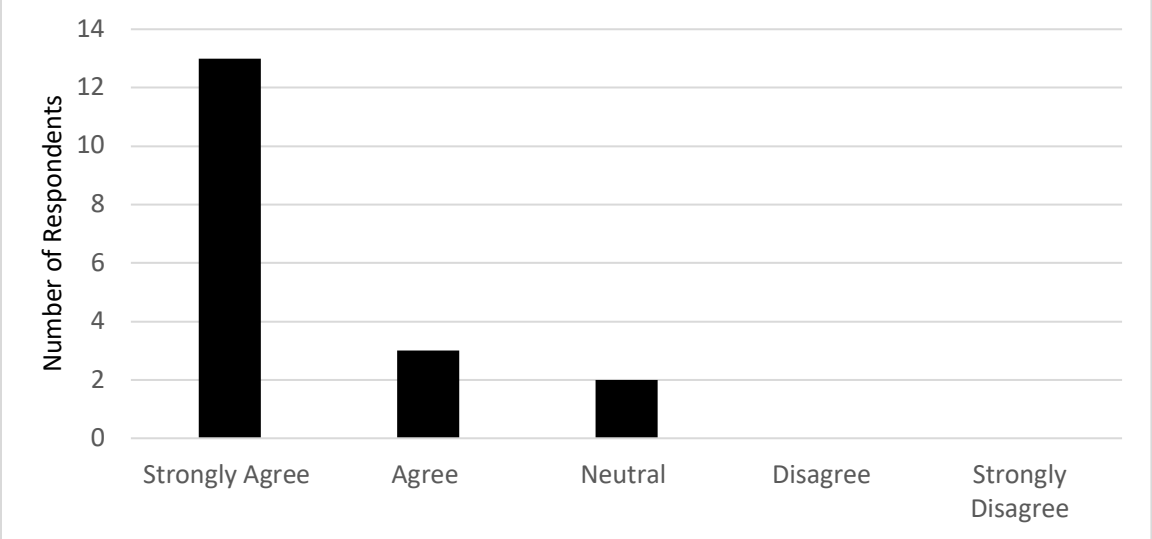
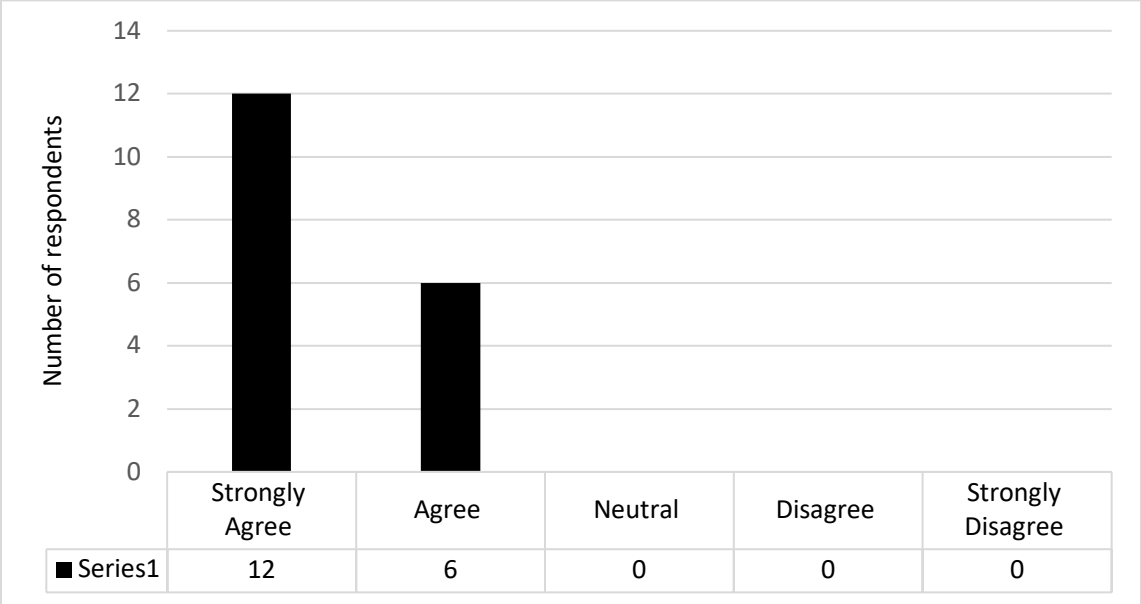


Figure 18

Level of Agreement Associated with the Clarity of the Wording for the Improvement Strategies Narrative Section (Delphi round I)



4.4.3 Delphi Round I: Importance and Clarity of PSAT$^{360°}$ Survey Items

Delphi (Round I) respondents were asked to rate the importance and clarity of the survey items generated following completion of Phase III (competency mapping). The results are organized based on each of the CanMEDS roles (Medical Expert, Communicator, Collaborator, Leader, Scholar, Professional, Health Advocate).

As defined in the methodology chapter (chapter 3), a 75% level of agreement for scores 4 (‘important’) and 5 (‘very important’) was used as a cut-off for consensus that the survey item was important for inclusion in the PSAT$^{360°}$. For this study, the percent agreement was calculated for each statement by comparing the total number of ‘important’ and ‘very important’ responses to the total number of responses for each

item. Items having a 75% agreement or higher were identified as important by experts and included in the next draft of the Delphi survey (Round II).

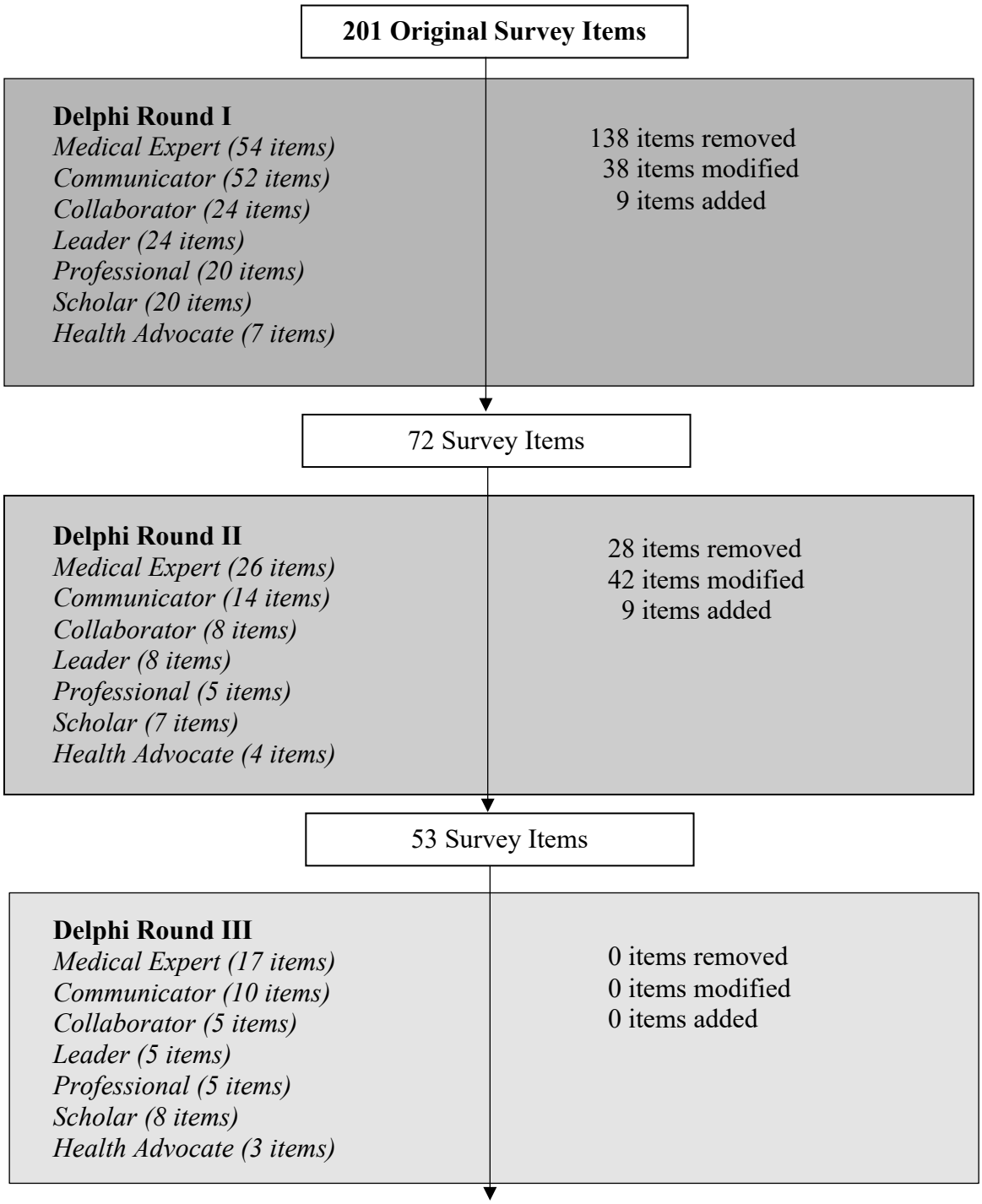
All the data arising from round one of the Delphi survey, including the importance and clarity ratings for each item under the Medical Expert role, Communicator role, Collaborator role, Health Advocate role, Leader role, Scholar role, and Professional role are outlined in Appendix D. For both the importance and clarity scales, the number and percentage of responses are noted. Items that achieved consensus are highlighted. Figure 19 illustrates the number of survey items retained and excluded through each Delphi round and the pilot test phase.

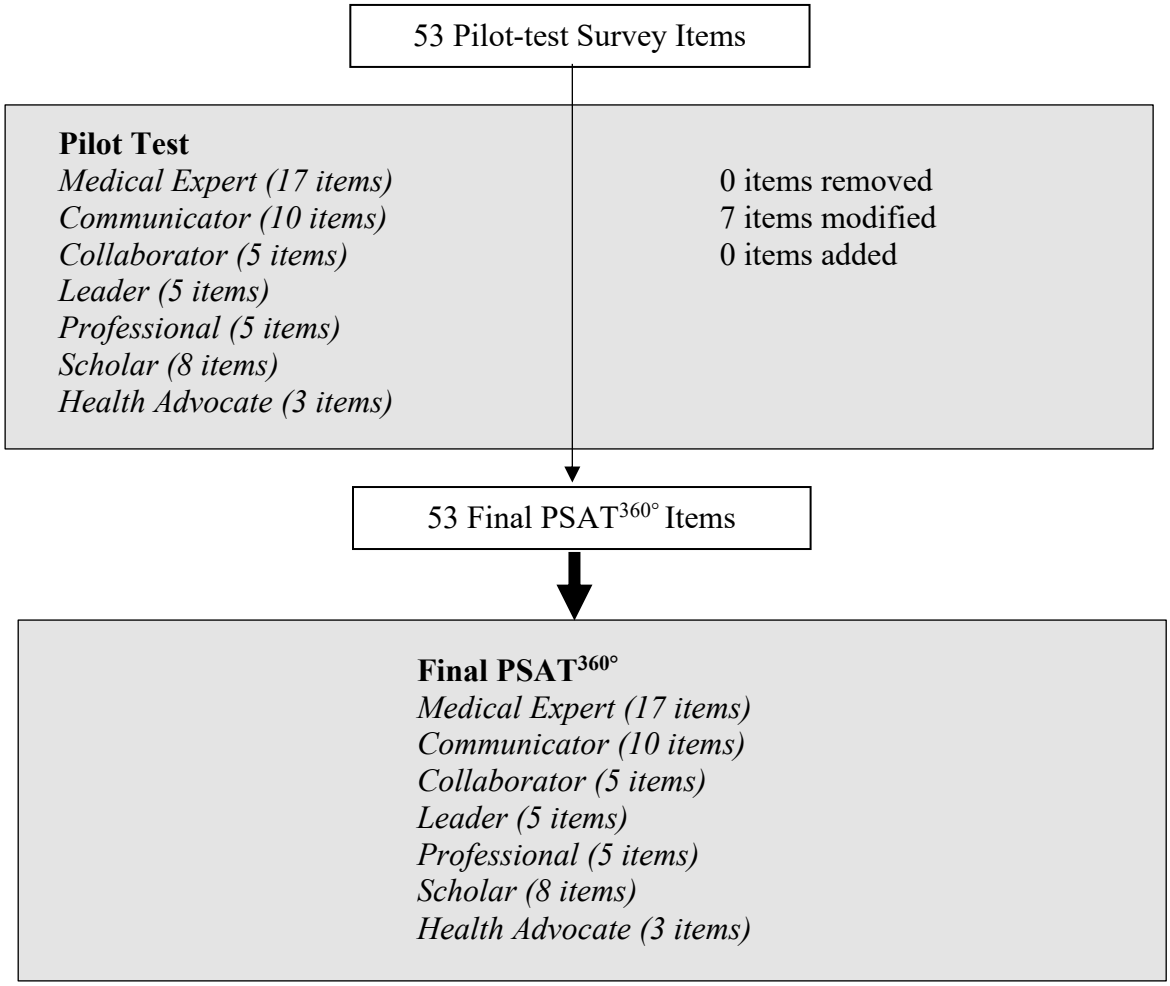
As a result of editing, removing, and adding the first round of Delphi survey items (n = 201), 72 items were integrated into the second round Delphi survey. A total of 138 survey items were removed during this Delphi round. Items that were removed either did not meet the 75% consensus level of agreement for inclusion in the PSAT$^{360°}$ (not deemed as appropriate for assessment at the residency level) or were considered redundant.

A total of nine additional survey items were requested by experts who participated in the first Delphi round. These items spanned across five CanMEDS roles; including, Medical Expert (n = 1), Communicator (n = 2), Leader (n = 3), Scholar (n = 1) and Professional (n = 2) CanMEDS roles. Of these nine additional items, only three were retained in the final PSAT$^{360°}$ survey. The other six items added were removed after the second Delphi round as consensus was not reached by experts for those items.

Figure 19

A flow-chart illustrating the content validation of patient safety skills via key experts





Comments from respondents regarding the clarity of wording of each survey item were used to refine the statements under each CanMEDS role. A total of 38 items were modified in Delphi round one. Many experts provided specific suggestions on how to improve the wording alongside the rationale for making the change.

Once all edits to the Delphi round I survey items were complete, a 72-item Delphi round II survey was distributed to the same 18 patient safety experts who responded in the first round.

4.4.4 Delphi Survey Round II and III

Of the 18 Delphi survey respondents in round one, 15 experts completed the Delphi survey in round two for an 83.3% response rate. See Appendix E for a copy of the Delphi survey used in round two. A summary of experts' Delphi round II responses (importance and clarity of the assessment items) is presented in Appendix F. These results are organized around each of the CanMEDS roles and are illustrated in individual tables within the appendix. As in the first Delphi round, a 75% level of agreement for scores 4 ('important') and 5 ('very important') was used to determine consensus for the importance and clarity of the survey items.

The wording of the narrative sections was reviewed by Delphi round II respondents and no further changes were indicated. The number of survey items was reduced from 72 to 53 following a review of experts' ratings of survey items in Delphi round II. Survey items were removed when the 75% consensus level of agreement was not reached or a redundancy in items were noted. Of the survey items that were removed during this phase, some were deemed not appropriate for assessment of residents, not directly related to the safe patient care, or overlapped with survey items in another more appropriate CanMEDS role. Items that were deemed redundant with items in other roles included those related to disclosure and reporting of PSIs under the Medical Expert role.

Nine survey items were added to the Medical Expert (n = 3), Communicator (n = 1), Collaborator (n = 1), Professional (n = 1), and Scholar (n = 3) CanMEDS roles. Some experts felt additional items were needed, such as the ability of residents to consider concurrent illnesses and medications when prescribing (Medical Expert), refrain

from using unprofessional behaviours towards staff in front of patients (Professional), inform and educate patients about procedures and therapies (Communicator), and collaborate with quality and safety professionals who may transiently work within their practice setting as consultants (Collaborator). Three additional items were suggested by experts under the CanMEDS Scholar role. These additional items were intended to capture residents' skill in presenting and engaging in scholarly activities focusing on patient safety and quality improvement, such as mortality and morbidity rounds, academic presentations, and PI and quality improvement research projects.

Experts' opinion to add an item related to informing and educating patients overlaps with nurses' and allied health professionals' perspectives shared within interviews and focus group sessions. Nurses and allied health professions reported that they often received questions from patients about tests (e.g., what to expect, why is it being done, when will they get the results of the test). They explained that they are not always able to answer these questions for patients because they are either not knowledgeable about the test, or it is beyond their scope of practice to educate patients about investigations that a physician or resident has ordered. It can result in patients having knowledge gaps about their care and therefore patients' inability to provide information that might influence care decisions. For example, a patient may not have been provided with information around a procedure for which the patient has specific risk factors. If the resident or physician does not discuss the procedure and associated risks with the patient, there is a missed opportunity for the patient to share critical information that might impact patient safety. It is also contradictory to PCC, which is a core concept

to patient safety. If patients are not fully informed about a procedure or therapy, they may inappropriately provide consent or inadvertently not comply with post-intervention therapy.

Feedback on the clarity of survey items was used to improve the wording and enhance the focus of patient safety across all CanMEDS roles. A total of 42 survey items were modified following round two of the Delphi survey. As in round one of the Delphi, experts provided specific suggestions for changes to the wording and the rationale. Some of the edits were done to create a more accurate and consistent use of terminology and ensure the items was measurable.

Under the medical expert role, it was recommended to use the term "*close calls*" as opposed to near misses. The term near miss implies that the patient was negatively affected by the care they received. Close call is a more encompassing and appropriate term to use when referring to instances when a PSI occurred, but no harm reached a patient due to a "timely intervention or good fortune" (p. 1, Canadian Patient Safety Institute, n.d.). For this reason, the term close call was adopted for use in the survey.

Experts also suggested avoiding use of the term medical error in place of a PSI or an adverse event. The term medical error does not capture those instances in which harm does not reach a patient (e.g., close call). The term medical error can be perceived as someone being at fault or the need to hold someone accountable when there is a negative patient outcome. Therefore, this term does not align with the notion of a just culture or systems thinking where everything (e.g., policies, equipment, process) that impacts patient care is reviewed when a PSI occurs. There are times when a negative patient

outcome is a result of the natural progression of his or her health condition as opposed to a PSI involving a health professional. For these reasons, the term PSI was used throughout the survey. Under the Health Advocate role, experts suggested removing examples that did not provide an inclusive list (e.g., Choosing Wisely guidelines) or recommendations that might change over time.

Experts recommended alternative wording to survey items to improve observability and assessability by raters. For example, under the Medical Expert role, *Models a just culture by promoting openness and transparency and supporting those involved in a patient safety incident* was altered to *Reports patient safety incidents and talks to co-workers and students about them*. Experts felt that a just culture is a multifaceted, abstract concept that is difficult to assess and is associated with behaviours beyond openness and transparency. Experts also recommended assessment items related to residents' ability to report PSIs and being transparent by talking about PSIs with others. *Recognizes their knowledge and/or skill limitations and seeks assistance* is another example of an item that was reworded, based on expert input. This item was regarded as requiring residents to self-reflect, which is a behaviour that is difficult to objectively observe and assess. This item was changed to *Seeks assistance due to limitations in knowledge or skill*.

The first Delphi survey comprised several more items than the second Delphi survey. In the second Delphi round, experts had engaged in comparing items across CanMEDS roles resulting in the removal of redundant items and rewording of other items, so they were more specific and measurable. The task of cross-referencing survey

items across multiple CanMEDS roles may have been achievable because of the fewer number of items within this round. Edits in this round generated a 53-item survey. A third Delphi round was carried out by sending experts a summary of the second Delphi survey results and a list of items that were added or reworded based on their expert advice. All 15 Delphi round II experts were asked to review the list and indicate if any further edits were required. No additional edits were submitted, and all 53 survey items were incorporated into a pilot survey (appendix G) for key stakeholders.

4.5 Results of Phase V: Pilot Test

The pilot involved participation of 52 people, including faculty (n = 14), allied health (n = 10), nurses (n = 11), and residents (n = 17). All respondents were asked to indicate their preferred rating scale and the importance and clarity of wording for the narrative sections and each of the survey items. Respondents were also asked to provide their thoughts on the fairness, utility, and challenges of an MSF tool such as the PSAT$^{360°}$. Pilot test respondents also asked to review and provide input on the 26-item PSAT$^{360°}$ patient survey.

4.5.1 PSAT$^{360°}$ Rating Scale

The majority of respondents indicated their preference for the Entrustability scale. Some faculty (n = 2) and allied health (n = 2) reported their preference for the Level of Expectation rating scale, and two faculty preferred the Level of Agreement scale (Table 24). While the Entrustability scale is becoming increasingly integrated into undergraduate and postgraduate medical education programming, in comparison, the Level of

Expectation and Level of Agreement scales are widely adopted for use in educational research surveys, evaluation surveys, and learner assessment forms.

Table 24

Resident, Faculty, Allied Health and Nursing Preferred Rating Scale

Scale	Residents (n = 17)	Faculty (n = 14)	Allied Health (n = 10)	Nurses (n = 11)
#1: Level of Expectation	1	2	2	0
#2 Level of Agreement	0	3	0	0
#3: Entrustability	**16**	**9**	**8**	**11**
#4: Performance	0	0	1	0
Either scale is appropriate	0	0	0	0
No response	0	0	0	0

4.5.2 Wording and Clarity of Narrative Sections

Respondents were asked to review the wording of the narrative sections of the PSAT$^{360°}$where raters would have an opportunity to provide examples of residents' performance and make suggestions for improvement or further skill development. Faculty, nurses, allied health, and residents did not report any changes to the wording of these narrative sections. The final wording for these are:

Concrete examples:

> *Under the "x" CanMEDS role, please provide concrete objective examples of resident's behaviour <u>you</u> have witnessed. Please only include examples you have directly observed.*

Strategies for Improvement:

Please provide the resident with one or more strategies for improvement in this CanMEDS competency domain.

The majority of cohorts indicated that it was either important or very important to include these open-ended sections and that the wording for the instructions of these sections were clearly written (Table 25).

4.5.3 Importance and Clarity of Wording of Survey Items

Importance

Most survey items (n = 33) were rated as 'Important' or 'Very Important' across all rater groups (Appendix H). The highest response category reported by each cohort is noted for each survey item. Only 11 (21%) survey items received a score of somewhat important or less. There were no specific response pattern(s) noted between cohorts. There were various disciplines within each cohort (e.g., social work, physiotherapy, and pharmacy within the allied health cohort), and the number of participants within each of those disciplines (e.g., social work) was too low to check for any comparisons within a single cohort. As described in the methodology, the purpose for having a heterogeneous

Table 25

Level of Agreement on the Importance and Clarity of the Open-ended Sections of the PSAT$^{360°}$

Cohort	Level of Importance	*'Provide concrete feedback'*	*'Provide strategies for improvement'*	Clarity	*'Provide concrete feedback'*	*'Provide strategies for improvement'*
Residents (n = 17)	Very Important	17	16	Strongly Agree	17	17
	Important	0	0	Agree	0	0
	Neutral	0	0	Neutral	0	0
	Somewhat Important	0	1	Disagree	0	0
	Not important	0	0	Strongly Disagree	0	0
Faculty (n = 14)	Very Important	7	14	Strongly Agree	14	14
	Important	5	0	Agree	0	0
	Neutral	2	0	Neutral	0	0
	Somewhat Important	0	0	Disagree	0	0
	Not important	0	0	Strongly Disagree	0	0
Allied Health (n = 10)	Very Important	4	8	Strongly Agree	7	10
	Important	6	2	Agree	0	0
	Neutral	0	0	Neutral	0	0
	Somewhat Important	0	0	Disagree	3	0
	Not important	0	0	Strongly Disagree	0	0
Nurses (n = 11)	Very Important	11	11	Strongly Agree	8	11
	Important	0	0	Agree	2	0
	Neutral	0	0	Neutral	0	0
	Somewhat Important	0	0	Disagree	1	0
	Not important	0	0	Strongly Disagree	0	0

representation in the pilot test was to gain insight from various disciplines to ensure the tool was broadly applicable across multiple disciplines.

Clarity

Responses pertaining to the clarity of the survey items by pilot test participants are noted in Appendix H. The wording of seven items was adjusted based on feedback from key stakeholders: Medical Expert (n = 2), Health Advocate (n = 1), Collaborator (n = 1), Communicator (n = 2), and Professional (n = 1). Again, most cohorts agreed or strongly agreed with the clarity of the wording. Suggestions included placement of an action verb at the beginning of survey items so the expected behaviour is evident, adding examples to clarify terminology, separating items that referenced more than one skill, and removing actions that are difficult to access objectively.

The majority of participants agreed or strongly agreed that items under Leader and Scholar were clearly written and no further changes to survey items under these three CanMEDS roles were made. Fifty-three (n = 53) survey items were retained for inclusion in the final supervisor/co-worker PSAT$^{360°}$ survey and the resident PSAT$^{360°}$ survey.

4.5.4 Use of the PSAT$^{360°}$ and MSF in Participants' Setting

Key stakeholders (residents, allied health professionals, nurses, and faculty) in the pilot test were presented with eight questions to prompt them to reflect upon the use of the MSF tool in his or her setting. Fifty-one (n = 51, 98%) of the respondents stated that the tool would likely be understood by raters and the resident in their setting. One person

noted the need for information sessions on the purpose and benefit of MSF and how to complete the surveys. Allied health respondents expressed that education on general patient safety concepts and safety issues should preceed implementation of the tool.

All participants (n = 52) responded that the tool reflects teachable skills, and that it would be fair to residents and potentially free of bias. All participants indicated that this tool is suitable for residency and that it would be useful in providing residents with feedback on their patient safety skills. When asked how this tool might be used within their program, 13 (25%) indicated it was most suitable on longitudinal rotations where residents could be afforded time to get to know the team, learning environment, and expectations before being assessed. After spending some time in the workplace, residents would be more equipped to self-assess their patient safety skills. Another 15 respondents indicated they would foresee using it at the end of each academic year and tracking the data over the course of residents' training to determine their progress towards development of patient safety skills.

When asked about the challenges associated with implementing this tool and the MSF process within their discipline, 14 (27%) participants indicated that potential barriers include lack of knowledge on patient safety and the process of MSF. Seventeen (33%) respondents reported that engaging faculty to participate may be a challenge due to lack of time and familiarity with completing an MSF form.

Enablers of uptake were reported to include offering professional development on what MSF is, the benefits, and an opportunity to practise completion of the forms (n = 14, 27%). Other suggestions included providing faculty with a self-learning guide outlining

how to complete the form, with examples, as well as implementing slowly (e.g., use of small pilot groups) and *"building on successes"* (n = 4, 8%).

4.5.5 Input on the Patient MSF Survey

Key stakeholders (n = 52) who participated in the pilot test survey (residents, allied health professionals, nurses, and faculty) were provided with a draft copy of the 26-item patient survey (Appendix K). Respondents were asked if the items were important (yes/no) and to indicate suggestions for rewording if they were deemed unclear, as well as a place to indicate additional items for the patient survey (Table 26).

Table 26

Participants Review of the MSF Patient Survey

Survey item	Importance		Suggestions to improve the clarity of the wording
	Yes Number (%)	No Number (%)	
Explains my health problem to me in a way that I can easily understand.	50 (96%)	2 (3.8)	
Gives me information of when I need to see another doctor or health professional again	52 (100%)	-	Gives me details of when I need to see the doctor or others who help with my health care
Provides answers to questions that I have about - my condition - treatments - procedures - impact of the condition or treatments on my life	52 (100%)	-	Answers my questions about all aspects of my care
Listens to my health concerns	52 (100%)	-	

Survey item	Importance		Suggestions to improve the clarity of the wording
	Yes Number (%)	No Number (%)	
Considers how my cultural, emotional, religious, family needs may impact care decisions	52 (100%)	-	Add – life situation
Has respect for my treatment preferences	52 (100%)	-	Respects my choices about treatments
Helps me about my fears and worries	52 (100%)	-	Not sure helps is the right word...perhaps is respectful about my fears...or listens to my
Includes me and/or my family in decisions	52 (100%)	-	
Treats me with respect	52 (100%)	-	
Takes time to understand my health concerns	52 (100%)	-	Time to 'discuss'
Explains why he/she is recommending an examination or procedure	52 (100%)	-	
Explains examinations or procedures before they are preformed	52 (100%)	-	
Explains what to expect following an examination or procedure, before it is performed	52 (100%)	-	
Explains all treatments options to me, including possible side effects and benefits	52 (100%)	-	
Explains the results of tests I have done, whether the results are good or poor	52 (100%)	-	
Explains my prescriptions to me (how to take it, side effects, interactions with other medicine)	52 (100%)	-	
Confirms with me current medicines I am taking before writing a new prescription	52 (100%)	-	Add – and financial ability to pay

Survey item	Importance		Suggestions to improve the clarity of the wording
	Yes Number (%)	No Number (%)	
Asks about any non-prescription medicine (e.g., Aspirin, Tylenol, herbs, vitamins, etc.)	52 (100%)	-	
Explains what to do if my problem does not get better or worsens	51 (100%)	1 (2%)	
Sends me to other health professionals (e.g., specialist physicians, dieticians, nutritionist, massage therapists, physiotherapists, etc.) when necessary and in a timely fashion	51 (100%)	1 (2%)	Remove 'timely fashion' because we can't control wait times for specialists unfortunately
Follows up when my health problem is serious	52 (100%)	-	
Talks about preventing health problems (weight loss, exercise, sleep habits, smoking, alcohol, etc.)	52 (100.0)	-	Change stem to "Talks to me about staying healthy"
Washes his/her hands at the start and end of their visit	52 (100%)	-	Include "at the start and end of the visit"
Creates an environment of continuity of care (e.g., follows-up on tests done by other specialists, follows-up when I transition from hospital to home, etc.)	48 (92%)	4 (7%)	Suggested wording – "This doctor follows me as I go through the health care system and stays in touch with my care."
I feel comfortable asking this resident questions	52 (100%)		
Is professional and ethical in their approach to patient care	52 (100%)		

As outlined in the table above, most participants agreed that each of the patient survey items were important to include in the PSAT$^{360°}$. Suggested wording provided by respondents were used to create a final copy of the patient survey (Appendix K).

4.6 Delphi and Pilot Test Summary

With the pilot test complete, final copies of the PSAT$^{360°}$ were generated (Appendix I, J, and K). Figure 19 provides a comparison of the number of items used in the first round of the Delphi survey (n = 201) and the number of items retained and integrated into second and third Delphi surveys (n = 72 and n = 53, respectively), as well as the pilot test survey (n = 53). Thirty-one percent (31%) of the original medical expert items from round one were removed due to lack of importance or relevance to residency training. The percentage of survey items in the other CanMEDS roles were reduced from 19% to 43% between round one of the Delphi and the pilot test survey (Figure 19). Following edits to the patient survey items using stakeholder feedback, all 26 items were retained in the final PSAT$^{360°}$ (Appendix K).

Chapter 5: Discussion and Conclusions

5.1 Discussion and Conclusion Synopsis

The purpose of this study was to develop a valid MSF Patient Safety Assessment Tool (PSAT$^{360°}$) that will provide a comprehensive measure of residents' patient safety skill level. This research study serves to fill gaps and needs within the PGME context in relation to patient safety training and CBA tools. In recent years, there has been increased attention on systemic factors to maximize patient safety and approaches to preventing and mitigating PSIs (Leape et al., 1997; World Alliance for Patient Safety Drafting Group, 2009). Additionally, patients and health care staff, leaders, and government have called for greater transparency and accountability for PSIs, which includes the need to train residents in the area of patient safety (Kassam et al., 2016; Leape et al., 2009; Sorra et al., 2012; Wachter & Pronovost, 2009; Weaver et al., 2013).

The need to increase Canadian residency training on patient safety still exists. Training should be explicit, through classroom-based training (e.g., academic half days) or other scheduled activities (e.g., morbidity and mortality rounds, patient safety research forums), and implicit, through coaching and mentoring of residents during their clinical experiences (Gandhi et al. 2018; Neumeier et al., 2018). Canadian institutions have been slowly incorporating patient safety education into their residency training programs (e.g., University of British Columbia, Memorial University, University of Toronto).

Establishing a PGME patient safety curriculum requires that residents have opportunities to apply their learning in practice and educators to observe and monitor residents' progress, preferably through workplace-based assessment tools. The

introduction of a competency-based training model requires formative assessment of skills, with greater value placed on narrative feedback, multiple raters, strong psychometric properties, and alignment with PGME competency frameworks (Albanese & Case, 2016; Archer, 2010; Gingerich, 2011; Lockyer, 2017). Before competency-based education there was limited accountability for measuring and documenting how residents were progressing during their program. Assessment during that time was primarily summative, infrequent, and did not always involve feedback on how residents can improve (Bullock et al., 2014).

There is a place for both summative and formative assessments in CBME. Assessments of learners who are new or mid-way in their program, for example, may require formative assessment on how to close skill gaps and enhance their strengths (Gruppen et al., 2018). The same assessment tool can be used summatively to judge residents' progression to the next stage (e.g., advancement to the next phase in their training program or graduation). Hence, the importance does not lie with defining the tool or process of collecting assessment data as formative or summative; rather it is how the assessment data are used. Therefore, the PSAT$^{360°}$ can be used in PGME formatively or summatively. The PSAT$^{360°}$ is designed to stimulate learning formatively; however, it can be used alongside other assessment data to make high-stake decisions.

Govaerts (2015) indicated that "workplace-based assessment has become the cornerstone in the summative assessment of learning and professional competence" (p. 265). However, in this study, residents, faculty, and experts expressed that the PSAT$^{360°}$ should be used as part of a formative process so residents can make improvements and

changes throughout their program. If the PSAT$^{360^{o}}$ is used summatively, residents may not find out until the end of their program that they require remediation due to deficiencies in their patient safety skills, which impacts the resident's graduation timeline and program resources. To foster residents' self-reflection of their learning needs, skill improvement and development, and avoid remediation, residents need formative feedback and guidance as part of the assessment blueprint (Konopasek et al., 2016; Sklar, 2017).

With the shift to a competency-based training model and the need for formative assessment, a notable dearth in appropriate assessment approaches and tools emerged within the PGME community. In the 2014 white paper titled, '*A culture of patient safety: Foundation for a Royal College patient safety road map*' prepared for the RCPSC, recommendations for improving PGME in the area of patient safety were highlighted (Matlow & Brian, 2014). These recommendations included implementing curriculum that supported the attainment of competencies necessary to the delivery of safe, high-quality care, development of assessment tools to assess all competencies, and assessment processes that include multisource feedback.

Boulet and Durning (2019) noted that while advances in medical education assessment are being made, "Unfortunately, many assessment processes remain outdated, are based on what is easy to measure, or have limited evidence to support their use. As a result, and based on a number of frameworks, their validity is questionable*"* (p. 87). During medical education conferences and from discussions within the medical community, it was noted that programs had developed tools that enabled faculty to judge

residents' progress without checking for validity, reliability, feasibility, or utility. As Cox et al. (2007) noted, medical schools often make their own decisions regarding which assessment methods and standards to use in their programs. A pragmatic approach is often used when developing and using assessment tools in medicine; where great value is placed on faculty's experience, physician roles and responsibilities, and what they need to learn. A lack of specific assessment tools needed by a medical education program often serve as a driving force for faculty to develop their own tools in order to obtain the data they need to make high-stakes decisions. A formalized group decision-making process or MSF was not consistently used in PGME to make judgments about residents' progress. With the emergence of CBME, faculty collaborated on tool development to support CBA, but little value was placed on content validity. As CBME and CBA gained more traction, the need to collaborate and share valid and reliable tools nationally increased.

Assessment processes in PGME are enhanced when integrating multiple perspectives (e.g., beyond that of a residents' supervisor or MSF), group decision-making processes, self-reflection, and formative feedback to help stimulate learning. The development of the PSAT$^{360°}$, an MSF tool, helps meet these criteria and aligns with the increased expectation of residents to participate in patient safety training. A comprehensive methodological approach was used to determine the structure and content (assessment items) of the PSAT$^{360°}$. It involved triangulation of data from multiple sources and the use of multiple methods and theories. This study used qualitative data through content analysis of the literature and environmental scan documents, focus groups and interviews, and narrative data from Delphi and pilot test surveys. Interviews

and focus groups were used to gather key experts' and stakeholders' perceptions of patient safety and skills associated with the provision of safe patient care by physicians and residents, the design and utility of the PSAT$^{360°}$ within the context of PGME, as well as the challenges and enablers associated with implementing an MSF tool to assess residents' patient safety skills. These data, alongside quantitative data from the Delphi and pilot test surveys, informed the development of the PSAT$^{360°}$.

This chapter provides an outline of key findings from this study that resulted in the development of a content validated set of MSF surveys (supervisor, co-worker, resident, and patient surveys) for assessing residents' patient safety skills. A comprehensive approach was taken to design and develop the PSAT$^{360°}$ and address the key elements of content validity, including how well the assessment items represent patient safety skills and relevance of those skills in postgraduate medical education. The following sections describe how the literature, key stakeholders (end-users of the tool), and experts (MSF, patient safety, medical education, and development of assessment tools) informed the design, content, and utility of the PSAT$^{360°}$ through interviews, focus groups, Delphi surveys, and pilot test surveys.

Lynn (1986) described a two-stage process used to develop an assessment tool that ensures content validity. Briefly, Stage I (Development) involves the development of assessment items that would be included in the assessment tool, and Stage II (Judgement and Quantification) entails evaluation of those assessment items for relevance. Discussion of the results of this study are organized under these two stages.

5.2 Stage I: Development of the PSAT$^{360°}$

This study is similar to Halek et al. (2017) when they developed their assessment tool and established content validity, in that it began with a review of the literature to identify frameworks and content related to patient safety and residency assessment (Stage I- Development). Through consultation with experts, the CanMEDS framework was used as the foundational framework to design the PSAT^{360} because it would be familiar and meaningful to residents and faculty. Experts indicated that this would be helpful in terms of engagement in the MSF process and use of the tool. Therefore, the CanMEDS roles served as constructs within the PSAT$^{360°}$. The tool is grounded in competency frameworks and guidelines that are needed by faculty and residents to safely perform their clinical tasks.

Competency Frameworks

A constant comparative mapping process was applied to information extracted from competency frameworks, literature, and interviews and focus groups to identify an initial list of assessment items. This process involved an iterative comparison of competency statements across all frameworks where skill-based items of most relevance to residency education were extracted. The CPSI safety competencies framework was useful in identifying additional assessment items when compared to competencies within the CanMEDS framework and the RCSPC Patient Safety Working Group competency list in the first comparative iteration. Inclusion of the CMPA and Accreditation Canada guidelines did not result in additional assessment items, yet they helped inform the structure and wording in the initial draft of assessment items. Inclusion of CPSI, CMPA,

and Accreditation Canada frameworks and guidelines was a critical and useful step in validating the content of the PSAT$^{360°}$ by confirming the relevance of items from the RCPSC framework and improving the clarity and structure of the items. Competency frameworks describe the blueprint of knowledge, skills, and attitudes expected of a target population. Therefore, the mapping process was followed by removal of items that were linked to knowledge or attitudes, and therefore not measurable (e.g., "Demonstrate knowledge of patient terminology and clinical care policies at your institution, including key patient safety terms and definitions").

Literature Review

All the skills extracted from the literature mapped onto (e.g., overlapped with) assessment items identified through an analysis of frameworks and guidelines. This was not a surprise for literature that described the patient safety curriculum. Educators likely used existing frameworks to develop education that served to fill a void in patient safety programming, without critical reflection to determine gaps in the competency frameworks or the patient safety curriculum/training they delivered. It is also possible that educators did not assess learners' patient safety skill level, after experiential learning activities, for any deficiencies and difficulties in completing tasks (identification of additional patient safety skills). If the educational intervention was evaluated for this purpose, it was not widely reported in the literature.

Intuition and listening to the inner voice, empathy, honesty, humility, and conscientiousness are all important patient safety qualities identified within the literature, but they are difficult to assess objectively (Ahmed et al., 2014). Some of these qualities

were integrated into the first Delphi survey and reviewed by experts in patient safety and survey development. It was suggested to remove those qualifiers from the assessment tool as there may be variation in how residents demonstrate them and how raters would assess them. While these qualities are not explicit in the PSAT$^{360°}$, they underlie many of the safety tasks or assessment items within the tool, such as completing disclosure of PSIs accurately and appropriately (e.g., being honest, having empathy).

Input from Experts and Stakeholders

The next step in the development process involved asking MSF experts for their input on the process and criteria for designing and testing an MSF tool. The most important advice provided by MSF experts regarding the development of the PSAT$^{360°}$ was to ensure that a sample of stakeholders and experts were invited to participate in the development of the tool. This important step is also emphasized in the literature, including Sargeant (2006) who suggested that inclusion of experts and end users in the development of an MSF tool was central to establishing content validity. In this study experts with experience in developing competency frameworks and assessment tools brought a national perspective in regard to the development process, content, and utilization of the PSAT$^{360°}$. Experts, therefore, helped ensure that the PSAT$^{360°}$ aligned with national standards for assessment of residents' competency.

Stakeholders (raters and residents) were able to provide contextual information based on their experiences within the workplace, including the skills they deemed necessary to practise safely and their needs in terms of an MSF patient safety assessment tool. Involving residents and raters in the development phase was valuable in

understanding their work practices, measures they take to practise safely, and how raters expect residents to demonstrate patient safety. The following section outlines expert and stakeholder input on the assessment items that should be captured in the PSAT$^{360°}$.

Both experts and stakeholders addressed the need for an MSF survey with specific and measurable skills that are appropriately aligned with the expectation levels of residents (e.g., each skill or assessment item should be suitable for a resident who is training). They recommended that the PSAT$^{360°}$ assess patient safety skills generally across all disciplines, and then programs could adapt and pilot for use within their respective discipline. Stakeholders noted that a pilot of the tool within their program would determine if the tool was sufficient or if they would need to amend the tool with specific assessment items (e.g., assessment items specific to the surgery program). With this in mind, stakeholders expressed appreciation for the opportunity to participate in the development of the PSAT$^{360°}$ and provide input on the content and design of the tool.

There was a high level of agreement across multiple data sources (e.g., literature, competency frameworks, and expert and stakeholder responses) on the patient safety skills that residents should attain and demonstrate, and therefore skills that should be included in the PSAT$^{360°}$. Patient safety was regarded by all participant groups as a central focus of their work and deeply rooted within the philosophy of their training of "doing no harm". Experts and stakeholders expressed the importance of assessing residents' ability to practise safely since it underlies their daily tasks, including technical (e.g., procedures) and non-technical tasks (clinical reasoning and teamwork). Approximately 70-80% of medical errors are attributed to a breakdown in non-technical

skills, supporting the rationale to provide residents the opportunity to develop these skills during their training and receive feedback, following observation and assessment by raters (Dunn et al., 2007; Glavin & Maran, 2003; Sasou & Reason, 1999).

Unsafe behaviours often go unchecked and uncorrected. This can occur when educators or colleagues find it uncomfortable to point out those behaviours and correct them through coaching (Grissinger, 2017; Morrison & Milliken, 2003). Some health professionals and faculty may not have the skills to address others' poor safety skills and behaviours, view assessment as time consuming, or they are concerned about residents' reactions to being called out (Morrow et al., 2016; Okuyama et al., 2014). However, if professionals are not taking action to correct unsafe behaviours, including those of residents, they are condoning it. Therefore, it is important to build capacity among health professionals through system-level resources such as relevant policies, mandatory professional development (e.g., how to assess and give mandatory feedback), performance assessment tools, and promoting the 'act of speaking up' in the workplace. Adopting a performance assessment tool, such as the PSAT$^{360°}$, brings attention to the importance of checking, correcting, and coaching for safety in the workplace. It is unlikely that poor, unsafe skills will go unchecked if there were policies and expectations associated with measurement of patient safety skills. As per the design of MSF, this check for unsafe skills would be expected by all raters or health professionals.

Flin et al. (2008) define non-technical skills as "the cognitive, social, and personal resource skills that complement technical skills, and contribute to safe and efficient task performance" (p. 38). Flin et al. (2010) suggest that staffs' technical performance is

enhanced through staffs' non-technical abilities, such as vigilance, anticipation, teamwork, communication, professionalism, leadership, situation awareness, and monitoring and managing stress and fatigue. The risk of a PSI increases when residents and physicians are deficient in these critical non-technical skills, yet, these skills are not the main focus of training in some areas of health care (e.g., surgery) (Youngson & Flin, 2010). Youngson and Flin (2010) also reported that some staff were not ready to accede to inclusion of non-technical skills as part of their training.

Study participants felt that patient safety could also be compromised if physicians did not advocate for timely investigations, collaborate with other health professionals, talk to patients about what they were feeling and their needs, and possess non-technical skills such as diligence (e.g., following-up on patient test results). Corbett et al. (2011) also linked the role of individual diligence of health professionals to creating safer systems and suggested that organizations should consider how to promote individual diligence given its link to reliable and safe care. The Agency for Healthcare Research and Quality (AHRQ) and Winble and Yeong (2012) explained that diligence and follow-up is linked to a positive patient-physician relationship by clarifying any misunderstandings of the patient, explaining adjustments made to care plans (e.g., treatments and additional investigations), and following-up on discharge summaries.

Another noteworthy non-technical attribute mentioned by most cohorts is that of assertiveness and confidence in one's ability to question everyday tasks, policies, protocols/processes, as well as decisions. It is known that controlled and assertive communication skills are needed in moments when patient safety is at risk (Omura et al.,

2019). In this regard, residents who are confident and assertive may seek clarification and suggest alternative means to improve the safety of protocols/processes. This was incorporated into the Delphi and pilot test surveys and maintained as an assessment item in the final set of surveys. However, confidence in questioning the decisions of others (e.g., decisions that might impact patient safety) was not seen by Delphi respondents as something that could be easily assessed. Experts suggested that due to hierarchy and power differentials, it might impose a high level of discomfort for residents to complete this task within certain contexts.

All interview and focus group cohorts indicated that residents' ability to be intuitive and reflective of their skills could impact patient safety. Residents should recognize when there are limitations in their knowledge or skills, ask for help, and be receptive to feedback. Physicians who are humble are likely to recognize when they need assistance from others in order to practise safely (as described by experts) and teach others to seek and accept help.

Other notable themes that emerged through focus group discussions include preventing patient harm and mitigating risk to patient safety. This aligns with the definition of patient safety within the Canadian Patient Safety Dictionary (Davies et al., 2003), *"the reduction and mitigation of unsafe acts within the health care system, as well as through the use of best practices shown to lead to optimal patient outcomes"* (p. 12). Experts and stakeholders suggested adding assessment items related to residents' harm prevention skills, such as the use of checklists (e.g., before a surgical procedure) and their ability to mitigate risk to patient safety by following-up with patients, recognizing

situations when they should follow-up, and communicating patient information with other health professionals.

Quality improvement, systems thinking, and situational awareness skills are central to preventing and mitigating patient harm; yet, these were either not mentioned nor were not a significant discussion across all cohorts. Some participants defined quality improvement when sharing their perspectives on what the concept of patient safety meant to them, yet, the skills associated with the concept of quality improvement were only loosely discussed when they suggested that residents and physicians who practice safely should be able to carry out risk and hazard assessment in the workplace. However, quality improvement is more extensive than assessing the workplace for potential safety hazards. It also involves careful selection of quality improvement methods and tools to determine if and what change is needed, developing a solution, planning, communicating, and implementing the change, and evaluating to see if the change was effective (Varkey et al., 2007). Interestingly, the skills associated with such an important safety task were not discussed at great lengths in the focus group and interviews; they did not associate quality improvement with residents' roles and safety competencies.

It was surprising that systems thinking, which is closely linked to quality improvement activities and the prevention of PSIs, was not discussed by participants when defining key patient safety tasks or resident patient safety roles and competencies. A systems thinking lens within health care allows staff to view all "processes as parts of a larger system, rather than in isolation or as segments" (Furst-Bowe, 2011, p. 2). Systems

thinking skills aids in making efficient and safe quality improvements (Johnson, Miller, & Horowitz, 2008; McNab et al., 2020).

Residents are expected to acquire quality improvement and system thinking skills and these should be incorporated into their curriculum and clinical training (Frank et al., 2015), yet only 10-25% of U.S. and Canadian medical schools have reported that they provide explicit patient safety or quality improvement education (Alper et al., 2009; Wong et al., 2012). Wong et al. (2013) stated that to integrate and sustain quality improvement education in residency, physicians need to view quality improvement and patient safety as "core to their identity" (p. 1154), both as scholars and clinicians. It is as equally important to prevent, as it is to correct, PSIs. Not having future physicians trained in quality improvement and systems thinking could have dire consequences for the safety of patients. While these topics are integrated into competency frameworks, it is concerning that these concepts were not associated with the safety roles or competencies of a resident. Having these incorporated into the PSAT$^{360°}$ will bring awareness to the topics of quality improvement and systems thinking and encourage educators and residents to provide or seek training in these areas.

Effective quality improvement and systems thinking skills requires residents to practise what Frank and Brien (2008) described as situational awareness (e.g., recognizing the risk associated with emergency code or crash carts located in a poorly accessible room). This involves residents taking action to correct notable safety risks in the workplace by actively reviewing the patient's environment for potential errors, thinking critically, asking questions, anticipating potential risks and the unexpected, and

sharing risk information with other health professionals (van Tilburg et al., 2006). Stakeholders reported that while this skill was something expected of more senior residents, having it in a tool will let junior residents know this is expected of them and they should seek opportunities to build that skill. Experts indicated that since these skills are teachable, attainable, and measurable, they should be captured in the PSAT$^{360°}$.

Patient-centered care was another key theme noted by experts and stakeholders during interviews and the focus group sessions. Allied health staff and nurses demonstrated a sense of concern and frustration with physicians and residents who do not practise PCC by educating patients about their diagnoses and prognoses, what to expect (e.g., investigations or treatment), providing updates on their test results, or asking them for input on care decisions. Participants noted that patients often report to nurses that they feel ill-informed as they do not know what is happening next in terms of further testing or treatments. Allied health staff and nurses said that patients can become concerned when they are not informed, which can impede healing and their mental health, as well as length of stay in hospital.

Weingart et al. (2005) reported that patients who are engaged in their health care by staff and residents are often a source for detecting safety threats, reporting them, and therefore providing a learning source for staff and residents. Studies have shown that engagement of ICU and pediatric patients in their own health care enhances the safety culture and may decrease PSI rates (Cox et al., 2017; Dykes et al., 2017). Reyonalds (2009) reported that PCC is associated with better patient outcomes and increased safety when the patient is included in discussions about their care. Meaningful discussions with

patients can lead to alternative investigation and treatment strategies. In this instance, patients act as a "second set of eyes" (Dimick & Greenberg, 2014; Hashjin et al., 2014).

An insufficient amount of time spent with patients was viewed by all cohorts, except program directors, as a factor that influences patient safety. Physicians should ensure ample time to explain care decisions, investigations, and treatment options, carry out patient follow-ups, and consistently review care plans. Patients should also be afforded time to ask questions and communicate how they are feeling. This factor is linked to program director, faculty, and resident suggestions to include an item related to practice management. While time is largely a systemic influence on patient safety, having efficient practice management skills may enable physicians and residents to gain additional time to spend with patients.

A coordinated, team-based approach to patient care was referenced across all cohorts, in interviews and focus groups, as an important patient safety skill. It was not discussed frequently when asked about their patient safety perspectives, but teamwork and collaboration were expressed by participants as patient safety tasks that physicians should engage in regularly. The ability to work with a health care team is widely accepted as a critical patient safety skill and is highlighted in the frameworks and guidelines that informed this study. Participants believe that comprehensive care is achieved by integrating the expertise from multiple health care providers and ensuring that the care plan is clearly communicated among patients and staff, including the delegation of tasks. Participants perceiving teamwork as central to the concept of patient safety mirrors the extensive literature and competency frameworks which supports the need for essential

teamwork skills in establishing safe care and preventing and mitigating preventable harm (Anderson et al., 2017; Manser, 2009; Thom et al., 2016; Reeves et al., 2010).

Baker et al. (2006) released a report developed for the AHRQ's Center for Quality Improvement and Patient Safety on the relationship between teamwork and patient safety. This report highlighted that teamwork enhances patient safety through demonstration of collective efficacy and interdependence to solve complex problems and fulfill the goals of patient care, optimize resources, understand and integrate the roles and responsibilities of team members, and effectively communicate with each other and the patient/family (Baker et al., 2005).

Teamwork training involving residents has been shown to positively influence patient safety (Barrett et al., 2001; Chakraborti et al. 2008; Freytag et al., 2017; Singh et al., 2005). Dedy et al. (2013) also described the positive correlation between teamwork training interventions involving residents and improvement in non-technical skills, including collaboration and communication. For this reason, assessment items linked to residents' ability to function within a team and collaborate with other health professionals were captured in the PSAT$^{360°}$.

Providing clear communication to patients and colleagues was well referenced by most stakeholders as an important patient safety skill that physicians and residents should consistently demonstrate in their practice. Communication deficits have been linked to PSIs in Canada and identified as the leading cause of medical errors and harm in the U.S. (Baker & Norton, 2004; Dingley et al., 2008; Leonard et al., 2004). The close connection between communication and safety has led to the implementation of disclosure and

interprofessional communication training for residents (Dedy et al., 2013). (Allenbaugh et al., 2019; Posner & Nakajima, 2011; Schinasi et al., 2018).

It is notable that role modelling, teaching junior learners, and professionalism were not key discussions among residents and other cohorts. This was surprising given that these are key skills noted within the CanMEDS and linked to patient safety. Students reported witnessing poor decision-making or habits of residents that could impact patient safety (e.g., inadequate hand hygiene, meager PCC, and incomplete pre-operative procedures/steps) (Mileder et al., 2014). Residents should be mindful of such safety practices since they spend about 25% of their time teaching and residents' role modelling is seen as one of the most influential teaching methods (Newman et al., 2015; Seely, 1999). Although it is well highlighted in medical school and PGME, professional skills linked to patient safety (e.g., such as being on time, health equity, patient handoff, patient advocacy, disclosure of PSIs or close calls) (Kenny, 1996; Martinez et al., 2017) were not associated with patient safety or residents' roles during focus groups and interviews. It is interesting that residents did not associate these skills with their role and patient safety during focus groups and interviews. The PSAT$^{360°}$ bridges the connection between building and demonstrating these skills in residency and patient safety.

New assessment items were not identified by comparing the interview and focus group data with the literature sources and frameworks. Some specific attributes (e.g., acting diligently) were identified, but they did not fit the requirement for an objective survey item. However, diligence is an example of an attribute that underlies other survey

items such as identifying gaps and risks within the workplace and patient follow-up (e.g., tracking completion of patient investigations).

Skills emanating from the comparative analysis of focus groups, interviews, and the literature were integrated into the Delphi survey to determine relevance for inclusion in the PSAT$^{360°}$ and clarity of wording, as outlined in the following section.

5.3 Stage II: Judgement and Quantification

Based on recommendations within the two-stage process identified by Lynn (1986), experts were then invited to review and rate the assessment items for relevance and clarity as a means of obtaining content validity (Stage II - Judgement and Quantification).

The Delphi Method

Three rounds of the Delphi survey method proved useful in identifying assessment items that were important in residency training and improving the clarity of the wording of those items. Based on the recommendations of Delphi respondents, items were either added, deemed unimportant and removed, reformatted, or reworded to make them more specific (e.g., breaking some items into two more specific items), or moved to a more appropriate CanMEDS role. The wording of some items was altered based on the input from experts, so they were more appropriate for residents' training level and the context of their training. The wording of some items was enhanced to include examples and increase the specificity and measurability.

Many of the patient safety competencies recommended by the RCPSC patient safety working group (Wong et al., 2014) and those within the CanMEDS competency framework (Frank et al., 2015), were incorporated into the first draft of PSAT$^{360°}$. It was surprising to learn that a few specific competencies had not received a consensus rating by experts for inclusion in the PSAT$^{360°}$ (e.g., the ability to cope with PSIs). This is remarkable considering it is a key skill linked to wellness and the ability to recover from future events. If residents do not demonstrate the ability to cope following PSIs, there is a possibility of risk for future PSIs if they are emotionally unwell (Engel, 2006). Two studies reported that physicians felt anxious, guilty, nervous, and fearful of repercussions when PSIs occurred. Such feelings can cause residents to make mistakes and prevent them from reporting, disclosing PSIs, and learning from PSIs (Wolf et al., 2000; Wu et al., 1991). Residents should also model good coping skills for junior learners that they teach and support.

Some assessment items from the safety and CanMEDS framework were reworded to strengthen the focus on patient safety and quality improvement skills, including residents' ability to: (i) work with other patient safety and quality improvement professionals (Collaborator role), (ii) collaborate on patient safety and quality improvement research and analysis of PSI data (Scholar role), (iii) evaluate and apply evidence-based patient safety and quality improvement information in their clinical practice (Scholar role), and (iv) monitor the influences of personal wellness on patient safety (Professional role).

The Delphi process proved useful in identifying a list of 53 patient safety skills that residents should attain. With a set of assessment items agreed upon by experts, a set of tools were developed for the pilot test and distributed to a sample of end users, which comprised residents, faculty, allied health professionals, and nurses across multiple disciplines. Representation of several different allied health professionals participated.

Pilot Test

Many raters welcomed the opportunity to participate in the study. They provided input on the importance and wording of the assessment items and the utility of the PSAT$^{360°}$. In comparison, residents were hesitant to engage in the study due to competing demands, survey/test fatigue, or did not see value in their participation. There were few changes to the PSAT$^{360°}$during this phase of the study. No notable differences in ratings for importance and clarity across cohorts were noted for the resident self-assessment and supervisor/colleague surveys. This may indicate that the PSAT$^{360°}$ is generalizable across disciplines and professions. A total of seven (n = 7) items were reworded under the Medical Expert, Health Advocate, Collaborator, Communicator, and Professional roles based on stakeholder feedback. The majority of cohorts rated the patient survey items as important, and no additional assessment items were added. Suggested edits to wording were completed and a final set of PSAT$^{360°}$ surveys were developed (Appendix I, J, and K).

5.4 Design and Utility

The following summarizes finding associated with expert and stakeholder

feedback on the utility and design of the PSAT$^{360°}$ in terms of the context for its use, rating scale, narrative components, and distribution of the tool using an electronic or paper-based format.

5.4.1 Design

Rating Scale

The majority of experts and stakeholder groups agreed that the entrustment scale (1 = not able to complete the task, even with assistance to 5 = can complete the task without assistance) was the most appropriate for assessing residents' patient safety skills and the context of their training. Among experts, a small number also rated the expectation scale as important. The 5-point entrustment scale was subsequently selected to be used in the final set of surveys, except for the patient survey. It was thought that an entrustment scale may not be as well understood by patients or relevant across all the patient survey items, so a 5-point level of agreement scale was used for the patient survey. In modelling other MSF tools, an additional rating option of 'unable to assess/no opportunity to observe' was added to the PSAT^{360º}. This additional rating option would allow raters who did not have the opportunity to observe specific safety skills at the time of the assessment or the resident – rater working relationship does not afford the rater to observe the resident in that capacity (e.g., colleague who can rate residents' communication or collaboration skills, but does not work closely enough to make judgements on residents' technical or procedural skills).

The entrustment scale has been used within other residency workplace-based assessment tools (Gofton et al., 2012; Warm et al., 2014), but none were integrated into

an MSF tool to measure patient safety skills in PGME. Of the 21 patient safety tools reviewed for this study, only one tool used the entrustment scale and its focus was on clinical assessment by a resident's supervisor only. Vygotsky's sociocultural theory provides support for the use of this scale within the PSAT$^{360°}$. Vygotsky purported that an individual's cognitive development is in part shaped by his or her social interactions and that social development precedes learning. Vygotsy proposed that learners first interact with peers and educators who provide direction and guidance on how to perform tasks and gradually build knowledge and skills to independently carry out their tasks (Taylor & Hamdy, 2013; Vygotsky, 1978). In PGME, residents observe and learn from other health professionals, colleagues, supervisors, and interactions with patients, absorbing knowledge and building skills so they can perform tasks safely and independently. The entrustability rating scale enables raters to identify if residents can perform tasks independently or if they are dependent on interactions (e.g., direct supervision during a procedure) with others to complete tasks (ten Cate, 2016).

Residents who participated in this study believed the entrustment scale was relevant to their training and useful when setting goals. There are significant concerns noted within the literature with respect to the reliability and validity associated with some of the scales often used in WBA, including the performance expectations scale (1 = rarely meets expectations to 5 = consistently exceeds expectations) and the quality of one's performance (1 = poor to 5 = excellent) (Carline et al., 1989; Kreiter et al., 1998; Turnbull & Van Barneveld, 2002; van der Vleuten & Verhoeven, 2013). However, entrustment scales have been associated with demonstrated reliability compared to

traditional WBA scales (Crossley et al., 2011; Rekman et al., 2016) and they align with the way supervisors reflect on a resident's performance level. This scale is particularly suitable for the PSAT$^{360°}$ given its linkages to patient safety. Raters typically think about a resident's performance in terms of how much they 'trust' them to complete tasks safely and independently (Gofton et al., 2017). The scale needs to have significance to the rater and ratee, but so does the feedback. Evidence has shown that residents are more accepting of lower scores if they are provided with specific feedback on how to improve (Crossley et al. 2011; Crossley & Jolly, 2012; Gofton et al., 2012; Rekman et al., 2016).

Narrative Components

MSF experts, patient safety experts, and all stakeholders noted that the provision of concrete feedback to learners is critical to assisting residents with improvement in their safety skills. Both experts and stakeholders agreed that feedback will aid the learner in making changes or setting goals to further develop their skills. Feedback used to drive learning goes hand in hand with the notion of an MSF model, where the goal is to help the learner build and improve their skills by providing consistent feedback throughout their program. Without an integrated feedback system in PGME, residents are likely to find it challenging to catch up and attain the required skills before completing their program. Overeem et al. (2010) found that physicians were more satisfied with multisource feedback that included narrative comments from co-workers (e.g., nurses, allied health professionals, and administrative personnel). However, in the case of Sargeant et al. (2003), receiving negative MSF feedback was often followed by long-lasting affliction and disquietude. Participants recommended adding a feedback coaching

session to review the feedback, help the ratee interpret the results, and manage their reactions to the feedback. Seifert et al. (2003) and Sargeant et al. (2006, 2007) supported the use of a facilitator to increase the acceptance of MSF feedback by helping the ratee deconstruct the feedback and translate it into actionable learning goals.

Experts and stakeholders recommended adding a narrative or an open-ended section to the end of each CanMEDS role. They suggested that these sections could be used to complement the ratings residents received under each CanMEDS role by providing specific examples of raters' observations. Stakeholders also believe that the open-ended sections are necessary if the resident received specific scores (e.g., below or above average scores). Ratings or scores, without commentary, pinpoint areas that residents need to improve in and areas of strength, but scores alone can leave the resident questioning how their performance or behaviour resulted in poor or high ratings. Experts and stakeholders explained that these open-ended sections would provide contextual information to help residents understand why they received specific ratings. As Sargeant (2015) stated, "narrative comments can provide specific and relevant observations which can inform how and what to improve, while numerical scores can only identify the presence or absence of a performance gap or a need to improve" (p. 55).

Feedback stemming from WBA has been shown to positively affect a physician's practice, if implemented correctly. Physician cohorts have successfully used MSF to make positive clinical and operational changes to their practice and competency improvement (Fidler et al., 1999; Lockyer, 2003; Saedon et al., 2012; Sargeant et al., 2003; ten Cate & Sargeant, 2011). However, Canavan et al. (2010) found that most of the

raters' comments in an MSF survey for residents and fellows were general and not focused on specific behaviours, and therefore less likely to be used for learning and performance improvement.

The narrative sections of the PSAT$^{360°}$ were developed using input from experts and stakeholders. The wording of these sections need to engage raters to enter valuable feedback and uptake of that feedback by residents. The PSAT$^{360°}$ narrative sections have specific instructions, instead of asking for general feedback. Raters are asked to provide concrete, objective examples of the residents' behaviour (they observed directly) and strategies for improving. The purpose of these narrative sections aligns with van der Vlueten's (2010) belief that assessment will be successful by stimulating learning and skill development when it is learner-centered instead of a data collection task, for example, to fulfill an accreditation requirement.

Distribution: Electronic vs Paper

Most stakeholders thought it was best to offer both an electronic and paper format of the surveys to account for differences in technical skills. A paper copy can serve as a physical reminder to complete versus something that might be missed or forgotten in an email. Some cohorts (e.g., nurses) felt a paper copy is appropriate within their context since they do not always have access to a computer to complete assessment tools. Experts advocated for an electronic format to protect privacy and confidentiality in case completed paper copies are misplaced. An electronic format would ease data management and comparison of learner's progress over time. To this effect, Lockyer and Sargeant (2017) added in their national set of MSF guidelines that a stable human

resources structure and data management system are needed to manage an MSF program given the potential large number of data that will come in for each resident. A data management system and personnel are needed to enter (in the case of paper-based tools), store, monitor, analyze the data, and generate MSF reports for residents and their raters. Hence, adequate technology resources are a considerable aspect of implementing an MSF program.

5.4.2 Utility

Rater selection, faculty or rater roles, and context are some of the key factors that arose through discussions with experts and stakeholders, and influence the utility of the PSAT$^{360°}$.

Rater Selection

Pilot test data highlights that the PSAT$^{360°}$ tool would be useful and feasible within residency programs. However, experts and stakeholders reported potential challenges to rater selection and anonymity. The debate surrounding the selection of raters in an MSF process persists. The debate centers on who selects, how many raters are needed, and the types of raters given the context and skills being accessed (Becton & Schraeder, 2004; Bracken et al., 2001).

Some initial research reported no significant differences in the overall data and feedback when raters are self-selected or chosen for the resident. Yet, more recent work suggests physicians have received higher ratings through self-selection of raters than perhaps warranted (e.g., physicians who were not performing well received higher than

expected ratings from raters they selected themselves). Brutus and Derayeh (2000) found that 84% of organizations had given the employee the freedom to select their own raters; however, it can be associated with the introduction of ratee (not rater) biases. This type of bias can impact the value placed by ratees on the feedback and scores they receive, rather than biases linked to the feedback and scores that are provided. Archer et al. (2010) believe that unregulated self-selection of raters can result in leniency bias (raters assign higher performance ratings than can be justified) and should not be permitted. However, Lockyer and Sargeant (2013) suggested that the expected skills and behaviours within the MSF tool should be reviewed by the ratee and they should determine who would be the most appropriate colleagues to rate and provide the feedback to them.

Participants in this study expressed the desire for self-selection of raters versus having someone else select raters for them. The benefits of rater self-selection are two-fold. First, it can engage residents in the MSF process, and secondly, residents are more likely to view the scores and feedback as credible and take action to make improvements, if they know and trust the rater.

As Petosa (2000) pointed out in her thesis on rater selection and biases, there is no evidence that illuminates the impact of potential rater biases on the growth and skill development of the ratee. One option is to have the supervisor and resident work together to develop a list of raters based on the clinical context and the content of the PSAT$^{360°}$ (e.g., what the resident is being assessed on) (Petosa, 2000). Regardless of the rater selection process that a program adopts, the success of the PSAT$^{360°}$ would be linked to

clear communication with residents and raters about what the process is and maintaining a consistent selection process for all residents and across all PGME programs.

Rater anonymity was another notable concern among stakeholders and one that can impact the raters' level of engagement. This study revealed that some raters preferred a tool and process that was structured to ensure anonymity. However, this conflicts with the recommendation of self-selection of raters within the literature (Bracken & Rose, 2011; ten Cate & Sargeant; 2011). The potential consequence of permitting rater self-selection by residents is the loss of anonymity. The literature suggested a compromise by asking residents to submit a list of possible raters to his or her supervisor and the supervisor would select the final list of raters. Hence, the resident would not know the final list of raters. Also, the data presented to the resident in his or her MSF report would be aggregated, with identifying information removed beforehand. A collated summary of the raters' narrative feedback could be generated for inclusion in the resident's MSF report.

A collated summary of the feedback could be produced by coming together as a group to discuss the feedback they have for each resident and synthesizing it. Group discussion has been noted to have other benefits, such as potentially identifying skill deficiencies that require immediate attention and risk for patient safety. Studies by Hemmer et al. (2000) and Schwind et al. (2004) revealed that residents' deficiencies were only detected during a group process review session. This speaks to the 'wisdom of crowds', where assessment data is synthesized, discussed, and debated as a group. Ideally this group discussion results in a shared decision regarding the resident's progress level

and next steps. It also lends itself to the importance of having these group processes to drive learning and promote patient safety.

Faculty Roles

The shift from a time-based to a competency-based training model brought about a concurrent shift in how faculty teach residents during their program and how they determine if residents are ready for practice at the end of their training. For residents to acquire patient safety skills, faculty need to consistently monitor how residents are progressing and coach them towards competency. Gruppen et al. (2018) noted that faculty need a method for documenting their observations to make comparisons over time and determine if residents are improving. Documentation also serves as a tool to engage in discussion with residents about where and how they need to improve in relation to skill development and ROPs (Gruppen et al., 2018; Moonen-van Loon et al., 2015).

The PSAT$^{360°}$ enables faculty to coach residents towards patient safety skill development formatively, consistently, and objectively. Experts and stakeholders believe that implementing the PSAT$^{360°}$ would require that faculty be prepared to observe, judge, and guide residents towards patient safety competency. Stakeholders indicated that for some faculty, this would necessitate professional development on patient safety concepts (e.g., systems thinking), MSF, assisting residents with the interpretation of the PSAT$^{360°}$ feedback report, and how to appropriately assess and teach patient safety skills in practice. Faculty would also need to know the expected milestones or patient safety skill level for each residency year (e.g., PGME year 1, PGME year 2). Experts believe that development of the PSAT$^{360°}$ is a step towards building patient safety competency in

PGME, with many other steps, such as faculty development, required to prepare for practical application of the tool.

Context

CBA tools should be designed for use within the resident's clinical practice setting, instead of demonstrated performance in a simulated setting (Rethans et al., 2002). These assessments should require raters to observe residents when they are in the clinical setting in order to provide an appropriate rating of the resident's abilities.

Assessment tools that are designed for use within a clinical environment, or WBA tools, should be contextualized and have items that reflect clinicians' work tasks. Development of the PSAT$^{360°}$ used peer-review literature, frameworks, and experts to create a contextualized tool with items that reflect tasks that residents do in the workplace that require patient safety skills. Residents' learning is enhanced through repetitive exposure within their training or practice (Schuwirth & Van Der Vleuten, 2011). The PSAT$^{360°}$ provides residents with a set of expectations and goals they should focus on in the clinic, including the skills they should repetitively practise and receive coaching and feedback on until competence is achieved, then focusing on maintenance of those skills.

Stakeholders remarked that residents should be aware of the patient safety skills they are expected to develop, and that they will be assessed on those skills throughout their program. Completing a baseline assessment early in their program would serve as an educational diagnosis and baseline. However, it is essential to allow residents time to build relationships with their raters before assessing them. Residents tend to move through several rotations or domains of care in their first year, which can pose challenges

to running MSF. Hence, MSF experts and stakeholders recommended using the PSAT$^{360°}$ when residents are on longitudinal rotations and have time to acclimate to their work environment.

5.5 Success of Multisource Feedback in Postgraduate Medical Education

Experts and program directors suggested that successful implementation is associated with appropriate timing of the assessment, an MSF change champion, integration of the PSAT$^{360°}$ within existing assessment frameworks, and communication about the tool in advance of its use and through multiple avenues. Many stakeholders may not be familiar with MSF. Therefore, the implementation of MSF in residency may involve change management processes where residents and raters need information on the assessment approach and their role before committing to the process. MSF experts, program directors, and faculty reported that many raters have competing demands, including responsibility for completion of other assessment forms for multiple residents. A change champion is someone who can facilitate the implementation process by supporting and engaging others in the MSF process.

Engagement and success of the PSAT$^{360°}$ as an MSF tool will require transparency and communication of the purpose of the tool through websites, social media, and hosting information and training sessions before implementing the MSF program. Training sessions should include facilitated feedback and coaching sessions for raters and residents (Lockyer, 2017; Lockyer & Sargeant, 2013). For residents to improve and build their patient safety skills, they would need to develop a learning plan based on the PSAT$^{360°}$ data and feedback. Therefore, faculty need to learn how to provide constructive and

specific feedback so that residents can develop a plan that reflects gaps in their patient safety skills.

Resident participants asked for communication on the purpose of the PSAT$^{360°}$. If the tool is learner-centered and focused on skill-building, they would likely be more engaged and accepting of the feedback than a data collection tool used to make pass-fail decisions or decisions about progression in their program (Govaerts, 2015). Residents may hold negative attitudes towards performance assessment and towards other health professionals giving them feedback, and may need reassurance that this process is about helping them gain patient safety skills. If the PSAT$^{360°}$ will also be used to make high stake decisions, then stakeholders agreed that this information should be provided to residents up front.

Participants also suggested incorporating the PSAT$^{360°}$ within existing assessment processes and tools so that faculty do not see the tool as an add-on. Some program directors said they would consider incorporating it into the In-Training Assessment Report (ITAR) currently used at periodic time points to assess residents' skills.

5.6 Implications

The PSAT$^{360°}$ provides programs with the ability to determine a resident's ability to practise safety using a process that brings in multiple perspectives. This tool may also inform resident patient safety training (clinical and classroom learning experiences) and professional development activities for faculty. Further to this, the PSAT$^{360°}$ provides residents and faculty with the level of expectations regarding patient safety skill attainment during their training. This research, including the PSAT$^{360°}$ tools, may

enhance a culture of safety by generating conversations about residents' patient safety skills and encouraging stakeholders to think about residency training with an explicit patient safety lens in the workplace.

Sharing with the public that the PSAT$^{360°}$ is being used to measure and build patient safety skills supports an organizations' vision for transparency and social accountability. The public may be keen to know that residents' patient safety skills are being assessed to ensure that physicians are patient safety oriented and competent to practise safety. Additionally, with an increase in patients' involvement in their health care and interest in patient safety, it is anticipated that they will appreciate the opportunity to provide feedback through completion on the patient PSAT$^{360°}$ survey.

5.7 Study Limitations

With all forms of research comes a set of limitations that might impact data collection, analysis, interpretation, and generalizability of the data. Part of this study involved participants who work or train in health care and teaching institutions in St. John's, Newfoundland, which may impact the generalizability to other medical education communities. While patient safety and MSF experts from Canada, U.S., and the UK participated, having input from frontline staff and residents who work and train nationally and internationally may be needed to account for differences in training and practice contexts.

Researcher bias is another potential limitation. It is common for academic staff to lead or participate in research activities within their workplace (Fleming, 2018). Endogenous, or insider, research is defined as research that is conducted within an

organization, group, or community where the researcher who is also a member or has a priori familiarity (Brannick & Coghlan, 2007; Hellawell, 2006; Hockey, 1993; Mercer, 2007; Trowler, 2011). This work would be classified as insider research given my role as a doctoral student who leads this research study and an academic staff member who engaged with members of the medical education community through teaching and research activities.

As a staff member within the research environment, I had prior knowledge and understanding of the research context and pre-established relationships with some of the participants. These relationships and prior knowledge are often viewed as a potential source of bias by potentially influencing the design and direction of the research (Taylor, 2011). Merriam et al. (2001) suggested that an inside researcher may not raise provocative questions like external researchers, who would be at an appropriate distance from subjects to permit objectivity. In contrast, Harvey (2013) recommended that researchers invest themselves in the work, acknowledge the impact that their presence has on the work, and accept the investigation and its outcomes shape the researcher's identity. Residents were reassured of the anonymity of their involvement in the study and confidentiality of information they shared. However, it is still possible that some residents did not share valuable information or refrained from participating in the study, knowing I was a staff member involved in their program.

Fleming (2018) shared that both insider and outsider researchers must resolve methodological issues of identity within the research field and any prior knowledge they hold. Therefore, Chavez (2008) posited that the “insider-outsider distinction is a false

dichotomy" (p.474). While it is thought that only external researchers come into a study without prior knowledge, many aspects may also be unknown to an inside researcher (Fleming, 2018). Like many other insider research studies, this work had unknown elements associated with the research topic, environment, and participants that reduces the level of bias.

Experts and stakeholders were recruited based on specific criteria focused on their experience and expertise. The primary objective was to obtain input on the content, structure, and utility of the tool from all of the experts who met the recruitment criteria. However, age, gender, sex, and rural/urban factors were not taken into account during the recruitment phase. These sociocultural factors may have influenced perspectives about patient safety and the skills residents should possess. As a result, these sociocultural factors may have implications for the generalizability of the findings and the context in which the PSAT$^{360^{o}}$ is used. It would be crucial to consider these factors in future research to field test the PSAT$^{360^{o}}$ tool.

Numerous steps were taken to minimize bias and establish credibility by triangulating multiple data sources, use of multiple supporting theories, member-checking, note-taking (e.g., steps taken during the study, context, progress, challenges), and peer-debriefing. The later permitted discussion of the research design and acknowledgement of beliefs and judgements I held (e.g., design of the PSAT$^{360^{\circ}}$, the importance of transparency and a just culture in health care, and patient safety in residency education). Through discussions with experts and stakeholders, I recognized the valuable role that medical educators play in enhancing patient safety by assessing

residents on skills known to prevent PSIs and modeling systems thinking.

Due to resident and physician schedules, some participants could not participate in focus group sessions and therefore agreed to participate through individual interviews. The perspectives of interview participants may have differed if they had participated in a focus group session – their viewpoints may have shifted during a focus group session as they listened to the perspectives of others'. Similarly, some focus group participants may not have shared their viewpoints if they were not comfortable doing so in front of others.

Patient involvement and engagement in future research to field test the implementation of the patient PSAT$^{360°}$ survey would be important. Ideally, patient consultation as part of the process for validating the patient survey developed in the current study would have been preferred and may be a potential limitation to the study. Challenges associated with patient recruitment as noted earlier in the dissertation, including ethics approval and a rigorous recruitment strategy to ensure a well-represented sample limited patient engagement in the current study. Previous MSF patient surveys did serve as a guide when developing the patient survey items. Experts and stakeholders also provided input on the importance and clarity of the wording of the patient survey items. However, involving patients in the review of the patient PSAT^{360º} would strengthen the tool by seeking patient input on the importance and clarity of the survey items. The patient PSAT^{360º} survey is a part of a collection of content validated surveys as described in the current study, so inviting patients to provide feedback as part of a field test would be a critical next step. Involving patients in the development of the PSAT^{360º}

could also build a sense of ownership and invested interest in the tool by patients, and possibly increase patients' participation and engagement in the MSF process.

Stakeholder engagement in MSF as a residency assessment model was sought through information sessions with program directors, faculty, and residents. These sessions were used to describe MSF, the importance of formative feedback on patient safety skills, and the benefits of participating in a field test of the PSAT$^{360°.}$ During these information sessions, enablers and barriers to participation were discussed. A lack of time due to their busy clinic and academic schedules was a notable barrier. Some faculty and program directors reported that they already felt overburdened with the expectation of completing numerous evaluation forms and that this would likely impact participation in a field test. Faculty also expressed concerns for those residents who were not engaged in the process of assessment or self-directed learning by identifying learning opportunities to build evidence of competency (Delva et al., 2013).

Nevertheless, faculty explained that often residents who are not active participants (e.g., do not seek feedback on his or her performance from their supervisors) are residents who are underperforming and need feedback. Faculty suggested that this lack of resident engagement in the process may be, in part, due to residents' concern about receiving negative scores and feedback. Residents also expressed that participating in a field test would be challenging due to competing clinic and academic responsibilities. Therefore, integrating this MSF tool would require linking it to their existing assessment processes, implementing the tool gradually across programs, using MSF champions to help and engage others in the process, and development of relevant policies to support its uptake.

Residents are more likely to be open and express their viewpoints among their peers. However, it may have been advantageous to have a group of residents and faculty come to a consensus on the purpose of the MSF process and discuss strategies to field test the tool within their program.

5.8 Conclusions

This study culminated in a final set of MSF tools that are validated in terms of content through a comprehensive approach that is both grounded in a set of validated competency frameworks and guidelines, and reflects the needs of key stakeholders and the input of experts in patient safety, residency education, assessment, and MSF.

The PSAT$^{360°}$ is an MSF tool that consists of a 53-item supervisor/colleague survey and a 53-item resident self-assessment survey, as well as a 26-item patient survey (Appendices I, J, and K). The entrustment rating scale and organization of items under the CanMEDS roles are familiar to residents and raters. Having these elements within the tool is anticipated to help with the utility of the tool and engagement of end users.

This work is innovative in that it introduces the first MSF tool to assess residents' patient safety skills. The tool is built using well-defined patient safety frameworks, guidelines, best practices, literature sources, patient safety and MSF experts, and the experience of educators in the PGME community. The tool includes two narrative sections at the end of each CanMEDS role where raters can provide feedback on how the resident can improve under each domain and concrete examples of observed behaviour that reflect the rating scores. For example, a low rating score within the Scholar role may be explained by the following: *Minimal engagement during morbidity and mortality*

rounds (M&M rounds) or was not well prepared for his or her presentation at the patient safety forum (e.g., did not use appropriate and relevant sources of information). This feedback section acts as a stimulus for discussion about the resident's abilities and goals for future learning with his or her supervisor.

The PSAT$^{360°}$ can help prepare residents to practice safely within an environment that requires interaction with multiple health professionals and patients, each of whom have different expectations of the resident. An MSF tool is appropriate in that it provides residents with feedback on their patient safety skills from the lens of multiple health professionals, as opposed to their supervisor only.

5.9 Future Directions

Patient safety experts with backgrounds in family medicine and surgery stated that the tool would be of significant value to educators within PGME. Experts stated that a validated feedback tool that focuses on a specific skill area and uses input from multiple staff and patients would help engage end-users in the assessment process and build essential patient safety skills. An important next step would involve field-testing the tools and evaluating for factors using the Norcini et al. (2018) consensus framework for good assessment: reliability, feasibility, equivalence (similar scores across institutions or testing cycles), educational effect (motivates participants to prepare for the assessment such that it generates learning and competency development), catalytic effect (drives future learning and program improvement following completion), and acceptability (the process and results are perceived as credible). Having demonstrated evidence of reliability and validity may encourage uptake by residency programs at other institutions.

Determining if there is interest in field testing the tool at other universities should be explored. Some patient experts who participated in this study expressed interest in using the tool within their setting. The PSAT$^{360°}$ is a WBA tool that uses an entrustment assessment rating scale. Workplace-based assessment tools and entrustment rating scales are both recommended by the RCPSC as part of their competence by design framework. The tool is also grounded in and organized by the CanMEDS roles, so it has elements of familiarity to residents, faculty, and other potential raters. For these reasons, collaboration with the RCPSC to pilot the tool might be another feasible option.

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Appendix A

Ethics – Participant Consent Form

CHECKLIST

This checklist is to be completed and submitted with this consent form.
It is to be removed from the final version of the consent document.

X Most recent version of consent template (November 2011) has been used
X Footer includes consent version, study name, line for patient initials
X Font size no less than 12 [except for footer]
X Left justification of text
X Grade 9 or lower reading level. Assessed reading level is: __8_____
X Accepted definitions for specialized terms used where applicable
X Plain language principles used for study specific wording – no jargon, no acronyms, short words, short sentences, active voice and, where appropriate, bulleted lists

Standard, required wording (in bold type) has been used in the following sections:

	Yes	No
Introduction	X	☐
Benefits (Q6)	X	☐
Liability Statement (Q7)	X	☐
Privacy and confidentiality (Q8)	X	☐
Questions or problem (Q9)	X	☐
Signature page	X	☐
Signature page for minor/assenting participants if applicable	n/a	☐

If you have answered No to any of the above, please give the rationale for these changes below:

TCPS2 guidelines provide a list of the information required for informed consent. Please refer to TCPS2, Chapter 3, available at: http://www.pre.ethics.gc.ca/eng/policy-politique/initiatives/tcps2-eptc2/chapter3-chapitre3/.
The HREB Policy Manual provides detailed information on specific consent issues including: consent to research in emergency health situations; the use of substitute decision makers; assent for children; research involving special populations (children, cognitively impaired); managing consent in situations of difficult power relationships; and community consent to research involving Aboriginal communities. Please refer to the HREB Policy Manual on the HREA website: www.hrea.ca.

MEMORIAL UNIVERSITY
Faculty of Medicine

Consent to Take Part in Research

TITLE: Development and Validation of a Multisource Feedback Tool to Assess Medical Trainee Competence in Patient Safety.

INVESTIGATOR:
Ms. Patricia McCarthy, MSc., PhD Candidate
Curriculum Development Assistant
Room 446, 4th Floor, Agnus Cowan Hostel
Faculty of Medicine, Memorial University
St. John's, NL, Canada

SPONSOR:
This project is being funded by the Medical Council of Canada (2012 Fund for Research in Clinical Assessment) and Eastern Health (2012 Commission of Inquiry Research Fund)

You have been invited to take part in a research study. Taking part in this study is voluntary. It is up to you to decide whether to be in the study or not. You can decide not to take part in the study. If you decide to take part, you are free to leave at any time. This will not affect your student status or your evaluation as a resident.

Before you decide, you need to understand what the study is for, what risks you might take and what benefits you might receive. This consent form explains the study.

Please read this carefully. Take as much time as you like. If you like, take it home to think about for a while. Mark anything you do not understand or want explained better. After you have read it, please ask questions about anything that is not clear.

The researchers will:

- discuss the study with you
- answer your questions
- keep confidential any information which could identify you personally
- be available during the study to deal with problems and answer questions

Introduction/Background:
Memorial University's Faculty of Medicine strategic plan recommends adoption of the Canadian Patient Safety Institute (CPSI) Patient Safety competencies throughout medical education. If medical residents are expected to be competent in patient safety then it is very important to formally assess these skills throughout their program so that changes can be prescribed. The Multisource Feedback (MSF) method is also known as 360^0 assessment because it involves rating an individual's performance in specific areas (e.g., communication, professionalism, etc.) by multiple assessors (i.e., coworkers, patients, supervisors, managers) and by self-assessment. Traditionally, residents only receive feedback from their supervisor or faculty preceptor. It is thought that feedback based on multiple perspectives is more valuable and valid than that of a single source.

1. Purpose of study:
   This project seeks to develop a valid MSF/360^0 assessment tool for measuring residents' patient safety skills.

2. Description of the study procedures:
   In order to develop this tool, focus groups or interviews will be conducted to help develop the content and design of survey questionnaires. Given your role/expertise we would like your input on the design and content of this assessment tool.

3. Length of time:
   You will be expected to participate in focus group session or interview that will be approximately 1 hour in length.

4. Possible risks and discomforts:
   There are no known risks, other than the inconvenience for the time to participate in the focus group.

5. Benefits:
   It is not known if this study will benefit you.

6. Liability statement:
   Signing this form gives us your consent to be in this study. It tells us that you understand the information about the research study. When you sign this form, you do not give up your legal rights. Researchers or agencies involved in this research study still have their legal and professional responsibilities.

7. What about my privacy and confidentiality?
   Protecting your privacy is an important part of this study. Every effort to protect your privacy will be made. However it cannot be guaranteed. Other people taking

part in focus groups may know your name and hear your comments. All members of the focus group will be reminded to:

- respect the privacy of each member of the group
- treat all information shared with the group as confidential

When you sign this consent form you give us permission to

- Collect information from you
- Share information with the people conducting the study

Access to records

The members of the research team will see study records that identify you by name. Other people may need to look at the study records that identify you by name. This might include the research ethics board. You may ask to see the list of these people. They can look at your survey records only when supervised by a member of the research team.

Use of your study information

The research team will collect and use only the information they need for this research study. This information will include your:
name
contact information (i.e., email, internal mail address, etc.)
Discipline
Position/rank
information from study interviews and questionnaires

Your name and contact information will be kept secure by the research team in Newfoundland and Labrador. It will not be shared with others without your permission. Your name will not appear in any report or article published as a result of this study.

Information collected for this study will kept for five years after publication.

If you decide to withdraw from the study, the information collected up to that time will continue to be used by the research team. It may not be removed. This information will only be used for the purposes of this study.

Information collected and used by the research team will be stored securely using password protected network files on a secure Memorial University computer. All paper files will be stored in a locked cabinet. Both will be located in a locked office (Professional Development and Conferencing Services, Room 2961, Health Sciences Centre, Faculty of Medicine, Memorial University).

Your access to records

You may ask the Principal Investigator, Ms. Patricia McCarthy to see the information that has been collected about you.

Questions or problems:
If you have any questions about taking part in this study, you can meet with the investigator who is in charge of the study at this institution. That person is:
Ms. Patricia McCarthy, MSc., PhD Candidate
Curriculum Development Assistant
Room 446, 4th Floor, Agnus Cowan Hostel
Faculty of Medicine, Memorial University
St. John's, NL, Canada
Tel: (709) 777-2494
Email:pattimccarthy@mun.ca
Or you can talk to someone who is not involved with the study at all, but can advise you on your rights as a participant in a research study. This person can be reached through:

Ethics Office
Health Research Ethics Authority
709-777-6974 or by email at info@hrea.ca

After signing this consent, you will be given a copy.

Signature Page

Study title: Development and Validation of a Multisource Feedback Tool to Assess Medical Trainee Competence in Patient Safety

Name of principal investigator: Ms. Patricia McCarthy, BSc, MSc, PhD(c)
To be filled out and signed by the participant:
Please check as appropriate:

I have read the consent form and information/cover letter.	Yes { } No { }
I have had the opportunity to ask questions/to discuss this study.	Yes { } No { }
I have received satisfactory answers to all of my questions.	Yes { } No { }
I have received enough information about the study.	Yes { } No { }
I have spoken to Patti McCarthy and she has answered my questions.	Yes { } No { }
I understand that I am free to withdraw from the study	Yes { } No { }
at any time without having to give a reason without affecting my evaluation as a resident	
I understand that it is my choice to be in the study and that I may not benefit.	Yes { } No { }
I understand how my privacy is protected my records kept confidential.	Yes { } No { }
I agree to be audio taped.	Yes { } No { }
I agree to take part in this study.	Yes { } No { }

_____	_____	_____
Signature of participant	Name printed	Year Month Day
_____	_____	_____
Signature of person authorized as	*Name printed*	*Year Month Day*

*Substitute decision maker, if applicable*_____

To be signed by the investigator or person obtaining consent

I have explained this study to the best of my ability. I invited questions and gave answers. I believe that the participant fully understands what is involved in being in the study, any potential risks of the study and that he or she has freely chosen to be in the study.

_____	_____	_____
Signature of investigator	Name printed	Year/Month/Day

Telephone number: _____

Appendix B

Interview and Focus Group Scripts

1. Interview and Focus Group Script – Key Stakeholders (Physicians, Residents, Allied Health, and Nursing)
2. Interview script - Experts in MSF
3. Interviews script - Experts in Patient Safety

INTERVIEW/FOCUS GROUP SCRIPT
[Key Stakeholders]

Consultation to Inform the Content and Design of a Multisource Feedback (360^0) Tool for Assessing Medical Residents' Patient Safety Skills

Definition of Multisource Feedback:
The Multisource Feedback (MSF) method (360^0 assessment) is a specific process and set of instruments used for information gathering, appraisal and providing feedback on workplace-based performance. Questionnaires designed to gather data about specific behaviors or professional competencies (e.g., communication skills, professionalism, teamwork) are administered on behalf of the assesse. In medical settings, raters may include medical colleagues (e.g., peers or referring physicians), nonmedical coworkers (e.g., nurses, allied health professionals), patients and family members, and oneself. The goal of this type of assessment is to provide feedback to the assesse for use in developing future learning plans to enhance their competence in that area.

1. What does the concept "patient safety" mean to you as a clinician educator/faculty member/resident?

2. What are the key principles you would associate with being a "patient safety"-oriented physician?

3. What types of tasks do you perform on a frequent basis that requires you to apply or demonstrate patient safety? [For non-physician groups: What types of tasks do you perform on a frequent basis in collaboration with physicians and require application or demonstration of patient skills?]

4. What tasks would a resident [you] perform on a frequent basis that requires application and demonstration of patient safety skills?

5. What are the key factors that influence patient safety in your clinical practice? How does this relate to a resident's [your] training within that practice setting?

6. How would you describe the specific areas of knowledge, skills and attitudes (competencies) associated with a resident [you] applying/demonstrating patient safety in your clinical practice?

7. What are your thoughts on the use of the 360-degree process/Multisource Feedback process as a means to assess and offer feedback to residents on their patient safety competencies [on your patient safety competencies]?

If the specific topics do not come up through this question below are some questions that might be presented to the group:

a. *What are your thoughts regarding engagement and uptake of the tool for use?*
b. *Electronic administration verses paper-based format?*
c. *Scale: check-list with 2 pt. scale of yes/no (doing it/not doing) format or categorical: e.g., novice, developing, expert; close supervision, minimal supervision, independent, etc.*
d. *Utility: used throughout program (formative) and/or summative; frequency*

8. Is there anything else that you would like to add?

INTERVIEW SCRIPT
[Key Expert - MSF/360-degree assessment]

Consultation to Inform the Content and Design of a Multisource Feedback (360^0) Tool for Assessing Medical Residents' Patient Safety Skills

1. How have you utilized and/or applied 360-degree/MSF in your work?

2. What key lessons have you learned from using 360-degree/MSF process for assessment purposes?

3. What key recommendations would you have for the successful design and implementation of a 360-degree/MSF process for assessing learners/health professionals?

4. What key steps should be followed in the design of a 360-degree/MSF process for assessing learners/health professionals?

5. What potential challenges/barriers should one be aware of in the design and implementation of a 360-degree/MSF process for assessing learners/health professionals?

6. From your perspective what would be an appropriate scale/benchmarks to use in a 360-degree/MSF tool designed to assess residents on this topic?

7. Is there anything else you would like to add?

INTERVIEW SCRIPT
[Key Experts - Patient Safety]

Consultation to Inform the Content and Design of a Multisource Feedback (360^0) Tool for Assessing Medical Residents' Patient Safety Skills

The Multisource Feedback (MSF) method, or 360° assessment, is a specific process and set of instruments used for information gathering, appraisal and providing feedback on workplace-based performance. Questionnaires designed to gather data about specific behaviors or professional competencies (e.g., communication skills, professionalism, teamwork) are administered on behalf of the assesse. In medical settings, assessors may include medical colleagues (e.g., peers or referring physicians), nonmedical coworkers (e.g., nurses, allied health professionals), patients and family members, and one's self. The goal of this type of assessment is to provide feedback to the assessee for use in developing future learning plans to enhance their learning in that area and enable them to meet the associated competencies.

1. What does the concept "patient safety" mean to you?

2. What key principles would you associate with being a "patient safety" oriented practitioner?

3. From your perspective, what tasks would a resident perform on a frequent basis that require application and demonstration of patient safety competence?

4. How would you describe the specific areas of knowledge, skills and attitudes (competencies) associated with a resident applying/demonstrating patient safety in a clinical setting?

5. What are the key factors that influence patient safety in a clinical setting? How does this relate to a resident training within that setting?

6. How can the application/demonstration of patient safety within an organization be appropriately evaluated?

7. Are you aware of any best-practice approaches to the assessment of patient safety amongst health care teams and/or individual practitioners?

8. Is there anything else that you would like to add?

9. What are your thoughts on the use of the 360-degree process/Multisource Feedback process as a means to assess and offer feedback to residents on their patient safety competencies?

Appendix C

Delphi Survey – Round I

To whom it may concern:

You have been invited to take part in a research study that is seeking to develop, pilot-test and evaluate a valid and reliable Multisource Feedback (MSF)/360-degree assessment tool designed to measure residents' patient safety skills. At this time, experts are being asked to provide comments and feedback on a draft copy MSF/360- degree assessment tool.

Given your role and the time commitment required to participate we are providing you a $150 honorarium. Please see the bottom of the next page of this survey for information needed by our finance office to complete the payment of the honorarium.

We are collecting feedback on the survey from various individuals using a modified Delphi method. A minimum of 2 Delphi survey rounds will be employed. This Delphi method is being administered to check for the clarity and the importance of each competency statement, suggestions for an appropriate survey scale and clarity of the wording for the open-ended sections of the survey.

Given you are a potential end user of the tool, if implemented, your input will be considered highly valuable. Comments and feedback will help inform the design and content of the final version of the MSF/360-degree assessment tool to be used during the pilot test.

Taking part in this study is completely anonymous and voluntary. Completion of this online survey is expected to take approximately 90 minutes. It is up to you to decide whether or not to complete the online questionnaire. There are no known direct benefits or risks to completing this survey. You can withdraw from the study by not submitting or completing the survey. You may exit the questionnaire at any time. You may also skip any questions that you do not wish to answer or make you feel uncomfortable. Your reply will be kept confidential as the results are anonymous. Only myself, as PI of the project, and my PhD supervisor will have access to the data. Once the data comes back, identifying information will be extracted from the raw data and data will be presented in aggregate format. Further information related to the study rationale and objectives are provided on the following page.

The Provincial Health Research Ethics Board (HREB) in Newfoundland and Labrador has approved the plans for this research study. The rationale and objectives for this study are contained on the next page. Please know that completing this questionnaire implies consent to have your responses reviewed and analyzed by the research team, used in aggregate format for dissemination, and potentially used to inform the development of relevant training curricula and/or the development of policies/procedures.

Please feel free to forward any questions about this project to Ms. Patti McCarthy via email (pattimccarthy@mun.ca) or telephone (709) 864-6676.
Thank you for taking the time to complete this survey.

Payment of Honoraria:

As a participant of this study and to help compensate you for your time commitment required to review the following survey, we are offering you a $150 honorarium. In order for the Finance Department, Faculty of Medicine, Memorial University to pay you this honorarium we need you to provide the following information: Name, SIN and home address (space has been provided below to enter this information).

This personal information is only for the purposes of payment of the honorarium and will therefore be separated from the data as responses are received, and then forwarded to our finance administrator for immediate processing. There will be no way of linking data to specific responses. All data will be reported in an aggregate and anonymous format. As each response is received, payment information will be forwarded to our finance officer and the information will be permanently deleted from the survey file.

Information for honorarium payment

First Name Last Name
SIN
Street address
City/Town
Postal Code

Sincerely,

Patti McCarthy, MSc, PhD Candidate

Section A: Scale

Please review the following scales and indicate below which scale you feel is more appropriate for use in assessing residents' patient safety competence:

Scale #1: LEVEL OF EXPECTATON

0 = Not Observable
1 = Well Below Expected
2 = Below Expected
3 = Expected
4 = Above Expected
5 = Well Above Expected

Scale #2: LEVEL OF AGREEMENT

0 = Not Observable
1 = Strongly Disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly Agree

Scale #3: ENTRUSTABILITY

0 = No opportunity to observe or not applicable
1 = Resident cannot perform this task/skill, even with assistance
2 = Resident can preform this task/skill, but only with assistance
3 = Resident can perform this task/skill under indirect supervision
4 = Resident can perform this task/skill independently
5 = Resident can act as an instructor or supervisor for this task/skill (aspirational)

Scale #4: PERFORMANCE

1 - 2 Well Below Expected
3 - 4 Below Expected
5 Expected
6 - 7 Above Expected
8 - 9 Well Above Expected
N/O Not Observable

Please indicate which scale (1, 2,3 or 4 above) you feel is most appropriate for assessing residents' patient safety skills:

☐ Scale #1 is most appropriate
☐ Scale #2 is most appropriate
☐ Scale #3 is most appropriate
☐ Scale #4 is most appropriate
☐ Either scale is appropriate
☐ Neither of these scales are appropriate

If you checked "#6. Neither of these scales are appropriate," could you please use the space below to provide alternative suggestions to a scale:

Section B: Open Ended Sections

Key stakeholders and experts recommended to include an open-ended section where raters could provide concrete examples of the resident's behaviors that they have observed directly and strategies on how to make improvements in those areas. These open-ended sections would appear after each domain of competency statements which are organized under CanMEDS roles.

Please review the draft wording for these statements below and indicate (1) Level of agreement with the IMPORTANCE of including this section in a resident's patient safety assessment tool, you (2) Level of agreement with the CLARITY of the statement, and (3) if either statement is unclear as written use the space below each statement to provide suggestions for alternate wording.

1. *Please reflect upon your ratings of the above competencies for this resident under the "X" CanMEDS role (e.g., Communicator role) and provide concrete examples of their behaviour for competencies you rated as needing improvement. Note: Please do not include examples of behaviours you may have heard about from co-workers or patients and therefore did not directly observe yourself. This is a 360-degree feedback tool and these behaviours will be captured in the co-worker and patient surveys.*
2. Please use the space below to provide the resident with strategies for improvement in this competency domain

Section C: Rating of competency statements for importance and clarity

For each of the items below, indicate the level of importance for including that item in a patient safety assessment tool for residents. Also indicate your agreement with the clarity of the wording of each item.
Adjacent to each item in the Delphi survey: If this item is unclear in terminology, interpretation or meaning, please describe how so or provide recommendations on how best to increase the clarity of the wording.

Medical Expert Patient Safety Skills

1. Utilizes the domains of health care quality (Safe, Timely, Effective, Patient-centred, Efficient, Equitable) to identify gaps in care delivery that might pose a risk to providing safe patient care
2. Demonstrate a commitment to high-quality care of patients
3. Integrates safety activities into routine daily practice is (e.g., hand hygiene)
4. Manages adverse events, at the patient level, by mitigating harm and responding to the emotional needs of the patient and family
5. Differentiates between natural progression of disease outcomes and treatment risks from harm or complications arising from health care delivery
6. Mitigates further injury by prioritizing initial medical response to harmful incident
7. Incorporates, where appropriate, harm from health care delivery into the differential diagnosis
8. Recognizes near-misses in real time and respond to correct them, preventing them from reaching the patient
9. Take appropriate steps to help patients, families and other health professionals manage the emotional impact following an adverse event
10. Seeks personal support and employs strategies to manage the emotional impact of their involvement in an adverse event
11. Applies lessons learned from the event analysis in future practice
12. Demonstrates knowledge of clinical care policies and procedures as they relate to patient and provider safety
13. Recognizes and manages patient safety hazards and threats to patient safety (e.g., involving clinical processes, equipment, technology, work interruptions, physical workplace set-up, etc.) and takes appropriate action to correct them
14. Demonstrates situational awareness by assessing the Patient, Environment, Task and Time (PETT) to (i) gather information; (ii) making meaning/sense of the information; and (iii) extrapolate the status of the situation in the near and extended future, for the purpose of safe clinical decision-making
15. Integrates quality improvement principles into daily clinical practice
16. Seeks opportunities to improve quality (care of patients, teamwork, physical environment, etc.) through self-reflection and performance assessment
17. Contributes to a patient safety and quality improvement culture by, encouraging and enabling others to contribute to the improvement in healthcare quality and patient safety
18. Identifies patient safety and quality improvement as essential values and components of daily practice
19. Values the 'patient voice' by including patients and families in the continuous quality improvement of health care quality and patient safety
20. Acts as a change agent by supporting and encouraging others to abandon unsafe or inefficient practices, in order to adopt quality improvements

21. Identifies existing procedures or policies that may be unsafe or inconsistent with best practices and takes action to address such concerns
22. Demonstrates a fair and non-punitive attitude and approach to addressing safety issues and adverse events
23. Models a blame free culture by promoting openness and transparency and supporting those involved in an adverse event, near miss or close call
24. Uses cognitive aids, such as procedural checklists, structured communication tools, or care paths, to enhance patient safety
25. Adopts strategies to mitigate the negative effects of human factors (fatigue, stress, cognitive and affective biases) on clinical decision-making, particularly diagnostic reasoning
26. Utilizes cognitive and affective debiasing strategies and aids (mnemonics, reflection, algorithms, etc.) to improve accuracy of judgement and diagnosis
27. Completes a timely follow-up on patients and investigations
28. Selects appropriate diagnostic investigations and therapeutic procedures
29. Consults with other team members to determine current patient status and reviews patient's health record to review recent investigations and results before making further clinical decisions, including further investigations
30. Acts to reduce surgical risks by demonstrating the appropriate indications for surgery
31. Obtains and documents informed consent (through shared decision-making with the patient), explaining the risks and benefits of, and the rationale for, the proposed procedure or therapy
32. Integrates all sources of information to develop a procedural or therapeutic plan that is safe, patient-centred and considers the risks and benefits of all approaches
33. Performs discipline specific procedures in a skillful and safe manner, adapting to unanticipated findings or changing clinical circumstances
34. Establishes and implements a plan for post-procedural care
35. Gives special consideration when disclosing to certain populations/individuals, including vulnerable populations, substitute decision-makers, and patients with special needs (e.g., hearing impaired).
36. Demonstrates awareness of stages of disclosure (initial disclosure and post-analysis disclosure), person responsible for disclosure, information to be disclosed, and the disclosure timeframe
37. Provides ongoing follow-up to patients, families, team members and other health professionals involved in an adverse event
38. Demonstrates concern for patient well-being during day to day practice and following a patient safety incident
39. Develops and implements management plans that considers all of the patient's health problems, the context, and clinical uncertainties in collaboration with the patient and the team (when appropriate)
40. Adopts a comprehensive or 'whole' patient approach by integrating information from the patient's physical, emotional and psychosocial history (including family

support, work, mental health, financial impact, etc.) into diagnostic reasoning, decision-making and the patient centred care plan

41. Follows proper prescribing practices to help decrease the possibility of medication adverse events
42. Pays particular attention when prescribing for pediatric patients, vulnerable populations, including elderly, immunocompromised patients, low income/uninsured patients, ethnic minorities, etc.
43. Performs appropriately timed clinical assessments and provides recommendation that are presented in an organized manner
44. Maintains professional duties and patient safety while balancing multiple responsibilities
45. Adapts care as the complexity, uncertainty and ambiguity of the patient's clinical situation evolves
46. Identifies and prioritizes issues to be addressed in a patient encounter and future visits by considering urgency, feasibility, availability of resources, and comorbidities
47. Selects and interprets investigations based on a differential diagnosis
48. Synthesis patient information to determine a diagnosis
49. Focuses the patient encounter and performs it in a time effective manner, without excluding key elements
50. Addresses the impact of a medical condition on the patient's ability to pursue life goals and purposes
51. Share concerns, in a constructive and respectful manner, with the patient and family about goals of care that are not felt to be achievable
52. Triage a procedure or therapy, taking into account clinical urgency, potential deterioration, and available resources
53. recognizes urgent problems that may require the involvement of specialists or other health professionals and seek their immediate assistance
54. recognizes their limitations and seeks assistance in situations that are complex and new

Are there any competencies missing from this the MEDICAL EXPERT ROLE above? If so, please include competencies below you feel are critical to include.

Communicator Skills

1. Uses a structured communication tool to facilitate patient handover
2. Seeks clarification on patient care and needs during a patient handover
3. Use appropriate communication approaches to provide safe transfers and during a patient transition to a different health care professional, stage of care, or settings (institutions or discharge to community care)

4. Demonstrates cultural sensitivity/safety by recognizing and respecting that patients/families may feel and respond differently to their health care needs and treatment options.
5. Takes time to learn about patients (values, spiritual/religious beliefs, language barriers, etc.) from cultures other than their own, thus allowing them to safely and appropriately treat their patients.
6. Demonstrates skill in obtaining informed consent by discussing the proposed investigation or treatment with the mentally capable patient, including the chances of success, risks and assesses the patient's understanding of the information.
7. Listens and addresses the patient's concerns and respect their decision during the informed consent process
8. Educates patient/family/care givers to recognize the symptoms and signs that should alert them to seek further medical care.
9. Provides the patient with supplementary materials with information about their condition, what to expect after discharge (what is normal), and when to seek medical attention
10. Communicates with the responsible community health professionals regarding the patient's discharge and follow-up care
11. Prepares comprehensive and timely discharge summaries
12. Applies professional and legal policies when disclosing a patient safety incident
13. Upholds their ethical obligation to disclose and report harmful patient safety incidents
14. Appropriately performs disclosure of safety incidents to patients in a sincere and caring manner
15. Provides clear and transparent account of patient safety incidents to supervisors and patients by communicating all related information of what happened to the patient, reasons for the unanticipated outcomes, and apologizes
16. Plans, conducts and documents follow-up with the patient, family, team members and other health professionals involved in an adverse event, near miss or close call
17. Utilizes a systems-thinking approach and just culture lens to view and analyze patient safety incidents
18. Reviews information provided by other health professionals before proceeding with further decisions or diagnosis
19. Provides appropriate and clear information to patients about their condition and investigations (rationale and what to expect) to enable patients to make informed decisions
20. Communicates using a patient-centred approach to facilitate patient trust and autonomy and is characterized by empathy, respect, and compassion
21. Optimizes the physical environment for patient comfort, dignity, privacy, engagement, and safety
22. Tailors their approach to decision-making based on the patient's capacity, values and preferences.
23. Summarizes, presents and integrates the biopsychosocial information obtained from a patient-centred interview

24. Actively listens to their patients and responds to patient's non-verbal cues
25. Seeks and synthesizes information from all sources before making decisions, including information from other health professionals, the patient's family, as well as information gathered through clinical investigations
26. Confirms patient and family understanding when sharing information and explanations
27. Explores the patient perspective when developing a care plan
28. Communicates with cultural awareness and sensitivity
29. Identifies difficulties and errors in medical record keeping that can have a negative impact patient care
30. Document clinical encounters in an accurate, legible, timely, and accessible manner, in compliance with legal and privacy requirements
31. Documents patient information in a manner that enhances intra – and interprofessional care by i) conveying clinical reasoning and the rationale for decisions ii) coveys all patient information that might impact care or decisions made by another health professionals; iii) clarifies responsibilities for ongoing care; iv) maintains up to date lists of patient problems and medications; v) identifies and corrects ambiguous documentation
32. Communicates effectively with the patient and other health professionals using a written health record, electronic medical record, or other digital technology by: 1- adapts the use of the health record based on the patient's health literacy 2- demonstrating actively listening, open-ended inquiry, empathy, and making eye contact
33. Shares information with patients and others in a manner that respects patient privacy and confidentiality (e.g., electronic sharing of information via EMR or fax) and avoid the use of non-secure means of communicating patient information that would otherwise jeopardize confidentially and safety
34. Communicates patient's concerns with other team members or providers (e.g., family physician upon discharge) and family members, with permission.
35. Uses abbreviations known to all team members and keeps writing legible in all written forms of communication
36. Utilizes communication strategies, such as call-outs, check-backs, SBARs to ensure that critical information is conveyed to the appropriate person and that the information is understood
37. Communicates respectfully with others, including other health professionals, team members and the patient and the family
38. Provides information to other providers (verbal or written) in a timely fashion to allow for safe, high-quality patient care
39. Speaks up when there are patient safety concerns using respectful communication
40. Accesses only medical record for patients they are treating and only when necessary to provide their care and gather or share patient's clinical information
41. Considers any possible conflicts of interests between the patient and other providers in the circle of care and considers this before releasing information to others
42. Obtains consent before divulging patient information outside the circle of care

43. Documents requests for consultation, including the reason(s) for the consult and the outcome
44. Employs appropriate communication in high-risk situations, such as in clinical crises, emotional or distressing situations, and conflict
45. Responds to team members requests/consultations regarding patient care in a timely and respectful manner (e.g., responding to nurses page call regarding a change in patient medication)
46. Provides sufficient documentation to facilitate team members' comprehension of the patient's history, investigations, and their perspective on the diagnosis and rationale for the diagnosis, treatment and care plan
47. Provides patient care orders and prescriptions using safe practices (e.g., legibility, dosing) to avoid misinterpretation
48. Identifies and promotes patient education material
49. Utilizes abbreviations appropriately in all forms of written communication
50. Communicates to the team and patient the rationale for deviations from established processes or guidelines
51. Respects the limitations of technology for communicating patient information (e.g., fax, Electronic medical records, email, telephone) and follows up in a timely manner to ensure the information was received and understood
52. Negotiates with patients and families when making clinical decisions regarding their treatment/care.

Below each CanMEDS role: Are there any competencies missing from this the COMMUNICATOR ROLE above? If so, please include competencies below you feel are critical to include.

Collaborator Skills

1. Reduces fragmented care by working collaboratively during high risk transition points.
2. Shows respect, actively listens and engages with other health care providers, the patient and the family
3. Accepts and delegates tasks and responsibilities in an appropriate and respectful manner
4. Identifies a shared set of values, goals and beliefs about the patient's care with others on a team
5. Establishes and maintains healthy relationships with other health professions to support relationship-centred collaborative care
6. Works with other health care professionals to continuously improve health care quality and address any patient, environmental/workplace, human factor related safety issues
7. Motivates and engages others to contribute to health care system improvement at the level of both the larger system and of local practice

8. Utilizes structured written and verbal communication skills and to reliably hand over patient care to colleagues, including clinical information and responsibility of care (e.g., clarifies roles and responsibilities, describes the patient's condition and care plan, and any anticipated problems and solutions).
9. Analyzes gaps in communication between health care professionals during transitions in care
10. Recognizes and acts on patient safety issues that arise during the transfer of care
11. Integrates situational awareness by scanning and accessing situations to maintain an understanding of what's going on around them and anticipate next steps
12. Integrates cross-checking strategies by monitoring the actions of other team members and providing feedback for the purpose of avoiding errors and harm to a patient and acting as a safety net/protection for other team members
13. Expresses concern to superiors in a series of steps which have increasing degrees of assertion, ranging from low to high (graded assertiveness technique)
14. Utilizes safe, effective strategies when referring and consulting with other health professionals, such as completing them in a timely fashion, follows-up when necessary, seeks clarification, and provides all related information.
15. Identifies gaps in patient care and acts to integrate health professionals effectively through awareness of others roles, expertise and overlapping scopes of practice of other health professionals
16. Explains their role in patient care to team members and patients
17. Engages in respectful shared decision-making with physicians and other colleagues in the health care profession
18. Uses referral and consultations as opportunities to improve quality of care and patient safety by sharing expertise
19. Gathers information and resources needed to gain an understanding, manage differences and resolve conflicts
20. Employs collaborative negotiation techniques to prevent and manage destructive conflicts
21. Addresses practice variations that might otherwise impede reliable, safe delivery of patient care
22. Provides and accepts feedback to improve the performance of the team
23. Appropriately integrates evidence-based information provided by team members into the patient care plan
24. Engages patients to participate in the decision-making process and management of their own health

Below each CanMEDS role: Are there any competencies missing from this the COLLABORATOR ROLE above? If so, please include competencies below you feel are critical to include.

Leader Skills

1. Demonstrates proficiency in foundational methodologies for continuous QI, such as PSDA cycles or LEAN.
2. Applies the science of quality improvement to conduct patient safety and/or quality improvement investigations
3. Provide feedback on processes seen in one's own practice, team, organization, and system
4. Works with patients and other health professionals to develop a strategy for implementing change in health care
5. Continuously analyzing ongoing changes in health care delivery and presents evidence-based recommendations for change
6. Creates a personal organized approach for practice management to improve patient care
7. Creates a personal practice improvement plan, including evaluating a problem, setting priorities, executing the plan, and analyzing the results
8. Identifies policies and processes that may be unsafe or inconsistent with best practices/guidelines and take action to address them through context specific solutions
9. Demonstrates proficiency in the processes and policies related to adverse event reporting
10. Participates in the analysis of systems (retrospectively – root cause analysis or prospectively - failure modes effect analysis) to understand and change underlying processes that can potentially lead to adverse events and near misses
11. Participates in event and close call reporting
12. Analyzes harmful patient safety incidents (adverse events) or near miss to generate recommendations for safer care and potential improvement opportunities
13. Recognizes and reports patient safety problems or hazards in real-time and acts to correct and prevent them from reaching the patient
14. Recognizes and reports the occurrence of a patient safety incident to the appropriate personnel and follows established processes and guidelines
15. Use health informatics to improve the quality of patient care and optimize patient safety by: Mapping the flow of patient care information
16. Integrates clinical performance data into team discussions and team decision making
17. Demonstrates the value in health care in terms of outcomes achieved, costs, efficiency, appropriate use of services and resources without focus on the volume of services delivered
18. Employs evidence-based strategies to resource allocation to avoid overuse of finite health care resources and minimalize wasteful practices
19. Champions patient safety by engaging others to participate in continuous quality improvement and patient safety activities
20. Recognizes high-risk situations in the workplace and acts to structure the workplace to maximize safety

21. Balances personal life with responsibilities in education, research, administration, and patient care
22. Demonstrates leaderships such self-awareness, self-reflection and self-management
23. Demonstrates task management, crisis team functioning and decision-making skills when managing high risk situations
24. Employs techniques such as diligent information-gathering, cross-checking of information using checklists, and investigating mismatches between the current situation and the expected state when managing high risk situations

Below each CanMEDS role: Are there any competencies missing from this the LEADER ROLE above? If so, please include competencies below you feel are critical to include.

Professional Skills

1. Demonstrates a commitment to patient safety and quality improvement by adhering to institutional and regulatory policies and practices
2. Participates in the review of practice, standard setting and quality improvement activities
3. Participates in the assessment of junior leaners patient safety and quality improvement skills
4. Prepares morbidity and mortality report or chart review
5. Recognize conflicts of interest that could potentially result in harm to a patient and act to resolve them transparently
6. Recognizes and responds to ethical issues encountered in the clinical or academic setting
7. Exhibits positive behavioral adaptation (resilience) and applies constructive coping strategies to combat potentially long-standing negative effects following their involvement in an adverse event
8. Employs strategies to mitigate the negative effects (e.g., medication or diagnostic error) of human factors (including fatigue, stress, and cognitive biases) on their performance and workplace environment
9. Adapts and recovers in challenging situations by regulating their attention, emotions, and behaviours to performs their professional tasks
10. Manage competing personal and professional priorities
11. role-models positive behaviours to address the hidden curriculum related to patient safety and quality improvement
12. Respectful and honest with patients, peers, supervisors and members of the healthcare team.
13. Advocates in a professional manner for improvements in patient care in a professional manner
14. Exhibits professional behaviours in the use of technology- enabled communication
15. Recognizes and responds to unprofessional and unethical behaviours in physicians and other colleagues in the health care professions

16. Promotes a 'just or no blame culture' that supports and responds to colleagues involved in a patient safety incident or crisis (the 'second victim')
17. Ask patients to explain how their values, beliefs or religious or spiritual practices influence their preferences for the proposed medical treatment.
18. Cares and treats all patients related to their clinical competence and expertise, without influence of their own personal beliefs and values
19. Takes action when there are potential risks posed by their personal and professional limitations
20. Demonstrates accountability to society through maintenance and enhancement of competence

Below each CanMEDS role: Are there any competencies missing from this the PROFESSIONAL ROLE above? If so, please include competencies below you feel are critical to include.

Scholar Skills

1. Contributes to the creation, dissemination, and application of new QI and patient safety knowledge and innovative approaches practice
2. Use quality outcomes (safety, timeliness, effectiveness, efficient, equity, and patient-centeredness) when performing individual gap analysis, self needs assessments and development of personal learning plans
3. Utilizes multiple QI and patient safety performance data and feedback to continuously improve performance
4. works with a team or a community of practice environment to continuously improve personal practice and contribute to collective improvements in practice
5. Acts to make performance improvements based on previous mistakes and adverse events
6. Participate in self- and peer assessments that focus on practice and patient outcomes
7. Works with others to create an environment where continuous learning is the norm
8. Identifies potentially harmful or unintended consequences of safety interventions
9. Presents and integrates safety solutions based on lessons learned and the successes and experiences of others
10. Uses knowledge translation frameworks, such as knowledge-to-action cycle to integrate clinical evidence into practice
11. Generates questions focused on quality improvement and patient safety knowledge gaps within the practice and other professional encounters
12. Contributes to the enhancement of their practice by critically appraising quality improvement and patient safety literature and evaluating its applicability to their practice
13. role models safe and respectful practices
14. Questions contradictions between the unspoken or implicit academic, social, and cultural messages (hidden curriculum) and the formal or intended curriculum that might compromise patient safety and quality care

15. Promotes a safe learning environment by recognizing power differentials between learners and teachers
16. Promotes a safe learning environment appropriately delegating tasks to learners
17. Instructs learners to both recognize their limits and to seek greater supervision when needed
18. Appropriately provides learners with progressive independence when matched by learner competence and without compromising patient safety or quality of care
19. Provide feedback to leaners, faculty and team members to enhance learning and performance on patient safety and quality improvement
20. Observe and assess learners' patient safety and quality improvement skills

Below each CanMEDS role: Are there any competencies missing from this the SCHOLAR ROLE above? If so, please include competencies below you feel are critical to include.

Health Advocate Skills

1. Advocates for equitable access to health care resources to serve all populations
2. Identifies barriers to access (care and resources) for all patients
3. Advocate for a patient's procedure or therapy on the basis of urgency and available resources
4. Advocates for system-level changes and/or continuous improvement in the system and processes of care
5. Recognizes the importance of physician advocacy for patient safety and QI
6. Demonstrates an awareness of the methods that health care professionals can use to advocate for patient and health care system safety
7. Participates in a process to improve health in the community or population they serve

Below each CanMEDS role: Are there any competencies missing from this the HEALTH ADVOCATE ROLE above? If so, please include competencies below you feel are critical to include.

Section D : Comments

Please use the space below to provide additional comments or suggestions regarding the content or design of the survey.

Appendix D

Delphi Survey Round I Results

Importance and Clarity of CanMEDS Medical Expert Role items

Statement	Importance		Clarity		Comment(s):
Utilizes the domains of health care quality (Safe, Timely, Effective, Patient-centred, Efficient, Equitable) to identify gaps in care delivery that might pose a risk to providing safe patient care	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	8 (50.0) 5 (31.3) 2 (12.5) 1 (6.3) 0 (0.0)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	4 (25.0) 8 (50.0) 2 (12.5) 1 (6.3) 1 (6.3)	
Demonstrate a commitment to high-quality care of patients	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	13 (72.2) 2 (11.1) 2 (11.1) 1 (5.6) 0 (0.0)	Strongly Agree Agree Neutral Disagree Strongly Disagree	8 (44.4) 3 (16.7) 1 (5.6) 6 (33.3) 0 (0.0)	
Integrates safety activities into routine daily practice is (e.g., hand hygiene)	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	13 (72.2) 4 (22.2) 1 (5.6) 0 (0.0) 0 (0.0)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	8 (44.4) 8 (44.4) 2 (11.1) 0 (0.0) 0 (0.0)	
Manages adverse events, at the patient level, by mitigating harm and responding to the emotional needs of the patient and family	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	12 (66.7) 4 (22.2) 1 (5.6) 0 (0.0) 1 (5.6)	Strongly Agree Agree Neutral Disagree Strongly Disagree	4 (22.2) 8 (44.4) 4 (22.2) 0 (0.0) 2 (11.1)	"Manages preventable adverse events and near miss at the patient level...responding to the information and emotional needs of the..."
Differentiates between natural progression of disease outcomes and treatment risks from harm or	Very Important Important Neutral Somewhat Important	7 (38.9) 8 (44.4) 2 (11.1) 1 (5.6)	Strongly Agree Agree Neutral Disagree	5 (27.8) 5 (27.8) 3 (16.7) 5 (27.8)	"Very nice competency here. This is where many clinicians get hung up; its just part of

Statement	Importance		Clarity		Comment(s):
complications arising from health care delivery	Not Important **75% Consensus**	0 (0.0)	Strongly Disagree	0 (0.0)	the progression - thanks for this one!"
Mitigates further injury by prioritizing initial medical response to harmful incident	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	11 (61.1) 4 (22.2) 1 (5.6) 1 (5.6) 1 (5.6)	Strongly Agree Agree Neutral Disagree Strongly Disagree	6 (33.3) 4 (22.2) 4 (22.2) 1 (5.6) 3 (16.7)	
Incorporates, where appropriate, harm from health care delivery into the differential diagnosis	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	7 (41.2) 6 (35.3) 1 (5.9) 1 (5.9) 2 (11.1)	Strongly Agree Agree Neutral Disagree Strongly Disagree	4 (22.2) 9 (50.0) 2 (5.6) 0 (0.0) 3 (16.7)	"I think you should be more clear just to say 'medical error' or 'patient safety incident' rather than harm from health care delivery."
Recognizes near-misses in real time and respond to correct them, preventing them from reaching the patient	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	9 (50.0) 5 (27.8) 3 (16.7) 1 (5.6) 0 (0.0)	Strongly Agree Agree Neutral Disagree Strongly Disagree	4 (22.2) 7 (38.9) 3 (16.7) 4 (22.2) 0 (0.0)	
Take appropriate steps to help patients, families and other health professionals manage the emotional impact following an adverse event	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	10 (55.6) 5 (27.8) 1 (5.6) 2 (11.1) 0 (0.0)	Strongly Agree Agree Neutral Disagree Strongly Disagree	7 (38.9) 9 (50.0) 1 (5.6) 1 (5.6) 0 (0.0)	
Seeks personal support and employs strategies to manage the emotional impact of their involvement in an adverse event	Very Important Important Neutral Somewhat Important Not Important	2 (11.1) 5 (27.8) 0 (0.0) 1 (5.6) 10 (55.6)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	6 (33.3) 10 (55.6) 1 (5.6) 0 (0.0) 1 (5.6)	"Redundant- other options have captures this and in a more clear manner"

Statement	Importance		Clarity		Comment(s):
Applies lessons learned from the event analysis in future practice	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	6 (33.3) 10 (55.6) 0 (0.0) 0 (0.0) 2 (11.1)	Strongly Agree Agree Neutral Disagree Strongly Disagree	5 (27.8) 7 (38.9) 3 (16.7) 2 (11.1) 1 (5.6)	"As appropriate, applies lessons learned from the event analysis in future practice. (system changes may well be beyond the residents ability to change)"
Recognizes and manages patient safety hazards and threats to patient safety (involving clinical processes, equipment, technology, work interruptions, physical workplace set-up, etc.) and takes appropriate action to correct them	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	7 (41.2) 8 (47.1) 1 (5.9) 0 (0.0) 1 (5.9)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	7 (43.8) 6 (37.5) 2 (12.5) 0 (0.0) 1 (6.3)	"Recognize and respond"
Demonstrates knowledge of clinical care policies and procedures as they relate to patient and provider safety	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	8 (47.1) 7 (41.2) 1 (5.9) 0 (0.0) 1 (5.9)	Strongly Agree Agree Neutral Disagree Strongly Disagree	7 (38.9) 6 (33.3) 3 (16.7) 2 (11.1) 0 (0.0)	"use elements here"
Demonstrates situational awareness by assessing the Patient, Environment, Task and Time (PETT) to (i) gather information; (ii) making meaning/sense of the information; and (iii) extrapolate the status of the situation in the near and extended future, for the purpose of safe clinical decision-making	Very Important Important Neutral Somewhat Important Not Important	8 (47.1) 3 (17.6) 3 (17.6) 3 (17.6) 0 (0.0)	Strongly Agree Agree Neutral Disagree Strongly Disagree	6 (35.3) 6 (35.3) 4 (23.5) 1 (5.9) 0 (0.0)	
Integrates quality improvement principles into daily clinical practice	Very Important Important Neutral	5 (29.4) 7 (41.2) 0 (0.0)	Strongly Agree Agree Neutral	8 (44.4) 4 (22.2) 2 (11.1)	

Statement	Importance		Clarity		Comment(s):
	Somewhat Important	5 (29.4)	Disagree	3 (16.7)	
	Not Important	0 (0.0)	Strongly Disagree	1 (5.6)	
Seeks opportunities to improve quality (e.g., care of patients, teamwork, physical environment, through self-reflection and performance assessment)	Very Important	7 (41.2)	Strongly Agree	7 (41.2)	
	Important	2 (11.8)	Agree	5 (29.4)	
	Neutral	5 (29.4)	Neutral	2 (11.8)	
	Somewhat Important	1 (5.9)	Disagree	1 (5.9)	
	Not Important	2 (11.8)	Strongly Disagree	2 (11.8)	
Contributes to a patient safety and quality improvement culture by, encouraging and enabling others to contribute to the improvement in health care quality and patient safety	Very Important	5 (29.4)	Strongly Agree	4 (23.5)	
	Important	2 (11.8)	Agree	6 (35.3)	
	Neutral	6 (35.3)	Neutral	4 (23.5)	
	Somewhat Important	3 (17.6)	Disagree	2 (11.8)	
	Not Important	1 (5.9)	Strongly Disagree	1 (5.9)	
Identifies patient safety and quality improvement as essential values and components of daily practice	Very Important	7 (41.2)	Strongly Agree	5 (31.3)	“Hard to observe”
	Important	5 (29.4)	Agree	6 (37.5)	
	Neutral	0 (0.0)	Neutral	2 (12.5)	
	Somewhat Important	3 (17.6)	Disagree	2 (12.5)	
	Not Important	2 (11.8)	Strongly Disagree	1 (6.3)	
Values the 'patient voice' by including patients and families in the continuous quality improvement of health care quality and patient safety	Very Important	8 (44.4)	Strongly Agree	5 (31.3)	
	Important	4 (22.2)	Agree	7 (43.8)	
	Neutral	2 (11.1)	Neutral	2 (12.5)	
	Somewhat Important	3 (16.7)	Disagree	2 (12.5)	
	Not Important	1 (5.6)	Strongly Disagree	1 (6.3)	
			75% Consensus		
Acts as a change agent by supporting and encouraging others to abandon unsafe or inefficient practices, in order to adopt quality improvements	Very Important	6 (35.3)	Strongly Agree	5 (29.4)	
	Important	1 (5.9)	Agree	7 (41.2)	
	Neutral	8 (47.1)	Neutral	0 (0.0)	
	Somewhat Important	2 (11.8)	Disagree	5 (29.4)	
	Not Important	0 (0.0)	Strongly Disagree	0 (0.0)	
Identifies existing procedures or policies that may be unsafe or inconsistent with best practices and takes action to address such concerns	Very Important	8 (47.1)	Strongly Agree	6 (35.3)	
	Important	5 (5.9)	Agree	6 (35.3)	
	Neutral	2 (11.8)	Neutral	2 (11.8)	
	Somewhat Important	2 (11.8)	Disagree	3 (17.6)	

Statement	Importance		Clarity		Comment(s):
	Not Important	0 (0.0)	Strongly Disagree	0 (0.0)	
Demonstrates a fair and non-punitive attitude and approach to addressing safety issues and adverse events	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	8 (50.0) 5 (31.3) 2 (12.5) 0 (0.0) 1 (6.3)	Strongly Agree Agree Neutral Disagree Strongly Disagree	8 (47.1) 3 (17.6) 4 (23.5) 2 (11.8) 0 (0.0)	"Non-punitive attitude and approach" to whom??”
Models a blame free culture by promoting openness and transparency and supporting those involved in an adverse event, near miss or close call	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	10 (62.5) 4 (25.0) 0 (0.0) 2 (12.5) 0 (0.0)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	6 (35.3) 8 (47.1) 2 (11.8) 1 (5.9) 0 (0.0)	
Uses cognitive aids, such as procedural checklists, structured communication tools, or care paths, to enhance patient safety	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	9 (52.9) 6 (35.3) 1 (5.9) 0 (0.0) 1 (5.9)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	9 (56.3) 5 (31.2) 2 (12.5) 0 (0.0) 0 (0.0)	
Adopts strategies to mitigate the negative effects of human factors (fatigue, stress, cognitive and affective biases) on clinical decision-making, particularly diagnostic reasoning	Very Important Important Neutral Somewhat Important Not Important	6 (35.3) 6 (35.3) 2 (11.8) 1 (5.9) 2 (11.8)	Strongly Agree Agree Neutral Disagree Strongly Disagree	6 (35.3) 5 (29.4) 2 (11.8) 1 (5.9) 3 (17.6)	“Very nice--specific, time-bounded and appropriate to level of learner.”
Utilizes cognitive and affective debiasing strategies and aids (mnemonics, reflection, algorithms, etc.) to improve accuracy of judgement and diagnosis	Very Important Important Neutral Somewhat Important Not Important	3 (17.6) 7 (41.2) 5 (29.4) 0 (0.0) 2 (11.8)	Strongly Agree Agree Neutral Disagree Strongly Disagree	6 (33.3) 4 (22.2) 4 (22.2) 1 (5.6) 3 (16.7)	

Statement	Importance		Clarity		Comment(s):
Completes a timely follow-up on patients and investigations	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	11 (64.7) 2 (11.8) 2 (11.8) 2 (11.8) 0 (0.0)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	10 (58.8) 3 (17.6) 2 (11.8) 2 (11.8) 0 (0.0)	“Sorry but I'm not sure after reading all these questions if investigations means investigative tests on a patient or investigation of an adverse event. If it means diagnostic tests, it could be worded "Completes timely follow-up on patient's investigative tests"
Selects appropriate diagnostic investigations and therapeutic procedures	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	7 (43.8) 5 (31.3) 2 (12.5) 1 (6.3) 1 (6.3)	Strongly Agree Agree Neutral Disagree Strongly Disagree	6 (35.3) 4 (23.5) 5 (29.4) 1 (5.9) 1 (5.9)	
Consults with other team members to determine current patient status and reviews patient's health record to review recent investigations and results before making further clinical decisions, including further investigations	Very Important Important Neutral Somewhat Important Not Important	10 (58.8) 5 (29.4) 2 (11.8) 2 (11.8) 1 (5.9)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	8 (47.1) 5 (29.4) 2 (11.8) 1 (5.9) 1 (5.9)	
Acts to reduce surgical risks by demonstrating the appropriate indications for surgery	Very Important Important Neutral Somewhat Important Not Important	4 (25.0) 3 (18.8) 3 (18.8) 4 (25.0) 2 (12.5)	Strongly Agree Agree Neutral Disagree Strongly Disagree	4 (25.0) 3 (18.8) 3 (18.8) 4 (25.0) 2 (12.5)	
Obtains and documents informed consent (through shared decision-	Very Important Important	9 (50.0) 6 (33.3)	Strongly Agree Agree	8 (50.0) 6 (37.5)	

Statement	Importance		Clarity		Comment(s):
making with the patient), explaining the risks and benefits of, and the rationale for, the proposed procedure or therapy	Neutral Somewhat Important Not Important **75% Consensus**	0 (0.0) 2 (11.1) 1 (5.6)	Neutral Disagree Strongly Disagree **75% Consensus**	1 (6.3) 0 (0.0) 3 (16.7)	
Integrates all sources of information to develop a procedural or therapeutic plan that is safe, patient-centred and considers the risks and benefits of all approaches	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	8 (47.1) 5 (29.4) 2 (11.8) 1 (5.9) 2 (11.1)	Strongly Agree Agree Neutral Disagree Strongly Disagree	7 (41.2) 1 (5.9) 2 (11.8) 0 (0.0) 7 (41.2)	
Performs discipline specific procedures in a skillful and safe manner, adapting to unanticipated findings or changing clinical circumstances	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	7 (43.8) 6 (37.5) 1 (6.3) 1 (6.3) 1 (6.3)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	7 (43.8) 6 (37.5) 1 (6.3) 1 (6.3) 1 (6.3)	
Establishes and implements a plan for post-procedural care	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	8 (50.0) 4 (25.0) 2 (12.5) 1 (6.3) 1 (6.3)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	7 (43.8) 7 (43.8) 0 (0.0) 1 (6.3) 1 (6.3)	
Gives special consideration when disclosing to certain populations/individuals, including vulnerable populations, substitute decision-makers, and patients with special needs (e.g., hearing impaired).	Very Important Important Neutral Somewhat Important Not Important	5 (31.3) 4 (25.0) 2 (12.5) 3 (18.8) 2 (12.5)	Strongly Agree Agree Neutral Disagree Strongly Disagree	4 (25.0) 5 (31.3) 3 (18.8) 3 (18.8) 1 (6.3)	
Demonstrates awareness of stages of disclosure (initial disclosure and post-analysis disclosure), person	Very Important Important Neutral	10 (58.8) 2 (11.8) 3 (17.6)	Strongly Agree Agree Neutral	10 (55.6) 2 (11.1) 3 (16.7)	

Statement	Importance		Clarity		Comment(s):
responsible for disclosure, information to be disclosed, and the disclosure timeframe	Somewhat Important Not Important	1 (5.9) 1 (5.9)	Disagree Strongly Disagree	1 (5.6) 2 (11.1)	
Provides ongoing follow-up to patients, families, team members and other health professionals involved in an adverse event	Very Important Important Neutral Somewhat Important Not Important	6 (35.3) 5 (29.4) 3 (17.6) 2 (11.8) 1 (5.9)	Strongly Agree Agree Neutral Disagree Strongly Disagree	5 (29.4) 6 (35.3) 3 (17.6) 2 (11.8) 1 (5.9)	
Demonstrates concern for patient well-being during day to day practice and following a patient safety incident	Very Important Important Neutral Somewhat Important Not Important	7 (41.2) 6 (35.3) 1 (5.9) 2 (11.8) 1 (5.9)	Strongly Agree Agree Neutral Disagree Strongly Disagree	7 (41.2) 5 (29.4) 2 (11.8) 2 (11.8) 1 (5.9)	
Develops and implements management plans that considers all of the patient's health problems, the context, and clinical uncertainties in collaboration with the patient and the team (when appropriate).	Very Important Important Neutral Somewhat Important Not Important	7 (46.7) 3 (20.0) 1 (6.7) 3 (20.0) 1 (6.7)	Strongly Agree Agree Neutral Disagree Strongly Disagree	5 (31.3) 6 (37.5) 2 (12.5) 2 (12.5) 1 (6.3)	
Adopts a comprehensive or 'whole' patient approach by integrating information from the patient's physical, emotional and psychosocial history (including family support, work, mental health, financial impact, etc.) into diagnostic reasoning, decision-making and the patient centred care plan	Very Important Important Neutral Somewhat Important Not Important	6 (37.5) 5 (31.3) 1 (6.3) 3 (18.8) 1 (6.3)	Strongly Agree Agree Neutral Disagree Strongly Disagree	6 (35.3) 5 (29.4) 2 (11.8) 2 (11.8) 2 (11.8)	
Follows proper prescribing practices to help decrease the possibility of medication adverse events	Very Important Important Neutral Somewhat Important	11 (64.7) 5 (29.4) 0 (0.0) 0 (0.0)	Strongly Agree Agree Neutral Disagree	8 (47.1) 4 (23.5) 1 (5.9) 3 (17.6)	"...proper prescribing practices, avoiding dangerous abbreviations, to help

Statement	Importance		Clarity		Comment(s):
	Not Important **75% Consensus**	1 (5.9)	Strongly Disagree	1 (5.9)	decrease ... (see ISMP website on this), seeks assistance from clinical pharmacist when unsure of prescribing recommendations ... pay attention to high risk medications such as insulin, opioids and anticoagulants."
Pays particular attention when prescribing for pediatric patients, vulnerable populations, including elderly, immunocompromised patients, low income/uninsured patients, ethnic minorities, etc.	Very Important Important Neutral Somewhat Important Not Important	7 (41.2) 4 (23.5) 2 (11.8) 3 (17.6) 1 (5.9)	Strongly Agree Agree Neutral Disagree Strongly Disagree	6 (37.5) 4 (25.0) 1 (6.3) 4 (25.0) 1 (6.3)	
Performs appropriately timed clinical assessments and provides recommendation that are presented in an organized manner	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	7 (43.8) 5 (31.3) 0 (0.0) 3 (18.8) 1 (6.3)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	7 (41.2) 7 (41.2) 2 (11.8) 0 (0.0) 1 (5.9)	
Maintains professional duties and patient safety while balancing multiple responsibilities	Very Important Important Neutral Somewhat Important Not Important	4 (26.7) 5 (33.3) 0 (0.0) 4 (26.7) 2 (13.3)	Strongly Agree Agree Neutral Disagree Strongly Disagree	4 (25.0) 4 (25.0) 4 (25.0) 1 (6.3) 3 (18.8)	
Adapts care as the complexity, uncertainty and ambiguity of the patient's clinical situation evolves	Very Important Important Neutral Somewhat Important Not Important	6 (37.5) 5 (31.2) 1 (6.3) 2 (12.5) 2 (12.5)	Strongly Agree Agree Neutral Disagree Strongly Disagree	5 (29.4) 5 (29.4) 4 (23.5) 1 (5.9) 2 (11.8)	

Statement	Importance		Clarity		Comment(s):
Identifies and prioritizes issues to be addressed in a patient encounter and future visits by considering urgency, feasibility, availability of resources, and comorbidities	Very Important	6 (37.5)	Strongly Agree	6 (35.6)	
	Important	5 (31.3)	Agree	8 (47.1)	
	Neutral	2 (12.5)	Neutral	1 (5.9)	
	Somewhat Important	2 (12.5)	Disagree	1 (5.9)	
	Not Important	1 (6.3)	Strongly Disagree	1 (5.9)	
			75% Consensus		
Selects and interprets investigations based on a differential diagnosis	Very Important	7 (43.8)	Strongly Agree	7 (41.2)	
	Important	4 (25.0)	Agree	7 (41.2)	
	Neutral	0 (0.0)	Neutral	2 (11.8)	
	Somewhat Important	3 (18.8)	Disagree	0 (0.0)	
	Not Important	2 (12.6)	Strongly Disagree	1 (5.9)	
			75% Consensus		
Synthesizes patient information to determine a diagnosis	Very Important	7 (43.8)	Strongly Agree	5 (29.4)	
	Important	3 (18.8)	Agree	6 (35.3)	
	Neutral	2 (12.5)	Neutral	4 (23.5)	
	Somewhat Important	3 (18.8)	Disagree	1 (5.9)	
	Not Important	1 (6.3)	Strongly Disagree	1 (5.9)	
Focuses the patient encounter and performs it in a time effective manner, without excluding key elements	Very Important	5 (31.5)	Strongly Agree	5 (29.4)	
	Important	3 (18.8)	Agree	5 (29.4)	
	Neutral	2 (12.5)	Neutral	3 (17.6)	
	Somewhat Important	5 (31.3)	Disagree	2 (11.8)	
	Not Important	1 (6.3)	Strongly Disagree	2 (11.8)	
Addresses the impact of a medical condition on the patient's ability to pursue life goals and purposes	Very Important	6 (37.5)	Strongly Agree	7 (41.2)	
	Important	1 (6.3)	Agree	2 (11.8)	
	Neutral	5 (31.3)	Neutral	7 (41.2)	
	Somewhat Important	3 (18.8)	Disagree	0 (0.0)	
	Not Important	1 (6.3)	Strongly Disagree	1 (5.9)	
			75% Consensus		
Share concerns, in a constructive and respectful manner, with the patient and family about goals of care that are not felt to be achievable	Very Important	7 (43.8)	Strongly Agree	4 (25.0)	
	Important	3 (18.8)	Agree	8 (50.0)	
	Neutral	3 (18.8)	Neutral	3 (18.8)	
	Somewhat Important	2 (12.5)	Disagree	0 (0.0)	

Statement	Importance		Clarity		Comment(s):
	Not Important	1 (6.3)	Strongly Disagree	1 (6.3)	
			75% Consensus		
Triage a procedure or therapy, taking into account clinical urgency, potential deterioration, and available resources	Very Important	9 (52.9)	Strongly Agree	6 (35.3)	
	Important	4 (23.5)	Agree	8 (47.1)	
	Neutral	2 (11.8)	Neutral	2 (11.8)	
	Somewhat Important	1 (5.9)	Disagree	0 (0.0)	
	Not Important	1 (5.9)	Strongly Disagree	1 (5.9)	
	75% Consensus		**75% Consensus**		
Recognizes urgent problems that may require the involvement of specialists or other health professionals and seek their immediate assistance	Very Important	7 (41.2)	Strongly Agree	6 (35.3)	
	Important	5 (29.4)	Agree	8 (47.1)	
	Neutral	3 (17.6)	Neutral	2 (11.8)	
	Somewhat Important	1 (5.9)	Disagree	0 (0.0)	
	Not Important	1 (5.9)	Strongly Disagree	1 (5.9)	
			75% Consensus		
Recognizes their limitations and seeks assistance in situations that are complex and new	Very Important	13 (76.4)	Strongly Agree	11 (64.7)	"They don't necessarily need assistance just because something is complex. It is the recognition of one's own knowledge and skills that is important.
	Important	3 (17.6)	Agree	4 (23.5)	
	Neutral	0 (0.0)	Neutral	0 (0.0)	
	Somewhat Important	0 (0.0)	Disagree	1 (5.9)	
	Not Important	1 (5.9)	Strongly Disagree	1 (5.9)	
	75% Consensus		**75% Consensus**		

Importance and Clarity of CanMEDS Communicator Role items

Statement:	**Importance**		**Clarity**		**Comments**
Uses a structured communication tool to facilitate patient handover	Very Important	7 (46.7)	Strongly Agree	6 (40.0)	"Not all centers use structured tools yet."
	Important	2 (13.3)	Agree	7 (46.7)	
	Neutral	5 (33.3)	Neutral	1 (6.7)	
	Somewhat Important	1 (6.7)	Disagree	1 (6.7)	
	Not Important	0 (0.0)	Strongly Disagree	0 (0.0)	
			75% Consensus		

Statement:	**Importance**		**Clarity**		**Comments**
Seeks clarification on patient care and needs during a patient handover	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	9 (60.0) 5 (33.3) 0 (0.0) 0 (0.0) 1 (6.7)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	7 (46.7) 6 (40.0) 1 (6.7) 0 (0.0) 1 (6.7)	"Seeks clarification...through question and answer..."
Use appropriate communication approaches to provide safe transfers and during a patient transition to a different health care professional, stage of care, or settings (institutions or discharge to community care)	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	9 (60.0) 3 (20.0) 0 (0.0) 2 (13.3) 1 (6.7)	Strongly Agree Agree Neutral Disagree Strongly Disagree	4 (26.7) 6 (40.0) 1 (6.7) 3 (20.0) 1 (6.7)	"Such as ...which approaches and to whom?"
Demonstrates cultural sensitivity/safety by recognizing and respecting that patients/families may feel and respond differently to their health care needs and treatment options.	Very Important Important Neutral Somewhat Important Not Important	6 (40.0) 3 (20.0) 3 (20.0) 2 (13.3) 1 (6.7)	Strongly Agree Agree Neutral Disagree Strongly Disagree	4 (26.7) 6 (40.0) 1 (6.7) 3 (20.0) 1 (6.7)	
Takes time to learn about patients (values, spiritual/religious beliefs, language barriers, etc.) from cultures other than their own, thus allowing them to safely and appropriately treat their patients.	Very Important Important Neutral Somewhat Important Not Important	3 (20.0) 4 (26.7) 5 (33.2) 2 (13.3) 1 (6.7)	Strongly Agree Agree Neutral Disagree Strongly Disagree	4 (26.7) 5 (33.3) 4 (26.7) 1 (6.7) 1 (6.7)	
Demonstrates skill in obtaining informed consent by discussing the proposed investigation or treatment with the mentally capable patient, including the chances of success, risks and assesses the patient's understanding of the information.	Very Important Important Neutral Somewhat Important Not Important	9 (60.0) 1 (6.7) 2 (13.3) 2 (13.3) 1 (6.7)	Strongly Agree Agree Neutral Disagree Strongly Disagree	5 (33.3) 6 (40.0) 2 (13.3) 1 (6.7) 1 (6.7)	

Statement:	**Importance**		**Clarity**		**Comments**
Listens and addresses the patient's concerns and respect their decision during the informed consent process	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	7 (46.7) 5 (33.3) 1 (6.7) 1 (6.7) 1 (6.7)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	5 (33.3) 9 (60.0) 0 (0.0) 0 (0.0) 1 (6.7)	
Educates patient/family/care givers to recognize the symptoms and signs that should alert them to seek further medical care.	Very Important Important Neutral Somewhat Important Not Important	9 (50.0) 0 (0.0) 2 (11.1) 6 (33.3) 1 (5.6)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	7 (38.9) 7 (38.9) 1 (5.6) 2 (11.1) 1 (5.6)	
Provides the patient with supplementary materials with information about their condition, what to expect after discharge (what is normal), and when to seek medical attention	Very Important Important Neutral Somewhat Important Not Important	5 (33.3) 3 (20.0) 5 (33.3) 1 (6.7) 1 (6.7)	Strongly Agree Agree Neutral Disagree Strongly Disagree	4 (26.7) 4 (26.7) 4 (26.7) 1 (7.1) 1 (7.1)	
Communicates with the responsible community health professionals regarding the patient's discharge and follow-up care	Very Important Important Neutral Somewhat Important Not Important	9 (50.0) 4 (22.2) 1 (5.6) 0 (0.0) 4 (22.2)	Strongly Agree Agree Neutral Disagree Strongly Disagree	6 (33.3) 7 (38.9) 2 (11.1) 0 (0.0) 3 (16.7)	"This will vary with clinical context."
Prepares comprehensive and timely discharge summaries	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	9 (50.0) 5 (27.8) 1 (5.6) 3 (16.7) 0 (0.0)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	9 (50.0) 6 (33.3) 2 (11.1) 0 (0.0) 1 (5.6)	

Statement:	**Importance**		**Clarity**		**Comments**
Applies professional and legal policies when disclosing a patient safety incident	Very Important Important Neutral Somewhat Important Not Important	7 (38.9) 2 (11.1) 2 (11.1) 4 (22.2) 3 (16.7)	Strongly Agree Agree Neutral Disagree Strongly Disagree	2 (11.1) 2 (11.1) 1 (5.36) 5 (29.8) 8 (44.4)	
Upholds their ethical obligation to disclose and report harmful patient safety incidents	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	9 (50.0) 5 (27.8) 0 (0.0) 3 (16.7) 1 (5.6)	Strongly Agree Agree Neutral Disagree Strongly Disagree	5 (27.8) 3 (16.7) 0 (0.0) 9 (50.0) 1 (5.6)	"...to the patient and family.... as well as the system of care which includes the health care administration responsible for the quality of care."
Appropriately performs disclosure of safety incidents to patients in a sincere and caring manner	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	8 (44.4) 6 (33.3) 1 (5.6) 1 (5.6) 2 (11.1)	Strongly Agree Agree Neutral Disagree Strongly Disagree	3 (16.7) 1 (5.6) 0 (0.0) 9 (50.0) 5 (27.8)	"We suggest disclosure is best performed by faculty unless senior resident."
Provides clear and transparent account of patient safety incidents to supervisors and patients by communicating all related information of what happened to the patient, reasons for the unanticipated outcomes, and apologizes	Very Important Important Neutral Somewhat Important Not Important	6 (33.3) 3 (16.7) 2 (11.1) 5 (27.8) 2 (11.1)	Strongly Agree Agree Neutral Disagree Strongly Disagree	4 (22.2) 3 (16.7) 4 (22.2) 5 (27.8) 2 (11.1)	
Plans, conducts and documents follow-up with the patient, family, team members and other health professionals involved in an adverse event, near miss or close call	Very Important Important Neutral Somewhat Important Not Important	4 (22.2) 1 (5.6) 4 (22.2) 5 (27.8) 4 (22.2)	Strongly Agree Agree Neutral Disagree Strongly Disagree	4 (22.2) 3 (16.7) 6 (33.3) 1 (5.6) 4 (22.2)	

Statement:	**Importance**		**Clarity**		**Comments**
Utilizes a systems-thinking approach and just culture lens to view and analyze patient safety incidents	Very Important Important Neutral Somewhat Important Not Important	4 (22.2) 5 (27.8) 3 (16.7) 5 (27.8) 1 (5.6)	Strongly Agree Agree Neutral Disagree Strongly Disagree	4 (22.2) 6 (33.3) 1 (5.6) 5 (27.8) 3 (16.7)	
Reviews information provided by other health professionals before proceeding with further decisions or a diagnosis	Very Important Important Neutral Somewhat Important Not Important	1 (5.6) 3 (16.7) 3 (16.7) 8 (44.4) 3 (16.7)	Strongly Agree Agree Neutral Disagree Strongly Disagree	5 (27.8) 5 (27.8) 0 (0.0) 4 (22.2) 4 (22.2)	
Provides appropriate and clear information to patients about their condition and investigations (rationale and what to expect) to enable patients to make informed decisions	Very Important Important Neutral Somewhat Important Not Important	4 (22.2) 6 (33.3) 0 (0.0) 5 (27.8) 3 (16.7)	Strongly Agree Agree Neutral Disagree Strongly Disagree	4 (22.2) 5 (27.8) 4 (22.2) 2 (11.1) 3 (16.7)	
Communicates using a patient-centred approach to facilitate patient trust and autonomy and is characterized by empathy, respect, and compassion	Very Important Important Neutral Somewhat Important Not Important	10 (55.6) 5 (27.8) 1 (5.6) 1 (5.6) 1 (5.6)	Strongly Agree Agree Neutral Disagree Strongly Disagree	5 (27.8) 7 (38.9) 0 (0.0) 4 (22.2) 2 (11.1)	"Could be better worded I think….it requires a lot of the evaluator."
	75% Consensus				
Summarizes, presents and integrates the biopsychosocial information obtained from a patient-centred interview	Very Important Important Neutral Somewhat Important Not Important	10 (55.6) 0 (0.0) 4 (22.2) 1 (5.6) 3 (16.7)	Strongly Agree Agree Neutral Disagree Strongly Disagree	6 (33.3) 6 (33.3) 5 (27.8) 1 (5.6) 0 (0.0)	
Optimizes the physical environment for patient comfort, dignity, privacy, engagement, and safety	Very Important Important Neutral	7 (38.9) 2 (11.1) 2 (11.1)	Strongly Agree Agree Neutral	7 (38.9) 3 (16.7) 4 (22.2)	

Statement:	Importance		Clarity		Comments
	Somewhat Important	4 (22.2)	Disagree	2 (11.1)	
	Not Important	3 (16.7)	Strongly Disagree	2 (11.1)	
Tailors their approach to decision-making based on the patient's capacity, values and preferences.	Very Important	4 (22.2)	Strongly Agree	4 (22.2)	
	Important	5 (27.8)	Agree	1 (5.6)	
	Neutral	4 (22.2)	Neutral	4 (22.2)	
	Somewhat Important	3 (16.7)	Disagree	5 (27.8)	
	Not Important	2 (11.1)	Strongly Disagree	4 (22.2)	
Actively listens to their patients and responds to patient's non-verbal cues	Very Important	7 (38.9)	Strongly Agree	6 (33.3)	
	Important	3 (16.7)	Agree	8 (44.4)	
	Neutral	2 (11.1)	Neutral	2 (11.1)	
	Somewhat Important	3 (16.7)	Disagree	0 (0.0)	
	Not Important	3 (16.7)	Strongly Disagree	2 (11.1)	
			75% Consensus		
Seeks and synthesizes information from all sources before making decisions, including information from other health professionals, the patient's family, as well as information gathered through clinical investigations	Very Important	1 (5.6)	Strongly Agree	4 (22.2)	
	Important	4 (22.2)	Agree	7 (38.9)	
	Neutral	2 (11.1)	Neutral	3 (16.7)	
	Somewhat Important	8 (44.4)	Disagree	2 (11.1)	
	Not Important	3 (16.7)	Strongly Disagree	2 (11.1)	
Confirms patient and family understanding when sharing information and explanations	Very Important	4 (23.5)	Strongly Agree	4 (22.2)	
	Important	3 (17.6)	Agree	1 (5.6)	
	Neutral	4 (23.5)	Neutral	4 (22.2)	
	Somewhat Important	2 (11.8)	Disagree	5 (27.8)	
	Not Important	4 (23.5)	Strongly Disagree	4 (22.2)	
Explores the patient perspective when developing a care plan	Very Important	2 (11.1)	Strongly Agree	7 (38.9)	
	Important	8 (44.4)	Agree	2 (11.1)	
	Neutral	1 (5.6)	Neutral	2 (11.1)	
	Somewhat Important	3 (16.7)	Disagree	4 (22.2)	
	Not Important	4 (22.2)	Strongly Disagree	3 (16.7)	
Communicates with cultural awareness and sensitivity	Very Important	7 (38.9)	Strongly Agree	6 (33.3)	
	Important	3 (16.7)	Agree	6 (33.3)	

Statement:	**Importance**		**Clarity**		**Comments**
	Neutral	4 (22.2)	Neutral	4 (22.2)	
	Somewhat Important	4 (22.2)	Disagree	2 (11.1)	
	Not Important	0 (0.0)	Strongly Disagree	0 (0.0)	
Identifies difficulties and errors in medical record keeping that can have a negative impact patient care	Very Important	7 (38.9)	Strongly Agree	2 (11.1)	
	Important	2 (11.1)	Agree	2 (11.1)	
	Neutral	4 (22.2)	Neutral	1 (5.6)	
	Somewhat Important	1 (5.6)	Disagree	7 (38.9)	
	Not Important	4 (22.2)	Strongly Disagree	6 (33.3)	
Document clinical encounters in an accurate, legible, timely, and accessible manner, in compliance with legal and privacy requirements	Very Important	9 (50.0)	Strongly Agree	1 (5.6)	“I don't think "legal" is the correct word. What you mean are expectations of regulatory authorities (colleges).”
	Important	3 (16.7)	Agree	0 (0.0)	
	Neutral	0 (0.0)	Neutral	0 (0.0)	
	Somewhat Important	4 (22.2)	Disagree	13 (72.2)	
	Not Important	2 (11.1)	Strongly Disagree	4 (22.2)	
Documents patient information in a manner that enhances intra - and interprofessional care by i) conveying clinical reasoning and the rationale for decisions ii) coveys all patient information that might impact care or decisions made by another health professionals; iii) clarifies responsibilities for ongoing care; iv) maintains up to date lists of patient problems and medications; v) identifies and corrects ambiguous documentation	Very Important	6 (33.3)	Strongly Agree	3 (16.7)	
	Important	8 (44.4)	Agree	3 (16.7)	
	Neutral	0 (0.0)	Neutral	5 (27.8)	
	Somewhat Important	2 (11.1)	Disagree	3 (16.7)	
	Not Important	2 (11.1)	Strongly Disagree	4 (22.2)	
	75% Consensus				

Statement:	**Importance**		**Clarity**		**Comments**
Communicates effectively with the patient and other health professionals using a written health record, electronic medical record, or other digital technology by: 1- adapts the use of the health record based on the patient's health literacy 2- demonstrating actively listening, open-ended inquiry, empathy, and making eye contact	Very Important Important Neutral Somewhat Important Not Important	3 (16.7) 4 (22.2) 0 (0.0) 7 (38.9) 4 (22.2)	Strongly Agree Agree Neutral Disagree Strongly Disagree	9 (50.0) 1 (5.6) 0 (0.0) 4 (22.2) 4 (22.2)	
Shares information with patients and others in a manner that respects patient privacy and confidentiality (such as electronic sharing of information via EMR or fax) and avoid the use of non-secure means of communicating patient information that would otherwise jeopardize confidentially and safety	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	8 (44.4) 7 (38.9) 1 (5.6) 1 (5.6) 1 (5.6)	Strongly Agree Agree Neutral Disagree Strongly Disagree	2 (11.1) 5 (27.8) 3 (16.7) 4 (22.2) 4 (22.2)	"What do you mean by non-secure means?"
Communicates patient's concerns with other team members or providers (e.g., family physician upon discharge) and family members, with permission	Very Important Important Neutral Somewhat Important Not Important	7 (38.9) 2 (11.1) 2 (11.1) 4 (22.2) 3 (16.7)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	12 (33.3) 1 (5.6) 0 (0.0) 1 (5.6) 4 (22.2)	
Uses abbreviations known to all team members and keeps writing legible in all written forms of communication	Very Important Important Neutral Somewhat Important Not Important	2 (11.1) 8 (44.4) 1 (5.6) 3 (16.7) 4 (22.2)	Strongly Agree Agree Neutral Disagree Strongly Disagree	7 (41.2) 0 (0.0) 4 (23.5) 6 (35.3) 0 (0.0)	

Statement:	**Importance**		**Clarity**		**Comments**
Utilizes communication strategies, such as call -outs, check-backs, SBARs to ensure that critical information is conveyed to the appropriate person and that the information is understood	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	8 (44.4) 6 (33.3) 0 (0.0) 2 (11.1) 2 (11.1)	Strongly Agree Agree Neutral Disagree Strongly Disagree	4 (22.2) 7 (38.9) 3 (16.7) 2 (11.1) 2 (11.1)	"…and assesses that the information is understood."
Communicates respectfully with others, including other health professionals, team members and the patient and the family	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	7 (41.2) 8 (47.1) 0 (0.0) 2 (11.8) 0 (0.0)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	8 (53.3) 6 (40.0) 0 (0.0) 0 (0.0) 1 (6.7)	
Provides information to other providers (verbal or written) in a timely fashion to allow for safe, high-quality patient care	Very Important Important Neutral Somewhat Important Not Important	7 (38.9) 4 (22.2) 3 (16.7) 0 (0) 4 (22.2)	Strongly Agree Agree Neutral Disagree Strongly Disagree	7 (38.9) 2 (11.1) 0 (0.0) 4 (22.2) 5 (27.8)	
Speaks up when there are patient safety concerns using respectful communication	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	10 (55.6) 5 (27.8) 1 (5.6) 2 (11.1) 0 (0.0)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	6 (33.3) 8 (44.4) 1 (5.6) 2 (11.1) 1 (5.6)	"Speaks up" is too colloquial. It should be "brings forward patient safety concerns to the appropriate person(s)"
Accesses only medical record for patients they are treating and only when necessary to provide their care and gather or share patient's clinical information	Very Important Important Neutral Somewhat Important Not Important	1 (5.6) 4 (22.2) 2 (11.1) 8 (44.4) 3 (16.7)	Strongly Agree Agree Neutral Disagree Strongly Disagree	5 (27.8) 5 (27.8) 2 (11.1) 4 (22.2) 2 (11.1)	

Statement:	**Importance**		**Clarity**	**Comments**
Considers any possible conflicts of interests between the patient and other providers in the circle of care and considers this before releasing information to others	Very Important Important Neutral Somewhat Important Not Important	7 (41.2) 1 (5.9) 1 (5.9) 5 (29.4) 3 (17.6)	Strongly Agree Agree Neutral Disagree Strongly Disagree	12 (70.6) 3 (17.6) 0 (0.0) 2 (11.8) 0 (0.0)
			75% Consensus	
Obtains consent before divulging patient information outside the circle of care	Very Important Important Neutral Somewhat Important Not Important	7 (46.7) 0 (0.0) 4 (26.7) 4 (26.7) 0 (0)	Strongly Agree Agree Neutral Disagree Strongly Disagree	3 (20.0) 4 (26.7) 0 (0.0) 7 (46.7) 1 (6.7)
Documents requests for consultation, including the reason(s) for the consult and the outcome	Very Important Important Neutral Somewhat Important Not Important	7 (38.9) 1 (5.6) 0 (0.0) 4 (22.2) 6 (33.3)	Strongly Agree Agree Neutral Disagree Strongly Disagree	3 (16.7) 4 (22.2) 4 (22.2) 2 (11.1) 5 (27.8)
Employs appropriate communication in high-risk situations, such as in clinical crises, emotional or distressing situations, and conflict	Very Important Important Neutral Somewhat Important Not Important	4 (22.2) 7 (38.9) 3 (16.7) 2 (11.1) 2 (11.1)	Strongly Agree Agree Neutral Disagree Strongly Disagree	7 (38.9) 3 (16.7) 1 (5.6) 2 (11.1) 1 (5.6)

Statement:	**Importance**		**Clarity**		**Comments**
Responds to team members requests/consultations regarding patient care in a timely and respectful manner (e.g., responding to nurses page call regarding a change in patient medication)	Very Important Important Neutral Somewhat Important Not Important	1 (5.6) 2 (11.1) 1 (5.6) 4 (22.2) 10 (55.6)	Strongly Agree Agree Neutral Disagree Strongly Disagree	3 (16.7) 4 (22.2) 0 (0.0) 7 (38.9) 4 (22.2)	
Provides sufficient documentation to facilitate team members' comprehension of the patient's history, investigations, and their perspective on the diagnosis and rationale for the diagnosis, treatment and care plan	Very Important Important Neutral Somewhat Important Not Important	2 (11.1) 8 (44.4) 1 (5.6) 3 (16.7) 4 (22.2)	Strongly Agree Agree Neutral Disagree Strongly Disagree	9 (50.0) 2 (11.1) 0 (0.0) 3 (16.7) 4 (22.2)	
Provides patient care orders and prescriptions using safe practices (e.g., legibility, dosing) to avoid misinterpretation	Very Important Important Neutral Somewhat Important Not Important	3 (16.7) 3 (16.7) 5 (27.8) 3 (16.7) 4 (22.2)	Strongly Agree Agree Neutral Disagree Strongly Disagree	7 (38.9) 2 (11.1) 2 (11.1) 4 (22.2) 3 (16.7)	"Could be used in conjunction with other descriptions. I like the wording of this."
Identifies and promotes patient education material	Very Important Important Neutral Somewhat Important Not Important	2 (11.1) 5 (27.8) 3 (16.7) 4 (22.2) 4 (22.2)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	6 (33.3) 8 (44.4) 0 (0.0) 2 (11.1) 2 (11.1)	

Statement:	**Importance**		**Clarity**	**Comments**
Utilizes abbreviations appropriately in all forms of written communication	Very Important	4 (22.2)	Strongly Agree	4 (22.2)
	Important	4 (22.2)	Agree	7 (38.9)
	Neutral	1 (5.6)	Neutral	0 (0.0)
	Somewhat Important	4 (22.2)	Disagree	2 (11.1)
	Not Important	5 (27.8)	Strongly Disagree	5 (27.8)
Communicates to the team and patient the rationale for deviations from established processes or guidelines	Very Important	7 (38.9)	Strongly Agree	3 (16.7)
	Important	4 (22.2)	Agree	4 (22.2)
	Neutral	0 (0.0)	Neutral	0 (0.0)
	Somewhat Important	4 (22.2)	Disagree	8 (44.4)
	Not Important	3 (16.7)	Strongly Disagree	3 (16.7)
Respects the limitations of technology for communicating patient information (e.g., fax, Electronic medical records, email, telephone, etc.) and follows up in a timely manner to ensure the information was received and understood	Very Important	7 (38.9)	Strongly Agree	1 (5.6)
	Important	2 (11.1)	Agree	4 (22.2)
	Neutral	2 (11.1)	Neutral	2 (11.1)
	Somewhat Important	4 (22.2)	Disagree	8 (44.4)
	Not Important	3 (16.7)	Strongly Disagree	3 (16.7)
Negotiates with patients and families when making clinical decisions regarding their treatment/care	Very Important	3 (16.7)	Strongly Agree	2 (11.1)
	Important	3 (16.7)	Agree	8 (44.4)
	Neutral	5 (27.8)	Neutral	1 (5.6)
	Somewhat Important	3 (16.7)	Disagree	3 (16.7)
	Not Important	4 (22.2)	Strongly Disagree	4 (22.2)

Importance and Clarity of CanMEDS Collaborator Role items

Statement	Importance		Clarity		Comment(s):
Reduces fragmented care by working collaboratively during high risk transition points	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	8 (44.4) 6 (33.3) 0 (0.0) 2 (11.1) 2 (11.1)	Strongly Agree Agree Neutral Disagree Strongly Disagree	3 (16.7) 7 (38.9) 1 (5.6) 5 (27.8) 2 (11.1)	“Not sure what is meant by "working collaboratively” too vague.”
Shows respect, actively listens and engages with other health care providers, the patient and the family.	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	8 (44.4) 7 (38.9) 0 (0.0) 2 (11.1) 1 (5.6)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	8 (50.0) 4 (25.0) 0 (0.0) 3 (18.8) 1 (6.3)	
Accepts and delegates tasks and responsibilities in an appropriate and respectful manner.	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	9 (56.3) 4 (25.0) 0 (0.0) 1 (6.3) 2 (12.5)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	9 (56.3) 6 (37.5) 0 (0.0) 1 (6.3) 0 (0.0)	“Worth including a competency related to delegation.”
Identifies a shared set of values, goals and beliefs about the patient's care with others on a team.	Very Important Important Neutral Somewhat Important Not Important	7 (38.9) 2 (11.1) 2 (11.1) 4 (22.2) 3 (16.7)	Strongly Agree Agree Neutral Disagree Strongly Disagree	3 (16.7) 5 (27.8) 5 (27.8) 5 (27.8) 0 (0.0)	
Establishes and maintains healthy relationships with other health professions to support relationship-centred collaborative care.	Very Important Important Neutral Somewhat Important Not Important	7 (38.9) 2 (11.1) 4 (22.2) 1 (5.6) 4 (22.2)	Strongly Agree Agree Neutral Disagree Strongly Disagree	7 (38.9) 6 (33.3) 0 (0.0) 0 (0.0) 5 (27.8)	
Works with other health care professionals to continuously	Very Important Important	7 (38.9) 4 (22.2)	Strongly Agree Agree	4 (22.2) 7 (38.9)	

Statement	Importance		Clarity		Comment(s):
improve health care quality and address any patient, environmental/workplace, human factor related safety issues.	Neutral Somewhat Important Not Important	3 (16.7) 0 (0) 4 (22.2)	Neutral Disagree Strongly Disagree	2 (11.1) 2 (11.1) 3 (16.7)	
Motivates and engages others to contribute to health care system improvement at the level of both the larger system and of local practice.	Very Important Important Neutral Somewhat Important Not Important	7 (38.9) 3 (16.7) 2 (11.1) 4 (22.2) 2 (11.1)	Strongly Agree Agree Neutral Disagree Strongly Disagree	7 (38.9) 2 (11.1) 2 (11.1) 4 (22.2) 3 (16.7)	this is duplication
Utilizes structured written and verbal communication skills and to reliably hand over patient care to colleagues, including clinical information and responsibility of care (e.g., clarifies roles and responsibilities, describes the patient's condition and care plan, and any anticipated problems and solutions).	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	10 (55.6) 6 (33.3) 2 (11.1) 0 (0.0) 0 (0.0)	Strongly Agree Agree Neutral Disagree Strongly Disagree	7 (41.2) 5 (29.4) 3 (17.6) 0 (0.0) 2 (11.8)	"Anticipated problems or safety issues and solutions.”
Analyzes gaps in communication between health care professionals during transitions in care.	Very Important Important Neutral Somewhat Important Not Important	4 (22.2) 7 (38.9) 3 (16.7) 2 (11.1) 2 (11.1)	Strongly Agree Agree Neutral Disagree Strongly Disagree	7 (38.9) 3 (16.7) 1 (5.6) 4 (22.2) 3 (16.7)	
Recognizes and acts on patient safety issues that arise during the transfer of care	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	9 (50.0) 6 (33.3) 0 (0.0) 1 (5.6) 2 (11.1)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	9 (50.0) 6 (33.3) 0 (0.0) 3 (16.7) 0 (0.0)	

Statement	Importance		Clarity		Comment(s):
Integrates situational awareness by scanning and accessing situations to maintain an understanding of what's going on around them and anticipate next steps	Very Important Important Neutral Somewhat Important Not Important	1 (5.6) 4 (22.2) 2 (11.1) 8 (44.4) 3 (16.7)	Strongly Agree Agree Neutral Disagree Strongly Disagree	4 (22.2) 7 (38.9) 2 (11.1) 2 (11.1) 3 (16.7)	"The last part 'acting as a . . . . . is vague and unhelpful."
Integrates cross-checking strategies by monitoring the actions of other team members and providing feedback for the purpose of avoiding errors and harm to a patient and acting as a safety net/protection for other team members	Very Important Important Neutral Somewhat Important Not Important	7 (38.9) 0 (0.0) 2 (11.1) 2 (11.1) 7 (38.9)	Strongly Agree Agree Neutral Disagree Strongly Disagree	7 (38.9) 2 (11.1) 4 (22.2) 1 (5.6) 4 (22.2)	
Expresses concern to superiors in a series of steps which have increasing degrees of assertion, ranging from low to high (graded assertiveness technique)	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	9 (50.0) 5 (27.8) 0 (0.0) 3 (16.7) 1 (5.6)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	8 (44.4) 6 (33.3) 0 (0.0) 2 (1.1) 2 (1.1)	"Concern for what - care issues, safety concerns"
Utilizes safe, effective strategies when referring and consulting with other health professionals, such as completing them in a timely fashion, follows-up when necessary, seeks clarification, and provides all related information.	Very Important Important Neutral Somewhat Important Not Important	2 (11.1) 5 (27.8) 3 (16.7) 4 (22.2) 4 (22.2)	Strongly Agree Agree Neutral Disagree Strongly Disagree	5 (27.8) 2 (11.1) 2 (11.1) 6 (33.3) 3 (16.7)	"Too mixed concepts to assess."
Identifies gaps in patient care and acts to integrate health professionals effectively through awareness of others roles, expertise and overlapping scopes	Very Important Important Neutral Somewhat Important Not Important	7 (38.9) 2 (11.1) 4 (22.2) 1 (5.6) 4 (22.2)	Strongly Agree Agree Neutral Disagree Strongly Disagree	3 (16.7) 2 (11.1) 3 (16.7) 4 (22.2) 6 (33.3)	

Statement	Importance		Clarity		Comment(s):
of practice of other health professionals					
Explains their role in patient care to team members and patients	Very Important	7 (38.9)	Strongly Agree	12 (66.7)	
	Important	0 (0.0)	Agree	0 (0.0)	
	Neutral	0 (0.0)	Neutral	0 (0.0)	
	Somewhat Important	8 (44.4)	Disagree	4 (22.2)	
	Not Important	3 (16.7)	Strongly Disagree	2 (11.1)	
Engages in respectful shared decision-making with physicians and other colleagues in the health care profession	Very Important	11 (61.1)	Strongly Agree	1 (5.6)	
	Important	0 (0.0)	Agree	4 (22.2)	
	Neutral	0 (0.0)	Neutral	2 (11.1)	
	Somewhat Important	4 (22.2)	Disagree	8 (44.4)	
	Not Important	3 (16.7)	Strongly Disagree	3 (16.7)	
Uses referral and consultations as opportunities to improve quality of care and patient safety by sharing expertise	Very Important	3 (16.7)	Strongly Agree	2 (11.1)	Consider revising last part to say "...by sharing expertise and being open to the expertise of others"
	Important	4 (22.2)	Agree	8 (44.4)	
	Neutral	0 (0.0)	Neutral	1 (5.6)	
	Somewhat Important	7 (38.9)	Disagree	3 (16.7)	
	Not Important	4 (22.2)	Strongly Disagree	4 (22.2)	
Gathers information and resources needed to gain an understanding, manage differences and resolve conflicts	Very Important	9 (50.0)	Strongly Agree	1 (5.6)	
	Important	0 (0.0)	Agree	8 (44.4)	
	Neutral	0 (0.0)	Neutral	2 (11.1)	
	Somewhat Important	2 (11.1)	Disagree	6 (33.3)	
	Not Important	7 (38.9)	Strongly Disagree	1 (5.6)	
Employs collaborative negotiation techniques to prevent and manage destructive conflicts	Very Important	7 (38.9)	Strongly Agree	3 (16.7)	
	Important	2 (11.1)	Agree	2 (11.1)	
	Neutral	4 (22.2)	Neutral	3 (16.7)	
	Somewhat Important	1 (5.6)	Disagree	4 (22.2)	
	Not Important	4 (22.2)	Strongly Disagree	6 (33.3)	
Addresses practice variations that might otherwise impede reliable, safe delivery of patient care	Very Important	0 (0)	Strongly Agree	4 (22.2)	
	Important	0 (0)	Agree	7 (38.9)	
	Neutral	2 (11.8)	Neutral	2 (11.1)	
	Somewhat Important	9 (52.9)	Disagree	2 (11.1)	
	Not Important	6 (35.3)	Strongly Disagree	3 (16.7)	

Statement	Importance		Clarity		Comment(s):
Provides and accepts feedback to improve the performance of the team	Very Important	7 (41.2)	Strongly Agree	7 (41.2)	"Add 'and the resident'"
	Important	7 (41.2)	Agree	8 (47.1)	
	Neutral	1 (5.9)	Neutral	0 (0.0)	
	Somewhat Important	0 (0.0)	Disagree	2 (11.8)	
	Not Important	1 (5.9)	Strongly Disagree	0 (0.0)	
	75% Consensus		**75% Consensus**		
Appropriately integrates evidence-based information provided by team members into the patient care plan	Very Important	9 (50.0)	Strongly Agree	4 (22.2)	
	Important	5 (27.8)	Agree	0 (0.0)	
	Neutral	0 (0.0)	Neutral	0 (0.0)	
	Somewhat Important	2 (11.1)	Disagree	6 (33.3)	
	Not Important	2 (11.1)	Strongly Disagree	8 (44.4)	
	75% Consensus				
Engages patients to participate in the decision-making process and management of their own health	Very Important	7 (38.9)	Strongly Agree	5 (27.8)	
	Important	0 (0.0)	Agree	2 (11.1)	
	Neutral	2 (11.1)	Neutral	2 (11.1)	
	Somewhat Important	0 (0)	Disagree	6 (33.3)	
	Not Important	7 (38.9)	Strongly Disagree	3 (16.7)	

Importance and Clarity of CanMEDS Leader Role items

Statement	Importance		Clarity		Comment(s):
Demonstrates proficiency in foundational methodologies for continuous QI, such as PSDA cycles or LEAN.	Very Important	6 (37.5)	Strongly Agree	4 (25.0)	
	Important	5 (31.2)	Agree	5 (31.2)	
	Neutral	2 (12.5)	Neutral	4 (25.0)	
	Somewhat Important	2 (12.5)	Disagree	3 (18.8)	
	Not Important	1 (6.3)	Strongly Disagree	0 (0.0)	
Applies the science of quality improvement to conduct patient	Very Important	4 (22.2)	Strongly Agree	2 (11.1)	
	Important	7 (38.9)	Agree	5 (27.8)	
	Neutral	3 (16.7)	Neutral	3 (16.7)	

Statement	Importance		Clarity		Comment(s):
safety and/or quality improvement investigations	Somewhat Important Not Important	2 (11.1) 2 (11.1)	Disagree Strongly Disagree	4 (22.2) 4 (22.2)	
Provide feedback on processes seen in one's own practice, team, organization, and system	Very Important Important Neutral Somewhat Important Not Important	8 (44.4) 4 (22.2) 2 (11.1) 3 (16.7) 1 (5.6)	Strongly Agree Agree Neutral Disagree Strongly Disagree	4 (26.7) 7 (46.7) 3 (20.0) 1 (6.7) 0 (0.0)	"To provide quality improvement may need to be added to the end."
Works with patients and other health professionals to develop a strategy for implementing change in health care	Very Important Important Neutral Somewhat Important Not Important	0 (0.0) 7 (43.8) 5 (31.3) 3 (18.8) 1 (6.3)	Strongly Agree Agree Neutral Disagree Strongly Disagree	4 (22.2) 9 (50.0) 4 (22.2) 0 (0.0) 1 (5.6)	
Continuously analyzing ongoing changes in health care delivery and presents evidence-based recommendations for change	Very Important Important Neutral Somewhat Important Not Important	1 (6.3) 2 (12.5) 6 (37.5) 3 (18.8) 4 (25.0)	Strongly Agree Agree Neutral Disagree Strongly Disagree	7 (43.8) 4 (25.0) 2 (12.5) 3 (18.8) 0 (0.0)	"Should this be 'continuously analyses ongoing changes'..."
Creates a personal organized approach for practice management to improve patient care	Very Important Important Neutral Somewhat Important Not Important	1 (5.6) 2 (11.1) 2 (11.1) 9 (50.0) 4 (22.2)	Strongly Agree Agree Neutral Disagree Strongly Disagree	1 (5.6) 4 (22.2) 2 (11.1) 8 (44.4) 3 (16.7)	
Creates a personal practice improvement plan, including evaluating a problem, setting priorities, executing the plan, and analyzing the results	Very Important Important Neutral Somewhat Important Not Important	2 (11.1) 5 (27.8) 3 (16.7) 4 (22.2) 4 (22.2)	Strongly Agree Agree Neutral Disagree Strongly Disagree	4 (22.2) 7 (38.9) 3 (16.7) 2 (11.1) 2 (11.1)	"Hard to create opportunities for a trainee to do this"
Identifies policies and processes that may be unsafe or inconsistent with best practices/guidelines and take action to address them through context specific solutions	Very Important Important Neutral Somewhat Important Not Important	4 (22.2) 7 (38.9) 2 (11.1) 2 (11.1) 3 (16.7)	Strongly Agree Agree Neutral Disagree Strongly Disagree	4 (22.2) 3 (16.7) 2 (11.1) 1 (5.6) 8 (44.4)	"I think the wording above provides more flexibility. The details in this competency could

Statement	Importance		Clarity		Comment(s):
					be included as examples above."
Demonstrates proficiency in the processes and policies related to adverse event reporting	Very Important Important Neutral Somewhat Important Not Important	6 (33.3) 2 (11.1) 4 (22.2) 6 (33.3) 0 (0.0)	Strongly Agree Agree Neutral Disagree Strongly Disagree	8 (44.4) 6 (33.3) 0 (0.0) 2 (11.1) 2 (11.1)	
Participates in the analysis of systems (retrospectively - root cause analysis or prospectively - failure modes effect analysis) to understand and change underlying processes that can potentially lead to adverse events and near misses	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	11 (61.1) 3 (16.7) 1 (5.6) 0 (0.0) 3 (16.7)	Strongly Agree Agree Neutral Disagree Strongly Disagree	3 (16.7) 4 (22.2) 0 (0.0) 10 (55.6) 1 (5.6)	"To improve (rather than change) ."
Participates in event and close call reporting	Very Important Important Neutral Somewhat Important Not Important	2 (11.1) 5 (27.8) 3 (16.7) 4 (22.2) 4 (22.2)	Strongly Agree Agree Neutral Disagree Strongly Disagree	6 (33.3) 4 (22.2) 4 (22.2) 1 (5.6) 3 (16.7)	"Uncommon for observation?"
Analyzes harmful patient safety incidents (adverse events) or near miss to generate recommendations for safer care and potential improvement opportunities.	Very Important Important Neutral Somewhat Important Not Important	4 (22.2) 7 (38.9) 3 (16.7) 1 (5.6) 0 (0.0)	Strongly Agree Agree Neutral Disagree Strongly Disagree	4 (22.2) 7 (38.9) 2 (11.1) 2 (11.1) 3 (16.7)	
Recognizes and reports patient safety incidents or hazards in real-time and acts to correct and prevent them from reaching the patient	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	7 (38.9) 10 (55.6) 0 (0.0) 1 (5.6) 0 (0.0)	Strongly Agree Agree Neutral Disagree Strongly Disagree	4 (22.2) 3 (16.7) 2 (11.1) 1 (5.6) 8 (44.4)	"This is a two part item again, and I think you have already included the second half in an earlier item."

Statement	Importance		Clarity		Comment(s):
Recognizes and reports the occurrence of a patient safety incident to the appropriate personnel and follows established processes and guidelines	Very Important	14 (77.8)	Strongly Agree	2 (11.1)	"Duplicate."
	Important	4 (22.2)	Agree	5 (27.8)	
	Neutral	0 (0.0)	Neutral	3 (16.7)	
	Somewhat Important	0 (0.0)	Disagree	0 (0.0)	
	Not Important	0 (0.0)	Strongly Disagree	8 (44.4)	
	75% Consensus				
Use health informatics to improve the quality of patient care and optimize patient safety by mapping the flow of patient care information	Very Important	4 (22.2)	Strongly Agree	1 (5.6)	
	Important	7 (38.9)	Agree	0 (0.0)	
	Neutral	2 (11.1)	Neutral	2 (11.1)	
	Somewhat Important	2 (11.1)	Disagree	6 (33.3)	
	Not Important	3 (16.7)	Strongly Disagree	9 (50.0)	
Integrates clinical performance data into team discussions and team decision making	Very Important	4 (22.2)	Strongly Agree	4 (22.2)	
	Important	4 (22.2)	Agree	5 (27.8)	
	Neutral	1 (5.6)	Neutral	6 (33.3)	
	Somewhat Important	4 (22.2)	Disagree	1 (5.6)	
	Not Important	5 (27.8)	Strongly Disagree	2 (11.1)	
Demonstrates the value in health care in terms of outcomes achieved, costs, efficiency, appropriate use of services and resources without focus on the volume of services delivered	Very Important	1 (6.3)	Strongly Agree	5 (27.8)	
	Important	2 (12.5)	Agree	1 (5.6)	
	Neutral	6 (37.5)	Neutral	1 (5.6)	
	Somewhat Important	3 (18.8)	Disagree	9 (50.0)	
	Not Important	4 (25.0)	Strongly Disagree	2 (11.1)	
Employs evidence-based strategies to resource allocation to avoid overuse of finite health care resources and minimalize wasteful practices	Very Important	6 (33.3)	Strongly Agree	2 (11.1)	"Needs rewording"
	Important	11 (61.6)	Agree	5 (27.8)	
	Neutral	0 (0.0)	Neutral	3 (16.7)	
	Somewhat Important	1 (5.6)	Disagree	4 (22.2)	
	Not Important	0 (0.0)	Strongly Disagree	4 (22.2)	
	75% Consensus				
Champions patient safety by engaging others to participate in continuous quality improvement and patient safety activities	Very Important	13 (72.2)	Strongly Agree	4 (22.2)	"I think champion is too much to ask and I am not sure what this means practically."
	Important	4 (22.2)	Agree	0 (0.0)	
	Neutral	1 (5.6)	Neutral	3 (16.7)	
	Somewhat Important	0 (0.0)	Disagree	11 (61.1)	

Statement	Importance		Clarity		Comment(s):
	Not Important	0 (0.0)	Strongly Disagree	0 (0.0)	
	75% Consensus				
Recognizes high-risk situations in the workplace and acts to structure the workplace to maximize safety	Very Important	4 (26.7)	Strongly Agree	4 (26.7)	
	Important	7 (46.7)	Agree	4 (26.7)	
	Neutral	3 (20.0)	Neutral	1 (6.7)	
	Somewhat Important	1 (6.7)	Disagree	6 (40.0)	
	Not Important	0 (0.0)	Strongly Disagree	0 (0.0)	
Balances personal life with responsibilities in education, research, administration, and patient care	Very Important	4 (22.2)	Strongly Agree	4 (22.2)	
	Important	7 (38.9)	Agree	8 (44.4)	
	Neutral	3 (16.7)	Neutral	3 (16.7)	
	Somewhat Important	4 (22.2)	Disagree	3 (16.7)	
	Not Important	0 (0.0)	Strongly Disagree	0 (0.0)	
Demonstrates leaderships such self-awareness, self-reflection and self-management	Very Important	4 (22.2)	Strongly Agree	3 (16.7)	
	Important	8 (44.4)	Agree	4 (22.2)	
	Neutral	3 (16.7)	Neutral	0 (0.0)	
	Somewhat Important	3 (16.7)	Disagree	10 (55.6)	
	Not Important	0 (0.0)	Strongly Disagree	1 (5.6)	
Demonstrates task management, crisis team functioning and decision-making skills when managing high risk situations	Very Important	6 (33.3)	Strongly Agree	0 (0.0)	“Very "jargony" and may not be interpretable to all evaluators”
	Important	2 (11.1)	Agree	7 (38.9)	
	Neutral	9 (50.0)	Neutral	5 (27.8)	
	Somewhat Important	0 (0.0)	Disagree	3 (16.7)	
	Not Important	1 (5.6)	Strongly Disagree	1 (5.6)	
Employs techniques such as diligent information-gathering, cross-checking of information using checklists, and investigating mismatches between the current situation and the expected state when managing high risk situations	Very Important	4 (22.2)	Strongly Agree	3 (16.7)	
	Important	4 (22.2)	Agree	8 (44.4)	
	Neutral	1 (5.6)	Neutral	2 (11.1)	
	Somewhat Important	4 (22.2)	Disagree	2 (11.1)	
	Not Important	5 (27.8)	Strongly Disagree	3 (16.7)	

Importance and Clarity of CanMEDS Professional Role items

Statement	Importance		Clarity		Comment(s):
Demonstrates a commitment to patient safety and quality improvement by adhering to institutional and regulatory policies and practices	Very Important Important Neutral Somewhat Important Not Important	4 (22.2) 7 (38.9) 2 (11.1) 0 (0.0) 5 (27.8)	Strongly Agree Agree Neutral Disagree Strongly Disagree	4 (22.2) 7 (38.9) 2 (11.1) 2 (11.1) 3 (16.7)	
Participates in the review of practice, standard setting and quality improvement activities	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	9 (50.0) 6 (33.3) 0 (0.0) 1 (5.6) 2 (11.1)	Strongly Agree Agree Neutral Disagree Strongly Disagree	0 (0.0) 11 (68.8) 5 (31.3) 2 (11.1) 0 (0.0)	
Participates in the assessment of junior leaners patient safety and quality improvement skills	Very Important Important Neutral Somewhat Important Not Important	2 (11.1) 4 (22.2) 9 (50.0) 0 (0.0) 3 (16.7)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	11 (61.6) 3 (16.7) 4 (22.2) 0 (0.0) 0 (0.0)	
Prepares morbidity and mortality report or chart review	Very Important Important Neutral Somewhat Important Not Important	4 (22.2) 4 (22.2) 6 (33.3) 1 (5.6) 3 (16.7)	Strongly Agree Agree Neutral Disagree Strongly Disagree	4 (22.2) 3 (16.7) 2 (11.1) 1 (5.6) 8 (44.4)	"This should be a stand alone item with its own assessment tool."
Recognize conflicts of interest that could potentially result in harm to a patient and act to resolve them transparently	Very Important Important Neutral Somewhat Important Not Important	4 (22.2) 7 (38.9) 3 (16.7) 4 (22.2) 0 (0.0)	Strongly Agree Agree Neutral Disagree Strongly Disagree	6 (33.3) 2 (11.1) 9 (50.0) 0 (0.0) 1 (5.6)	

Statement	Importance		Clarity		Comment(s):
Recognizes and responds to ethical issues encountered in the clinical or academic setting	Very Important	4 (22.2)	Strongly Agree	4 (22.2)	
	Important	3 (16.7)	Agree	8 (44.4)	
	Neutral	2 (11.1)	Neutral	3 (16.7)	
	Somewhat Important	1 (5.6)	Disagree	3 (16.7)	
	Not Important	8 (44.4)	Strongly Disagree	0 (0.0)	
Exhibits positive behavioral adaptation (resilience) and applies constructive coping strategies to combat potentially long-standing negative effects following their involvement in an adverse event	Very Important	0 (0.0)	Strongly Agree	3 (16.7)	
	Important	11 (61.1)	Agree	8 (44.4)	
	Neutral	2 (11.1)	Neutral	2 (11.1)	
	Somewhat Important	2 (11.1)	Disagree	2 (11.1)	
	Not Important	3 (16.7)	Strongly Disagree	3 (16.7)	
Employs strategies to mitigate the negative effects (e.g., medication or diagnostic error) of human factors (including fatigue, stress, and cognitive biases) on their performance and workplace environment	Very Important	6 (33.3)	Strongly Agree	7 (38.9)	
	Important	9 (50.0)	Agree	6 (33.3)	
	Neutral	2 (11.1)	Neutral	2 (11.1)	
	Somewhat Important	1 (5.6)	Disagree	0 (0.0)	
	Not Important	0 (0.0)	Strongly Disagree	3 (16.7)	
	75% Consensus				
Adapts and recovers in challenging situations by regulating their attention, emotions, and behaviours to performs their professional tasks	Very Important	4 (23.5)	Strongly Agree	2 (11.1)	
	Important	7 (41.2)	Agree	5 (27.8)	
	Neutral	3 (17.6)	Neutral	3 (16.7)	
	Somewhat Important	3 (17.6)	Disagree	4 (22.2)	
	Not Important	0 (0.0)	Strongly Disagree	4 (22.2)	
Manage competing personal and professional priorities	Very Important	3 (16.7)	Strongly Agree	2 (11.1)	
	Important	4 (22.2)	Agree	4 (22.2)	
	Neutral	0 (0.0)	Neutral	9 (50.0)	
	Somewhat Important	10 (55.6)	Disagree	0 (0.0)	
	Not Important	1 (5.6)	Strongly Disagree	3 (16.7)	
Role-models positive behaviours to address the hidden curriculum related to patient safety and quality improvement	Very Important	3 (16.7)	Strongly Agree	6 (33.3)	
	Important	8 (44.4)	Agree	4 (22.2)	
	Neutral	0 (0.0)	Neutral	7 (38.9)	
	Somewhat Important	4 (22.2)	Disagree	1 (5.6)	

Statement	Importance		Clarity		Comment(s):
	Not Important	3 (16.7)	Strongly Disagree	0 (0.0)	
Respectful and honest with patients, peers, supervisors and members of the health care team.	Very Important	12 (66.7)	Strongly Agree	6 (33.3)	
	Important	1 (5.6)	Agree	6 (33.3)	
	Neutral	0 (0.0)	Neutral	2 (11.1)	
	Somewhat Important	2 (11.1)	Disagree	1 (5.6)	
	Not Important	3 (16.7)	Strongly Disagree	3 (16.7)	
Advocates in a professional manner for improvements in patient care in a professional manner	Very Important	4 (23.5)	Strongly Agree	4 (22.2)	
	Important	4 (23.5)	Agree	7 (38.9)	
	Neutral	1 (5.9)	Neutral	2 (11.1)	
	Somewhat Important	7 (41.2)	Disagree	2 (11.1)	
	Not Important	1 (5.9)	Strongly Disagree	3 (16.7)	
Exhibits professional behaviours in the use of technology- enabled communication	Very Important	4 (22.2)	Strongly Agree	5 (27.8)	
	Important	7 (38.9)	Agree	5 (27.8)	
	Neutral	2 (11.1)	Neutral	3 (16.7)	
	Somewhat Important	2 (11.1)	Disagree	5 (27.8)	
	Not Important	3 (16.7)	Strongly Disagree	0 (0.0)	
Recognizes and responds to unprofessional and unethical behaviours in physicians and other colleagues in the health care professions	Very Important	7 (38.9)	Strongly Agree	7 (43.8)	"Responds appropriately to unprofessional and/or unethical behaviours in physicians and other colleagues."
	Important	10 (55.6)	Agree	4 (25.0)	
	Neutral	0 (0.0)	Neutral	2 (11.1)	
	Somewhat Important	1 (5.6)	Disagree	3 (18.8)	
	Not Important	0 (0.0)	Strongly Disagree	0 (0.0)	
	75% Consensus		**75% Consensus**		
Promotes a 'just or no blame culture' that supports and responds to colleagues involved in a patient safety incident or crisis (the 'second victim')	Very Important	1 (6.3)	Strongly Agree	4 (25.0)	
	Important	2 (12.5)	Agree	7 (43.8)	
	Neutral	6 (37.5)	Neutral	2 (12.5)	
	Somewhat Important	3 (18.8)	Disagree	0 (0.0)	
	Not Important	4 (25.0)	Strongly Disagree	3 (16.7)	
Ask patients to explain how their values, beliefs or religious or spiritual practices influence their preferences for the proposed medical treatment.	Very Important	4 (26.7)	Strongly Agree	4 (26.7)	
	Important	7 (46.7)	Agree	0 (0.0)	
	Neutral	3 (20.0)	Neutral	3 (20.0)	
	Somewhat Important	1 (6.7)	Disagree	0 (0.0)	
	Not Important	0 (0.0)	Strongly Disagree	8 (53.3)	

Statement	Importance		Clarity		Comment(s):
Cares and treats all patients related to their clinical competence and expertise, without influence of their own personal beliefs and values	Very Important	5 (27.8)	Strongly Agree	4 (22.2)	
	Important	1 (5.6)	Agree	7 (38.9)	
	Neutral	1 (5.6)	Neutral	2 (11.1)	
	Somewhat Important	9 (50.0)	Disagree	2 (11.1)	
	Not Important	2 (11.1)	Strongly Disagree	3 (16.7)	
Takes action when there are potential risks posed by their personal and professional limitations	Very Important	2 (11.1)	Strongly Agree	5 (27.8)	
	Important	4 (22.2)	Agree	1 (5.6)	
	Neutral	9 (50.0)	Neutral	1 (5.6)	
	Somewhat Important	0 (0.0)	Disagree	9 (50.0)	
	Not Important	3 (16.7)	Strongly Disagree	2 (11.1)	
Demonstrates accountability to society through maintenance and enhancement of competence	Very Important	1 (5.6)	Strongly Agree	4 (22.2)	
	Important	2 (11.1)	Agree	8 (44.4)	
	Neutral	6 (33.3)	Neutral	3 (16.7)	
	Somewhat Important	3 (16.7)	Disagree	3 (16.7)	
	Not Important	4 (22.2)	Strongly Disagree	0 (0.0)	

Importance and Clarity of CanMEDS Scholar Role items

Statement	Importance		Clarity		Comment(s)
Contributes to the creation, dissemination, and application of new QI and patient safety knowledge and innovative approaches practice	Very Important	9 (50.0)	Strongly Agree	4 (22.2)	“Aspirational”
	Important	4 (22.2)	Agree	7 (38.9)	
	Neutral	1 (5.6)	Neutral	3 (16.7)	
	Somewhat Important	2 (11.1)	Disagree	4 (22.2)	
	Not Important	2 (11.1)	Strongly Disagree	0 (0.0)	
Use quality outcomes (safety, timeliness, effectiveness, efficient, equity, and patient-centeredness) when performing individual gap analysis, self needs assessments and development of personal learning plans	Very Important	4 (22.2)	Strongly Agree	3 (16.7)	“'Gap analysis' may not be understood by all”
	Important	7 (38.9)	Agree	5 (27.8)	
	Neutral	2 (11.1)	Neutral	5 (27.8)	
	Somewhat Important	2 (11.1)	Disagree	5 (27.8)	
	Not Important	3 (16.7)	Strongly Disagree	0 (0.0)	

Utilizes multiple QI and patient safety performance data and feedback to continuously improve performance	Very Important	12 (66.7)	Strongly Agree	3 (16.7)
	Important	0 (0.0)	Agree	5 (27.8)
	Neutral	3 (16.7)	Neutral	5 (27.8)
	Somewhat Important	1 (5.6)	Disagree	5 (27.8)
	Not Important	2 (11.1)	Strongly Disagree	0 (0.0)
Works with a team or a community of practice environment to continuously improve personal practice and contribute to collective improvements in practice	Very Important	3 (16.7)	Strongly Agree	4 (22.2)
	Important	4 (22.2)	Agree	7 (38.9)
	Neutral	0 (0.0)	Neutral	2 (11.1)
	Somewhat Important	10 (55.6)	Disagree	2 (11.1)
	Not Important	1 (5.6)	Strongly Disagree	3 (16.7)
Acts to make performance improvements based on previous mistakes and adverse events	Very Important	2 (11.1)	Strongly Agree	6 (33.3)
	Important	2 (11.1)	Agree	4 (22.2)
	Neutral	0 (0.0)	Neutral	3 (16.7)
	Somewhat Important	10 (55.6)	Disagree	1 (5.6)
	Not Important	4 (22.2)	Strongly Disagree	3 (16.7)
Participate in self- and peer assessments that focus on practice and patient outcomes	Very Important	4 (22.2)	Strongly Agree	2 (11.1)
	Important	7 (38.9)	Agree	3 (16.7)
	Neutral	2 (11.1)	Neutral	0 (0.0)
	Somewhat Important	2 (11.1)	Disagree	5 (27.8)
	Not Important	3 (16.7)	Strongly Disagree	8 (44.4)
Works with others to create an environment where continuous learning is the norm	Very Important	5 (27.8)	Strongly Agree	2 (11.1)
	Important	1 (5.6)	Agree	4 (22.2)
	Neutral	1 (5.6)	Neutral	9 (50.0)
	Somewhat Important	9 (50.0)	Disagree	0 (0.0)
	Not Important	2 (11.1)	Strongly Disagree	3 (16.7)
Identifies potentially harmful or unintended consequences of safety interventions	Very Important	4 (22.2)	Strongly Agree	2 (11.1)
	Important	7 (38.9)	Agree	5 (27.8)
	Neutral	2 (11.1)	Neutral	3 (16.7)
	Somewhat Important	2 (11.1)	Disagree	4 (22.2)
	Not Important	3 (16.7)	Strongly Disagree	4 (22.2)
Presents and integrates safety solutions based on lessons learned	Very Important	6 (33.3)	Strongly Agree	4 (22.2)
	Important	4 (22.2)	Agree	4 (22.2)
	Neutral	3 (16.7)	Neutral	6 (33.3)

and the successes and experiences of others	Somewhat Important Not Important	1 (5.6) 3 (16.7)	Disagree Strongly Disagree	1 (5.6) 3 (16.7)	
Uses knowledge translation frameworks, such as knowledge-to-action cycle to integrate clinical evidence into practice	Very Important Important Neutral Somewhat Important Not Important	6 (33.3) 4 (22.2) 3 (16.7) 1 (5.6) 3 (16.7)	Strongly Agree Agree Neutral Disagree Strongly Disagree	1 (5.6) 2 (11.1) 6 (33.3) 3 (16.7) 4 (22.2)	
Generates questions focused on quality improvement and patient safety knowledge gaps within the practice and other professional encounters	Very Important Important Neutral Somewhat Important Not Important	4 (22.2) 7 (38.9) 2 (11.1) 2 (11.1) 3 (16.7)	Strongly Agree Agree Neutral Disagree Strongly Disagree	1 (5.6) 0 (0.0) 2 (11.1) 6 (33.3) 9 (50.0)	
Contributes to the enhancement of their practice by critically appraising quality improvement and patient safety literature and evaluating its applicability to their practice	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	5 (27.8) 13 (72.2) 0 (0.0) 0 (0.0) 0 (0.0)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	6 (37.5) 7 (43.8) 3 (18.8) 0 (0.0) 0 (0.0)	
Role models safe and respectful practices	Very Important Important Neutral Somewhat Important Not Important	6 (33.3) 2 (11.1) 9 (50.0) 0 (0.0) 1 (5.6)	Strongly Agree Agree Neutral Disagree Strongly Disagree	6 (33.3) 4 (22.2) 3 (16.7) 1 (5.6) 4 (22.2)	
Questions contradictions between the unspoken or implicit academic, social, and cultural messages (hidden curriculum) and the formal or intended curriculum that might compromise patient safety and quality care	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	11 (61.1) 6 (33.3) 0 (0.0) 1 (5.6) 0 (0.0)	Strongly Agree Agree Neutral Disagree Strongly Disagree	4 (22.2) 3 (16.7) 2 (11.1) 1 (5.6) 8 (44.4)	"Too wordy, but I do 4 that there needs to be at least one competency related to the hidden curriculum."
Promotes a safe learning environment by recognizing power	Very Important Important Neutral	4 (22.2) 8 (44.4) 3 (16.7)	Strongly Agree Agree Neutral	6 (33.3) 2 (11.1) 4 (22.2)	

differentials between learners and teachers	Somewhat Important Not Important	3 (16.7) 0 (0.0)	Disagree Strongly Disagree	6 (33.3) 0 (0.0)
Promotes a safe learning environment by appropriately delegating tasks to learners	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	16 (88.8) 1 (5.6) 0 (0.0) 0 (0.0) 1 (5.6)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	9 (50.0) 6 (33.3) 3 (16.7) 0 (0.0) 0 (0.0)
Instructs learners to both recognize their limits and to seek greater supervision when needed	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	10 (55.6) 7 (38.9) 0 (0.0) 1 (5.6) 0 (0.0)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	8 (44.4) 7 (38.9) 1 (5.6) 2 (11.1) 0 (0.0)
Appropriately provides learners with progressive independence when matched by learner competence and without compromising patient safety or quality of care	Very Important Important Neutral Somewhat Important Not Important	4 (22.2) 7 (38.9) 2 (11.1) 2 (11.1) 3 (16.7)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	9 (50.0) 6 (33.3) 0 (0.0) 2 (11.1) 1 (5.6)
Provide feedback to leaners, faculty and team members to enhance learning and performance on patient safety and quality improvement	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	10 (55.6) 4 (22.2) 2 (11.1) 1 (5.6) 1 (5.6)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	11 (61.1) 5 (27.8) 1 (5.6) 1 (5.6) 0 (0.0)
Observe and assess learners' patient safety and quality improvement skills	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	9 (50.0) 5 (27.8) 2 (11.1) 1 (5.6) 1 (5.6)	Strongly Agree Agree Neutral Disagree Strongly Disagree	3 (16.7) 6 (33.3) 1 (5.6) 4 (22.2) 4 (22.2)

Importance and Clarity of CanMEDS Health Advocate Role items

Statement	Importance		Clarity		Comment(s)
Advocates for equitable access to health care resources to serve all populations	Very Important	7 (38.9)	Strongly Agree	7 (38.9)	
	Important	2 (11.1)	Agree	2 (11.1)	
	Neutral	4 (22.2)	Neutral	4 (22.2)	
	Somewhat Important	1 (5.6)	Disagree	1 (5.6)	
	Not Important	4 (22.2)	Strongly Disagree	4 (22.2)	
Identifies barriers to access (care and resources) for all patients	Very Important	3 (16.7)	Strongly Agree	3 (16.7)	"Should go beyond identification (e.g., develops mitigation strategies)."
	Important	11 (61.1)	Agree	4 (22.2)	
	Neutral	3 (16.7)	Neutral	0 (0.0)	
	Somewhat Important	0 (0.0)	Disagree	7 (38.9)	
	Not Important	1 (5.6)	Strongly Disagree	4 (22.2)	
	75% Consensus				
Advocates for a patient's procedure or therapy on the basis of urgency and available resources	Very Important	5 (27.8)	Strongly Agree	2 (11.1)	"Appropriately advocates for a patient's ...."
	Important	10 (55.6)	Agree	5 (27.8)	
	Neutral	0 (0.0)	Neutral	3 (16.7)	
	Somewhat Important	0 (0.0)	Disagree	4 (22.2)	
	Not Important	3 (16.7)	Strongly Disagree	4 (22.2)	
	75% Consensus				
Advocates for system-level changes and/or continuous improvement in the system and processes of care	Very Important	9 (50.0)	Strongly Agree	1 (5.6)	
	Important	6 (33.3)	Agree	2 (11.1)	
	Neutral	2 (11.1)	Neutral	1 (5.6)	
	Somewhat Important	1 (5.6)	Disagree	4 (22.2)	
	Not Important	0 (0.0)	Strongly Disagree	10 (55.6)	
	75% Consensus				
Recognizes the importance of physician advocacy for patient safety and QI	Very Important	7 (38.9)	Strongly Agree	4 (22.2)	
	Important	4 (22.2)	Agree	7 (38.9)	
	Neutral	2 (11.1)	Neutral	2 (11.1)	
	Somewhat Important	3 (16.7)	Disagree	2 (11.1)	
	Not Important	2 (11.1)	Strongly Disagree	3 (16.7)	

Statement	Importance		Clarity		Comment(s)
Demonstrates an awareness of the methods that health care professionals can use to advocate for patient and health care system safety	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	14 (78.8) 1 (5.6) 1 (5.6) 1 (5.6) 1 (5.6)	Strongly Agree Agree Neutral Disagree Strongly Disagree	2 (11.1) 5 (27.8) 3 (16.7) 4 (22.2) 4 (22.2)	"Very vague. Needs to be made more context specific."
Participates in a process to improve health in the community or population they serve	Very Important Important Neutral Somewhat Important Not Important	2 (11.1) 8 (44.4) 1 (5.6) 3 (16.7) 4 (22.2)	Strongly Agree Agree Neutral Disagree Strongly Disagree	2 (11.1) 4 (22.2) 9 (50.0) 0 (0.0) 3 (16.7)	"This is nice but not something I expect of all trainees. Should be commented on when present but absence is not a problem in my mind."

Appendix E

Delphi Round II Survey

To whom it may concern:

Thank you for agreeing to participate as an expert Delphi survey respondent in the research project entitled, Development and Validation of a Multisource Feedback Tool to Assess Medical Trainee Competence in Patient Safety**.** We are now completing round 2 of the Delphi survey and the survey will take approximately 60 minutes to complete.

As indicated previously, the main goal of this research project is to develop a multisource feedback (MSF) tool for residents' patient safety competencies. A key step in the development of the tool is the validation of key items for inclusion in the assessment tool.

Draft items have been constructed following a thorough review of competency frameworks and peer-reviewed and grey literature, including the 2015 CanMEDS competency framework and work produced by The CanMEDS 2015 Patient Safety and Quality Improvement Expert Working Group. The first Delphi round was completed by experts in patient safety, as well as individuals with experiences in developing assessment tools and observing and teaching residents.

Below is the web link and QR code to Delphi survey. You may scan the QR code using your mobile devise to access the survey.

The following provides the number of competencies per CanMEDS Role in this phase of the tool development:

Medical Expert:	26
Communicator:	14
Collaborator:	8
Leader:	8
Professional:	5
Scholar:	7
Health Advocate:	4

If you could complete the online survey within 2 weeks, it would be greatly appreciated.

Taking part in this study is completely anonymous and voluntary. It is up to you to decide whether or not to complete the online questionnaire. There are no known direct benefits or risks to completing this survey. You can withdraw from the study by not submitting or completing the survey. You may exit the questionnaire at any time. You may also skip any questions that you do not wish to answer or make you feel uncomfortable. Your reply will be kept confidential as the results are anonymous. Once the data comes back, identifying information will be extracted from the raw data and data will be presented in

aggregate format. Further information related to the study rationale and objectives are provided on the following page.

The Provincial Health Research Ethics Board (HREB) in Newfoundland and Labrador has approved the plans for this research study. The rationale and objectives for this study are contained on the next page. Please know that completing this questionnaire implies consent to have your responses reviewed and analyzed by the research team, used in aggregate format for dissemination, and potentially used to inform the development of relevant training curricula and/or the development of policies/procedures.

Please feel free to forward any questions about this project to Ms. Patti McCarthy via email (pattimccarthy@mun.ca) or telephone (709) 864-6676.
Thank you for taking the time to complete this survey.

Sincerely,

Patti McCarthy, MSc, PhD Candidate

Section A: Open Ended Sections

Please review the revised wording for the narrative statements below and indicate (1) Level of agreement with the IMPORTANCE of including this section in a resident's patient safety assessment tool, you (2) Level of agreement with the CLARITY of the statement, and (3) if either statement is unclear as written use the space below each statement to provide suggestions for alternate wording.

1. *Under the "x" CanMEDS Role, please provide concrete objective examples of resident's behaviour <u>you</u> have witnessed. Note: Please only include examples you have directly observed.*
2. *Please provide the resident with one or more strategies for improvement in this CanMEDS competency domain.*

Section B: Rating of competency statements for importance and clarity

For each of the items below, indicate the level of importance for including that item in a patient safety assessment tool for residents. Also indicate your agreement with the clarity of the wording of each item.

Medical Expert Skills

1. Utilizes the following domains (Safe, Timely, Effective, Patient-centred, Efficient, Equitable) to identify gaps in care delivery that might pose a risk to providing safe, high-quality patient care
2. Demonstrates reliability by following through with care and tasks as discussed and informed others of changes to plan and why
3. Integrates patient safety activities into routine daily practice (e.g., hand hygiene, use of appropriate check lists, standard order sets, safety huddles, and standard handoff processes)
4. Manages harmful patient safety incidents, including near misses, at the patient level by Responding to the clinical, emotional and informational needs of the patient and family
5. Differentiates a harmful event arising as a result of the natural progression of disease, treatment risks and/or harm or complications arising from health care delivery
6. Mitigates further injury by prioritizing initial medical response to harmful incident
7. Recognizes, responds to and reports near-misses to prevent a harmful patient safety incident and initiate systemic change

8. Identifies existing procedures or policies that may be unsafe or inconsistent with best practices and takes action to address such concerns (e.g., alerting a supervisor or person responsible)
9. Demonstrates a fair, non-punitive attitude and approach when patient safety incidents occur
10. Models a just culture by promoting openness and transparency and supporting those involved in a patient safety incident
11. Uses cognitive aids, such as procedural checklists, structured communication tools, or care paths, to enhance patient safety
12. Performs discipline specific procedures in a skillful and safe manner, adapting to unanticipated findings or changing clinical circumstances
13. Follows proper prescribing practices to reduce the possibility of a medication adverse event, such as, avoiding dangerous abbreviations, seeking assistance from pharmacist when unsure of prescribing recommendations, paying attention to high risk medications such as insulin, opioids and anticoagulants, etc.)
14. Recognizes their knowledge and/or skill limitations and seeks assistance
15. Where appropriate, incorporates possible medical error into the differential diagnosis
16. Provides support to and assists others (patients, families, health professionals) with the impact of experiencing a patient safety incident.
17. As appropriate, applies lessons learned from the analysis of a patient safety incident
18. Recognizes patient safety hazards and threats to patient safety (involving clinical processes, equipment, technology, work interruptions, physical workplace set-up, etc.) and responds (e.g., alerting a supervisor or responsible individual)
19. Completes a timely follow-up on patient's investigative tests
20. Selects and interprets investigations and therapeutic procedures based on a differential diagnosis
21. Obtains and documents informed consent (through information sharing and decision-making with the patient), explaining the risks, benefits, and the rationale for the proposed procedure or therapy for that particular patient
22. Integrates multiple sources of information (including team/health professional consultations), and considers risks and benefits, when developing a patient care plan
23. Establishes and documents a plan for post-procedural care
24. Performs appropriately timed clinical assessments and documents recommendations in an organized manner
25. Triage a procedure or therapy based on urgency, potential deterioration, and available resources
26. Demonstrates concern for patient and their family following a patient safety incident (e.g., checking on the patient more frequently, ensuring timely information)

Below each CanMEDS Role: Are there any competencies missing from this the MEDICAL EXPERT ROLE above? If so, please include competencies below you feel are critical to include.

Communicator Skills

1. Seeks clarification on patient care and needs during a patient handover by asking questions and active listening of peers
2. Addresses the patient's concerns during the informed consent process
3. Prepares comprehensive and timely discharge summaries
4. Upholds their obligation to disclose and report harmful patient safety incidents to the appropriate supervisor, patients and family
5. Appropriately performs (with supervisor) disclosure of safety incidents to patients in a sincere and caring manner
6. Communicates using a patient-centred approach that is characterized by empathy, respect, and compassion
7. Documents/captures clinical encounters in an accurate, legible (including the avoidance of prohibited abbreviations), timely, and accessible manner, in compliance with regulatory authorities and privacy requirements
8. Utilizes communication strategies, such as call -outs, check-backs, SBARs to ensure that critical information is conveyed to the appropriate person and assesses if the information has been understood
9. Brings forward patient safety concerns to the appropriate person(s)
10. Uses memory aides for safe prescribing practices when appropriate (i.e. opioid conversion dosing)
11. Communicates effectively to provide safe transfers during a patient transition to a different health care professional, stage of care, or settings (institutions or discharge to community care) by ensuring transfer of patient information (update on diagnostic tests and results, changes in medication and indications for such change, discharge diagnosis, etc.) to their family physician and next provider in the system, updating patient medical records, by calling next provider directly, sending updates to patient pharmacist, etc..
12. Shares information with others in a manner that preserves privacy and confidentiality (e.g., using EMR)
13. Communicates respectfully with others, including other health professionals, team members and the patient and the family
14. Utilizes institutional standard order sets, care maps and protocols to enhance patient safety when appropriate (i.e. pre admission orders, TPN orders, VTE prophylaxis, epidural analgesia)

Below each CanMEDS Role: Are there any competencies missing from this the COMMUNICATOR ROLE above? If so, please include competencies below you feel are critical to include.

Collaborator Skills

1. Works collaboratively (showing respect, actively listening during handover and meetings, provides timely and appropriate patient information) with other health care professionals to reduce fragmented care during patient transition points (from admission from emergency to ward/unit, discharge to community, move from hospital to another tertiary care centre, etc.)
2. Utilizes structured communication tools to hand over patient care, including clarification roles and responsibilities, patient's condition and care plan, and any anticipated problems or safety issues and solutions.
3. Recognizes and acts (with other health professionals) on patient safety issues that arise during the transfer of care
4. Provides and accepts feedback to improve their individual performance and that of the team
5. Shows respect, actively listens and engages with other health care providers, the patient and the family
6. Accepts and delegates tasks in an appropriate and respectful manner
7. Uses graded assertiveness technique (increasing degrees of assertion, ranging from low to high) with other health professionals or superiors when expressing a patient safety concern
8. Demonstrates value for the professional contributions of the interprofessional team

Below each CanMEDS Role: Are there any competencies missing from this the COLLABORATOR ROLE above? If so, please include competencies below you feel are critical to include.

Leader Skills

1. Participates in the analysis of systems (root cause analysis or failure modes effect analysis) to improve underlying processes that can lead to patient safety incidents
2. Reports patient safety hazards (e.g., piece of equipment not working well; inefficient communication tool; unprofessional behaviour) in real-time and acts to correct and prevent them from reaching the patient
3. Applies the correct policies when reporting a patient safety incident (harm event, near miss, and close call)
4. Models patient safety by engaging others to participate in continuous quality improvement and patient safety activities
5. Leads a quality improvement initiative by acting as a change agent to identify opportunities and support others to abandon unsafe practices

6. Employs resource allocation strategies to avoid overuse of finite health care resources and minimize wasteful practices
7. Ensures patient follow-up is communicated to appropriate professionals (e.g., family doctor and other specialist involved in care, pharmacist, social worker) when a patient transitions through the system (e.g., emergency to nursing unit; discharge to another tertiary care centre, discharge to community)
8. Role models safe and respectful practices

Below each CanMEDS Role: Are there any competencies missing from this the LEADER ROLE above? If so, please include competencies below you feel are critical to include

Professional Skills

1. Participates in practice reviews and practice quality improvement activities
2. Recognizes the relationship between personal wellness, performance and patient safety by taking appropriate action when there are potential risks (e.g., taking time away from work, not performing procedures or seeing patients for a period of time; discussing personal wellness issues with a professional and/or supervisor; getting proper sleep; etc.)
3. Responds appropriately to unprofessional and/or unethical behaviours in physicians and other colleagues
4. When faced with a patient safety incident, communication to the patient/family is based on facts known at the time, rather than supposition.
5. Applies principles of just culture to practice reviews

Below each CanMEDS Role: Are there any competencies missing from this the PROFESSIONAL ROLE above? If so, please include competencies below you feel are critical to include.

Scholar Skills

1. Contributes to the enhancement of their practice by critically appraising quality improvement and patient safety literature and evaluating its applicability to their practice
2. Observe, assess and provide feedback on learners' patient safety and quality improvement skills
3. Participates in training and/or seeks guidance on how to properly disclose patient safety incidents
4. Promotes a safe learning environment by appropriately delegating tasks to learners
5. Instructs learners to recognize their limits and to seek greater supervision when needed

6. Questions contradictions between the unspoken/implicit academic curriculum (hidden curriculum) and the intended/explicit curriculum that could compromise patient safety and quality care
7. Provides feedback to learners, faculty and team members to enhance performance, patient safety and quality improvement

   Below each CanMEDS Role: Are there any competencies missing from this the SCHOLAR ROLE above? If so, please include competencies below you feel are critical to include.

Health Advocate Skills

1. Identifies barriers to access (care and resources) for all patients and develops relevant mitigation strategies
2. Advocates for a patient's procedure/therapy on the basis of urgency and available resources (consider Choosing Wisely guidelines) with the intent to avoid delayed diagnosis, or misdiagnosis, and treatment
3. Uses effective methods to advocate for safety improvements at the patient, provider, workplace and health care systems level
4. Demonstrates awareness and knowledge of contextual and local influences on the processes of care, including access, and advocates within those contexts

   Below each CanMEDS Role: Are there any competencies missing from this the HEALTH ADVOCATE ROLE above? If so, please include competencies below you feel are critical to include.

Appendix F

Delphi Survey Round II Results

Importance and Clarity of CanMEDS Medical Expert Role items

Statement	Importance		Clarity	
Utilizes the following domains (Safe, Timely, Effective, Patient-centred, Efficient, Equitable) to identify gaps in care delivery that might pose a risk to providing safe, high-quality patient care	Very Important	10 (55.6)	Strongly Agree	5 (27.8)
	Important	5 (27.8)	Agree	2 (11.1)
	Neutral	3 (16.7)	Neutral	2 (11.1)
	Somewhat Important	0 (0.0)	Disagree	6 (33.3)
	Not Important	3 (16.7)	Strongly Disagree	3 (16.7)
	75% Consensus			
Demonstrates reliability by following through with care and tasks as discussed and informed others of changes to plan and why	Very Important	8 (44.4)	Strongly Agree	1 (5.6)
	Important	6 (33.3)	Agree	4 (22.2)
	Neutral	1 (5.6)	Neutral	2 (11.1)
	Somewhat Important	3 (16.7)	Disagree	8 (44.4)
	Not Important	0 (0.0)	Strongly Disagree	3 (16.7)
	75% Consensus			
Integrates patient safety activities into routine daily practice (e.g., hand hygiene, use of appropriate check lists, standard order sets, safety huddles, and standard handoff processes)	Very Important	7 (43.8)	Strongly Agree	7 (38.9)
	Important	6 (37.5)	Agree	9 (50.0)
	Neutral	2 (12.5)	Neutral	1 (5.6)
	Somewhat Important	0 (0.0)	Disagree	1 (5.6)
	Not Important	1 (6.3)	Strongly Disagree	0 (0.0)
	75% Consensus		**75% Consensus**	
Manages harmful patient safety incidents, including near misses, at the patient level by Responding to the clinical, emotional and informational needs of the patient and family	Very Important	7 (41.2)	Strongly Agree	1 (5.6)
	Important	8 (47.1)	Agree	1 (5.6)
	Neutral	1 (5.9)	Neutral	8 (44.4)
	Somewhat Important	0 (0.0)	Disagree	6 (33.3)
	Not Important	1 (5.9)	Strongly Disagree	2 (11.1)
	75% Consensus			
Differentiates a harmful event arising as a result of the natural progression of disease, treatment risks and/or harm or complications arising from health care delivery	Very Important	7 (38.9)	Strongly Agree	9 (50.0)
	Important	8 (44.4)	Agree	4 (22.2)
	Neutral	2 (11.1)	Neutral	0 (0.0)
	Somewhat Important	0 (0.0)	Disagree	3 (16.7)
	Not Important	1 (5.6)	Strongly Disagree	2 (11.1)
	75% Consensus			

Statement	Importance		Clarity	
Mitigates further injury by prioritizing initial medical response to harmful incident	Very Important	13 (72.2)	Strongly Agree	9 (50.0)
	Important	4 (22.2)	Agree	6 (33.3)
	Neutral	1 (5.6)	Neutral	3 (16.7)
	Somewhat Important	0 (0.0)	Disagree	0 (0.0)
	Not Important	0 (0.0	Strongly Disagree	0 (0.0)
	75% Consensus		**75% Consensus**	
Recognizes, responds to and reports near-misses to prevent a harmful patient safety incident and initiate systemic change	Very Important	8 (50.0)	Strongly Agree	8 (44.4)
	Important	5 (31.3)	Agree	4 (22.2)
	Neutral	2 (12.5)	Neutral	2 (11.1)
	Somewhat Important	0 (0.0)	Disagree	3 (16.7)
	Not Important	1 (6.3)	Strongly Disagree	1 (53.6)
	75% Consensus			
Identifies existing procedures or policies that may be unsafe or inconsistent with best practices and takes action to address such concerns (e.g., alerting a supervisor or person responsible)	Very Important	9 (50.0)	Strongly Agree	9 (56.3)
	Important	7 (38.9)	Agree	5 (31.2)
	Neutral	1 (5.6)	Neutral	2 (12.5)
	Somewhat Important	1 (5.6)	Disagree	0 (0.0)
	Not Important	0 (0.0)	Strongly Disagree	0 (0.0)
	75% Consensus		**75% Consensus**	
Demonstrates a fair, non-punitive attitude and approach when patient safety incidents occur	Very Important	9 (52.9)	Strongly Agree	12 (66.7)
	Important	4 (23.5)	Agree	4 (22.2)
	Neutral	1 (5.9)	Neutral	1 (11.1)
	Somewhat Important	2 (11.8)	Disagree	1 (11.1)
	Not Important	1 (5.9)	Strongly Disagree	0 (0.0)
	75% Consensus		**75% Consensus**	
Models a just culture by promoting openness and transparency and supporting those involved in a patient safety incident	Very Important	7 (38.9)	Strongly Agree	5 (27.8)
	Important	8 (44.4)	Agree	2 (11.1)
	Neutral	2 (11.1)	Neutral	2 (11.1)
	Somewhat Important	0 (0.0)	Disagree	6 (33.3)
	Not Important	1 (5.6)	Strongly Disagree	3 (16.7)
	75% Consensus			

Statement	Importance		Clarity	
Uses cognitive aids, such as procedural checklists, structured communication tools, or care paths, to enhance patient safety	Very Important	10 (55.6)	Strongly Agree	2 (11.1)
	Important	6 (33.3)	Agree	5 (27.8)
	Neutral	1 (5.6)	Neutral	3 (16.7)
	Somewhat Important	0 (0.0)	Disagree	4 (22.2)
	Not Important	1 (5.6)	Strongly Disagree	4 (22.2
	75% Consensus			
Performs discipline specific procedures in a skillful and safe manner, adapting to unanticipated findings or changing clinical circumstances	Very Important	7 (38.9)	Strongly Agree	6 (33.3)
	Important	8 (44.4)	Agree	2 (11.1)
	Neutral	2 (12.5)	Neutral	0 (0.0)
	Somewhat Important	0 (0.0)	Disagree	4 (22.2)
	Not Important	1 (5.6)	Strongly Disagree	6 (33.3)
	75% Consensus			
Follows proper prescribing practices to reduce the possibility of a medication adverse event, such as, avoiding dangerous abbreviations, seeking assistance from pharmacist when unsure of prescribing recommendations, paying attention to high risk medications such as insulin, opioids and anticoagulants, etc.)	Very Important	7 (41.2)	Strongly Agree	8 (44.4)
	Important	8 (47.1)	Agree	6 (33.3)
	Neutral	1 (5.9)	Neutral	0 (0.0)
	Somewhat Important	0 (0.0)	Disagree	2 (1.1)
	Not Important	1 (5.9)	Strongly Disagree	2 (1.1)
	75% Consensus			
Recognizes their knowledge and/or skill limitations and seeks assistance	Very Important	13 (72.2)	Strongly Agree	3 (16.7)
	Important	4 (22.2)	Agree	4 (22.2)
	Neutral	1 (5.6)	Neutral	0 (0.0)
	Somewhat Important	0 (0.0)	Disagree	7 (38.9)
	Not Important	0 (0.0	Strongly Disagree	4 (22.2)
	75% Consensus			
Where appropriate, incorporates possible medical error into the differential diagnosis	Very Important	5 (27.8)	Strongly Agree	7 (38.9)
	Important	7 (38.9)	Agree	2 (11.1)
	Neutral	0 (11.1)	Neutral	4 (22.2)
	Somewhat Important	4 (22.2)	Disagree	1 (5.6)
	Not Important	2 (11.1)	Strongly Disagree	4 (22.2)

Statement	Importance		Clarity	
Provides support to and assists others (patients, families, health professionals) with the impact of experiencing a patient safety incident.	Very Important	7 (38.9)	Strongly Agree	3 (16.7)
	Important	2 (11.1)	Agree	3 (16.7)
	Neutral	2 (11.1)	Neutral	5 (27.8)
	Somewhat Important	4 (22.2)	Disagree	3 (16.7)
	Not Important	3 (16.7)	Strongly Disagree	4 (22.2)
As appropriate, applies lessons learned from the analysis of a patient safety incident	Very Important	7 (41.2)	Strongly Agree	4 (22.2)
	Important	3 (17.6)	Agree	4 (22.2)
	Neutral	1 (5.9)	Neutral	1 (5.6)
	Somewhat Important	4 (22.2)	Disagree	4 (22.2)
	Not Important	1 (5.9)	Strongly Disagree	5 (27.8)
Recognizes patient safety hazards and threats to patient safety (involving clinical processes, equipment, technology, work interruptions, physical workplace set-up, etc.) and responds (e.g., alerting a supervisor or responsible individual)	Very Important	6 (33.3)	Strongly Agree	3 (16.7)
	Important	6 (33.3)	Agree	4 (22.2)
	Neutral	0 (0.0)	Neutral	7 (38.9)
	Somewhat Important	2 (11.1)	Disagree	2 (11.1)
	Not Important	4 (22.2)	Strongly Disagree	2 (11.1)
Completes a timely follow-up on patient's investigative tests	Very Important	2 (11.1)	Strongly Agree	8 (44.4)
	Important	10 (55.6)	Agree	6 (33.3)
	Neutral	0 (0.0)	Neutral	1 (5.6)
	Somewhat Important	2 (11.1)	Disagree	1 (5.6)
	Not Important	4(22.2)	Strongly Disagree	2 (11.1)
Selects and interprets investigations and therapeutic procedures based on a differential diagnosis	Very Important	0 (0.0)	Strongly Agree	5 (27.8)
	Important	7 (38.9)	Agree	2 (11.1)
	Neutral	0 (0.0)	Neutral	1 (5.6)
	Somewhat Important	8 (44.4)	Disagree	9 (50.0)
	Not Important	3 (16.7)	Strongly Disagree	1 (5.6)
Obtains and documents informed consent (through information sharing and decision-making with the patient), explaining the risks, benefits, and the rationale for the proposed procedure or therapy for that particular patient	Very Important	4 (22.22)	Strongly Agree	8 (44.4)
	Important	0 (0.0)	Agree	5 (27.8)
	Neutral	5 (27.8)	Neutral	5 (27.8)
	Somewhat Important	0 (0.0)	Disagree	0 (0.0)
	Not Important	9 (50.0)	Strongly Disagree	0 (0.0)

Statement	Importance		Clarity	
Integrates multiple sources of information (including team/health professional consultations), and considers risks and benefits, when developing a patient care plan	Very Important	4 (22.2)	Strongly Agree	5 (27.8)
	Important	0 (0.0)	Agree	2 (11.1)
	Neutral	0 (0.0)	Neutral	2 (11.1)
	Somewhat Important	6 (33.3)	Disagree	6 (33.3)
	Not Important	8 (44.4)	Strongly Disagree	3 (16.7)
Establishes and documents a plan for post-procedural care	Very Important	0 (0.0)	Strongly Agree	3 (16.7)
	Important	1 (5.6)	Agree	4 (22.2)
	Neutral	2 (11.1)	Neutral	7 (38.9)
	Somewhat Important	15 (83.3)	Disagree	4 (22.2)
	Not Important	0 (0.0)	Strongly Disagree	7 (38.9)
Performs appropriately timed clinical assessments and documents recommendations in an organized manner	Very Important	0 (0.0)	Strongly Agree	0 (0.0)
	Important	5 (27.8)	Agree	7 (38.9)
	Neutral	1 (5.6)	Neutral	5 (27.8)
	Somewhat Important	4 (22.2)	Disagree	3 (16.7)
	Not Important	8 (44.4)	Strongly Disagree	1 (5.6)
Triage a procedure or therapy based on urgency, potential deterioration, and available resources	Very Important	3 (16.7)	Strongly Agree	5 (27.8)
	Important	4 (22.2)	Agree	2 (11.1)
	Neutral	0 (0.0)	Neutral	2 (11.1)
	Somewhat Important	10 (55.6)	Disagree	6 (33.3)
	Not Important	1 (5.6)	Strongly Disagree	3 (16.7)
Demonstrates concern for patient and their family following a patient safety incident (e.g., checking on the patient more frequently, ensuring timely information)	Very Important	8 (44.4)	Strongly Agree	6 (33.3)
	Important	4 (22.2)	Agree	10 (55.6)
	Neutral	2 (11.1)	Neutral	0 (0.0)
	Somewhat Important	3 (16.7)	Disagree	2 (11.1)
	Not Important	1 (5.6)	Strongly Disagree	0 (0.0)

Condensed comments for the MEDICAL EXPERT ROLE:

- Consider making “models a just culture” item so it is more observable and accessible and focused
- Add something about collaboration with QI and patient safety professionals in incident investigations/debriefs
- Completing timely follow up on ordered investigations [is not] inherently unique to the patient safety competency – suggestion: utilizes approaches to track patient care investigations, especially across transition points in care, to mitigate risk'
- Move the consent item to Communication. Add an extended item for this under communication for “explaining the risks, benefits, and the rationale for the proposed procedure or therapy for that particular patient”

Importance and Clarity of CanMEDS Communicator Role items

Statement:	**Importance**		**Clarity**	
Seeks clarification on patient care and needs during a patient handover by asking questions and active listening of peers	Very Important	7 (38.9)	Strongly Agree	9 (52.9)
	Important	9 (50.0)	Agree	6 (35.3)
	Neutral	1 (5.6)	Neutral	1 (5.9)
	Somewhat Important	1 (5.6)	Disagree	0 (0.0)
	Not Important	0 (0.0)	Strongly Disagree	1 (5.9)
	75% Consensus		**75% Consensus**	
Addresses the patient's concerns during the informed consent process	Very Important	10 (55.6)	Strongly Agree	4 (22.2)
	Important	5 (27.8)	Agree	7 (38.9)
	Neutral	0 (0.0)	Neutral	3 (16.7)
	Somewhat Important	1 (5.6)	Disagree	2 (11.1)
	Not Important	2 (11.1)	Strongly Disagree	2 (11.1)
	75% Consensus			
Prepares comprehensive and timely discharge summaries	Very Important	8 (44.4)	Strongly Agree	5 (27.8)
	Important	9 (50.0)	Agree	12 (66.7)
	Neutral	1 (5.6)	Neutral	0 (0.0)
	Somewhat Important	0 (0.0)	Disagree	1 (5.6)
	Not Important	1 (5.6)	Strongly Disagree	0 (0.0)
	75% Consensus		**75% Consensus**	
Upholds their obligation to disclose and report harmful patient safety incidents to the appropriate supervisor, patients and family	Very Important	4 (25.0)	Strongly Agree	9 (56.3)
	Important	8 (50.0)	Agree	5 (31.3)
	Neutral	3 (18.8)	Neutral	2 (12.5)
	Somewhat Important	0 (0.0)	Disagree	0 (0.0)
	Not Important	1 (6.3)	Strongly Disagree	0 (0.0)
	75% Consensus		**75% Consensus**	
Appropriately performs (with supervisor) disclosure of safety incidents to patients in a sincere and caring manner	Very Important	13 (81.3)	Strongly Agree	8 (53.3)
	Important	3 (16.7)	Agree	6 (40.0)
	Neutral	0 (0.0)	Neutral	0 (0.0)
	Somewhat Important	2 (11.1)	Disagree	0 (0.0)
	Not Important	0 (0.0)	Strongly Disagree	1 (6.7)
	75% Consensus		**75% Consensus**	

Statement:	**Importance**		**Clarity**	
Communicates using a patient-centred approach that is characterized by empathy, respect, and compassion	Very Important	7 (38.9)	Strongly Agree	10 (55.6)
	Important	9 (50.0)	Agree	8 (50.0)
	Neutral	1 (5.6)	Neutral	0 (0.0)
	Somewhat Important	1 (5.6)	Disagree	0 (0.0)
	Not Important	0 (0.0)	Strongly Disagree	0 (0.0)
	75% Consensus		**75% Consensus**	
Documents/captures clinical encounters in an accurate, legible (including the avoidance of prohibited abbreviations), timely, and accessible manner, in compliance with regulatory authorities and privacy requirements	Very Important	7 (38.9)	Strongly Agree	1 (5.6)
	Important	8 (44.4)	Agree	2 (11.1)
	Neutral	2 (12.5)	Neutral	5 (27.8)
	Somewhat Important	0 (0.0)	Disagree	10 (55.6)
	Not Important	1 (5.6)	Strongly Disagree	0 (0.0)
	75% Consensus			
Utilizes communication strategies, such as call-outs, check-backs, SBARs to ensure that critical information is conveyed to the appropriate person and assesses if the information has been understood	Very Important	11 (64.7)	Strongly Agree	0 (0.0)
	Important	5 (29.4)	Agree	4 (26.7)
	Neutral	0 (0.0)	Neutral	1 (6.7)
	Somewhat Important	0 (0.0)	Disagree	9 (60.0)
	Not Important	1 (5.9)	Strongly Disagree	1 (6.7)
	75% Consensus			
Brings forward patient safety concerns to the appropriate person(s)	Very Important	12 (66.7)	Strongly Agree	12 (66.7)
	Important	4 (22.2)	Agree	3 (16.7)
	Neutral	1 (5.6)	Neutral	2 (22.2)
	Somewhat Important	0 (0.0)	Disagree	1 (5.6)
	Not Important	1 (5.6)	Strongly Disagree	0 (0.0)
	75% Consensus		**75% Consensus**	
Uses memory aides for safe prescribing practices when appropriate (i.e. opioid conversion dosing)	Very Important	2 (11.1)	Strongly Agree	13 (72.2)
	Important	1 (5.6)	Agree	4 (22.2)
	Neutral	0 (0.0)	Neutral	1 (5.6)
	Somewhat Important	14 (77.8)	Disagree	0 (0.0)
	Not Important	1 (5.6)	Strongly Disagree	0 (0.0)
			75% Consensus	

Statement:	**Importance**		**Clarity**	
Communicates effectively to provide safe transfers during a patient transition to a different health care professional, stage of care, or settings (institutions or discharge to community care) by ensuring transfer of patient information (update on diagnostic tests and results, changes in medication and indications for such change, discharge diagnosis, etc.) to their family physician and next provider in the system, updating patient medical records, by calling next provider directly, sending updates to patient pharmacist, etc..	Very Important Important Neutral Somewhat Important Not Important	5 (27.8) 2 (11.1) 7 (38.9) 2 (11.1 0 (0.0)	Strongly Agree Agree Neutral Disagree Strongly Disagree	6 (33.3) 6 (33.3) 0 (0.0) 2 (11.1) 4 (22.2)
Shares information with others in a manner that preserves privacy and confidentiality (e.g., using EMR)	Very Important Important Neutral Somewhat Important Not Important	5 (29.4) 5 (29.4) 3 (17.6) 0 (0.0) 4 (23.5)	Strongly Agree Agree Neutral Disagree Strongly Disagree	4 (23.5) 3 (17.6) 1 (5.9) 4 (23.5) 5 (29.4)
Communicates respectfully with others, including other health professionals, team members and the patient and the family	Very Important Important Neutral Somewhat Important Not Important	1 (5.6) 0 (0.0) 2 (11.1) 15 (83.3) 0 (0.0)	Strongly Agree Agree Neutral Disagree Strongly Disagree	6 (33.3) 2 (11.1) 9 (50.0) 0 (0.0) 1 (5.6)
Utilizes institutional standard order sets, care maps and protocols to enhance patient safety when appropriate (i.e. pre-admission orders, TPN orders, VTE prophylaxis, epidural analgesia)	Very Important Important Neutral Somewhat Important Not Important	1 (5.6) 0 (0.0) 2 (11.1) 6 (33.3) 9 (50.0)	Strongly Agree Agree Neutral Disagree Strongly Disagree	2 (11.1) 6 (33.3) 1 (5.6) 1 (5.6) 8 (44.4)

Condensed comments for the COMMUNICATOR ROLE:

- Consider differentiating the term 'disclosure' (restrict it to mean the communication with patient / family) from notifying (communicating with the chain of command)
- Add ‘memory aids’ as an example under safe prescribing practices (medical expert)
- Under the “utilizes comm strategies” add examples (call-outs, SBARS, check-backs)
- “Documents and captures clinical encounters…” is not resident relevant as written, but something related to documenting legibly is important to reduce misinterpretation and therefore PSIs.

Importance and Clarity of CanMEDS Collaborator Role items

Statement:	**Importance**		**Clarity**	
Works collaboratively (showing respect, actively listening during handover and meetings, provides timely and appropriate patient information) with other health care professionals to reduce fragmented care during patient transition points (from admission from emergency to ward/unit, discharge to community, move from hospital to another tertiary care centre, etc.)	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	7 (41.2) 8 (47.1) 1 (5.9) 0 (0.0) 1 (5.9)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	7 (46.7) 8 (53.3) 0 (0.0) 0 (0.0) 0 (0.0)
Utilizes structured communication tools to hand over patient care, including clarification roles and responsibilities, patient's condition and care plan, and any anticipated problems or safety issues and solutions.	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	7 (38.9) 8 (44.4) 2 (12.5) 0 (0.0) 1 (5.6)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	5 (31.3) 8 (50.0) 2 (12.5) 0 (0.0) 1 (6.3)
Recognizes and acts (with other health professionals) on patient safety issues that arise during the transfer of care	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	13 (72.2) 4 (22.2) 1 (5.6) 0 (0.0) 0 (0.0	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	7 (43.8) 5 (31.3) 2 (12.5) 1 (6.3) 1 (6.3)
Provides and accepts feedback to improve their individual performance and that of the team	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	9 (56.3) 5 (31.3) 2 (12.5) 0 (0.0) 0 (0.0)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	10 (62.5) 2 (12.5) 2 (12.5) 1 (5.6) 1 (5.6)
Shows respect, actively listens and engages with other health care providers, the patient and the family	Very Important Important	4 (22.2) 6 (33.3)	Strongly Agree Agree	5 (29.4) 5 (29.4)

Statement:	**Importance**		**Clarity**	
	Neutral	3 (16.7)	Neutral	3 (17.6)
	Somewhat Important	5 (27.8)	Disagree	2 (11.8)
	Not Important	0 (0.0)	Strongly Disagree	2 (11.8)
Accepts and delegates tasks in an appropriate and respectful manner	Very Important	9 (50.0)	Strongly Agree	2 (11.1)
	Important	4 (22.2)	Agree	2 (11.1)
	Neutral	0 (0.0)	Neutral	1 (5.6)
	Somewhat Important	3 (16.7)	Disagree	5 (27.8)
	Not Important	2 (11.1)	Strongly Disagree	8 (44.4)
Uses graded assertiveness technique (increasing degrees of assertion, ranging from low to high) with other health professionals or superiors when expressing a patient safety concern	Very Important	4 (22.2)	Strongly Agree	1 (5.6)
	Important	3 (16.7)	Agree	5 (33.3)
	Neutral	7 (38.9)	Neutral	0 (0.0)
	Somewhat Important	4 (22.2)	Disagree	0 (0.0)
	Not Important	0 (0.0)	Strongly Disagree	12 (75.0)
Demonstrates value for the professional contributions of the interprofessional team	Very Important	5 (27.8)	Strongly Agree	4 (26.7)
	Important	2 (11.1)	Agree	5 (33.3)
	Neutral	0 (0.0)	Neutral	4 (26.7)
	Somewhat Important	8 (44.4)	Disagree	1 (6.7)
	Not Important	3 (16.7)	Strongly Disagree	1 (6.7)

Condensed comments for the COLLABORATOR ROLE:

- Q7 nice one
- Add item on collaborating with QI and patient safety professionals
- Clean up wording on item #3 2nd bracket – add “e.g.,” and change last example to “transfer to different tertiary care center”

Importance and Clarity of CanMEDS Leader Role items

Statement:	**Importance**		**Clarity**	
Participates in the analysis of systems (root cause analysis or failure modes effect analysis) to improve underlying processes that can lead to patient safety incidents	Very Important	8 (50.0)	Strongly Agree	5 (27.8)
	Important	4 (25.0)	Agree	2 (11.1)
	Neutral	2 (12.5)	Neutral	2 (11.1)
	Somewhat Important	1 (6.3)	Disagree	6 (33.3)
	Not Important	1 (6.3)	Strongly Disagree	3 (16.7)
	75% Consensus			
Reports patient safety hazards (e.g., piece of equipment not working well; inefficient communication tool; unprofessional behaviour) in real-time and acts to correct and prevent them from reaching the patient	Very Important	9 (52.9)	Strongly Agree	9 (60.0)
	Important	6 (35.3)	Agree	5 (33.3)
	Neutral	1 (5.9)	Neutral	0 (0.0)
	Somewhat Important	0 (0.0)	Disagree	0 (0.0)
	Not Important	1 (5.9)	Strongly Disagree	1 (6.7)
	75% Consensus		**75% Consensus**	
Applies the correct policies when reporting a patient safety incident (harm event, near miss, and close call)	Very Important	7 (38.9)	Strongly Agree	7 (38.9)
	Important	8 (44.4)	Agree	9 (50.0)
	Neutral	2 (12.5)	Neutral	1 (5.6)
	Somewhat Important	0 (0.0)	Disagree	1 (5.6)
	Not Important	1 (5.6)	Strongly Disagree	0 (0.0)
	75% Consensus		**75% Consensus**	
Models patient safety by engaging others to participate in continuous quality improvement and patient safety activities	Very Important	8 (44.4)	Strongly Agree	9 (50.0)
	Important	6 (33.3)	Agree	6 (33.3)
	Neutral	1 (5.6)	Neutral	0 (0.0)
	Somewhat Important	3 (16.7)	Disagree	2 (11.1)
	Not Important	0 (0.0)	Strongly Disagree	1 (5.6)
	75% Consensus			
Leads a quality improvement initiative by acting as a change agent to identify opportunities and support others to abandon unsafe practices	Very Important	13 (81.3)	Strongly Agree	3 (16.7)
	Important	3 (16.7)	Agree	6 (33.3)
	Neutral	0 (0.0)	Neutral	1 (5.6)
	Somewhat Important	2 (11.1)	Disagree	0 (0.0)
	Not Important	0 (0.0)	Strongly Disagree	8 (44.4)

Statement:	**Importance**		**Clarity**	
	75% Consensus			
Employs resource allocation strategies to avoid overuse of finite health care resources and minimize wasteful practices	Very Important Important Neutral Somewhat Important Not Important	1 (5.6) 11 (61.1) 0 (0.0) 2 (11.1) 4 (22.2)	Strongly Agree Agree Neutral Disagree Strongly Disagree	12 (66.7) 0 (0.0) 3 (16.7) 1 (5.6) 2 (11.1)
Ensures patient follow-up is communicated to appropriate professionals (e.g., family doctor and other specialist involved in care, pharmacist, social worker) when a patient transitions through the system (e.g., emergency to nursing unit; discharge to another tertiary care centre, discharge to community)	Very Important Important Neutral Somewhat Important Not Important	5 (31.3) 2 (12.5) 6 (37.5) 0 (0.0) 3 (18.8)	Strongly Agree Agree Neutral Disagree Strongly Disagree	6 (35.3) 4 (23.5) 5 (29.4) 1 (5.9) 1 (5.9)
Role models safe and respectful practices	Very Important Important Neutral Somewhat Important Not Important	2 (11.1) 5 (27.8) 3 (16.7) 4 (22.2) 4 (22.2)	Strongly Agree Agree Neutral Disagree Strongly Disagree	7 (38.9) 2 (11.1) 4 (22.2) 1 (5.6) 4 (22.2)

Condensed comments for the LEADER ROLE:

- Item #1 – can remove brackets as these all fall under PSIs and there are additional ones that would need to be added to be inclusive
- Wouldn't list specific methodologies like RCA or FMEA - there are other approaches for analyzing systems

Importance and Clarity of CanMEDS Professional Role items

Statement:	**Importance**		**Clarity**	
Participates in practice reviews and practice quality improvement activities	Very Important Important Neutral Somewhat Important Not Important **75% Consensus**	8 (44.4) 6 (33.3) 0 (0.0) 0 (0.0) 1 (5.6)	Strongly Agree Agree Neutral Disagree Strongly Disagree **75% Consensus**	10 (55.6) 5 (27.8) 3 (16.7) 0 (0.0) 0 (0.0)

Statement:	**Importance**		**Clarity**	
Recognizes the relationship between personal wellness, performance and patient safety by taking appropriate action when there are potential risks (e.g., taking time away from work, not performing procedures or seeing patients for a period of time; discussing personal wellness issues with a professional and/or supervisor; getting proper sleep; etc.)	Very Important	7 (38.9)	Strongly Agree	6 (33.3)
	Important	9 (50.0)	Agree	8 (44.4)
	Neutral	1 (5.6)	Neutral	1 (5.6)
	Somewhat Important	1 (5.6)	Disagree	3 (16.7)
	Not Important	0 (0.0)	Strongly Disagree	0 (0.0)
	75% Consensus		**75% Consensus**	
Responds appropriately to unprofessional and/or unethical behaviours in physicians and other colleagues	Very Important	10 (55.6)	Strongly Agree	7 (41.2)
	Important	5 (27.8)	Agree	8 (47.1)
	Neutral	1 (5.6)	Neutral	1 (5.9)
	Somewhat Important	2 (11.1)	Disagree	0 (0.0)
	Not Important	0 (0.0)	Strongly Disagree	1 (5.9)
	75% Consensus		**75% Consensus**	
When faced with a patient safety incident, communication to the patient/family is based on facts known at the time, rather than supposition.	Very Important	15 (83.3)	Strongly Agree	13 (72.2)
	Important	2 (11.1)	Agree	1 (5.6)
	Neutral	0 (0.0)	Neutral	2 (11.1)
	Somewhat Important	1 (5.6)	Disagree	2 (11.1
	Not Important	0 (0.0)	Strongly Disagree	0 (0.0)
	75% Consensus		**75% Consensus**	
Applies principles of just culture to practice reviews	Very Important	1 (5.6)	Strongly Agree	0 (0.0)
	Important	4 (22.2)	Agree	4 (22.2)
	Neutral	2 (11.1)	Neutral	2 (11.1)
	Somewhat Important	8 (44.4)	Disagree	12 (66.7)
	Not Important	3 (16.7)	Strongly Disagree	0 (0.0)

Condensed comments for the PROFESSIONAL ROLE:

- Q2 patient and family- good one
- Q2 is great but needs rewording
- Consider an item on not criticizing other health care professionals in front of patients refrain

Importance and Clarity of CanMEDS Scholar Role items

Statement:	**Importance**		**Clarity**	
Contributes to the enhancement of their practice by critically appraising quality improvement and patient safety literature and evaluating its applicability to their practice	Very Important	13 (72.2)	Strongly Agree	7 (38.9)
	Important	4 (22.2)	Agree	7 (38.9)
	Neutral	1 (5.6)	Neutral	0 (0.0)
	Somewhat Important	0 (0.0)	Disagree	1 (5.6)
	Not Important	0 (0.0	Strongly Disagree	3 (16.7)
	75% Consensus		**75% Consensus**	
Observe, assess and provide feedback on learners' patient safety and quality improvement skills	Very Important	7 (38.9)	Strongly Agree	8 (44.4)
	Important	8 (44.4)	Agree	6 (33.3)
	Neutral	2 (12.5)	Neutral	2 (11.1)
	Somewhat Important	0 (0.0)	Disagree	3 (16.7)
	Not Important	1 (5.6)	Strongly Disagree	1 (53.6)
	75% Consensus		**75% Consensus**	
Participates in training and/or seeks guidance on how to properly disclose patient safety incidents	Very Important	11 (61.1)	Strongly Agree	9 (50.0)
	Important	6 (33.3)	Agree	4 (22.2)
	Neutral	1 (5.6)	Neutral	0 (0.0)
	Somewhat Important	0 (0.0)	Disagree	3 (16.7)
	Not Important	0 (0.0)	Strongly Disagree	2 (11.1)
	75% Consensus		**75% Consensus**	
Promotes a safe learning environment by appropriately delegating tasks to learners	Very Important	12 (70.6)	Strongly Agree	4 (22.2)
	Important	5 (29.4)	Agree	10 (55.6)
	Neutral	0 (0.0)	Neutral	3 (16.7)
	Somewhat Important	0 (0.0)	Disagree	0 (0.0)
	Not Important	0 (0.0)	Strongly Disagree	1 (5.6)
	75% Consensus		**75% Consensus**	
Instructs learners to recognize their limits and to seek greater supervision when needed	Very Important	10 (55.6)	Strongly Agree	11 (64.7)
	Important	5 (27.8)	Agree	6 (35.3)
	Neutral	0 (0.0)	Neutral	0 (0.0)
	Somewhat Important	1 (5.6)	Disagree	0 (0.0)
	Not Important	2 (11.1)	Strongly Disagree	0 (0.0)

Statement:	**Importance**		**Clarity**	
	75% Consensus		**75% Consensus**	
Questions contradictions between the unspoken/implicit academic curriculum (hidden curriculum) and the intended/explicit curriculum that could compromise patient safety and quality care	Very Important Important Neutral Somewhat Important Not Important	1 (5.6) 4 (22.2) 2 (22.2) 8 (44.4) 3 (16.7)	Strongly Agree Agree Neutral Disagree Strongly Disagree	6 (33.3) 6 (33.3) 0 (0.0) 2 (11.1) 4 (22.2)
Provides feedback to learners, faculty and team members to enhance performance, patient safety and quality improvement	Very Important Important Neutral Somewhat Important Not Important	7 (38.9) 2 (11.1) 4 (22.2) 1 (5.6) 4 (22.2)	Strongly Agree Agree Neutral Disagree Strongly Disagree	4 (22.2) 6 (33.3) 3 (16.7) 5 (27.8) 0 (0.0)

Condensed comments for the SCHOLAR ROLE:

- Add item on - participates or presents in scholarly presentations on patient safety and Quality Improvement
- Add item on - participates or presents in mortality and morbidity rounds

Importance and Clarity of CanMEDS Health Advocate Role items

Statement:	**Importance**		**Clarity**	
Identifies barriers to access (care and resources) for all patients and develops relevant mitigation strategies	Very Important	8 (50.0)	Strongly Agree	8 (44.4)
	Important	4 (25.0)	Agree	5 (27.8)
	Neutral	2 (12.5)	Neutral	2 (12.5)
	Somewhat Important	1 (6.3)	Disagree	0 (0.0)
	Not Important	1 (6.3)	Strongly Disagree	1 (6.3)
	75% Consensus		**75% Consensus**	
Advocates for a patient's procedure/therapy on the basis of urgency and available resources (consider Choosing Wisely guidelines) with the intent to avoid delayed diagnosis, or misdiagnosis, and treatment	Very Important	7 (41.2)	Strongly Agree	8 (44.4)
	Important	8 (47.1)	Agree	3 (16.7)
	Neutral	1 (5.9)	Neutral	1 (5.6)
	Somewhat Important	0 (0.0)	Disagree	6 (33.3)
	Not Important	1 (5.9)	Strongly Disagree	0 (0.0)
	75% Consensus			
Uses effective methods to advocate for safety improvements at the patient, provider, workplace and health care systems level	Very Important	11 (64.7)	Strongly Agree	4 (25.0)
	Important	4 (23.5)	Agree	8 (50.0)
	Neutral	0 (0.0)	Neutral	3 (18.8)
	Somewhat Important	1 (5.9)	Disagree	0 (0.0)
	Not Important	1 (5.9)	Strongly Disagree	1 (6.3)
	75% Consensus		**75% Consensus**	
Demonstrates awareness and knowledge of contextual and local influences on the processes of care, including access, and advocates within those contexts	Very Important	7 (38.9)	Strongly Agree	7 (41.2)
	Important	2 (11.1)	Agree	7 (41.2)
	Neutral	4 (22.2)	Neutral	2 (11.8)
	Somewhat Important	1 (5.6)	Disagree	0 (0.0)
	Not Important	4 (22.2)	Strongly Disagree	1 (5.9)

Appendix G

Pilot Test Survey

To whom it may concern:

You have been invited to take part in a research study that is seeking to develop a content valid Multisource Feedback (MSF)/360-degree assessment tool designed to measure residents' patient safety skills. At this time, stakeholders are being asked to provide feedback on a draft copy MSF/360-degree assessment tool. As a potential end user of the tool, your input is considered to be highly valuable.

Given your role and the time commitment required to participate we are providing you an honorarium. Please see the bottom of the next page of this survey for information needed by our finance office to complete the payment of the honorarium.

In this phase of the study respondents are being asked to indicate if you think the survey items are important to include in a tool that is being designed to assess residents' patient safety skills. In addition, respondents are being asked to indicate of the items are clearly written, suggestions for an appropriate rating scale, and the feasibility and utility of the tool within your setting.

Taking part in this study is completely anonymous and voluntary. Completion of this online survey is expected to take approximately 90 minutes. It is up to you to decide whether or not to complete the online questionnaire. There are no known direct benefits or risks to completing this survey. You can withdraw from the study by not submitting or completing the survey. You may exit the questionnaire at any time. You may also skip any questions that you do not wish to answer or make you feel uncomfortable. Your reply will be kept confidential as the results are anonymous. Only myself, as PI of the project, and my PhD supervisor will have access to the data. Once the data comes back, identifying information will be extracted from the raw data and data will be presented in aggregate format. Further information related to the study rationale and objectives are provided on the following page.

The Provincial Health Research Ethics Board (HREB) in Newfoundland and Labrador has approved the plans for this research study. The rationale and objectives for this study are contained on the next page. Please know that completing this questionnaire implies consent to have your responses reviewed and analyzed by the research team, used in aggregate format for dissemination, and potentially used to inform the development of relevant training curricula and/or the development of policies/procedures.

Please feel free to forward any questions about this project to Ms. Patti McCarthy via email (pattimccarthy@mun.ca) or telephone (709) 864-6676.
Thank you for taking the time to complete this survey.

Payment of Honoraria:

As a participant of this study and to help compensate you for your time commitment required to review the following survey, we are offering you a $150 honorarium. In order for the Finance Department, Faculty of Medicine, Memorial University to pay you this honorarium we need you to provide the following information: Name, SIN and home address (space has been provided below to enter this information).

This personal information is only for the purposes of payment of the honorarium and will therefore be separated from the data as responses are received, and then forwarded to our finance administrator for immediate processing. There will be no way of linking data to specific responses. All data will be reported in an aggregate and anonymous format. As each response is received, payment information will be forwarded to our finance officer and the information will be permanently deleted from the survey file.

Information for honorarium payment

First Name Last Name
SIN
Street address
City/Town
Postal Code

Sincerely,

Patti McCarthy, MSc, PhD Candidate

Discipline of Family Medicine
Room 2714, Health Science Centre
Memorial University
St. John's, NL A1B 3V6
Phone: (709) 864-6676
Fax: (709) 864-3382
pattimccarthy@mun.ca | www.med.mun.ca/familymed

Section A: Scale

Please review the following scales and indicate below which scale you feel is more appropriate for use in assessing residents' patient safety competence:

Scale #1: LEVEL OF EXPECTATON

1 = Not Observable
1 = Well Below Expected
2 = Below Expected
3 = Expected
4 = Above Expected
5 = Well Above Expected

Scale #2: LEVEL OF AGREEMENT

0 = Not Observable
1 = Strongly Disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly Agree

Scale #3: ENTRUSTABILITY

0 = No opportunity to observe or not applicable
1 = Resident cannot perform this task/skill, even with assistance
2 = Resident can preform this task/skill, but only with assistance
3 = Resident can perform this task/skill under indirect supervision
4 = Resident can perform this task/skill independently
5 = Resident can act as an instructor or supervisor for this task/skill (aspirational)

Scale #4: PERFORMANCE

1 - 2 Well Below Expected
3 - 4 Below Expected
5 Expected
6 - 7 Above Expected
8 - 9 Well Above Expected
N/O Not Observable

Please indicate which scale (1, 2,3 or 4 above) you feel is most appropriate for assessing residents' patient safety skills:

☐ Scale #1 is most appropriate
☐ Scale #2 is most appropriate
☐ Scale #3 is most appropriate
☐ Scale #4 is most appropriate
☐ Either scale is appropriate
☐ Neither of these scales are appropriate

If you checked "#6. Neither of these scales are appropriate," could you please use the space below to provide alternative suggestions to a scale:

Section B: Open Ended Sections

Key stakeholders and experts recommended to include an open-ended section where raters could provide concrete examples of the resident's behaviors that they have observed directly and strategies on how to make improvements in those areas. These open-ended sections would appear after each domain of competency statements which are organized under CanMEDS Roles.

Please review the draft wording for these statements below and indicate (1) Level of agreement with the IMPORTANCE of including this section in a resident's patient safety assessment tool, you (2) Level of agreement with the CLARITY of the statement. and (3) if either statement is unclear as written use the space below each statement to provide suggestions for alternate wording.

1. *Under the "x" CanMEDS Role, please provide concrete objective examples of resident's behaviour <u>you</u> have witnessed. Note: Please only include examples you have directly observed.*
2. *Please provide the resident with one or more strategies for improvement in this CanMEDS competency domain.*

Section C: Rating of competency statements for importance and clarity

For each of the items below, indicate the level of importance for including that item in a patient safety assessment tool for residents. Also indicate your agreement with the clarity of the wording of each item.

Adjacent to each item in the Delphi survey: If this item is unclear in terminology, interpretation or meaning, please describe how so or provide recommendations on how best to increase the clarity of the wording.

Medical Expert Patient Safety Skills

1. Identifies gaps in care delivery that might pose a risk to providing safe, high-quality patient care
2. Follows up on a patient's initial care plan to ensure identified tasks get completed, updated and communicated to the team and the patient
3. Integrates patient safety activities into routine daily practice (e.g., hand hygiene, use of appropriate check lists, standard order sets, safety huddles, and standard handoff processes)

4. Following a patient safety incident, he/she responds to the patients': clinical care needs, emotional needs, informational needs
5. Differentiates patient harm due to the natural progression of disease from all other potential sources of harm (e.g., medications with similar shape and packaging)
6. Recognizes, responds to and reports near-misses
7. Uses cognitive aids, such as procedural checklists, consistent communication systems, tools, or care paths, to enhance patient safety
8. Considers concurrent illness and concurrent medications when prescribing to avoid drug-drug interactions or contraindicated medications
9. Identifies existing procedures or policies that may be unsafe or inconsistent with best practices and takes action to address such concerns (e.g., alerting a supervisor or person responsible)
10. Demonstrates a fair, non-punitive attitude and approach when patient safety incidents occur
11. Reports patient safety incidents and talks to co-workers and students about them
12. Performs procedures in a skillful & safe manner
13. Follows proper prescribing practices to reduce preventable patient harm (e.g., memory aides, excludes abbreviations, consults with a pharmacist, refers nomograms and uses standard order sets)
14. Seeks assistance due to limitations in knowledge or skill
15. Safely prescribes high risk medications
16. Mitigates further injury by prioritizing initial medical response to a harmful incident
17. Tracks patient care investigations, especially across transition points in care

Communicator Skills

1. Seeks clarification on patient care and needs during a patient handover by asking questions and active listening of peers
2. Addresses the patient's concerns during the informed consent process, explaining the risks, benefits, and the rationale for the proposed procedure or therapy for that particular patient
3. Prepares comprehensive and timely discharge summaries
4. Upholds their obligation to disclose harmful patient safety incidents to patients and family and report them to the appropriate supervisor/staff
5. Accurately and appropriately performs (with supervisor) disclosure of safety incidents to patients in a sincere and caring manner
6. Patient communication is characterized by empathy, respect, and compassion
7. Legibly documents information for patients, colleagues and team members in an effort to reduce misinterpretation and potential patient safety incidents
8. Utilizes communication strategies to ensure that critical information is conveyed to the appropriate person and assesses if the information has been understood

9. Reports patient safety concerns, both patient and environmental, to the appropriate person(s)
10. Explains to patients the details of procedures or therapies, including the risks, benefits, and the rationale for them

Collaborator Skills

1. Works collaboratively (showing respect, actively listening during handover and meetings, provides timely and appropriate patient information) with other health care professionals to reduce fragmented care during patient transition points (e.g., from admission from emergency to ward/unit, discharge to community, move from hospital to another tertiary care centre)
2. Utilizes structured communication tools to hand over patient care, including clarification roles and responsibilities, patient's condition and care plan, and any anticipated problems or safety issues and solutions.
3. Recognizes and acts (with other health professionals) on patient safety issues that arise during processes of care (e.g., during patient transfer, central line insertion, daily rounds)
4. Provides and accepts feedback to improve their individual performance and that of the team
5. Collaborates with quality and patient safety professionals when carrying out incident investigations/debriefs

Leader Skills

1. Participates in the analysis of systems to improve underlying processes that can lead to patient safety incidents
2. Reports patient safety hazards (e.g., piece of equipment not working well; inefficient communication tool; unprofessional behaviour) in real-time and acts to correct and prevent them from reaching the patient
3. Applies the correct reporting processes following a patient safety incident
4. Acts to engage others in continuous quality improvement and patient safety initiatives
5. Identifies quality improvement opportunities and support others to abandon unsafe practices

Professional Skills

1. Participates in practice reviews and practice quality improvement activities
2. Recognizes the relationship between personal wellness, performance and patient safety by taking appropriate action when there are potential risks (e.g., personal time, not performing procedures or seeing patients for a period of time; discussing personal wellness issues with a professional and/or supervisor; getting proper sleep)

3. Responds appropriately to unprofessional and/or unethical behaviours in physicians and other colleagues
4. Communication about a patient safety incident with patient/family is based on facts known at the time, rather than supposition
5. Refrains from unprofessional behaviours towards staff in front of patients/families (e.g., criticizing)

Scholar Skills

1. Contributes to the enhancement of their practice by critically appraising quality improvement and patient safety literature and evaluating its applicability to their practice
2. Promotes a safe learning environment by appropriately delegating tasks to learners
3. Instructs learners to recognize their limits and to seek greater supervision when needed
4. Observe, assess and provide feedback on learners' patient safety and quality improvement skills
5. Participates in training and/or seeks guidance on how to properly disclose patient safety incidents
6. Presents or participates in mortality and morbidity rounds
7. Presents or participates in scholarly presentations on patient safety and quality
8. Participates in research that focuses on patient safety and QI

Health Advocate Skills

1. Identifies barriers to access (care and resources) for all patients and develops relevant mitigation strategies
2. Advocates for a patient's procedure/therapy on the basis of urgency and available resources with the intent to avoid delayed diagnosis, or misdiagnosis, and treatment
3. Advocates for safety improvements at the patient, provider, workplace and health care systems level

Appendix H

Pilot Test Survey Results

Importance of survey items across cohorts

Medical Expert Survey Items	Allied Health (n = 10)	Nurses (n = 11)	Faculty (n = 14)	Residents (n = 17)
Identifies gaps in care delivery that might pose a risk to providing safe, high-quality patient care	Very Important 7/10	Important 9/11	Very Important 9/14	Very Important 11/17
Follows up on a patient's initial care plan to ensure identified tasks get completed, updated and communicated to the team and the patient	Very Important 6/10	Very Important 11/11	Very Important 9/1	Very Important 17/11
Integrates patient safety activities into routine daily practice (e.g., hand hygiene, use of appropriate check lists, standard order sets, safety huddles, and standard handoff processes)	Very Important 6/10	Important 6/11	Very Important 11/14	Very Important 9/17
Following a patient safety incident or close call, he/she responds to the patients': - Clinical care needs - Emotional needs - Informational needs	Very Important 8/10	Very Important 7/11	Very Important 11/14	Very Important 17/17
Differentiates patient harm due to the natural progression of disease from all other potential sources of harm (e.g., medications with similar shape and packaging)	Very Important 10/10	Very Important 6/11	Very Important 8/14	Important 16/17
Reports patient safety incidents and talks to co-workers and students about them	Very Important 5/10	Important 11/11	Very Important 11/14	Important 13/17
Recognizes, responds to and reports near-misses	Important 7/10	Very Important 9/11	Very Important 14/14	Important 13/17
Uses cognitive aids, such as procedural checklists, consistent communication systems, tools, or care paths, to enhance patient safety	Important 7/10	Very Important 8/11	Very Important 14/14	Somewhat important 9/17

Considers concurrent illness and concurrent medications when prescribing to avoid drug-drug interactions or contraindicated medications	Very Important 10/10	Very Important 6/11	Very Important 14/14	Very Important 17/17
Identifies existing procedures or policies that may be unsafe or inconsistent with best practices and takes action to address such concerns (e.g., alerting a supervisor or person responsible)	Very Important 10/10	Very Important 9/11	Very Important 14/14	Very Important 14/17
Demonstrates a fair, non-punitive attitude and approach when patient safety incidents occur	Very Important 9/10	Important 9/11	Somewhat important 14/14	Somewhat important 17/17
Perform procedures in a skillful & safe manner	Very Important 10/10	Important 8/11	Very Important 11/14	Very Important 15/17
Follows proper prescribing practices to reduce preventable patient harm (e.g., memory aides, excludes abbreviations, consults with a pharmacist, refers to nomograms and uses standard order sets)	Very Important 10/10	Very Important 9/11	Very Important 14/14	Very Important 17/17
Seeks assistance due to limitations in knowledge or skill	Very Important 8/10	Important 7/11	Very Important 8/14	Very Important 9/17
Mitigates further injury by prioritizing initial medical response to a harmful incident	Important 7/10	Very Important 7/11	Very Important 14/14	Very Important 17/17
Safely prescribes high risk medications	Important 8/10	Important 9/11	Very Important 12/14	Very Important 14/17
Tracks patient care investigations, especially across transition points in care	Very Important 8/10	Important 7/11	Very Important 8/14	Very Important 9/17

Communicator Survey Items	**Allied Health (n = 10)**	**Nurses (n = 11)**	**Faculty (n = 14)**	**Residents (n = 17)**
Seeks clarification on patient care and needs during a patient handover by asking questions and active listening of peers	Important 9/10	Important 11/11	Neutral/ Somewhat Important 7/14	Very important 16/17
Addresses the patient's concerns during the informed consent process, explaining the risks, benefits, and the rationale for the proposed procedure or therapy for that particular patient	Important 7/10	Very Important 7/11	Very Important 10/14	Very Important 9/17
Prepares comprehensive and timely discharge summaries	Very Important 10/10	Very important 8/11	Very Important 8/14	Somewhat important 9/11
Upholds their obligation to disclose harmful patient safety incidents to patients and family and reports them to the appropriate supervisor/staff	Very Important 10/10	Very important 8/11	Neutral 13/14	Very Important 17/17
Accurately and appropriately performs (with supervisor) disclosure of safety incidents to patients in a sincere and caring manner	Very Important 10/10	Very Important 7/11	Very Important 12/14	Very important 9/11
Patient communication is characterized by empathy, respect, and compassion	Very Important 7/10	Very Important 7/11	Very Important 14/14	Very important 9/11
Legibly documents information for patients, colleagues and team members in an effort to reduce misinterpretation and potential patient safety incidents	Very Important 7/10	Very Important 10/11	Neutral 13/14	Very Important 17/17
Utilizes communication strategies, such as call -outs, check-backs, SBARs to ensure that critical information is conveyed to the appropriate person and assesses if the information has been understood	Very Important 7/10	Very Important 7/11	Neutral 12/14	Very Important 17/17

Reports patient safety concerns, both patient and environmental, to the appropriate person(s)	Very Important 10/10	Very Important 7/11	Very Important 12/14	Very Important 17/17
Explains to patients the details of procedures or therapies, including the risks, benefits, and the rationale for them	Very Important 9/10	Very Important 8/11	Important 9/14	Very Important 17/17

Collaborator Survey Items	**Allied Health (n = 10)**	**Nurses (n = 11)**	**Faculty (n = 14)**	**Residents (n = 17)**
Collaborates with quality and patient safety professionals when carrying out incident investigations/debriefs	Very Important 10/10	Very Important 11/11	Very Important 7/14	Very important 16/17
Provides and accepts feedback to improve their individual performance and that of the team	Important 10/10	Very Important 10/11	Very Important 14/14	Very Important 8/17
Works collaboratively (showing respect, actively listening during handover and meetings, provides timely and appropriate patient information) with other health care professionals to reduce fragmented care during patient transition points (e.g., admission from emergency to ward/unit, discharge to community, transfer to another tertiary care centre)	Very Important 8/10	Very important 10/11	Very Important 8/14	Somewhat important 14/11
Utilizes structured communication tools to hand over patient care, including clarification roles and responsibilities, patient's condition and care plan, and any anticipated problems or safety issues and solutions	Very Important 10/10	Very important 8/11	Neutral 13/14	Very Important 17/17
Recognizes and acts (with other health professionals) on patient safety issues that arise during processes of care (e.g., during patient transfer, central line insertion, daily rounds)	Very Important 10/10	Very Important 7/11	Very Important 12/14	Very important 11/11

Leader Survey Items	**Allied Health (n = 10)**	**Nurses (n = 11)**	**Faculty (n = 14)**	**Residents (n = 17)**
Applies the correct reporting processes following a patient safety incident	Very Important 7/10	Very Important 7/11	Very Important 14/14	Very Important 17/17
Participates in the analysis of systems to improve underlying processes that can lead to patient safety incidents	Very Important 5/10	Important 11/11	Very Important 12/14	Somewhat important 9/17
Reports patient safety hazards (e.g., piece of equipment not working well; inefficient communication tool; unprofessional behaviour) in real-time and acts to correct and prevent them from reaching the patient	Somewhat Important 6/10	Very Important 11/11	Very Important 8/14	Somewhat important 9/11
Acts to engage others in continuous quality improvement and patient safety initiatives	Very Important 10/10	Important 8/11	Very Important 9/14	Very Important 17/17
Identifies quality improvement opportunities and support others to abandon unsafe practices	Important 9/10	Very Important 6/11	Neutral 13/14	Very Important 17/17

Professionalism Survey Items	**Allied Health (n = 10)**	**Nurses (n = 11)**	**Faculty (n = 14)**	**Residents (n = 17)**
Recognizes the relationship between personal wellness, performance and patient safety by taking appropriate action when there are potential risks (e.g., personal time, not performing procedures or seeing patients for a period of time; discussing personal wellness issues with a professional and/or supervisor; getting proper sleep)	Very Important 10/10	Very Important 11/11	Very Important 14/14	Very Important 15/17
Communication about a patient safety incident with	Very Important	Somewhat important	Very Important	Important

patient/family is based on facts known at the time, rather than supposition	5/10	11/11	8/14	9/17
Responds appropriately to unprofessional and/or unethical behaviours in physicians and other colleagues	Somewhat Important 7/10	Very Important 7/11	Very Important 14/14	Very Important 17/17
Participates in practice reviews and practice quality improvement activities	Very Important 5/10	Somewhat important 11/11	Very Important 14/14	Very Important 16/17
Refrains from unprofessional behaviours towards staff in front of patients/families (e.g., criticizing)	Very Important 7/10	Very Important 7/11	Very Important 14/14	Very Important 17/17

Scholar Survey Items	**Allied Health (n = 10)**	**Nurses (n = 11)**	**Faculty (n = 14)**	**Residents (n = 17)**
Contributes to the enhancement of their practice by critically appraising quality improvement and patient safety literature and evaluating its applicability to their practice	Important 7/10	Very Important 7/11	Very Important 14/14	Very Important 17/17
Promotes a safe learning environment by appropriately delegating tasks to learners	Very Important 6/10	Somewhat important 11/11	Very Important 8/14	Somewhat important 9/11
Instructs learners to recognize their limits and to seek greater supervision when needed	Important 7/10	Important 7/11	Neutral 14/14	Very Important 17/17
Observe, assess and provide feedback on learners' patient safety and quality improvement skills	Very Important 10/10	Important 8/11	Very Important 9/14	Very Important 17/17
Participates in training and/or seeks guidance on how to properly disclose patient safety incidents	Important 7/10	Very Important 7/11	Very Important 14/14	Very Important 17/17
Presents or participates in mortality and morbidity rounds	Neutral 8/10	Important 7/11	Important 13/14	Important 15/17

Presents or participates in scholarly presentations on patient safety and quality	Important 7/10	Neutral 7/11	Very Important 14/14	Very Important 17/17
Participates in research that focuses on patient safety and QI	Somewhat Important 10/10	Important 8/11	Very Important 14/14	Very Important 17/17

Health Advocate Survey Items	**Allied Health (n = 10)**	**Nurses (n = 11)**	**Faculty (n = 14)**	**Residents (n = 17)**
Identifies barriers to access (care and resources) for all patients and develops relevant mitigation strategies	Neutral 7/10	Important 11/11	Very Important 8/14	Very important 11/11
Advocates for a patient's procedure/therapy on the basis of urgency and available resources with the intent to avoid delayed diagnosis, or misdiagnosis, and treatment	Very Important 10/10	Very important 8/11	Very Important 14/14	Very important 10/11
Advocates for safety improvements at the patient, provider, workplace and health care systems level	Very Important 6/10	Very important 8/11	Very Important 14/14	Very important 11/11

Clarity of survey items across cohorts

Medical Expert Survey Items	**Allied Health (n = 10)**	**Nurses (n = 11)**	**Faculty (n = 14)**	**Residents (n = 17)**
Identifies gaps in care delivery that might pose a risk to providing safe, high-quality patient care	Agree 10/10	Strongly Agree 8/11	Strongly Agree 10/14	Strongly Agree 11/17
Follows up on a patient's initial care plan to ensure identified tasks get completed, updated and communicated to the team and the patient	Agree 10/10	Strongly Agree 11/11	Strongly Agree 7/14 Agree 7/14	Strongly Agree 11/17
Integrates patient safety activities into routine daily	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree

practice (e.g., hand hygiene, use of appropriate check lists, standard order sets, safety huddles, and standard handoff processes)	10/10	11/11	11/14	16/17
Following a patient safety incident or close call, he/she responds to the patients': - Clinical care needs - Emotional needs Informational needs	Agree 7/10	Strongly Agree 11/11	Strongly Agree 11/14	Strongly Agree 13/17
Differentiates patient harm due to the natural progression of disease from all other potential sources of harm (e.g., medications with similar shape and packaging)	Strongly Agree 7/10	Strongly Agree 11/11	Strongly Agree 11/14	Strongly Agree 11/17
Reports patient safety incidents and talks to co-workers and students about them	Agree 8/10	Agree 9/11	Strongly Agree 8/14	Agree 15/17
Recognizes, responds to and reports near-misses	Strongly Agree 5/10 Agree 5/10	Neutral 8/11	Strongly Agree 10/14	Strongly Agree 17/17
Uses cognitive aids, such as procedural checklists, consistent communication systems, tools, or care paths, to enhance patient safety	Strongly Agree 8/10	Strongly Agree 11/11	Strongly Agree 11/14	Strongly Agree 13/17
Considers concurrent illness and concurrent medications when prescribing to avoid drug-drug interactions or contraindicated medications	Strongly Agree 10/10	Strongly Agree 11/11	Strongly Agree 9/14	Strongly Agree 16/17
Identifies existing procedures or policies that may be unsafe or inconsistent with best practices and takes action to address such concerns (e.g., alerting a supervisor or person responsible)	Strongly Agree 9/10	Strongly Agree 11/11	Strongly Agree 10/14	Strongly Agree 17/17
Demonstrates a fair, non-punitive attitude and approach when patient safety incidents occur	Strongly Agree 8/10	Strongly Agree 11/11	Strongly Agree 14/14	Strongly Agree 12/17

Perform procedures in a skillful & safe manner	Agree 10/10	Strongly Agree 11/11	Strongly Agree 14/14	Strongly Agree 15/17
Follows proper prescribing practices to reduce preventable patient harm (e.g., memory aides, excludes abbreviations, consults with a pharmacist, refers to nomograms and uses standard order sets)	Strongly Agree 10/10	Strongly Agree 11/11	Strongly Agree 14/14	Strongly Agree 17/17
Seeks assistance due to limitations in knowledge or skill	Strongly Agree 10/10	Strongly Agree 11/11	Strongly Agree 14/14	Strongly Agree 10/17
Mitigates further injury by prioritizing initial medical response to a harmful incident	Neutral 6/10	Disagree 7/11	Neutral 8/14	Disagree 14/17
Safely prescribes high risk medications	Agree 9/10	Strongly Agree 11/11	Strongly Agree 14/14	Strongly Agree 12/17
Tracks patient care investigations, especially across transition points in care	Agree 10/10	Strongly Agree 11/11	Strongly Agree 14/14	Strongly Agree 15/17

Communicator Survey Items	**Allied Health (n = 10)**	**Nurses (n = 11)**	**Faculty (n = 14)**	**Residents (n = 17)**
Seeks clarification on patient care and needs during a patient handover by asking questions and active listening of peers	Strongly Agree 10/10	Strongly Agree 11/11	Strongly Agree 14/14	Strongly Agree 17/17
Addresses the patient's concerns during the informed consent process, explaining the risks, benefits, and the rationale for the proposed procedure or therapy for that particular patient	Strongly Agree 10/10	Strongly Agree 11/11	Strongly Agree 14/14	Strongly Agree 9/14
Prepares comprehensive and timely discharge summaries	Strongly Agree 10/10	Strongly Agree 11/11	Strongly Agree 14/14	Agree 14/17

Upholds their obligation to disclose harmful patient safety incidents to patients and family and reports them to the appropriate supervisor/staff	Strongly Agree 10/10	Agree 10/11	Agree 8/14	Strongly Agree 17/17
Accurately and appropriately performs (with supervisor) disclosure of safety incidents to patients in a sincere and caring manner	Strongly Agree 10/10	Strongly Agree 11/11	Strongly Agree 14/14	Strongly Agree 17/17
Patient communication is characterized by empathy, respect, and compassion	Strongly Agree 10/10	Strongly Agree 11/11	Strongly Agree 14/14	Strongly Agree 17/17
Legibly documents information for patients, colleagues and team members in an effort to reduce misinterpretation and potential patient safety incidents	Strongly Agree 10/10	Strongly Agree 11/11	Agree 8/14	Agree 17/17
Utilizes communication strategies, such as call -outs, check-backs, SBARs to ensure that critical information is conveyed to the appropriate person and assesses if the information has been understood	Strongly Agree 10/10	Strongly Agree 11/11	Agree 11/14	Strongly Agree 17/17
Reports patient safety concerns, both patient and environmental, to the appropriate person(s)	Strongly Agree 10/10	Strongly Agree 11/11	Strongly Agree 14/14	Agree 17/17
Explains to patients the details of procedures or therapies, including the risks, benefits, and the rationale for them	Strongly Agree 10/10	Strongly Agree 11/11	Agree 10/14	Agree 17/17

Collaborator Survey Items	**Allied Health (n = 10)**	**Nurses (n = 11)**	**Faculty (n = 14)**	**Residents (n = 17)**
Collaborates with quality and patient safety professionals when carrying out incident investigations/debriefs	Strongly Agree 10/10	Strongly Agree 11/11	Strongly Agree 14/14	Strongly Agree 17/17
Provides and accepts feedback to improve their individual	Strongly Agree	Strongly Agree	Agree	Strongly Agree

performance and that of the team	10/10	11/11	11/14	17/17
Works collaboratively (showing respect, actively listening during handover and meetings, provides timely and appropriate patient information) with other health care professionals to reduce fragmented care during patient transition points (e.g., admission from emergency to ward/unit, discharge to community, transfer to another tertiary care centre)	Strongly Agree 10/10	Strongly Agree 11/11	Strongly Agree 14/14	Strongly Agree 17/17
Utilizes structured communication tools to hand over patient care, including clarification roles and responsibilities, patient's condition and care plan, and any anticipated problems or safety issues and solutions	Strongly Agree 10/10	Strongly Agree 11/11	Agree 14/14	Strongly Agree 17/17
Recognizes and acts (with other health professionals) on patient safety issues that arise during processes of care (e.g., during patient transfer, central line insertion, daily rounds)	Strongly Agree 10/10	Strongly Agree 11/11	Agree 11/14	Agree 8/17

Leader Survey Items	**Allied Health (n = 10)**	**Nurses (n = 11)**	**Faculty (n = 14)**	**Residents (n = 17)**
Applies the correct reporting processes following a patient safety incident	Strongly Agree 10/10	Strongly Agree 8/11	Strongly Agree 9/14	Strongly Agree 15/17
Participates in the analysis of systems to improve underlying processes that can lead to patient safety incidents	Agree 7/10	Neutral 6/11	Agree 9/14	Agree 8/17
Reports patient safety hazards (e.g., piece of equipment not working well; inefficient communication tool; unprofessional behaviour) in real-time and acts to correct and	Strongly Agree 8/10	Strongly Agree 8/11	Strongly Agree 14/14	Strongly Agree 17/17

prevent them from reaching the patient				
Acts to engage others in continuous quality improvement and patient safety initiatives	Agree 10/10	Agree 7/11	Agree 8/14	Agree 8/17
Identifies quality improvement opportunities and support others to abandon unsafe practices	Strongly Agree 10/10	Strongly Agree 11/11	Agree 7/14 Strongly Agree 7/14	Strongly Agree 17/17

Professionalism Survey Items	**Allied Health (n = 10)**	**Nurses (n = 11)**	**Faculty (n = 14)**	**Residents (n = 17)**
Recognizes the relationship between personal wellness, performance and patient safety by taking appropriate action when there are potential risks (e.g., personal time, not performing procedures or seeing patients for a period of time; discussing personal wellness issues with a professional and/or supervisor; getting proper sleep)	Strongly Agree 10/10	Strongly Agree 11/11	Strongly Agree 14/14	Strongly Agree 17/17
Communication about a patient safety incident with patient/family is based on facts known at the time, rather than supposition	Agree 9/10	Strongly Agree 11/11	Strongly Agree 14/14	Strongly Agree 17/17
Responds appropriately to unprofessional and/or unethical behaviours in physicians and other colleagues	Agree 7/10	Strongly Agree 11/11	Strongly Agree 14/14	Strongly Agree 16/17
Participates in practice reviews and practice quality improvement activities	Strongly Agree 10/10	Strongly Agree 11/11	Strongly Agree 8/14	Strongly Agree 8/17
Refrains from unprofessional behaviours towards staff in front of patients/families (e.g., criticizing)	Strongly Agree 10/10	Strongly Agree 10/11	Strongly Agree 10/14	Strongly Agree 10/17

Scholar Survey Items	**Allied Health (n = 10)**	**Nurses (n = 11)**	**Faculty (n = 14)**	**Residents (n = 17)**
Contributes to the enhancement of their practice by critically appraising quality improvement and patient safety literature and evaluating its applicability to their practice	Strongly Agree 8/10	Strongly Agree 11/11	Strongly Agree 8/14	Strongly Agree 17/17
Promotes a safe learning environment by appropriately delegating tasks to learners	Strongly Agree 6/10	Strongly Agree 8/11	Strongly Agree 14/14	Strongly Agree 17/17
Instructs learners to recognize their limits and to seek greater supervision when needed	Disagree 8/10	Strongly Agree 11/11	Strongly Agree 14/14	Agree 12/17
Observe, assess and provide feedback on learners' patient safety and quality improvement skills	Strongly Agree 9/10	Strongly Agree 11/11	Strongly Agree 14/14	Strongly Agree 17/17
Participates in training and/or seeks guidance on how to properly disclose patient safety incidents	Strongly Agree 7/10	Strongly Agree 11/11	Strongly Agree 14/14	Strongly Agree 17/17
Presents or participates in mortality and morbidity rounds	Strongly Agree 6/10	Strongly Agree 11/11	Strongly Agree 14/14	Strongly Agree 17/17
Presents or participates in scholarly presentations on patient safety and quality	Strongly Agree 8/10	Strongly Agree 11/11	Strongly Agree 14/14	Agree 8/17
Participates in research that focuses on patient safety and QI	Strongly Agree 10/10	Agree 11/11	Agree 8/14	Strongly Agree 13/17

Health Advocate Survey Items	**Allied Health (n = 10)**	**Nurses (n = 11)**	**Faculty (n = 14)**	**Residents (n = 17)**
Identifies barriers to access (care and resources) for all patients and develops relevant mitigation strategies	Agree 6/10	Strongly Agree 11/11	Strongly Agree 14/14	Agree 9/17

Advocates for a patient's procedure/therapy on the basis of urgency and available resources with the intent to avoid delayed diagnosis, or misdiagnosis, and treatment	Strongly Agree 9/10	Strongly Agree 11/11	Strongly Agree 14/14	Strongly Agree 9/14
Advocates for safety improvements at the patient, provider, workplace and health care systems level	Strongly Agree 10/10	Strongly Agree 11/11	Strongly Agree 14/14	Agree 14/17

Appendix I

Supervisor & Colleague PSAT$^{360°}$ Survey

Survey Instructions:

Please use the entrustability scale below to assess the resident on the skill below. This scale is based on a graded level of skill development and associated independence to perform tasks. If you are unable to assess the resident for a particular task, check off the **0 = No opportunity observe**

The following statements describe some of a physician's patient safety skills, which are organized under each of the 7 CanMEDS Roles.

Please rate the resident on each of the statements listed below using the 5-point scale. Other raters will be assessing the resident using a similar entrustability scale. The scale below will allow for comparison of ratings.

At the end of each CanMEDS role are 2 small narrative sections for you to (i) enter in concrete examples of the resident's behaviour, as well as (ii) a place to provide strategies on how they can build specific skills.

Entrustability Scale:

0 = No opportunity to observe or not applicable

1 = Resident cannot perform this task/skill, even with assistance

2 = Resident can perform this task/skill, but only with assistance

3 = Resident can perform this task/skill under indirect supervision

4 = Resident can perform this task/skill independently

5 = Resident can act as an instructor or supervisor for this task/skill (aspirational)

Medical Expert **Patient Safety Skills**	**0**	**1**	**2**	**3**	**4**	**5**
Identifies gaps in care delivery that might pose a risk to providing safe, high-quality patient care						
Follows up on a patient's initial care plan to ensure identified tasks get completed, updated and communicated to the team and the patient						
Integrates patient safety activities into routine daily practice (e.g., hand hygiene, use of appropriate check lists, standard order sets, safety huddles, and standard handoff processes)						
Following a patient safety incident, he/she responds to the patients': clinical care needs, emotional needs, informational needs						
Differentiates patient harm due to the natural progression of disease from all other potential sources of harm (e.g., medications with similar shape and packaging)						

Medical Expert **Patient Safety Skills**	**0**	**1**	**2**	**3**	**4**	**5**
Recognizes, responds to and reports near-misses						
Uses cognitive aids, such as procedural checklists, consistent communication systems, tools, or care paths, to enhance patient safety						
Considers concurrent illness and concurrent medications when prescribing to avoid drug-drug interactions or contraindicated medications						
Identifies existing procedures or policies that may be unsafe or inconsistent with best practices and takes action to address such concerns (e.g., alerting a supervisor or person responsible)						
Demonstrates a fair, non-punitive attitude and approach when patient safety incidents occur						
Reports patient safety incidents and talks to co-workers and students about them						
Performs procedures in a skillful & safe manner						
Follows proper prescribing practices to reduce preventable patient harm (e.g., memory aides, excludes abbreviations, consults with a pharmacist, refers nomograms and uses standard order sets)						
Seeks assistance due to limitations in knowledge or skill						
Safely prescribes high risk medications						
Prioritizes the initial medical response to a harmful patient safety incident to mitigate further injury						
Tracks patient care investigations, especially across transition points in care						
Under the **Medical Expert Role,** please provide **concrete, objective examples** of the resident's behaviour you have witnessed. **Please ONLY include examples you have directly observed.**						
Please provide the resident with **one or more** strategies for improvement in this CanMEDS competency domain.						

Communicator **Survey Items**	**0**	**1**	**2**	**3**	**4**	**5**
Seeks clarification on patient care and needs during a patient handover by asking questions and active listening of peers						
Addresses the patient's concerns during the informed consent process, explaining the risks, benefits, and the rationale for the proposed procedure or therapy for that particular patient						

Communicator **Survey Items**	**0**	**1**	**2**	**3**	**4**	**5**
Prepares comprehensive and timely discharge summaries						
Reports patient safety incidents to the appropriate supervisor/staff						
Accurately and appropriately performs (with supervisor) disclosure of safety incidents to patients in a sincere and caring manner						
Patient communication is characterized by empathy, respect, and compassion						
Legibly documents information for patients, colleagues and team members in an effort to reduce misinterpretation and potential patient safety incidents						
Utilizes communication strategies to ensure that critical information is conveyed to the appropriate person and assesses if the information has been understood						
Reports patient safety concerns, both patient and environmental, to the appropriate person(s)						
Explains to patients the details of procedures or therapies, including the risks, benefits, and the rationale for them						
Under the **Communicator Role,** please provide **concrete, objective examples** of the resident's behaviour <u>you</u> have witnessed. **Please ONLY include examples you have directly observed yourself.**						
Please provide the resident with **one or more** strategies for improvement in this CanMEDS competency domain.						

Collaborator **Survey Items**	**0**	**1**	**2**	**3**	**4**	**5**
Works collaboratively (showing respect, actively listening during handover and meetings, provides timely and appropriate patient information) with other health care professionals to reduce fragmented care during patient transition points (e.g., from admission from emergency to ward/unit, discharge to community, move from hospital to another tertiary care centre)						
Utilizes structured communication tools to hand over patient care, including any anticipated problems or safety issues and solutions						

Recognizes and acts (with other health professionals) on patient safety issues that arise during processes of care (e.g., during patient transfer, central line insertion, daily rounds)						
Provides and accepts feedback to improve their individual performance and that of the team						
Collaborates with quality and patient safety professionals when carrying out incident investigations/debriefs						
Under the **Collaborator Role,** please provide **concrete, objective examples** of the resident's behaviour you have witnessed. **Please ONLY include examples you have directly observed yourself.**						
Please provide the resident with **one or more** strategies for improvement in this CanMEDS competency domain.						

Leader **Survey Items**	**0**	**1**	**2**	**3**	**4**	**5**
Participates in the analysis of systems to improve underlying processes that can lead to patient safety incidents						
Reports patient safety hazards (e.g., piece of equipment not working well; inefficient communication tool; unprofessional behaviour) in real-time and acts to correct and prevent them from reaching the patient						
Applies the correct reporting processes following a patient safety incident						
Acts to engage others in continuous quality improvement and patient safety initiatives						
Identifies quality improvement opportunities and support others to abandon unsafe practices						
Under the **Leader Role,** please provide **concrete, objective examples** of the resident's behaviour you have witnessed. **Please ONLY include examples you have directly observed yourself.**						
Please use the space below to provide the resident with strategies for improvement in this competency domain.						

Professionalism **Survey Items**	**0**	**1**	**2**	**3**	**4**	**5**
Participates in practice reviews and practice quality improvement activities						
Takes appropriate action when there are potential risks due to personal wellness (e.g., personal time, not performing procedures or seeing patients for a period of time, discussing						

personal wellness issues with a professional and/or supervisor, getting proper sleep)						
Responds appropriately to unprofessional and/or unethical behaviours in physicians and other colleagues						
Communication about a patient safety incident with patient/family is based on facts known at the time, rather than supposition						
Refrains from unprofessional behaviours towards staff in front of patients/families (e.g., criticizing)						
Under the **Professional Role,** please provide **concrete, objective examples** of the resident's behaviour you have witnessed. **Please ONLY include examples you have directly observed yourself.**						
Please provide the resident with **one or more** strategies for improvement in this CanMEDS competency domain.						

Scholar Survey Items	**0**	**1**	**2**	**3**	**4**	**5**
Contributes to the enhancement of their practice by critically appraising quality improvement and patient safety literature and evaluating its applicability to their practice						
Promotes a safe learning environment by appropriately delegating tasks to learners						
Instructs learners to recognize their limits and to seek greater supervision when needed						
Observe, assess and provide feedback on learners' patient safety and quality improvement skills						
Participates in training and/or seeks guidance on how to properly disclose patient safety incidents						
Presents or participates in mortality and morbidity rounds						
Presents or participates in scholarly presentations on patient safety and quality						
Participates in research that focuses on patient safety and quality improvement						
Under the **Scholar Role**, please provide **concrete, objective examples** of the resident's behaviour you have witnessed. **Please ONLY include examples you have directly observed yourself.**						
Please provide the resident with **one or more** strategies for improvement in this CanMEDS competency domain.						

Health Advocate **Survey Items**	**0**	**1**	**2**	**3**	**4**	**5**
Develop strategies to mitigate barriers to access for all patients						
Advocates for a patient's procedure/therapy on the basis of urgency and available resources with the intent to avoid delayed diagnosis, or misdiagnosis, and treatment						
Advocates for safety improvements at the patient, provider, workplace and health care systems level						
Under the **Health Advocate Role,** please provide **concrete, objective examples** of the resident's behaviour you have witnessed. **Please ONLY include examples you have directly observed yourself.**						
Please provide the resident with **one or more** strategies for improvement in this CanMEDS competency domain.						

Appendix J

Resident PSAT$^{360°}$ Survey

Survey Instructions:

This form is used by a variety of resident s, therefore, not all of the following items may be relevant to you. If any of these items are **NOT** relevant to you, mark these "**Unable to Assess**".

The following statements describe some of a physician's patient safety skills, which are organized under each of the 7 CanMEDS Roles.

Please rate yourself on each of the statements listed using the 5-point scale to the right. Your raters will be using an entrustability scale on for surveys. The scale below will allow for comparison of ratings.

Resident Name:

Entrustability Scale:

0 = I have not had an opportunity to build that skill
1 = I cannot complete this task, even with assistance
2 = I can complete this task, but only with assistance
3 = I can complete this task under indirect supervision
4 = I can do this task on my own (independently/without supervision)
5 = I can teach this skill to others

Medical Expert **Patient Safety Skills**	**0**	**1**	**2**	**3**	**4**	**5**
Identify gaps in care delivery that might pose a risk to providing safe, high-quality patient care						
Follow-up on a patient's initial care plan to ensure identified tasks get completed, updated and communicated to the team and the patient						
Integrate patient safety activities into routine daily practice (e.g., hand hygiene, use of appropriate check lists, standard order sets, safety huddles, and standard handoff processes)						
Following a patient safety incident, respond to the patients': clinical care needs, emotional needs, informational needs						
Differentiate patient harm due to the natural progression of disease from all other potential sources of harm (e.g., medications with similar shape and packaging)						
Recognize, respond to, and report near-misses						

Use cognitive aids, such as procedural checklists, consistent communication systems, tools, or care paths, to enhance patient safety						
Consider concurrent illness and concurrent medications when prescribing to avoid drug-drug interactions or contraindicated medications						
Identify existing procedures or policies that may be unsafe or inconsistent with best practices and takes action to address such concerns (e.g., alerting a supervisor or person responsible)						
Demonstrate a fair, non-punitive attitude and approach when patient safety incidents occur						
Report patient safety incidents and talks to co-workers and students about them						
Perform procedures in a skillful & safe manner						
Follow proper prescribing practices to reduce preventable patient harm (e.g., memory aides, excludes abbreviations, consults with a pharmacist, refers nomograms and uses standard order sets)						
Seek assistance due to limitations in knowledge or skill						
Safely prescribe high risk medications						
Prioritize the initial medical response to a harmful patient safety incident to mitigate further injury						
Track patient care investigations, especially across transition points in care						

Communicator **Patient Safety Skills**	**0**	**1**	**2**	**3**	**4**	**5**
Seeks clarification on patient care and needs during a patient handover by asking questions and active listening of peers						
Addresses the patient's concerns during the informed consent process, explaining the risks, benefits, and the rationale for the proposed procedure or therapy for that particular patient						
Prepares comprehensive and timely discharge summaries						
Reports patient safety incidents to the appropriate supervisor/staff						
Accurately and appropriately performs (with supervisor) disclosure of safety incidents to patients in a sincere and caring manner						

Patient communication is characterized by empathy, respect, and compassion						
Legibly documents information for patients, colleagues and team members in an effort to reduce misinterpretation and potential patient safety incidents						
Utilizes communication strategies to ensure that critical information is conveyed to the appropriate person and assesses if the information has been understood						
Reports patient safety concerns, both patient and environmental, to the appropriate person(s)						
Explains to patients the details of procedures or therapies, including the risks, benefits, and the rationale for them						

Collaborator **Patient Safety Skills**	**0**	**1**	**2**	**3**	**4**	**5**
Work collaboratively (showing respect, actively listening during handover and meetings, provides timely and appropriate patient information) with other health care professionals to reduce fragmented care during patient transition points (e.g., from admission from emergency to ward/unit, discharge to community, move from hospital to another tertiary care centre)						
Utilize structured communication tools to hand over patient care, including any anticipated problems or safety issues and solutions						
Recognize and acts (with other health professionals) on patient safety issues that arise during processes of care (e.g., during patient transfer, central line insertion, daily rounds)						
Provide and accepts feedback to improve their individual performance and that of the team						
Collaborate with quality and patient safety professionals when carrying out incident investigations/debriefs						

Leader **Patient Safety Skills**	**0**	**1**	**2**	**3**	**4**	**5**
Participate in the analysis of systems to improve underlying processes that can lead to patient safety incidents						

Report patient safety hazards (e.g., piece of equipment not working well; inefficient communication tool; unprofessional behaviour) in real-time and acts to correct and prevent them from reaching the patient						
Apply the correct reporting processes following a patient safety incident						
Act to engage others in continuous quality improvement and patient safety initiatives						
Identify quality improvement opportunities and support others to abandon unsafe practices						

Professionalism **Patient Safety Skills**	**0**	**1**	**2**	**3**	**4**	**5**
Participates in practice reviews and practice quality improvement activities						
Takes appropriate action when there are potential risks due to personal wellness (e.g., personal time, not performing procedures or seeing patients for a period of time, discussing personal wellness issues with a professional and/or supervisor, getting proper sleep)						
Responds appropriately to unprofessional and/or unethical behaviours in physicians and other colleagues						
Communication about a patient safety incident with patient/family is based on facts known at the time, rather than supposition						
Refrains from unprofessional behaviours towards staff in front of patients/families (e.g., criticizing)						

Scholar **Patient Safety Skills**	**0**	**1**	**2**	**3**	**4**	**5**
Contribute to the enhancement of their practice by critically appraising quality improvement and patient safety literature and evaluating its applicability to their practice						
Promote a safe learning environment by appropriately delegating tasks to learners						
Instruct learners to recognize their limits and to seek greater supervision when needed						
Observe, assess and provide feedback on learners' patient safety and quality improvement skills						
Participate in training and/or seeks guidance on how to properly disclose patient safety incidents						

Present or participate in mortality and morbidity rounds						
Present or participate in scholarly presentations on patient safety and quality						
Participate in research that focuses on patient safety and quality improvement						

Health Advocate **Patient Safety Skills**	**0**	**1**	**2**	**3**	**4**	**5**
Develop strategies to mitigate barriers to access for all patients						
Advocate for a patient's procedure/therapy on the basis of urgency and available resources with the intent to avoid delayed diagnosis, or misdiagnosis, and treatment						
Advocate for safety improvements at the patient, provider, workplace and health care systems level						

Appendix K:

Patient PSAT$^{360°}$ Survey

Patient PSAT$^{360°}$ Survey

Questionnaire Instructions:	**Information about you and your visit:**
On the next page you will see a list of statements related to the health care you receive and your interaction with your doctor on the left side of the page. Use the scale on the right-hand side to indicate how much you agree with each statement. If you feel you do not have enough information to fairly assess an item, please mark it as **"unable to asses".**	**Age**: - under 18 - 19-25 - 26- 34 - 35-44 - 45 -54 - 55-64 - 65 and over **Gender**: - Male - Female - Other **Over the last two years how often have you seen this resident?** - once - 2-3 times - 4-6 times - More than 6 times **Today's visit is mainly for:** New concern Ongoing concern Examination Procedure Other **Resident's Name:**

The Resident:	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree	Not able to assess
Explains my health problem to me in a way that I can easily understand.						
Gives me details of when I need to see the doctor or others who help with my health care						
Provides answers to questions that I have about - my condition - treatments - procedures - impact of my condition or treatments on my life						
Listens to my health concerns						
Considers how my life situation, cultural, emotional, religious, family needs may impact care decisions						
Respects my choices about treatments						
Listens to my fears and worries						
Includes me and/or my family in decisions						
Treats me with respect						
Takes time to discuss my health concerns						
Explains why he/she is recommending an examination or procedure						
Explains examinations or procedures before they are preformed						
Explains what to expect following an examination or procedure, before it is performed						
Explains all treatments options to me, including possible complications or side effects and benefits						

Explains results of tests I have done, whether the results are good or poor						
Explains my prescriptions to me (how to take it, side effects, interactions with other medicine)						
Confirms with me which current medicines I am taking and my financial ability to pay before writing a new prescription						
Asks about any non-prescription medicine (e.g., Aspirin, Tylenol, herbs, vitamins, etc.)						
Explains what to do if my problem does not get better or worsens						
Sends me to other health professionals (e.g., specialist physicians, dieticians, nutritionist, massage therapists, physiotherapists, etc.) when necessary						
Follows up with when my health problem is serious						
Talks to me about staying healthy (weight loss, exercise, sleep habits, smoking, alcohol, etc.)						
Washes his/her hands at the start and end of the						
I feel comfortable asking this resident questions						
Follows me through the health care system and stays in touch with my care (e.g. follows-up on tests done by other specialists, follows-up when I transition from hospital to home, etc.)						
Is professional and ethical in their approach to patient care						