DEVELOPMENT OF SELF-GUIDED PRE-SURGICAL OPTIMIZATION RESOURCES FOR OLDER ADULTS

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Abstract

Background: Surgical complications are a significant concern for older adults. Pre-surgical optimization is one method that has shown promise in preventing complications. However, these programs can be labour intensive for providers which is further compounded by provider shortages. Self-optimization offers a plausible alternative, enabling patients to independently improve their health before surgery to enhance their surgical outcomes.

Purpose: To develop self-guided pre-surgical optimization resources for older adults.

Methods: An integrative literature review of 22 sources was conducted, incorporating an embedded environmental scan and consultations with Island Health's pre-admissions clinic, surgical services and quality improvement experts.

Results: Two main themes emerged from the literature: 1) critical self-guided optimization elements for older adults preparing for surgery and 2) effective strategies for educating and preparing older adults for surgery, along with six subthemes. The review and consultations provided insights into developing resources for (1) quitting smoking, (2) improving nutrition, and (3) increasing physical activity before surgery, to best meet the needs of older adults in self-guided pre-surgical optimization within the health authority.

Implications: There is a critical need for pre-surgical optimization resources for older adults, offering clear, evidence-based guidance to improve health before surgery and ensure better outcomes. The resource should focus on lifestyle modifications, such as nutrition, physical activity, and smoking cessation, which are particularly important for older adults.

Key Words: Pre-surgical optimization, older adults, self-guided resource, patient education, surgical complications prevention.

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Introduction

Surgical complications pose a significant health risk for older adults, ranking as the third leading cause of death globally (7.7%), surpassed only by ischemic heart disease and stroke (Nepogodiev et al., 2019). Annually, 4.2 million deaths are attributed to perioperative complications, with the highest burden observed among older adults and individuals with underlying medical conditions (Nepogodiev et al., 2019). Concerningly, one in four older adults experiences some form of post-operative complication following elective surgery (Watt et al., 2018). A systematic review and meta-analysis by Watt et al. (2018) further highlight that modifiable risk factors play a significant role in these complications, emphasizing the importance of pre-surgical interventions in preventing adverse outcomes in this vulnerable population.

Pre-surgical optimization involves health promoting and improvement activities prior to surgery to reduce the likelihood of surgical complications. This preventative approach is helpful in minimizing intra and post-operative risks (McLaughlin et al., 2021). Certain optimization elements, such as anemia management, require healthcare provider directed interventions (Shander et al., 2023). However, other modifiable risk factors, including nutrition, smoking cessation, glycemic control, and physical activity can be effectively addressed through self-directed optimization without intensive pre-admission clinic management (Surgical Patient Optimization Collaborative [SPOC], 2022a). Given provider shortages and the growing aging population, particularly on Vancouver Island (Provincial Services Health Authority, 2024), relying solely on provider-driven programming is neither feasible nor sustainable (Hedden et al., 2021). Self-directed, pre-surgical optimization resources for older adults empower patients to take control of their own health to help reduce the likelihood of surgical complications (McDonald et al., 2019).

While provincial programs exist to assist healthcare providers in pre-surgical optimization efforts (SPOC, 2022a), patient facing resources often require significant provider support and assume access to digital devices and digital literacy, creating barriers for many older adults (SPOC, 2022b). Additionally, existing resources lack adaptation to local context and do not address the unique needs of older adults. Developing tailored, evidence-based, self-guided pre-surgical optimization resources that align with local needs can bridge this gap, providing older adults with accessible tools to improve their surgical outcomes.

Objectives

The primary objective of this practicum project was to develop pre-surgical optimization resources for older adults, offering evidence-based strategies to improve their health prior to elective surgery. The secondary objectives achieved during this project were:

1. Develop evidence-based recommendations for self-guided pre-surgical optimization resources for older adults.
2. Identify barriers to the effectiveness of self-guided pre-surgical optimization resources for older adults, through expert consultations.
3. Identify available resources that are relevant and accessible to older adults to include in the self-guided resources.
4. Demonstrate advanced nursing practice competencies by applying evidence-based practices and leadership skills in the development of the resources.

Overview of Methods

This practicum project used two main methods to meet the project objectives and inform the overall development of the self-guided, pre-surgical optimization resources. First, an integrative review was conducted to ensure the resources were informed by current best

practices. During the literature review, available resources relevant and accessible to older adults were identified based on emerged themes from the literature (see Appendix A). Second, consultations were conducted to gain an understanding of pre-surgical optimization needs of older adults from the perspective of healthcare leadership and expert clinical staff, as well as how to support them through self-guided resources (see Appendix B). The knowledge gained from both the literature review and consultations was integrated to develop the self-guided pre-surgical optimization resources for older adult patients (see Appendix C).

Summary of the Literature Review

To ensure that the pre-surgical optimization resources were evidence-based, an integrative literature review was conducted following the approach outlined by Whittemore and Knafl (2005). This methodology provided a systematic framework for synthesizing qualitative, qualitative, review and mixed methods studies. A search was performed using CINAHL, PubMed, Scopus, and the Nursing and Allied Health Databases. Additionally, grey literature was searched using Google, Google Scholar and Open Grey. The search strategy incorporated subject headings, MeSH terms and keywords, including “pre-operative”, “pre-surgical”, “optimization”, “prehabilitation”, “enhanced recovery”, “ERAS”, “self-guided education”, “education”, “older adults”, and “seniors”. All quantitative, qualitative, reviews, mixed methods studies and grey literature were considered for inclusion. Studies were selected for inclusion in the review if they:

- Contained older adult populations (60+ years of age).
- Examined written educational approaches for older adults, with an emphasis on pre-surgical self-guided resources.
- Were peer-reviewed or grey literature.
- Were published in English between September 2014 to September 2024

Studies were excluded if they:

- Focused on provider-driven interventions without potential for self-management.
- Were non-research articles (e.g., editorials, opinion pieces, conference abstracts, book chapters, or commentaries).

In total, 22 research studies were included. Of which, 11 studies were quantitative, six were reviews, four were qualitative and one was mixed methods.

All research studies in the integrative review were evaluated using critical appraisal tools appropriate for their study type and design. All quantitative studies and reviews were critically appraised using the Public Health Agency of Canada (PHAC, 2014) *Critical Appraisal Toolkit*. All qualitative studies were evaluated using the *Joanna Briggs Institute (JBI) Checklist for Qualitative Research* (JBI, 2017). Overall, the quality of the studies ranged from medium to high. The quantitative studies included six high quality studies and five medium quality studies. Of the reviews, five were rated as high quality, and one as medium quality. Each of the qualitative studies were considered to be sufficient quality for inclusion to the review.

Data were organized and analyzed in table format. Two major themes and six subthemes emerged from the included literature. The themes included:

1) Critical elements of pre-surgical optimization for older adults, which was divided into subthemes of smoking cessation, physical activity and nutrition, and

2) Educational interventions and techniques, which was subdivided into sub-themes of providing rationale for change, creating resources for those with low digital health literacy, and designed with age related changes in mind.

Theme 1: Critical Elements of Pre-Surgical Optimization. The literature review identified a strong correlation between smoking, nutritional status, and physical activity with

post-operative complications. These three factors were recognized as the most critical pre-operative health optimization elements for reducing surgical risks.

Several studies demonstrated an association between pre-operative smoking and adverse surgical outcomes. Haeuser et al. (2021) found that increased age was significantly associated with higher probability of developing complications, with the association becoming stronger with each year of age (P= 0.045). Pre-operative smoking has been linked to an increased incidence of surgical site infections, wound dehiscence, implant failures, unexpected returns to the operating room, cardiac complications, and post-operative delirium (Agrawal et al., 2021; Ely et al., 2020; Johnson et al., 2021; Karamanos et al., 2016; Kashanchi et al., 2021; Thomas & Leitman, 2018; Kim et al., 2020; Zhang et al., 2024). These findings reiterated the importance of smoking cessation as a pre-surgical optimization factor to reduce serious post-operative complications.

Similarly, pre-operative nutritional status plays an important role in preventing serious surgical complications. In a retrospective cohort study, Johnson et al. (2021) found that older patients with low serum albumin levels had 3.7 times higher odds of developing a post-operative infection and, increasingly concerning, a 7.2 times higher odds of 30-day mortality. A meta-analysis of 15 studies (N = 3831) found a statistically significant decrease in the incidence of both infectious (RR; 95%CI 0.6 [0.5–0.7]; $p < 0.01$) and non-infectious complications (RR; 95%CI 0.7 [0.6–0.9]; $p < 0.01$) after pre-surgical nutritional support (Jing-Xia et al., 2015).

Physical activity was another important optimization element identified through the literature review. Lee et al. (2019) investigated the impact of baseline physical activity on the incidence of post-operative delirium. The findings indicated that regular physical activity was associated with 74% lower odds of developing post-operative delirium (OR = 0.26; 95% CI =

0.08-0.82), concluding that physical activity increases physiological reserves and reduces the incidence of post-operative complications such as delirium. Similarly, the systematic review and meta-analysis by Hughes et al. (2019) highlighted the benefits of pre-operative physical fitness and emphasized its role in improving post-operative outcomes in older adults, including morbidity (OR 0.63 95% CI 0.46–0.87 I 2 34%, p = 0.005).

In addition to the optimization elements, the environmental scan conducted during the literature review identified several evidence-based supports and community resources available to assist older adults in pre-surgical optimization. There were a variety of community-based programs that provide structured exercise and nutrition guidance tailored to older adults. Telephone support services offer personalized coaching for those who may have limited access to in-person programs or mobility issues. Additionally, financial assistance programs were identified to help those facing economic barriers to accessing optimization interventions.

Theme 2: Educational Interventions and Techniques. The second major theme identified in the literature review focuses on educational strategies that support pre-surgical optimization in older adults. Three key subthemes emerged: (1) providing a rationale for change, (2) accommodating individuals with low digital health literacy, and (3) designing educational materials that consider age-related changes.

The Health Belief Model (HBM) is a widely recognized theory of health behavior change, emphasizing that individuals are more likely to engage in health-promoting behaviors if they: (1) perceive a health risk, (2) recognize the severity of that risk, and (3) believe that taking action can effectively reduce it (Becker, 1974). Integrating the HBM into pre-surgical optimization materials could enhance patient engagement by helping older adults understand how their health choices directly impact surgical outcomes.

Digital health literacy emerged as a critical factor during the literature review for ensuring the accessibility of pre-surgical educational resources. The literature indicated that 40.3% of older adult respondents lacked confidence in using information on the Internet to help them make health decisions, and 21.1% did not know how to use the Internet to answer their health-related questions (Canada Health Infoway, 2023). These barriers underscore the need for non-digital, user-friendly educational materials.

Further research has identified that inequalities in digital health literacy is a further important consideration in developing pre-surgical optimization resources for older adults. A cross-sectional study by Gordon and Hornbrook (2018) explored the digital divide among seniors from diverse racial and ethnic backgrounds. The findings revealed that older adults, particularly Black, Latino, and Filipino, have less access to digital devices, less online experience and feel less capable of seeking health information online compared to their white peers. Given these limitations, low barrier access options, such as print materials, were identified as the most effective for creating self-guided pre-surgical optimization resources.

Educational materials should be designed to accommodate age-related changes in cognition and vision. A large longitudinal study (N= 3138) by Playdon et al. (2016) found that 60.9% of older adults preferred printed materials such as books, magazines, or pamphlets for health information. Additionally, participants preferred having headings in written education material to easily navigate the information, and preferred underlining bolding, and making headings in a larger text size and colour. Older adults also preferred sans-serif fonts with a minimum size of 14 for readability (Wilson & Read, 2016). They also preferred shorter sentences, words, and paragraphs (Playdon et al., 2016). The use of visual aids was also preferred, but the visual aid needed to support the material and make it easier to understand

(Edmonds et al., 2017). Older adults expressed a preference for photographs over graphics, and for visual aids that represented diversity in race, sex, age, and body size (Edmonds et al., 2017; Playdon et al., 2016).

Summary of Consultations

A series of consultations with local clinical experts and respected administrative staff within Island Health were conducted. The overall purpose of the consultations was to gain an understanding from healthcare leaders and optimization experts on the pre-surgical optimization needs of older adults and how to support them through self-guided resources. This was done so that expert advice could be incorporated into the content and design of the optimization guide.

Consultations took place within Island Health in British Columbia which is the regional health authority providing healthcare services to those who live on Vancouver Island and the Gulf Islands. Those selected for consultations included esteemed healthcare leaders and experts involved in the care of older adults in the pre-operative period. Requests for consultations were done via email with a formal letter of consultation request. All the consultations were structured with open-ended, pre-formulated questions to help guide the conversation to achieve the objectives of the consultations. There was also an opportunity during the consultation for the experts to openly discuss any additional topics they deemed relevant to this project. The consultations lasted approximately 15-20 minutes and were conducted virtually.

The individuals consulted were selected from diverse roles and positions within Island Health to provide a broad range of perspectives to help inform the development of the guide. A regional healthcare executive (n = 1) was included to provide a high level view on the need for the pre-surgical optimization resources. Pre-admission clinical leaders (n=2) were invited to share input on the current state of care and the specific needs of older adults before surgery. A

physician (n = 1) with expertise in optimization was included to provide clinical expertise to ensure that the resources are evidence based and aligned with clinic practices. Additionally, a pre-admission clinic nurse (n = 1) was consulted to help provide further context on patient concerns, questions, and needs.

Ethically, the *Health Research Ethics Authority Screening Tool* (HREA, 2023) was used to determine if review by the ethics board was necessary. Since consultations were a part of a quality improvement project, an ethics board review was not required. There was no anticipated harm from engaging in professional consultations. Furthermore, organizational permission was sought and granted to commence the practicum project, which encompassed the consultations.

Data management was important throughout the consultation process. Detailed notes were kept during each consultation to ensure accuracy. Following the consultations, discussion summaries were drafted with a word processor on a password protected computer with no identifiers to maintain confidentiality. The notes were compared across consultations, and the information was synthesized into themes and organized for description in report format. All notes were securely destroyed after the consultations to ensure confidentiality.

The consultations proved valuable in providing insights that could not have been possible to obtain through the literature review alone. Through the six different consultations a variety of perspectives emerged. However, there were many commonalities identified. There were six main themes that highlighted: 1) the need for pre-surgical optimization, 2) the importance of concise and engaging materials, 3) critical content to include, 4) the organizational use of existing materials, 5) pathways to implementation, and 6) the consulting team’s perspectives on patient concerns.

All of consulted experts agreed that pre-surgical optimization interventions are critical for improving surgical outcomes. Consultants stated that there was an inequity between different hospital sites, emphasizing that patients in rural and remote areas would benefit from self-guided resources as in these areas in-person services are limited. Additionally, they stressed the importance of ensuring that professional contacts remain available for patients who require additional support. An unexpected benefit identified was that engaging in pre-surgical optimization could help patients cope with the uncertainty of waiting for their surgery.

Overall, most consulted experts emphasized the need for concise optimization resources for patients. One consultant reported that the existing pre-surgical resource was 64 pages long and that an abridged version was being developed in response to patient feedback, which indicated that the existing resource was too long and not user-friendly. It was recommended that the optimization resources serve as a supplemental tool, tailored to the needs identified during the pre-surgical screening interviews. An intriguing suggestion was the inclusion of gamification elements, such as topic appropriate word puzzles and trivia, to enhance patient engagement with the materials.

Consistent with the literature review, the consultants emphasized that smoking cessation, nutrition, and increasing physical activity are critical optimization elements for older adults before surgery. Most experts provided descriptions of various adverse effects of smoking in the pre-operative period, highlighting its physiological effects on surgical patient, such as decreased wound healing and post-operative infections. Physical activity was also highlighted as important, and the social elements of physical activity were also perceived to be beneficial.

Organizationally, none of the consultation experts were aware of specific optimization materials being used across the health authority. The consultants described that optimization

programs were done inconsistently as they described the optimization information sometimes given verbally during screening appointments, which lacked structure and consistency. Furthermore, consultants also emphasized the importance of providing patients with the optimization information as well as connecting them with community supports to help them improve their health before surgery.

There was a pre-defined implementation process to make education resources available for use across the health authority. This process was described as involving reviews by multiple individuals and committees. One consulting expert recommended piloting the resources at one site to assess its effectiveness before pursuing broader regional implementation. The consultant described this as a method to test the resources before going through the stages of approval for broader use. A key challenge identified was in keeping the resources up to date, the need to regularly review and update the resources.

A nurse on the clinical consulting team revealed that patients frequently had questions about how their existing health conditions could impact their surgical outcomes. The nurse highlighted that the pre-surgical period often serves as a critical window of a motivation for patients to adopt positive health changes, which could help patients cope with the stress of the often long waiting period and uncertainty around their upcoming procedure. Examples of stressors patients experience before surgery include a lack of control, fear of the unknown and complications. However, the expert nurse noted that many patients were unaware of how their health and lifestyle choices affect their surgical outcomes.

Summary of the Resources

Following the knowledge gathering phases of the practicum period, three pre-surgical optimization resources were developed for older adults, utilizing both evidence and expertise

insights. Utilizing the findings from the integrative literature review and expert consultations, the developed resources were designed to be accessible tools to support older adults in improving their health before surgery, ultimately reducing the risk of surgical complications. Three separate booklets were developed (see Appendix C), each addressing a specific pre-operative risk factors to meet individual needs during pre-admission clinic nursing assessment. Consultations revealed that while some patients may need only one resource, others may not require certain resources at all. Therefore, to address this variability, three separate resources were developed, each focusing on a key pre-operative risk factor, including smoking, nutrition and physical activity. This approach allows patients to receive only the information relevant to their specific needs. The three booklets were entitled:

1) Quitting Smoking to Improve My Surgical Outcomes
2) Eating to Improve My Surgical Outcomes
3) Moving My Body to Heal Better After Surgery

Each of the booklets were designed using standardized principles in both design and structure in consistency with what was found in the literature and consultations. Each booklet contained images that represented diversity of older adults and included graphics to draw the eye to important concepts that aligned with the topic being discussed. Additionally, headings were utilized to provide clear context to the body text and all text in the documents were set at a minimum of size 14 to accommodate those with visual impairment. To maximize accessibility, the use of digital mediums to provide information was minimized, recognizing that some older adults may have limited digital literacy or lack access to electronic devices to access this information. Additionally, phone numbers and designated spaces to handwrite phone numbers were included so patients knew where to go for further information and assistance. Visually

appealing graphics, colour, design and conversational tone were used to elicit engagement with the material.

The structure of each booklet followed a similar format to ensure consistency with best practices identified in the literature and recommendations from consultations. The cover pages featured images of older adult(s) engaging in daily life. Imagery related to surgery were purposely avoided to keep the focus on what was important to readers; health and the goal of achieving overall well-being. A table of contents was also included to help patients navigate topics easily within the booklet in a way that suited their needs. The following page explained the significance of the health topic in relation to surgery. Realistic solutions were then presented to the reader that mirrored best practices within that topic. Subsequent pages outlined key individuals who could provide support in the health topic area, along with available community resources. Furthermore, on the last page of each booklet, other booklets in the self-optimization series were also highlighted for patients interested in accessing the other resources.

Discussion of Advanced Nursing Practice (ANP) Competencies

As an advanced practice nurse, this practicum project allowed me to apply ANP competencies through the development of pre-surgical optimization resources for older adults. Key competencies demonstrated included optimizing the health system, research utilization, leadership as well as engaging in consultation and collaboration.

Optimizing the Health System

The Canadian Nurses' Association (2019) outlines that advanced practice nurses maximize the function of health systems through innovative care that promotes the health of patients and populations of patients. The benefits of pre-surgical optimization are a known practice to prevent surgical complications in older adults. However, gaps within the health

system were recognized to be able to provide this important aspect of pre-surgical care. Limited access to healthcare providers has been recognized as a significant barrier to delivering pre-surgical optimization in a growing population of older adults. Therefore, I demonstrated this competency by recognizing that certain components of pre-surgical optimization can be self-managed by patients while leveraging external resources and programs to support patients to improved health before surgery to minimize the risk of surgical complications.

Research Utilization

Advanced practice nurses generate, synthesize, critique and apply research evidence (Canadian Nurses' Association, 2019). For this practicum project, an integrative literature review was conducted to demonstrate this competency for the development of an evidence-based, pre-surgical optimization guide for older adults. The literature review process involved finding applicable, current research, synthesizing and critiquing the literature to ensure that the resources developed were based on current evidence. The pre-surgical optimization resources were developed utilizing the knowledge gained from both the literature review and expert consultations, ensuring that final resources were informed by the best available evidence and expert input.

Leadership

The Canadian Nurses' Association (2019) describes advanced practice nurses as leaders within their organizations who encourage change, new efficient practice and improve care. During this practicum project, I demonstrated leadership through this practicum, recognizing that older adult patients were not being fully optimized prior to their surgeries due to constraints within the healthcare system. I instituted a novel change idea to effectively educate older adult patients understand why and how to improve their health before surgery to decrease the

likelihood of surgical complications. I was able to identify a gap in care and initiate change by providing access to essential healthcare resources, helping to address the needs of older adult patients and enhance their pre-surgical optimization.

Consultation and Collaboration

Advanced practice nurses consult and collaborate with others to effectively improve the health of patients and populations of patients (CNA, 2019). Throughout this practicum project, I demonstrated this competency by incorporating the perspectives of experts within the organization at all levels, including frontline nurses, educators, clinical managers, and quality improvement specialists during the consultation period. Gathering expert opinions from a variety of perspectives helped ensure that the self-guided pre-surgical optimization resources were pragmatic and reflected both the needs of the organization and patients. The final pre-surgical optimization resources therefore reflected the appropriate workflow and roles of professionals, and directly addressed the identified patient needs within Island Health.

Next Steps

This project did not involve implementation, but rather the design of the pre-surgical optimization resources for older adults. The next stage will involve presentation to clinical governance structures for approval to pilot these resources with an implementation and evaluation plan. Ongoing collaboration with team members will be essential to further refine the resources and ensure it is appropriately integrated into the surgical trajectory. Once implemented, the resources will need to be regularly evaluated and updated to ensure continued relevance when new evidence and resources emerge. Regular evaluation is a part of educational materials through existing systems and structures at Island Health with the Clinical Learning and Education Services department. Furthermore, it would be prudent to further investigate other

areas of pre-surgical optimization that patients may benefit from through self-care approaches, and produce further resources within the self-optimization series. The development of similar patient resources for self-optimization will follow a similar methodology used in the development of these pre-surgical optimization resources.

Conclusion

As the population continues to age and requires more surgical interventions, it is crucial to focus on implementing pre-surgical optimization strategies to reduce the risk of surgical complications and improve overall surgical outcomes. This practicum project provided an opportunity to apply my advanced practice nursing competencies in developing evidence-informed pre-surgical optimization resources for older adult patients. The developed resources empower older adults to take an active role in improving their health before surgery through education, recommended strategies, and access to relevant community resources. In doing so, this project has the potential to improve surgical experiences and outcomes for older adults, while addressing gaps in care delivery within the healthcare system.

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Appendix A Integrative Literature Review

Engaging Older Adults in Surgical Optimization through a Self-Guided Resource

The growing need to prepare older adults for surgery has become a critical issue in healthcare, as the increasing surgical volumes are largely attributable to the aging population (Søreide & Wijnhoven, 2016), with the number of older adults in Canada projected to double by the year 2037 (Statistics Canada, 2024a). This aging demographic shift has contributed to a significant increase in Canadian surgical volumes (Statistics Canada, 2024b), highlighting the critical importance of implementing effective strategies to ensure the best possible surgical outcomes. Older adults often present with comorbidities and increased physiological vulnerability, leading to higher risks of surgical complications and mortality (McDonald et al., 2018). Pre-surgical optimization is one proactive approach aimed at improving surgical outcomes and refers to the process of preparing patients for surgical procedures through comprehensive assessment, risk stratification, and targeted interventions to address modifiable risk factors (Surgical Patient Optimization Collaborative [SPOC], 2022a).

However, as the population ages and surgical volumes increase, healthcare providers may struggle to provide comprehensive pre-surgical optimization programs for all older adults (Aronson et al., 2020). Self-management strategies to empower older adults to optimize their health prior to surgery may be a potential solution to augment current optimization programs. There is a clear need to develop education resources and tools to support older adults to effectively self-manage and optimize their health prior to elective surgery. The purpose of this literature review was to identify critical elements of pre-surgical optimization that older adults can effectively self-manage and to explore the most effective methods for delivering this education through a self-guided, pre-surgical optimization resource guide.

Background

Surgical Complications are a Public Health Issue

Surgical complications have become a significant public health issue. Surgical complications are the third leading cause of death globally (7.7%) only surpassed by ischemic heart disease and stroke (Nepogodiev et al., 2019). Specifically, 4.2 million deaths per year are caused by perioperative complications related to surgery, with the highest burden among older adults and those with underlying medical conditions (Nepogodiev et al., 2019). Nationally, it is reported that around 2% of patients died following major medical surgery in 2021, and 7.1% were unexpectedly readmitted to hospital within 30 days of surgery due to complications (CIHI, 2023). Within Island Health, 2.3% of patients died following major surgery, while the provincial average was 1.8% (CIHI, 2023). Additionally, 6.4% of patients who had surgery within Island Health were unexpectedly readmitted to the hospital within 30 days (CIHI, 2024). Thus, post-operative complications represent a significant public health issue globally, nationally and locally.

More specifically, older adults have been identified as a high risk population for morbidity and mortality following elective surgery in comparison to the general population (Watt et al., 2018). One in four older adults experiences some manner of post-operative complication following elective surgery (Watt et al., 2018). Older adults often present with multiple comorbidities, decreases in physiological reserve, and frailty, which increases their risk for post-operative complications, prolonged hospital stay, functional decline and mortality (Deiner et al., 2014). Although older adults, like many other populations, are not homogeneous in nature with various abilities and physiological states, it is crucial to proactively identify and address those at risk of poor outcomes to reduce the burden of post-operative complications.

Current State of Pre-Surgical Optimization

Pre-surgical optimization involves health-promoting activities prior to surgery to reduce the likelihood of complications (McLaughlin et al., 2021). This preventative approach is helpful in minimizing surgical risks by utilizing pre-surgical wait times to improve patients' overall health (Gagliardi et al., 2021). In British Columbia, the Surgical Patient Optimization Collaborative (SPOC) program focuses on 13 key components to decrease surgical risks (SPOC, 2022a). However, their patient pointing resource is heavily dependent on technology and contains considerable medical jargon (SPOC, 2022b), which may not be accessible to those with low digital health literacy.

SPOC guidance emphasizes provider-driven optimization programs (SPOC, 2022a), which are necessary for certain elements like anemia management (Shander et al., 2023). However, aspects like nutrition, smoking cessation, and physical activity do not require intensive clinic management (SPOC, 2022a). Wholly provider-driven optimization is resource-intensive, and not feasible given healthcare provider shortages (Kiran et al., 2024; Li et al., 2023), particularly in British Columbia (Hedden et al., 2021; Kiran et al., 2024; Li et al., 2023) and on Vancouver Island (BC Centre for Disease Control, 2024). This shortage presents a significant barrier to implementing optimization programs (Aronson et al., 2020) given the potentially high patient volumes (Søreide & Wijnhoven, 2016) and large, growing older adult population on Vancouver Island (Provincial Services Health Authority, 2024a; Statistics Canada, 2023).

Benefit of Optimization for Older Adults

Older adults benefit from pre-surgical optimization programs. McDonald et al. (2018) found that older adults who participated in a pre-surgical optimization program had lower readmission rates at 7 and 30 days compared to a similar group who received standard care.

Additionally, the optimization group experienced fewer mean complications, highlighting the efficacy of preventative pre-operative care in this complication-vulnerable population. Furthermore, a systematic review and meta-analysis by Watt et al. (2018) indicated that older adults face increased risk of harm following surgery, and that optimizable factors were often predictors of these complications. These findings suggest that pre-surgical optimization is likely beneficial for older adults. Given the magnitude of post-operative complications in older adults, challenges in pre-surgical optimization programs, and the potential benefits of optimization for this population, it is important to examine the literature on elements that can be effectively self-managed by older adults.

Methods

An integrative review was conducted according to the framework outlined by Whittemore and Knafl (2005). This approach allows for the inclusion of diverse methodologies and enables a broader understanding of the phenomenon of interest. The integrative review process outlined by Whittemore and Knafl (2005) includes five stages: (a) identifying the problem, (b) searching the literature, (c) evaluating the data, (d) analyzing the data, and finally (e) presenting the findings. The first stage involves clearly defining the problem or research question to be addressed. The second stage includes a comprehensive search of the literature using relevant databases and search terms. In the third stage, the data from the included studies is critically evaluated for quality and relevance. The fourth stage entails analyzing the data to identify key themes and synthesize the findings. Lastly, the fifth stage involves presenting the results of the review in a clear and organized manner. The methods of this integrative review are presented in accordance with the framework by Whittemore and Knafl (2005).

Phase I: Identifying the Problem

There is a large volume of research on pre-surgical optimization, and that it is generally effective in improving outcomes for older adults. However, the research is limited on self-management approaches in the presurgical optimization of older adults and mainly focuses on provider-driven models of care. The overall objective of this review is to identify critical elements of pre-surgical optimization that older adults can effectively self-manage and examine best practices in developing educational resources to support older adults in self-optimizing prior to surgery. The questions to guide this integrative review were:

1. According to the literature, what are the most important pre-surgical optimization components for older adult patients?
2. Is education effective in improving these health components prior to surgery?
3. What educational interventions are being used?
4. What pre-surgical optimization methods are the most effective for this population?

Phase II: Searching the Literature

Search Strategy

A literature review was conducted with the assistance of a research librarian to help formulate key questions, key terms, and a search strategy. The search strategy involved searching CINAHL, PubMed, Scopus, and the Nursing and Allied Health Database. Grey literature was searched using Google, Google Scholar and Open Grey. The search strategy utilized subject headings, MeSH terms and keywords including “pre-operative”, “pre-surgical”, “optimization”, “prehabilitation”, “enhanced recovery”, “ERAS”, “self-guided education”, “education”, “older

adults", and "seniors". These search terms then led to the development of the overarching themes, which then necessitated the inclusion of additional search terms including "nutrition", "nutrition support", "physical activity", "smoking", and "smoking cessation". Reference lists were also scanned for potential additional literature for inclusion.

Abstracts Reviewed

A search across all databases yielded 463 articles. After removing duplicates and screening titles and abstracts, 44 articles were screened for full text. Further, reference lists were also scanned and a total of 22 research-based studies were selected for inclusion in the review based on the inclusion criteria. Most studies for optimization components were empirical studies, whereas studies on educational interventions were a mix of qualitative and quantitative studies. Studies were then critically appraised based on the respective tools for reviews, quantitative and qualitative studies.

Inclusion and Exclusion Criteria

The review focused on literature that identified critical elements of pre-surgical optimization that can be effectively self-managed by older adults as well as best practices in developing education resources and tools for older adults. Studies were included if they contained older adult populations (60+ years of age) and/or if they investigated approaches to educating and providing education and/or optimization for this population. Prioritization of educational strategies was given to literature that was during the pre-surgical time and had potential to be self-guided in methodology. Studies were excluded if they did not include older adults or if they focused solely on provider-driven optimization rather than having potential for self-management. Both peer-reviewed and grey literature were considered for inclusion. All

quantitative, qualitative, reviews and mixed methods studies were considered for inclusion. Because of the large volume of work in some areas, preference for inclusion was provided to higher quality reviews to provide a broader perspective on the knowledge base. Included studies were limited to those published between September 2014 to September 2024 to ensure relevance and current best practices apart from particularly relevant older studies and theoretical works. Additionally, only studies published in the English language were considered for inclusion.

Phase III: Evaluating the Data

The review process involved critically appraising the 22 included studies. All quantitative studies (N = 11) and reviews (N = 6) were evaluated using the Public Health Agency of Canada (PHAC) *Critical Appraisal Toolkit* (PHAC, 2014) to assess the quality of studies. Using this tool, quantitative studies were evaluated for the strength of research design, sampling methods, internal and external validity, control of confounding variables, ethical considerations, analytical approach, and applicability. Similarly, qualitative studies (N = 5) were appraised using the *Joanna Briggs Institute (JBI) Checklist for Qualitative Research* (JBI, 2017). This tool evaluates the clarity of the philosophical perspective, study methodology, data collection, representation and analysis, influence of researcher, ethical considerations, and interpretation of results. Some studies were discussed in multiple sections of the review, but appraisal of these studies is provided in the section of first mention for brevity.

Phase IV: Analyzing the Data

The analysis involved identifying key themes across the literature that highlighted critical elements for pre-surgical optimization that could be self-managed by older adults, then synthesizing that information with local resources and evidence-based guidelines. Additionally,

the review compiled evidence-based strategies for educating and preparing older adults for surgery. Patterns in the literature were identified and categorized according to their respective themes with the objectives of the review in mind utilizing the literature review table in Appendix A and careful consideration of findings in each individual study.

Phase V: Presenting the Data

Data from the literature review were transferred to a literature summary table (Appendix A) to provide an organized and concise overview of each study, including publication details, study design, key findings, and overall quality rating with key elements of critical appraisal. The results were divided into two main themes with six subthemes with pertinent, prevailing details, critical appraisal and potential resources to support the development of a self-guided, pre-surgical optimization guide for older adults. The presentation of the findings of the literature review is organized into these main themes and subthemes within the findings section (Whittemore & Knafl, 2005).

Findings

The findings from the literature review were organized into two overarching themes including: (a) critical elements of pre-surgical optimization that older adults can self-manage, and, (b) effective strategies for educating and preparing older adults for surgery. Within the first theme, the key subthemes that emerged were smoking cessation, nutrition, and physical activity. For the second theme, the subthemes that were identified included providing a clear rationale, addressing digital health literacy, and tailoring the content to the older adult population. The studies utilized to formulate these findings were varied on multiple levels.

Characteristics of Studies

Of the included 22 research studies, 11 were quantitative, six were reviews, four were qualitative and one was mixed methods. Of the quantitative studies, one had strong design while eight had moderate design and two were weak design. The overall quality of quantitative studies included six high and five medium quality studies. The five reviews were rated as high quality, and one was medium. Each of the qualitative studies were regarded as having sufficient quality for inclusion to the review. The included studies provided valuable insights into important content and considerations for developing a self-guided pre-surgical optimization guide for older adults.

The included non-review research studies conducted across four different countries. Of the included studies, two were Australian, four were Canadian, one in the Netherlands, and the remaining nine were American based studies. The reviews were comprised of studies from a variety of countries, but all were based in the United States. The study settings were all based in countries similar to Canada, thus making findings generalizable to the desired population.

Theme 1: Critical Elements of Pre-Surgical Optimization for Older Adults

There were numerous critical elements of pre-surgical optimization identified through the review. Although many of these elements applied to surgical patients in general, where older adults were a part of many studies but were not specifically addressed. A recognizable gap in the literature is the limited research focused specifically on pre-surgical optimization of older adults, despite the known unique physiological needs and risks of this population (Yang et al., 2011). There was also limited research examining self-management of pre-surgical optimization by older adults. This gap presents an interesting opportunity for future research. The major

components of pre-surgical optimization that can be effectively self-managed by older adults that were consistently identified across studies included smoking cessation, nutrition and increasing physical activity.

Subtheme: Smoking Cessation

The literature indicates a correlation between smoking, post-operative complications, and older adults. Smoking is consistently identified as a risk factor that exacerbates the likelihood of adverse surgical outcomes, particularly in the older adult population (Grønkjær et al., 2014).

In the general surgical population, pre-operative smoking has been linked to a variety of post-operative complications, including surgical site infections (Agrawal et al., 2021; Ely et al., 2020; Johnson et al., 2021; Karamanos et al., 2016), wound dehiscence (Johnson et al., 2021; Karamanos et al., 2016; Kashanchi et al., 2021), implant failures (Johnson et al., 2021), and unexpected return to the operating room (Kashanchi et al., 2021; Thomas & Leitman, 2018). Likewise, pre-operative smoking is associated with many medical post-operative complications such as: cardiac issues (Agrawal et al., 2021; Johnson et al., 2021), and delirium (Kim et al., 2020; Zhang et al., 2024). Particularly concerning, Haeuser et al. (2021) found that the negative effects of smoking on post-operative complications are exacerbated in older adults. Their large (N = 10,528) retrospective cohort study found that for older adults undergoing surgery, smoking significantly increased the risk of some post-operative complications including pulmonary complications, wound complications, need for transfusion and reintervention rates. They also found that increased age was significantly associated with higher probability of developing complications and the association was stronger with each year of age (P= 0.045). Likewise, Zhang et al. (2024) found in their systematic review and meta-analysis that smoking was associated with the development of post-operative delirium in older adults which dramatically

increases the risk of mortality. These findings underscore the importance of smoking cessation as a key element of pre-surgical optimization for older adults, supporting the need to include smoking cessation support in self-guided pre-surgical optimization resources.

Methods of Providing Self-Directed Smoking Cessation Support Pre-Operatively. The literature highlights several approaches to delivering smoking cessation interventions to the general population in the pre-operative period. However, limited studies specifically address the unique needs of older adults in delivering smoking cessation interventions pre-operatively. Smoking cessation interventions have been found to be efficacious when applied to the general population pre-operatively (Prestwich et al., 2017; Thomsen et al., 2014). A meta-analysis of randomized controlled trials by Prestwich et al. (2017) found that smoking cessation interventions prior to surgery significantly increased the proportion of individuals who smoked to achieve abstinent (46.2%) in comparison to control groups (24.5%).This study demonstrates the potential for pre-surgical smoking cessation education within the pre-surgical optimization guide to aid older adults in abstaining before surgery, provided they receive appropriate supports.

Methods for providing successful pre-operative smoking cessation support have been examined extensively in the literature. A recent systematic review and meta-analysis by Prestwich et al. (2017) examined methods of pre-operative smoking cessation supports and found that intensive multi-component interventions, including counselling and nicotine replacement therapy (NRT), resulted in higher abstinence rates (25-36.4%) compared to brief interventions (13%). Thomsen et al. (2014) also found in their Cochrane Review that counselling and NRT are the most effective in combination. However, optimal timing and intensity remain unclear (Ricker et al., 2024). Additionally, providing patients with the rationale for smoking cessation before surgery has shown to be particularly impactful. An older, but particularly

interesting study by Shannon-Cain et al. (2002) found that smoking rates decreased from 15% to 4% when patients were informed regarding the risks of smoking in relation to surgical risks. This knowledge coincides with findings from the cross-sectional study by Webb et al. (2014), which reported that fewer than 40% of participants who smoked correctly answered pertaining to knowledge of post-operative complications resulting from smoking. Furthermore, a randomized control trial by Webb et al. (2020) found that offering free NRT appears to promote engagement in smoking cessation attempts in comparison to those who were not offered free NRT in patients awaiting surgery. According to the literature, a comprehensive pre-surgical optimization guide for older adults would benefit from including key information on the risks of smoking pre-operatively as well as offering evidence-based smoking cessation supports such as counselling, and information on how to obtain cost-free NRT.

Critical Appraisal of Smoking Cessation Literature. The literature examining the risks of smoking on surgical complications was predominantly high-quality retrospective cohort studies where information was retrieved from large, national databases (Agrawal et al., 2021; Ely et al., 2020; Haeuser et al., 2021; Johnson et al., 2021).This study design is regarded as a moderate quality, the quality of the studies was regarded as high as they incorporated propensity score matching to control for selection bias and multivariable logistic regression was utilized to control for potential confounders. While these methods are beneficial, it is important to highlight the potential for measurement bias that can occur when utilizing large databases such the NSQIP. For example, if smoking status was incorrectly entered, it could introduce misclassification bias. However, all these studies had large sample which provides a broad overview of the risks associated with pre-operative smoking status. Likewise, the reviews included within this section were all high quality. With quality assessments done utilizing appropriate tools for each of the

studies contained within. Where appropriate, the studies were assessed for publication bias, and heterogeneity testing completed.

Other Resources to Support Smoking Cessation. An environmental scan revealed a plethora of additional resources that have already been developed to help support older adults in quitting smoking. The British Columbia Smoking Cessation Program offers free nicotine replacement therapy, including gum, lozenges, patches, and medication when prescribed by pharmacists (Government of British Columbia, 2024). This program could be used in conjunction with their QuitNow program, which provides coaching, text-based or email tips, and peer support groups (British Columbia Lung Foundation, 2024). Additionally, the provincial SPOC *Patient Passport* program include a variety of smoking cessation resources and record keeping elements that may be useful in developing a resource (SPOC, 2022a, 2022b). Additionally, the best practice guideline by Wong et al. (2020) could also be of use, but it will be important to customize recommendations to the local context (Harrison & Graham, 2021) given the unique challenges such as limited access to provider support.

Subtheme: Nutritional Support

The literature highlights the importance of optimizing nutrition for older adult undergoing surgery, particularly, in addressing undernourishment. It is estimated that approximately 50% of Canadians admitted to hospital are malnourished (Jeejeebhoy et al., 2015). Undernourishment is known to cause decreased serum albumin levels, which are necessary for wound healing and overall recovery after surgery (Johnson et al., 2021; Thomas & Leitman, 2018; Zhang et al., 2024).

Nutritional education support is critical for older adults before surgery. Three studies emphasize the importance of including nutritional support in pre-surgical optimization programs for older adults. In a retrospective cohort study by Johnson et al. (2021), they found that older patients with low serum albumin levels had 3.7 fold higher odds of developing a post-operative infection and increasingly concerning, 7.2 fold higher odds of 30-day mortality. Similarly, Thomas and Leitman (2018) found that 30-day mortality was significantly associated with low serum albumin levels and increased age. Control trial evidence also supports the role of malnutrition as a critical pre-surgical optimization component for older adults. A meta-analysis of 15 studies (N = 3831) found a statistically significant decrease in the incidence of both infectious (RR; 95%CI 0.6 [0.5–0.7]; $p < 0.01$) and non-infectious complications (RR; 95%CI 0.7 [0.6–0.9]; $p < 0.01$) after pre-surgical nutritional support (Jing-Xia et al., 2015).

Interestingly, Zhang et al. (2024) found in their systematic review and meta-analysis that low pre-operative albumin levels were significantly associated with post-operative delirium after total joint arthroplasty in older adults. Given the increased likelihood of post-operative infection, 30-day mortality and post-operative delirium linked to undernourishment in older adults, the literature supports the inclusion of nutritional support within a self-guided pre-surgical optimization guide.

Methods of Providing Self-Directed Nutritional Support Pre-Operatively. Studies indicated that older adults face significant challenges in adhering to and understanding nutritional information (Beelen et al., 2017; Gillis et al., 2018). Two qualitative studies described their challenges and revealed how the provision of pre-surgical nutrition education could potentially be improved. Patients described that they found it difficult to adhere to nutritional recommendations (Beelen et al., 2017; Gillis et al., 2018) and participate in pre-surgical

optimization of their nutritional status (Gillis et al., 2018). Older adults were often unaware of the risks of undernutrition and lacked knowledge regarding the health consequences of such (Beelen et al., 2017; Gillis et al., 2018). However, the authors of both studies found that participants were more likely to follow recommendations if they perceived benefits for their health and wellbeing. Gillis et al. (2018) noted that while patients believed food is healing, they reported that they would have preferred to have more specific information on what to eat and how much, particularly in preparation for surgery. These studies indicate that providing clear, actionable nutrition education tailored to older adults' needs and preferences could improve their engagement and adherence to pre-surgical nutritional optimization.

What Information is Important in the Nutritional Support Section? Patients with illness or surgical injury have higher protein requirements (Gillis & Carli, 2015). Older adults often suffer from anabolic resistance which means that larger requirements of protein are necessary to avoid body tissue catabolism which puts older adults at increased risk of complications if nutritional needs are not satisfactory (Moore et al., 2015). A prospective cohort study of 1793 older adults demonstrated that half of the participants consumed less than one gram of protein per kilogram per day (Phillips et al., 2016). However, evidence based dietary protein requirements range from at least 1.2-1.6 grams per kilogram per day to offset age related muscle regression and tissue health for older adults (Phillips et al., 2016). Therefore, a balanced diet rich in protein and spread throughout the day is recommended before surgery.

Evidence suggests that pre-surgical optimization programs that target nutritional needs alone for protein synthesis is not as effective as targeting both nutritional needs and physical conditioning (Gillis et al., 2015). Physical conditioning, and resistance training work

synergistically with increasing protein intake for the body to further synthesize protein to avoid post-operative complications resulting from undernourishment (Gillis & Wischmeyer, 2019).

Additionally, there is evidence supporting supplementation which enhance protein synthesis in older adults awaiting surgery. Omega-3 fatty acid and vitamin D supplementation have shown to support protein synthesis in older adults and may be of benefit for older adults awaiting surgery (Gillis & Wischmeyer, 2019).

Critical Appraisal of the Nutrition Literature. Most of the studies included in the nutrition section were regarded as high quality apart from the article by Jeejeebhoy et al. (2015), where one of the of the tools utilized was subjective and not been tested for validity and reliability. The retrospective cohort studies, which utilized large data bases, like those in the smoking literature, introduces a potential for measurement bias. The qualitative studies by Beelen et al. (2014) and Gillis et al. (2018) were notably well designed and provided multiple perspectives with extensive triangulation and data collection methods.

Other Resources to Support the Nutrition Component. There are a variety of external resources to support the nutrition component of the self-guided resource for older adults. Island Health Seniors Health Department has an internal webpage with a variety of resources specific to older adult nutrition before surgery within Island Health (Island Health, 2022). Additionally, Canada's Food Guide provides special guidelines for healthy eating for seniors that provides direction for appropriate evidence-based inclusions in the nutritional section of the presurgical optimization guide for older adults (Government of Canada, 2022).

Food insecurity and the social determinants of health (World Health Organization, 2024) are other critical elements to consider in the development of this guide, as the reasons for

undernourishment may be deeper than providing knowledge. It will be necessary to provide education and guidance on accessing appropriate supports when needed. There are a variety of supports available within the province of British Columbia through HealthLinkBC (2023). The nutrition benefits program offers three months of nutritional support for surgery for those receiving income assistance. The 8-1-1 telephone service through HealthLinkBC (2023) also links patients with free dietician support. Additionally, for Indigenous older adults, Island Health's Indigenous Health Program works with First Nations, Inuit and Metis communities and has several resources, including Dieticians, to assist Indigenous people living on Vancouver Island with nutritional support (Island Health, 2022). The *ESPEN Symposium on Perioperative Nutrition* recommendations (Lobo et al., 2020), Centre for Peri-Operative Care (2021) and SPOC (2022a) *Prehabilitation Toolkit* provides specific evidence based guidelines for the undernourished and/or older adult. These resources will be valuable in developing a pre-surgical optimization guide for older adults.

Subtheme: Physical Activity

Increasing physical fitness was another noticeable subtheme within the literature on important pre-surgical optimization elements for older adults. The relationship between physical activity and surgical complications in older adults has been the subject of a prospective cohort study (Lee et al., 2019) and systematic review and meta-analysis of RCT (Hughes et al., 2019). Lee et al. (2019) investigated the impact of baseline physical activity on the incidence of post-operative delirium. The findings indicated that regular physical activity was associated with 74% lower odds of developing post-operative delirium (OR = 0.26; 95% CI = 0.08-0.82), concluding that physical activity increases physiological reserves and reduces the incidence of post-operative complications such as delirium. Likewise, the systematic review and meta-analysis by

Hughes et al. (2019), highlighted the benefits of pre-operative physical conditioning before surgery, and emphasized its role in improving post-operative outcomes in older adults including morbidity (OR 0.63 95% CI 0.46–0.87 I 2 34%, p = 0.005). As previously mentioned, protein synthesis, necessary for healing and physiological reserves is mutually influenced by both nutrition and physical activity improving patient outcomes (Gillis et al., 2015). Thus, physical activity becomes another important component to include in a pre-surgical optimization resource for older adults.

Barriers and Facilitators to Participation in Physical Activity Before Surgery. Adherence to exercise regimes for clinical improvement is generally low in older adult populations (Picorelli et al., 2014). It is, therefore, important to consider potential barriers and drivers to participation in exercise programs for pre-surgical optimization. A descriptive qualitative study by Barnes et al. (2023) explored some of the challenges and motivators for older adults participating in exercise programs before cancer surgery. The study found that manageable, home-based programs with support from others and a sense of enjoyment in the program both facilitated participation. Barriers to participation were health conditions, fatigue, weather and feelings of guilt when physically incapable of participating in the exercises provided. Therefore, exercise programming for the guide should include home-based exercises with modifications for those who need them, suggest activities that may be enjoyable with weather-related modifications, and offer ways in which participants can obtain peer and psychosocial support in their journey, if desired.

Critical Appraisal of the Physical Activity Literature. The literature supporting the inclusion of a physical activity component in pre-surgical optimization for older adults is moderate to high quality. The study by Lee et al. (2019) was limited in its single centre design,

and potential for recall bias in the self-reporting of physical activity. A strength of this study was the control of confounding. The study by Hughes et al. (2019) was limited by the lack of standardized definitions for prehabilitation protocols and substantial heterogeneity in one domain, although this was not a domain of interest for this review but had a standardized assessment for study quality.

The literature outlining the barriers and facilitators to older adult physical activity was also moderate to high quality. The study by Barnes et al. (2023) included reflexive notes, an audit trail and a clear demonstration of its theoretical basis. The systematic review by Picorelli et al. (2014) included three reviewers, with one designated as an arbitrator. However, there was no mention of how quality of individual studies was evaluated.

Other Resources to Support Increasing Physical Activity Before Surgery. There is a multitude of resources that could potentially be adapted and utilized within the pre-surgical optimization resource guide for older adults. As mentioned, psychosocial support was an important finding in the study by Barnes et al. (2023). HealthLink BC's 8-1-1 Physical Activity Line (PAL) allows seniors to call and speak with qualified exercise professionals to help guide, coach, support, and answer exercise related questions (HealthLinkBC, 2024). They assist older adults in planning and initiating a safe exercise program, and the service is cost-free. Finding Balance BC also has an exercise section to support older adults in exploring various types of exercise according to their needs and preferences (Finding Balance BC, 2024). The *24 Hour Movement Guidelines for Adults 65+* also provide evidence-based guidelines for older adults and physical activity, with adaptable elements that can be added to the resource guide (Canadian Society for Exercise Physiology, 2024). Additionally, many of the local municipalities have Leisure Economic Access Passes which provide free admission for lower income individuals to

recreation facilities such as pools, gymnasiums, and group exercise classes, as well as a pass for a support person or assistant if required (City of Courtenay, 2024; City of Nanaimo, 2023; City of Victoria, 2024; Municipality of North Cowichan, 2024), thus providing a means to obtain peer and psychosocial supports (Barnes et al., 2023). Many of these programs are specifically designed for older adults and include modified activities such as chair yoga, balance and mobility strength training and a variety of enjoyable exercise activities such as dancing and pickleball (City of Nanaimo, 2024).

Theme II: Educational Interventions and Techniques

It is fundamentally important to consider the unique needs and techniques specific to older adults to ensure the resource effectively addresses potential barriers and leverages facilitators to ensure engagement with the material (Harrison & Graham, 2021). If the older adult audience is engaged with the material, they are more likely to participate in making changes (Harrison & Graham, 2021), which can help reduce the likelihood of surgical complications.

Subtheme: Providing Rationale for Change

Change theory provides a framework for understanding how to motivate and facilitate changes in health behaviours. The rationale for change in health behaviours is supported by various models that emphasize the importance of understanding what determines the behaviours, how to change behaviour, and potential processes in changing behaviour, as well as contextual elements that influence behaviour change. The Health Belief Model (HBM) is a prominent theory related to health behaviour change. The HBM suggests that individuals are more likely to engage in health promoting behaviours if they perceive a risk to their health, that the risk has serious consequences, and believe that if they take action it will reduce their risk (Becker, 1974).

To motivate older adults, it will be important to include a clear rationale for pre-surgical optimization within the pre-surgical optimization guide. Recognizing the value of understanding the reasons behind recommendations can help encourage engagement (Harrison & Graham, 2021).

Subtheme: Created for those with Low Digital Health Literacy in Mind

The World Health Organization defines digital health literacy as the ability to find, understand, and use health information online to improve health (World Health Organization, 2021). Digital health literacy is increasingly recognized as a critical skill for older adults, enabling them to access, understand, and utilize health information available online. However, in the *2023 Canadian Digital Health Survey* 40.3% of older adult respondents did not feel confident in using information on the Internet to help them make health decisions and 21.1% of older adult respondents did not know how to use the internet to answer their health questions (Canada Health Infoway, 2023). Many of findings in the literature on older adults and digital literacy has significant implications for creating effective health education materials for this demographic. A descriptive qualitative study by Saadati et al. (2023) sought to explore the challenges, opportunities, and support needs with digital health literacy amongst older adults. A significant finding was that older adults face barriers in utilizing technology for health purposes, and that educational materials should be designed to also address these barriers. The authors concluded that health educational materials that require the utilization of technology should include built-in technological support. For example, if using QR codes to access information, as in the SPOC *Patient Passport* (SPOC, 2022b), there should be an explanation as to how to scan a QR code to obtain the health information.

Additionally, the literature suggests that inequities in digital health literacy also should be considered. A cross-sectional study by Gordon and Hornbrook (2018) explored the digital divide among seniors from diverse racial and ethnic backgrounds. The findings revealed that older seniors, as well as Black, Latino, and Filipino seniors tend to have less access to digital devices, less online experience and feel less capable of seeking health information online compared to their white peers. Given these limitations, low barrier access options such as print supports should be considered in creating a self-guided pre-surgical optimization guide. A notable limitation noted in the study by Gordon and Hornbrook (2018) was the dissemination of surveys only in English, but an outcome of interest was related to diversity, which may represent some underestimated results.

Subtheme: Designed for Older Adults with Age Related Changes in Mind

Considering the visual preferences and age-related visual changes of older adults will also be important in designing the pre-surgical optimization guide. Various studies have examined the visual preferences of older adults in print health education material. In a large (N = 3138) longitudinal study by Playdon et al. (2016), they assessed older adults' preferred sources for health education. They found that the majority (60.9%) of older adults preferred reading books, magazines, or printed publications the most for health information. Additionally, they preferred having headings in written education material to easily navigate the information, and preferred underlining bolding, and making headings in a larger text size and colour. Research shows that older adults also have preferences for certain text size and font, with a preference for sans-serif fonts with a minimum size of 14 (Wilson & Read, 2016). They also preferred shorter sentences, words, and paragraphs with either 1.5 to 2.0 spacing (Playdon et al., 2016). The use of visual aids was preferred, but the visual aid needed to support the material and make it easier to

understand (Edmonds et al., 2017). Older adults also described a preference for photographs over graphics, and visual aids that represent diversity in race, sex, age, and body size (Edmonds et al., 2017; Playdon et al., 2016). Following these preferences described in the literature will assist in making the pre-surgical optimization guide easy to follow and visually appealing to older adults.

There is a need to investigate digital health literacy, as well as preferences for information within pre-surgical optimization. The studies examined within this section although applicable as they pertain to digital health literacy and older adults in general were limited in their generalizability as they pertained to general healthcare, or specific areas other than the perioperative sphere (Gordon & Hornbrook, 2018; Playdon et al., 2016; Saadati et al., 2023). A notable weakness in the study by Edmonds et al. (2017) was the proportion of highly educated individuals which may have had some influence on information preferences. Although there was a standardized reading level set for the materials. Overall, studies were mostly of high quality and provided some beneficial insight for educational preferences for pre-surgical optimization materials.

Summary

Overall, the literature highlights that pre-surgical optimization is important in preventing surgical complications, and specific ways in which a self-guided pre-surgical optimization guide could potentially be helpful in minimizing these adverse outcomes. There have been several key considerations for designing self-guided pre-surgical optimization resources for older adults. Firstly, it is important to consider what content to include and secondly how to present it in a way that is accessible and engaging so that older adults are empowered to effectively self-manage their health before surgery to prevent surgical complications. The literature suggests that smoking cessation, nutritional optimization, and increasing physical activity are three critical

areas for self-management before surgery to avoid surgical complications, and there are key considerations to improving the pre-operative health of older adults within these domains. However, there is very little that is known about self-guided pre-surgical optimization and older adults which is postulated as an interesting and necessary future area for investigation.

There is strong evidence to suggest that pre-surgical optimization of smoking status, nutritional status and physical activity is effective in minimizing post-operative complications. However, literature on self-guided, optimization specific educational interventions for older adults is minimal. What is known is that interventions are generally regarded as effective at getting patients to stop smoking before surgery (Prestwich et al., 2017; Thomsen et al., 2014) and it is believed that a combination of NRT and counselling to be the most effective (Prestwich et al., 2017; Thomsen et al., 2014) especially when provided with cost-free NRT before surgery (Webb et al., 2020). Providing patients with the rationale behind smoking cessation is generally regarded as impactful in promoting cessation as patients have been found to be genuinely unaware of the surgical risks of smoking (Shannon-Cain et al., 2002; Webb et al., 2014).

It was also found that older adults have shown some challenges in both adhering to and understanding pre-operative nutritional advice (Beelen et al., 2017; Gillis et al., 2018). Much like smoking, patients were often unaware of the risks associated with their nutritional status (Gillis et al., 2018), but were also more likely to follow recommendations if they perceived benefits to their health during surgery (Beelen et al., 2017; Gillis et al., 2018). It was demonstrated in the literature that highlighting the importance of pre-operative protein intake (Gillis & Carli, 2015; Moore et al., 2015) and that older adults usually do not get enough protein to avoid complications (Phillips et al., 2016). Additionally, physical activity and protein intake are thought to work synergistically to increase protein synthesis to effectively protect against

surgical complications (Gillis et al., 2015; Gillis & Wischmeyer, 2019) with supplementation also being beneficial (Gillis & Wischmeyer, 2019).

Increasing physical activity was the third critical element for self-optimization for older adults. Although adherence to pre-operative exercise programs is often low for older adult populations (Picorelli et al., 2014). Home-based programs, support from others, enjoyment and manageability were regarded as facilitators to adherence. While health conditions, fatigue, weather and feelings of guilt were regarded as barriers (Barnes et al., 2023).

The second theme was techniques to increase the accessibility, engagement and uptake of pre-surgical optimization elements with older adults. Providing the rationale for change was an important element that was regarded as important (Beelen et al., 2017; Gillis et al., 2018; Shannon-Cain et al., 2002; Webb et al., 2014) and is also supported by the HBM to be motivating for change (Becker, 1974). It was also found to be important to consider the unique challenges of older adults with digital health literacy when designing pre-surgical optimization education (Canada Health Infoway, 2023). Elements of pre-surgical health optimization education that contain digital elements should include technological support (Saadati et al., 2023) while also considering inequities to access to digital tools (Gordon & Hornbrook, 2018). The literature also demonstrated that older adults prefer written information (Playdon et al., 2016) and have visual preferences in headings (Playdon et al., 2016), text font and size (Wilson & Read, 2016) and visual aids (Edmonds et al., 2017; Playdon et al., 2016).

There is a substantial amount of literature examining the pre-surgical optimization elements that are beneficial to adult surgical populations. However, there is limited evidence examining older adults specifically. Likewise, the evidence surrounding the unique needs of older adults in pre-surgical optimization education is also needed. This review recommends

future research specifically looking at the needs of older adults in pre-surgical optimization. Given the importance of pre-surgical optimization in older adults, shortage of healthcare practitioners to provide pre-surgical optimization and efficacy of optimization interventions a self-guided pre-surgical optimization guide for older adults is necessary to minimize surgical patient complications.

Discussion of Educational Resource Intervention

Self-Guided Pre-Surgical Optimization Guide for Older Adults

Providing educational interventions and resources to older adults is critical for improving their health before surgery to prevent post-operative complications (Kumar et al., 2018). The overall purpose of this review was to determine the critical elements of pre-surgical optimization that older adults can effectively self-manage and to explore the most effective methods for delivering this education. There are several strategies available to facilitate the success of educational strategies. Given that surgical complications are a significance issue, there are reduced numbers of healthcare providers and a large population of older adults on Vancouver Island, there is a critical need to develop a self-guided educational resource for older adults. The literature supports that smoking, nutritional status, and inactivity are all important risk factors to target in a pre-surgical optimization guide for older adults. The development of a self-guided resource will provide older adults with the foundational knowledge needed to self-optimize in these key areas and evidence-based methods will help with engagement to support success. Written information is preferred by older adults (Playdon et al., 2016) and should be considered as a primary method for providing this education. In addition to this literature review, consultations with Island Health leadership and healthcare practitioners will also reveal other

beneficial inclusions to the guide. The overall goal of this guide is to provide pre-surgical optimization education and resources to help older adults in preventing surgical complications.

Conclusion

Pre-surgical optimization is recognized as a critical component to the surgical trajectory in preventing post-operative complications. However, resources are limited in providing this important pre-surgical need. This integrative review synthesizes the literature and evidence on the critical elements of pre-surgical optimization that older adults can effectively self-manage, as well as the methods and resources available to provide an optimization guide for this population. The key self-management elements identified were smoking cessation, nutrition optimization, and physical activity enhancement. Effective education and resource accessibility were also identified as important considerations. With substantial evidence on the benefits of pre-surgical optimization in adult populations, there is a significant gap in the literature in examining the specific needs and preferences of older adults facing elective surgery. This review underscores the need for a self-guided educational resource on pre-surgical optimization targeted towards the older adult population to effectively reduce surgical complications and improve health.

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Literature Summary Tables

Key Question: What are important optimization elements to address in a pre-surgical optimization guide for older adults?

Study/Design	Methods	Key Results	Comments
Authors: Agrawal et al., 2021 **Country:** United States **Study Design:** Retrospective Cohort Study **Aim:** Identify association between pre-op smoking and 30 day post-op outcomes.	**Sample:** N = 67,897 patients who had total hip arthroplasty in 2016. **Data Source:** NSQIP database Compared smoking to various post-operative complications in risk-adjusted database.	Smoking increased risk of: • Pulmonary complications [OR], 1.352; 95% confidence interval [95% CI], 1.075-1.700; P = .01 • Infectious complications OR, 1.310; 95% CI, 1.094-1.567; P = .003 • Extended LOS (OR, 1.17; 95% CI, 1.099-1.251; P < .001)	**Strength of Design:** Moderate **Quality:** Medium **Notes:** • Propensity score matching • Multivariable regression control for confounding • Reliance on administrative data and retrospective is a weakness

Key: NSQIP, National Surgical Quality Improvement; OR, odds ratio.

Key Question: What are important methods to optimization to address in a pre-surgical optimization guide for older adults?

Study/Design	Methods	Key Results	Comments
Authors: Barnes et al., 2023 **Country:** Ottawa, Canada **Study Design:** Descriptive Qualitative **Aim:** Assess barriers and facilitators to participating in pre-surgical exercise optimization of older adults.	**Sample:** N = 15 older adults >60 years old undergoing elective cancer surgery. Participants completed structured, home-based exercise program before surgery. **Program Included:** • Strength training • Aerobic exercise • Stretching • Nutrition information • Guidebook, video, pedometer Semi-structured interviews & analysis informed by TDF. Recorded, transcribed verbatim and analyzed using qualitative software. Reflexivity assessed	**Facilitators:** • Manageable for older adults • Resources for engagement • Support from others • Sense of control& improvement of health • Enjoyable programming **Barriers:** • Pre-existing conditions, fatigue & baseline fitness • Weather • Guilt & frustration	**Decision:** Include **Notes:** • Rigor assessed • Audit trail completed • Reflexive notes

Key: TDF, theoretical domains framework

Key Question: What are important methods to optimization to address in a pre-surgical optimization guide for older adults?

Study/Design	Methods	Key Results	Comments
Authors: Beelen et al., 2017 **Country:** Netherlands **Study Design:** Descriptive Qualitative **Aim:** Explore barriers older adults face when adhering to dietary recommendations.	**Sample:** N = 18older adults, 13 dieticians Semi-structured interviews audiotaped and transcribed verbatim. Qualitative analysis software utilized **Global Questions Provided in Study. Were specific to older adults and dieticians.**	Seven Main Themes: • Loss of appetite • Lack of awareness about undernutrition • Social isolation • Increasing energy and protein • Limited effectiveness of current strategies • Enriching regular products • Improving palatability	**Decision:** Include **Notes:** • Consistence with constructivist approach • Rich insight with multiple perspectives • Clear methodology • Practical implications

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Key Question: What preferences do older adults have in pre-operative education materials?

Study/Design	Methods	Key Results	Comments

Authors: Edmonds et al., 2017
 	
Country: United States
 	
Study Design: Mixed methods
 	
Aim: Develop and test brochure on bone health for older adults.
	Sample: N = 64 older adults
	
	Phase 1: Developing Brochures
	• Developed 2 brochures
	  ○ Brochure A- photographs
	  ○ Brochure B - illustrations
	Phase 2: Pilot Testing Group 1
	• Presented all brochures to 53 participants.
	• Qualitative interviews about brochures
	• Quantitative survey
	Phase 3: Revisions & Pilot Testing Group 2
	• Revised brochures with feedback from phase 2
	• Presented revised brochure to 11 participants.
	• Same questions asked as in phase 2
	
	All data analyzed same phase 2&3
	
	Triangulation of data, used framework.
		• Preference for concise and easy to read material
		• Visual aids are important
		• Positive framing and relatable stories were helpful
		• Iterative design was helpful
		• Clear and specific recommendations for health interventions were important.
			Decision: Include
			
			Notes:
			• Rigor assessed
			• Triangulation done
			• Highly educated sample (may not be representative)

Key Question: What are important optimization elements to address in a pre-surgical optimization guide for older adults?

Study/Design	Methods	Key Results	Comments
Authors: Ely et al., 2019 **Country:** United States **Study Design:** Retrospective Cohort Study **Aim:** Determine what effect pre-operative smoking has on post-operative complications	**Sample:** N = 30,579 patients who had elective laparoscopic cholecystectomy 2012-2017. **Smoking Group Non-Smoking Group Compared:** • 30-day complication • Pulmonary complications • Cardiac complications • Transfusion complications • Surgical site infections • Length of stay • Discharge destination • Mortality **Data Source:** NSQIP national database	**People Who Smoke had statistically significant higher odds of:** • Pulmonary complications [OR] 1.35, 95% confidence interval [CI] 1.07-1.70 • Infectious complications [OR] 1.31, 95% CI 1.09-1.57 • Extended hospital stay [OR] 1.17, 95% CI 1.09-1.25	**Strength of Design:** Moderate **Quality:** Medium **Notes:** • Propensity score matching • Multivariable regression control for confounding • Reliance on administrative data and retrospective is a weakness

Key: NSQIP, National Surgical Quality Improvement; OR odds ratio.

Key Question: What are important methods to optimization to address in a pre-surgical optimization guide for older adults?

Study/Design	Methods	Key Results	Comments
Authors: Gillis et al., 2018 **Country:** Canada **Study Design:** Descriptive Qualitative **Aim:** Understand barriers at provider and patient level that limited adoption of optimization nutritional practices.	**Sample:** N = 27; Qualitative data sources (provider surveys) n = 198 Narrative interviews audiotaped and transcribed verbatim. Semi-Structured focus groups. Qualitative analysis software utilized Focus groups Narrative interviews Surveys to knowledge users and stakeholders.	Main Themes: • Mistaken nutrition facts • Misconceptions • Misinformation • Misunderstanding • Mistrust • Food is Medicine	**Notes:** • Multiple methods of data collection (focus groups, interviews) • Multiple perspectives (patients, providers, 6 hospitals)

Key Question: What are important considerations when developing pre-surgical optimization materials for older adults?

Study/Design	Methods	Key Results	Comments
Authors: Gordon & Hornbrook, 2018 **Country:** United States **Study Design:** Descriptive Cross Sectional **Aim:** Assess older adults' readiness, including access, ability, and preferences, for engaging with online patient education and self-care resources, and to examine related age and racial/ethnic differences.	**Sample:** N = 5420 older adults (65-79 years old) Mailed survey to stratified random sample. Survey collected demographic data and access to and use of: • Digital technology • Ability to perform tasks using technology • Interest in using technology for health information Survey was not a validated tool	• 75% had access to computer • Access to device declined with age and among black, Latino and Filipino compared to white • 80% were able to go online independently • 70% had used a search engine • 63% had printed health material from a website Preferred method to obtain health information: • Telephone appointment with health coach (50%) ○ ≥70% of blacks, Latinos, and Filipinos preferring	**Design: Weak** **Quality: High** **Notes:** • Survey delivered in English • Only delivered in one health region – limiting generalizability • Limited response rate

Key Question: What are important optimization elements to address in a pre-surgical optimization guide for older adults?

Study/Design	Methods	Key Results	Comments
Authors: Haeuser et al., 2021 **Country:** United States **Study Design:** Retrospective Cohort **Aim**: Assess the impact of pre-operative smoking on the probability of developing major complications post-operatively in older adults	**Sample:** N = 10528 surgical patients **Group 1:** Active People who smoke N = 2403 **Group 2:** People who do not smoke (included former & never) N= 8125 **Outcomes Measured:** Complications within 30 days of surgery. SSI, wound dehiscence, reintubation, PE, prolonged ventilation, acute renal failure, stroke, cardiac arrest, myocardial infarction, sepsis, death **Data Sources:** NSQIP database Regression done.	Complications: • Overall complication rate –16.6% • People who smoke had more complications than people who do not smoke (17.2% vs 16.4%) • Age associated with higher probability of complications. Association stronger with each year (P= 0.045) • >70 odds of complications increased significantly [OR], 1.28 [95% CI,1.12-1.47; P < .001] • >80 OR, 1.45[95% CI, 1.17-1.80; P = .001] • >90 OR, 1.64 [95% CI,1.19-2.26; P = .003) • Lung, wound, transfusion and reintervention rates significantly associated with smoking status.	**Design:** Moderate **Quality:** High **Notes:** • Large database, high potential for there to be inaccuracies • Control for confounding done • Could have been a gap between collecting smoking status and time of surgery • Only collected 30 days post-op, complications could happen after

Key: NSQIP, National Surgical Quality Improvement Program; SSI, surgical site infection; PE, pulmonary embolism

Key Question: What are important optimization elements to address in a pre-surgical optimization guide for older adults?

Study/Design	Methods	Key Results	Comments
Authors: Hughes et al., 2019 **Study Design:** Systematic Review & Meta-Analysis **Aim**: Assess the effect of physical activity prehabilitation on post-operative outcome after major abdominal surgery in older adults	**Sample:** N = 900 patients who smoke and were scheduled for elective surgery. **Studies Included**: 15 RCT that compared outcomes of patients undergoing prehabilitation involving prescribed respiratory and exercise interventions prior to abdominal surgery. **Outcomes Measured:** Pulmonary morbidity Morbidity LOS 6MWT **Data Sources:** EMBASE, Medline, PubMed and the Cochrane database **Reviewers:** Two reviewers. **Quality Assessment:** Assessed using the Jadad score, all high to moderate quality.	**Physical Activity Effective in Reducing:** • Morbidity (OR 0.63 95% CI 0.46–0.87 I 2 34%, p = 0.005) • Pulmonary morbidity (OR 0.4 95% CI 0.23–0.68, I 2 = 0%, p = 0.0007) **No SS Difference In:** • LOS (WMD −2.39 95% CI −4.86 to 0.08 I 2 = 0%, p = 0.06) • Change in 6MWT distance (WMD 9.06 95% CI −35.68, 53.81 I 2 = 88%, p = 0.69)	**Quality:** High **Notes:** I^2 Value of 88% for 6MW2 = substantial heterogeneity, pooled results may not be reliable. No standardized definitions for prehabilitation protocols. High to moderate quality studies.

Key: LOS, length of stay; MIP, Maximum inspiratory pressure; 6MWT, change in six-minute walking test distance; SS, statistically significant

Key Question: What are important optimization elements to address in a pre-surgical optimization guide for older adults?

Study/Design	Methods	Key Results	Comments
Authors: Jeejeebhoy et al., 2015 **Country:** Canada **Study Design:** Prospective Cohort Study **Aim:** Compare nutrition indicators to predict outcomes of LOS and readmission	**Sample:** N = 1022 older adult patients from 18 acute care surgical wards 2010-2013. **Nutrition Indicators Assessed By:** • SGA • Nutrition Risk Screening • Body measurements • Serum albumin • HGS • Patient self-assessment of intake **Mostly Valid & Reliable Tools** **Logic Regression Completed**	**Predictors of LOS** • SGA (OR: 2.19; 95% CI: 1.28, 3.75) • HGS (OR: 0.98; 95% CI: 0.96, 0.99 per kg of increase) • Reduced food intake (OR: 1.51; 95% CI: 1.08, 2.11) **Predictors of Readmission** • SGA (OR: 2.12; 95% CI: 1.24, 3.93) • HGS (OR: 0.96; 95% CI: 0.94, 0.98)	**Strength of Design:** Moderate **Quality:** Medium **Notes:** • Regression done, strength • Subjective tools (SGA and self-assessment) introduce some potential bias

Key: LOS, length of stay; SGA, subjective global assessment; HGS, handgrip strength.

Key Question: What are important optimization elements to address in a pre-surgical optimization guide for older adults?

Study/Design	Methods	Key Results	Comments
Authors: Johnson et al., 2021 **Country:** United States **Study Design:** Retrospective Cohort **Aim:** Determine: • prevalence of unoptimized risk factors in patients undergoing TKA • impact of unoptimized risk factors.	**Sample:** N = 84315 TKA patients. Mean age 72 years old. **Modifiable Risk Factors Measured:** • BMI • Albumin levels • Tobacco Use • Diabetes **Post-Operative Complications:** • Surgical site infection • Any complication • Readmission • Mortality **Logic Regression Completed**	**Not optimizing modifiable risk factors before TKA is associated with SS odds of complications, specifically:** • BMI > 40kg/m² • Low albumin (<3.5g/dL) • Smoking • Insulin-dependent diabetes **Optimizing these risk factors associated with lower complication rate.**	**Strength of Design:** Moderate **Quality:** High **Notes:** • Regression done, strength • Valid and reliable tools • Used a large database, potential for bias data entry • No baseline assessment of items like albumin • Large sample size

Key: TKA, total knee arthroplasty; BMI, body mass index; SS, statistically significant

Key Question: What are important optimization elements to address in a pre-surgical optimization guide for older adults?

Study/Design	Methods	Key Results	Comments
Authors: Lee et al., 2019 **Country:** United States **Study Design:** Prospective cohort study **Aim**: Determine effect of PA on the incidence of POD& determine if effect of PA independent cognitive reserve.	**Sample:** N = 132 non-demented, adults older than 60 undergoing elective orthopedic surgery. **POD Screened Using**: CAM – V&R MDAS – V&R **Baseline Assessments:** LAS – V&R Regular PA defined 6-7 days/week **Regression:** Multivariable logistic regression completed.	• 41 (31.1%) developed POD • Regular PA associated with 74% decrease odds of POD([OR] = 0.26; 95% confidence interval [CI] = 0.08-0.82) • No significant association PA and cognitive reserve (P = .70) • Women with regular PA lower odds of POD (OR = 0.08; 95% CI = 0.01-0.63) compared with men (OR = 0.93; 95% CI = 0.18-4.97)	**Strength of Design:** Moderate **Quality:** High **Notes:** • Single centre design – generalizability • Self-reported PA – potential recall bias • Control for confounding done • Tools V&R

Key: LAS, leisure activity scale; CAM, confusion assessment method; POD, post-operative delirium; PA, physical activity; V&R, valid and reliable; MDAS, memorial delirium

Key Question: What are important optimization methods to address in a pre-surgical optimization guide for older adults?

Study/Design	Methods	Key Results	Comments
Authors: Picorelli et al., 2014 **Study Design:** Systematic Review of Prospective Studies **Aim**: Examine older adults' adherence to exercise programs. Examine adherence: • Measurement • Rates • Enhancers	**Sample:** N = 1370 older patients undertaking exercise programs **Studies Included**: 9 studies; 8 RCT and 1 observational **Inclusion:** • 60 + years old • Structured exercise programs • Reporting on adherence • RCT, quasi-experimental, observational studies **Data Source:** Medline, Embase, SciELO, LILACS, PEDro **Reviewers:** Two reviewers, one for arbitration **Quality Assessment:** Not mentioned how quality of studies assessed Not assessed for publication bias.	**Adherence Measurement:** • Completion of program rates • Session attendance • Sessions completed per week **Adherence Rates:** • Difficult to determine because of heterogeneity in measurement • Some high completion (86%), some low attendance (58%) **Adherence Enhancers**: • Simple instructions • Cognitive motivational • Social support • Reminders • Peer mentoring • Home based	**Quality:** Moderate **Notes:** • Heterogeneity of interventions and outcome measures • Not mentioned how quality of studies assessed

Key: RCT, randomized control trial

Key Question: What are important optimization elements to address in a pre-surgical optimization guide for older adults?

Study/Design	Methods	Key Results	Comments
Authors: Prestwich et al., 2017 **Study Design:** Systematic Review and Meta-Analysis **Aim**: Identify BCT and interventions used in pre-operative smoking cessation. Then identify which are most successful in producing cessation.	**Sample:** N = 71,095 older adult (>60 years old) patients who had TJA. **Studies Included**: 22 studies, 19 meta-analysis, 16 RCT, 3 quasi-experimental **Inclusion:** • Effect of intervention decrease smoking • Elective surgery • Baseline measurement of smoking **Exclusion:** Review, post-operative intervention, non-English, dissertation. **Data Source:** Medline, Embase, CIHAHL, CENTRAL **Reviewers:** Two reviewers **Quality Assessment:** Assessed for bias Assessed for publication bias.	**Significant BCT for smoking cessation:** • Provision of knowledge of consequences Nurses utilized most often and were often most successful. Intensive, multicomponent interventions higher abstinence rates. Reduction in smoking with medium effect (g = 0.56, 95% CI, 0.32-0.80); intervention group 46.4% decrease vs. control 24.5% Heterogeneity Assessment Completed.	**Quality:** High **Notes:** • Sensitivity analysis completed. • Significant heterogeneity for some risk factors • Did not include unpublished studies • Egger's regression done for publication bias

Key: RCT, randomized control trial, BCT, behavioural change techniques

Key Question: What are important optimization elements to address in a pre-surgical optimization guide for older adults?

Study/Design	Methods	Key Results	Comments
Authors: Ricker et al., 2024 **Study Design:** Systematic Review **Aim**: Assess pre-operative smoking cessation interventions and impact on cessation rates.	**Sample:** N = 1762 patients who smoke and were scheduled for elective surgery. **Studies Included**: 9 RCT **Inclusion:** • Adult patients enrolled in pre-operative smoking cessation • All interventions Exclusion • Historical controls • Self-reported outcomes **Data Source:** MEDLINE, PubMed, PsycInfo, Embase, Web of Science, and CINAHL **Reviewers:** Three reviewers **Quality Assessment:** Assessed using the Risk of Bias 2 tool. Low risk of bias	**Effective Interventions:** Effectiveness of interventions highly variable. Some studies show positive results with interventions like: • Counseling • Education • Pharmacotherapy Other found no benefit or negative impacts. Best approach is currently unclear.	**Quality:** High **Notes:** • Only included 9 studies • A qualitative synthesis. A meta-analysis would have been more precise. • Publication bias not addressed.

Key: RCT, randomized control trial; NRT, nicotine replacement therapy

Key Question: What are important considerations when developing pre-surgical optimization materials for older adults?

Study/Design	Methods	Key Results	Comments

Authors: Playdon et al., 2016
 	
Country: United States
 	
Study Design: Descriptive Cross-Sectional
 	
Aim: Investigate the information needs and preferred sources of information amongst cancer surviving older adults.
	Sample: N = 3138 cancer survivors
	
	Cancer survivors mailed self-administered survey on 10 health information domains.
	
	Outcomes of Interest to Review in Study:
	• Preferences for health-related information
	  ○ Sources
	  ○ Format
		• Book, magazine, print publication most popular (60.9%)
		• Preference for type information differed by age ($p<0.05$)
			Strength of Design: Weak
			
			Quality: Medium
			
			Decision: Include
			
			Notes:
			• Part of larger survey
			• Cancer information different than surgical information however, preferences for information should be similar

Key Question: What are important considerations when developing pre-surgical optimization materials for older adults?

Study/Design	Methods	Key Results	Comments

Authors: Saadati et al., 2023
 	
Country: Canada
 	
Study Design: Descriptive Qualitative
 	
Aim: Explore challenges, opportunities and support required for e-health literacy in older adults.
	Sample: N = 30 older adults who have used ehealth within the last year
	
	Semi-Structured Interviews. Thematic Analysis.
		Themes:
		• Challenges
		  ○ Tech barriers
		  ○ Health literacy
		  ○ Accessibility Concerns
		  ○ Privacy Fears
		• Opportunities
		  ○ Enhanced access
		  ○ Communication
		  ○ Health management
		• Support Needs
		  ○ Demand for education
		  ○ Technical assistance
		  ○ Customizable tools
			Decision: Include
			
			Notes:
			• Interviews recorded and transcribed verbatim
			• Researcher triangulation
			• Member checking done
			• Reflective journal

Key Question: What are important optimization elements to address in a pre-surgical optimization guide for older adults?

Study/Design	Methods	Key Results	Comments
Authors: Thomas & Leitman, 2018 **Country:** United States **Study Design:** Retrospective Cohort Study **Aim:** Identify pre-operative variables independently associated with morbidity after endovascular repair of aortoiliac lesions.	**Sample:** N = 1210 patients who had endovascular repair of aortoiliac lesions, mean age 65 **Examined Adverse Outcomes of Interest:** • Death • Bleeding • Major reintervention • Amputation • Discharge to other location **Data Source:** NSQIP national database Regression done	**Predictors of Adverse Outcomes**: • Diabetes • Current person who smokes • Pre-operative albumin level	**Strength of Design:** Moderate **Quality:** High **Notes:** • Multivariable regression control for confounding • Reliance on administrative data and retrospective is a weakness • Smaller sample size in comparison to other retrospective cohorts utilized

Key: NSQIP, National Surgical Quality Improvement; OR odds ratio.

Key Question: What are important methods to optimization to address in a pre-surgical optimization guide for older adults?

Study/Design	Methods	Key Results	Comments
Authors: Thomsen et al., 2014 **Study Design:** Systematic Review and Meta-Analysis **Aim**: Determine best interventions to help people stop smoking before surgery.	**Sample:** N = 2010patients who smoke and were scheduled for elective surgery. **Studies Included**: 13 RCT **Inclusion:** • Intervention for smoking cessation • Any type of support • Control usual care or less intensive intervention **Data Source:** Cochrane Tobacco Addition Group, CENTRAL, MEDLINE, EMBASE, PsycINFO, Medline, Embase, CIHAHL **Reviewers:** Three reviewers **Quality Assessment:** Assessed as medium Assessed for publication bias.	**Effective Interventions:** • Brief and intensive interventions were effective, but intensive had larger effect Intensive intervention (combination NRT and counselling) had a reduction in complications. Intensive intervention had long term cessation effects. Medication showed benefit on cessation but not at time of surgery. Heterogeneity Assessment Completed.	**Quality:** High **Notes:** • Low risk of bias • Three reviewers with clear protocols • Assessed for heterogeneity

Key: RCT, randomized control trial; NRT, nicotine replacement therapy

Key Question: What are important considerations when developing pre-surgical optimization materials for older adults?

Study/Design	Methods	Key Results	Comments
Authors: Webb et al., 2014 **Country:** Australia **Study Design:** Descriptive Cross Sectional **Aim:** Assess patients' awareness of elevated risks associated with smoking pre-operatively.	**Sample:** N = 177 patients scheduled for surgery who smoke. Questionnaire provided to all patients regarding their knowledge of post-operative complications resulting from smoking. • 12 questions: 4 patient knowledge of risks, 7 cessation interventions Not tested for V&R	• Patients were generally unaware of increased risks of smoking pre-operatively	**Strength of Design:** Moderate **Quality:** Medium **Notes:** • Questionnaire not formally tested for V&R

Key: V&R, validity and reliability.

Key Question: What are important optimization elements to address in a pre-surgical optimization guide for older adults?

Study/Design	Methods	Key Results	Comments
Authors: Webb et al., 2020 **Country:** Australia **Study Design:** RCT **Aim:** Assess the effectiveness of 5 weeks free NRT to people who smoke on surgical waitlist.	**Sample:** N = 531 patients scheduled for surgery who smoke. **NRT Group:** Received 5-week supply of cost-free NRT **Control Group:** Did not receive NRT. **Data Collection**: -Baseline: Demographics, smoking history, cessation attempts -Day of Surgery: Blinded researcher asked participant about cessation practices before surgery -Post-Op: Cessation outcomes	**Quitting Rates:** 11.1% (59) total participants quit smoking for >24 hrs **Smoking Reduction:** NRT group 59.8% reported smoking less compared to pre-op Control group only 45.9% reported a reduction (p = 0.010) Free NRT may contribute to smoking reduction prior to surgery.	**Strength of Design:** Strong **Quality:** High **Notes:** • Questionnaire not formally tested for V&R

Key: RCT, Randomized Control Trial; NRT, nicotine replacement therapy.

Key Question: What are important optimization elements to address in a pre-surgical optimization guide for older adults?

Study/Design	Methods	Key Results	Comments
Authors: Zhang et al., 2024 **Study Design:** Systematic Review and Meta-Analysis **Aim**: Identify risk factors for POD after TJA in older adults.	**Sample:** N = 71,095 older adult (>60 years old) patients who had TJA. **Studies Included**: 23 studies **Inclusion:** • Risk factors delirium TJA • Inclusion elderly • Definitions cases/controls • Utilization DSM IV for diagnosis • Sufficient data to estimate OR SMD **Data Source:** Medline, Embase, Cochrane and manual search for unpublished **Reviewers:** Two reviewers **Quality Assessment:** Newcastle-Ottawa Scale, all scored over 7 Assessed for publication bias.	**Risk factors for developing POD:** • Age • Current person who smokes • Heavy drinker • MMSE • Hypertension • Diabetes • Chronic kidney disease • History of stroke • Coronary artery disease • Dementia • History of psychiatric illness • General anesthesia • Operative time • Medications Heterogeneity Assessment Completed.	**Quality:** High **Notes:** • Sensitivity analysis completed. • Significant heterogeneity for some risk factors • Beggs test done for publication bias

Key: TJA, total joint arthroplasty; DSM IV, Diagnostic and Statistical Manual of Mental Disorders IV; OR, odds ratio; SMD, standardized mean differences; POD, post-operative delirium; MMSE, mini-mental status exam

Appendix B Consultation Report

Supporting Older Adults in Surgical Optimization: Consultation Report

Post-operative complications are a significant public health issue and are the third leading cause of death globally (Nepogodiev et al., 2019). Older adults have been identified as a high-risk population for morbidity and mortality following elective surgery in comparison to the general population (Watt et al., 2018), with one in four older adults experiencing some manner of post-operative complication (Watt et al., 2018). Pre-surgical optimization involves health-promoting activities prior to surgery to reduce the likelihood of complications (McLaughlin et al., 2021). This preventative approach helps minimize surgical risks by utilizing pre-surgical wait times to improve patients' overall health (Gagliardi et al., 2021). However, wholly provider-driven optimization is resource-intensive and not feasible given healthcare provider shortages (Kiran et al., 2024; Li et al., 2023). Self-management strategies to empower older adults to optimize their health before surgery could be a potential solution to augment current optimization programs. Empowering older adults to self-manage their health before surgery may complement current optimization programs and help address resource constraints. The aim of this report was to present the results of the consultations with important stakeholders to help inform the development of a self-guided, pre-surgical optimization guide for older adults.

The Literature Review

An integrative review of the literature was conducted to develop an understanding of best practices for developing a self-guided pre-surgical optimization resource for older adults. The review identified some key areas of health self-management that should be addressed to prevent surgical complications in this population, including smoking cessation, increasing physical activity and improved nutrition (McMain, 2024). In addition to the optimization content of the pre-surgical optimization guide, it was also found that the structure and delivery method of the

resource should be tailored to the needs and preferences of older adults (McMain, 2024). The comprehensive pre-surgical optimization guide was designed to provide older adults with detailed information and actionable steps to improve their smoking, nutritional, and physical fitness in preparation for surgery.

The overall goal of this practicum project was to develop a self-guided pre-surgical optimization resource for older adults (65 years and older). The resource was developed with the specific needs of this population in mind to ensure ease of independent use. While the literature review provided valuable insights for the development of this resource, incorporating knowledge from the local context was critical for developing resources that meet the unique needs of its users (Harrison & Graham, 2021).

Consultations were completed to provide information on local concerns and obtain expert knowledge and leadership guidance. The primary purpose of the consultations was to gain an understanding from the perspective of healthcare leadership and expert clinical staff on the pre-surgical optimization needs of older adults and how to support them through a self-guided resource. The findings from these consultations were integrated into the content and design of the pre-surgical optimization guide. The consultation process occurred over one week and was guided by the following objectives:

1. Obtain a regional understanding of the status, challenges, and areas for improvement related to pre-surgical optimization for older adults awaiting elective surgery.
2. Determine the need for a self-guided pre-surgical optimization guide for older adults.
3. Establish potential pathways for implementing and integrating the self-guided optimization materials within Island Health.
4. Identify critical elements of pre-surgical optimization of older adults.

5. Evaluate the existing pre-surgical optimization materials provided to patients at Island Health according to professional perspectives.
6. The current materials' effectiveness in achieving their intended goals according to professional perspectives.
7. Identify additional content and methods to include in a self-guided pre-surgical optimization guide for older adult patients, if any.

Methods

Ethical Considerations

Regional Surgical Services approved this practicum project at the beginning of the practicum as part of the quality improvement portfolio. A Surgical Quality Lead designed the project to improve the care of older adults before elective surgery, and improve surgical outcomes. Consultations were optional, and consultants were free to participate if they wished. Additionally, the project lead emailed letters of invitation to consult before scheduling the meeting dates and times. All consultations were held confidentially, and the project lead conducted all data collection and consultation interviews securely and privately.

Additionally, the Health Research Ethics Authority (HREA) Screening Tool was used to determine if a review by the ethics board was required (Appendix A). The consultations were part of developing an educational resource and constituted a quality improvement project. Therefore, this project did not require approval from the HREA and institutional review board. There was no anticipated potential harm with participation in the consultations.

Setting

The consultations took place within the Island Health region of British Columbia, Canada and were all conducted virtually from a home office. The consultations were carried out

virtually, as many of those consultants lived in areas that were geographically distant from the writer.

Consultant Selection and Consultations

The individuals selected for consultations included healthcare leaders and clinical experts involved in quality improvement and pre-surgical care of older adults within Island Health. The clinical experts invited to participate in consultations were selected from the Surgical Quality Lead's professional network of associates and are subject matter experts with extensive experience within their areas. Those selected were regarded within the organization to be specialists in preparing patients for surgery. Requests for consultations were made via email with a letter of consultation (Appendix B). All consultations were structured with pre-formulated questions, allowing for necessary information for the project. There was also time allotted for additional open-ended discussion about the project. Consultations lasted approximately 15-20 minutes and were all conducted virtually.

Tools

Two different questionnaires were developed to guide the discussions and ensure the consultation objectives were met. The questions that were asked to administrative leaders have been provided in Appendix C, while the questions directed to clinical experts have been provided in Appendix D. A mix of administrative and clinical consultations was conducted to gather diverse perspectives from various clinical experts.

Consultants

Key subject matter experts were consulted to provide insights for developing the pre-surgical optimization resource. The author did not provide full job titles and names in the report to maintain confidentiality. A regional healthcare administrative professional (n = 1) offered a

broader perspective on the need for the resource and how it could be implemented within Island Health. Pre-admission clinic leaders (n = 1) and an educator (n = 1) shared valuable input on the state of pre-surgical optimization materials within Island Health and the care needs of older adult patients. A physician (n = 1) with expertise in pre-surgical optimization provided clinical perspectives to ensure the resource was evidence-based and supported clinic practices in a way that would benefit their workflow. Additionally, a nurse (n = 1) who worked closely with pre-admission clinic patients was able to offer insights on older adults' pre-operative concerns, questions, and education needs from a patient-centred perspective. The diverse viewpoints helped anticipate potential barriers and facilitators in the design of the self-guided resource, ensuring it covered all necessary aspects.

Data Management and Analysis

Permission was sought and granted from the organization for the commencement of the practicum project, which included consultations. Participation in the consultation was optional, as outlined in the letter of invitation provided in Appendix B. Verbal consent was sought from consultant experts before consultation discussions.

Data management was crucial to ensure the integrity and security of the consultations. Detailed notes were taken during the consultations to ensure accurate capture of consultation responses, explanations, and advice. Following the consultations, the author documented discussion summaries within a word processor on a password-protected computer with no identifiers to maintain confidentiality. The author compared notes between consultations, and information was organized according to emerging themes and organized for description in this report. After analyzing the data, the author destroyed all documents to ensure confidentiality.

Results

A Need for Pre-Surgical Optimization

There was a consensus among all consultants that pre-surgical optimization was critical for improving patient health and surgical outcomes. Regionally, the availability of clinics that optimize patients before surgery was limited, with select orthopedic services being the primary one. One consultant highlighted inequitable access to optimization services across the region and suggested that a self-guided pre-surgical optimization guide could help address this gap. When asked about significant barriers to implementing pre-surgical optimization programming within the region, consultants' responses were consistent with findings from the literature review. Respondents echoed that human resources and financial constraints were significant barriers to implementing traditional intensive optimization programs. All consultants agreed that some aspects of optimization, such as providing information on modifiable risk factors and preparation for surgery, only sometimes required direct provider guidance. However, they emphasized the importance of having a clinic contact available for patients to connect with if they had questions or needed additional support. Several consultants also discussed the potential for expanding the optimization resource guide beyond older adults after piloting, making it available to all surgical patients regardless of age to provide optimization resources to a broader population.

An interesting perspective emerged from one consultation. The consultant noted that there was often an emphasis on screening patients for surgical risk factors before surgery. However, there needed to be more emphasis on providing patients with the resources or education needed to self-manage their pre-operative health. Consultants described the pre-operative waiting period as an uncertain time for many patients. They suggested that offering education and resources to help older adults self-optimize their health during this period could

empower patients and provide a sense of control, particularly for those facing long wait times and complex health conditions requiring surgery.

The Need for Concise and Interesting Material

There was a unanimous expressed need from the consultant experts to make the optimization resource concise for patients. One consultant noted that an existing surgical preparation booklet containing items such as fasting instructions and skin preparation is 64 pages long. This consultant stated that they were in the process of making an abridged version, as patients had found the booklet to be too long to follow. This consultant suggested that the self-guided pre-surgical optimization resource could supplement the surgical preparation booklet. The consultant suggested that a more concise pre-surgical optimization resource should be provided only to patients identified as having specific risk factors, such as patients who smoke, during the pre-operative process. Other consultant experts highlighted the need to ensure that the pre-surgical optimization resource was distinct from the existing topics covered within the surgical preparation booklet. Consultants highlighted that delivering targeted, personalized optimization information would be important to those who could benefit from it the most.

The idea of gamification of the material emerged as a method to promote further interest in the materials. A consultant described those materials like the optimization resource often get overlooked in many instructions, educational materials, and pre-surgical checklists patient receive before surgery. They suggested that gamification could promote engagement with learning materials and that simple word puzzles and trivia-style questions be added to make the material more interactive and engaging. Another suggestion the consultant had was to incorporate a lifestyle change tracking diary to bring with them to pre-admission clinic

appointments. The education expert emphasized the importance of making the material appealing and enjoyable for older adults to encourage active participation.

Topics in the Pre-Surgical Optimization Guide

The consultations revealed that critical elements of pre-surgical optimization for older adults included nutrition, physical activity, and smoking cessation. Consistent with the literature, consultants agreed that addressing these modifiable risk factors could help improve surgical outcomes in this population. Consultants revealed that providing pre-surgical optimization could empower older adult patients to take a more active role in their care to improve their surgical outcomes.

A number of those consulted particularly highlighted the impacts that pre-operative smoking has on patient surgical outcomes. One consultant mentioned that depending on the type of surgery and other comorbidities, pre-operative cigarette smoking can sometimes be a reason for surgical cancellation based on the risks involved. One consultant expert described that the respiratory and cardiovascular effects seen intraoperatively and postoperatively can significantly impact the patient's recovery. Nursing specialists also emphasized the effects of pre-operative smoking on post-operative wound healing and explained that critical healing occurs immediately after the closing of the wound and that the vasoconstriction caused by smoking significantly impacts healing. The pre-admission clinic nurse emphasized that briefly mentioning the importance of smoking cessation during the screening interview, providing patients with the resources, and highlighting the available support could be beneficial. One professional suggested that the provincial QuitNow organization (Government of British Columbia, 2024) could be a valuable resource to include in the guide.

Consultant experts agreed that physical activity was an important part of increasing physiological reserve to help prepare for the intense physical stress of surgery for older adults. Connecting to local and affordable programs was emphasized to make this resource section accessible for all older adults. One consultant suggested including programming that also contained social elements to provide an added benefit of social connection to the community in a population that can sometimes be socially isolated. Experts suggested that resources be added for exercises that those can do with limited mobility and low-impact activities like swimming.

Experts indicated that nutritional information should be incorporated with physical activity as these two pre-surgical optimization elements were related and synergistic. Consultants highlighted that providing specific examples of foods high in protein and other essential nutrients was important as many patients may need to be made aware of what a high protein and nutrient-dense food meant. One expert recommended consulting the Canadian Food Guide (Government of Canada, 2024) for relevant information. One consultant expert described that the most critical period for nutritional improvement should be within 10 days before surgery, emphasizing high-quality carbohydrates and proteins. However, there was an added benefit if commenced further in advance. The expert described this as a way to build up their reserves to adequately sustain the physiological stress of surgery and assist in proper healing and recovery.

Organizational Use of Existing Materials

All the consultant experts were familiar with the Surgical Patient Optimization Collaborative patient education materials. However, none of the consultants interviewed were aware of their use within the organization. One consultant noted the needed for a consistent approach to optimization throughout the health authority, as different regions had different resources. The consultants noted that the lack of unification across Island Health's pre-operative

practices was most likely the reason for the absence of regional implementation of optimization patient education materials.

None of the consultants interviewed were aware of optimization patient education resources within Island Health. One clinical expert stated that often information on optimization was sometimes provided verbally but needed to be more structured by evidence or providing additional resources and support. The expert indicated that this information was sometimes provided if screening appointments had indicated a need for intervention. The clinical consultant emphasized the importance of providing older adult patients with both the knowledge and community support needed to improve their health before surgery and believed that a resource guide would help provide a consistent structure.

Consultant Perspectives and Information on Implementation

The author discussed implementation of the completed resource with consultants, who indicated that initial steps would involve a review of completed materials by a non-clinical reviewer from the clinical learning and knowledge services department. The consultant described the reviewer as someone who edits patient education materials to ensure the content and structure are clear and understandable for patients. The following steps involved bringing the completed resource before the Pre-admission Clinic Practice Committee, where materials are reviewed for alignment with best practices. After review and approval by the committee, the approved resource was then to be brought forward to the clinical governance committee for further approval and implementation planning. The consultant recommended that the resource be piloted to a small subset within the health authority initially to assess potential areas for improvement before broader regional implementation. Consultants emphasized that pre-surgical optimization

resources should be integrated with existing workflows and processes to streamline implementation and adoption.

A consultant identified a potential challenge in keeping resource guides up to date. This consultant revealed that patient education resources should be updated regularly to ensure accuracy and relevance. They cited that when providing information on programs such as cost-free smoking cessation, information should be monitored closely to ensure it remains accurate and current. However, another individual mentioned that patient education documents are regularly reviewed in cycles for accuracy and alignment with best practices. Additionally, consultants highlighted that ongoing monitoring and evaluation of the usage and impact of the resource guide through quality improvement methods would be crucial to assess its effectiveness

Implications

As a result of these consultations, it was important to consider the implications of the knowledge gained. Consultants emphasized the need for a consistent and standardized pre-surgical optimization resource for older adult patients. The content of this resource should focus on preparing patients on how to optimize their health before surgery, with a particular emphasis on nutrition, physical activity, and smoking cessation, as these lifestyle factors can significantly impact surgical outcomes and recovery. Specifically, the optimization resource should guide how older adult patients can make positive changes to their diet, exercise regimen, and smoking habits before surgery. This resource could include information on healthy meals, recommended physical activities, strategies to help them quit smoking, and explanations of how these lifestyle modifications can improve surgical outcomes and recovery.

Experts agreed that both the format and delivery of the resource were critical. They emphasized that the resource should be concise and engaging and complement existing pre-

operative education materials and workflows to provide a cohesive approach for patients. Ongoing monitoring, evaluation, and regular updates of the resource would be essential to ensure its continued relevance and impact on older adult patients. Additionally, experts asserted that ensuring seamless resource integration within established pre-admission processes would drive adoption and utilization by the target population. Overall, the consultations highlighted the need for a comprehensive, evidence-based pre-surgical optimization resource tailored to the unique needs of patients.

Conclusion

The consultations with administrative and clinical experts revealed key insights that informed the development of the optimization resource for older adults within Island Health. There was a demonstrated need to develop this resource by incorporating findings from the literature review and insights gained through the consultation process. These insights shaped the development of the patient-centred resource to empower older adults to reduce the risks of surgical complications in a way that is both evidence-based and consistent with local needs. Experts emphasized that the resource guide must be regularly reviewed and updated to reflect evolving best practices and incorporate user feedback.

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Health Research Ethics Authority Screening Tool

	Question	Yes	No
1.	Is the project funded by, or being submitted to, a research funding agency for a research grant or award that requires research ethics review	❒	☒
2.	Are there any local policies which require this project to undergo review by a Research Ethics Board?	❒	☒
	IF YES to either of the above, the project should be submitted to a Research Ethics Board. **IF NO** to both questions, continue to complete the checklist.	❒	❒
3.	Is the primary purpose of the project to contribute to the growing body of knowledge regarding health and/or health systems that are generally accessible through academic literature?	❒	☒
4.	Is the project designed to answer a specific research question or to test an explicit hypothesis?	❒	☒
5.	Does the project involve a comparison of multiple sites, control sites, and/or control groups?	❒	☒
6.	Is the project design and methodology adequate to support generalizations that go beyond the particular population the sample is being drawn from?	❒	☒
7.	Does the project impose any additional burdens on participants beyond what would be expected through a typically expected course of care or role expectations?	❒	☒
LINE A: SUBTOTAL Questions 3 through 7 = (Count the # of Yes responses)		**0**	
8.	Are many of the participants in the project also likely to be among those who might potentially benefit from the result of the project as it proceeds?	☒	❒
9.	Is the project intended to define a best practice within your organization or practice?	❒	☒
10.	Would the project still be done at your site, even if there were no opportunity to publish the results or if the results might not be applicable anywhere else?	☒	❒
11.	Does the statement of purpose of the project refer explicitly to the features of a particular program, organization, or region, rather than using more general terminology such as rural vs. urban populations?	☒	❒
12.	Is the current project part of a continuous process of gathering or monitoring data within an organization?	❒	☒
LINE B: SUBTOTAL Questions 8 through 12 = (Count the # of Yes responses)		**3**	
	SUMMARY **See Interpretation Below**		

Interpretation:

- If the sum of Line A is greater than Line B, the most probable purpose is **research**. The project should be submitted to an REB.

- If the sum of Line B is greater than Line A, the most probable purpose is **quality/evaluation**. Proceed with locally relevant process for ethics review (may not necessarily involve an REB).

- If the sums are equal, seek a second opinion to further explore whether the project should be classified as Research or as Quality and Evaluation.

These guidelines are used at Memorial University of Newfoundland and were adapted from ALBERTA RESEARCH ETHICS COMMUNITY CONSENSUS INITIATIVE (ARECCI).

Further information can be found at: http://www.hrea.ca/Ethics-Review-Required.aspx

Information Letter for Healthcare Professionals

Dear (insert consultant expert name),

My name is Cherisse McMain, I am a Registered Nurse completing my Master of Science in Nursing at Memorial University with Dr. Esther Monari as my supervisor. I am currently completing a final practicum project with the overall goal of developing a self-guided pre-surgical optimization guide for older adults to help decrease the likelihood of complications in this vulnerable population. I am deeply interested in improving surgical outcomes of all patients through pre-surgical optimization and education and am looking to further Island Health's resources in this regard. I also believe that pre-surgical optimization will be increasingly a focus of peri-operative care in the future.

I am in the process of conducting consultations to inform the development of this guide. I would like to understand what you perceive as the most important areas that older adults require pre-surgical optimization in as well as strengths and weaknesses in Island Health's self-guided pre-surgical optimization materials (if any). I am writing to request your professional expertise in pre-surgical optimization to help me develop a self-guided resource for older adults.

If you can help, I would like to arrange an appointment to gather your expertise. I am available either by telephone or Teams. Our consultation meeting should not take longer than 20 minutes and will only be utilized to develop the pre-surgical optimization guide. I have attached the questions I will be using to guide our discussion to help you know what to expect. I will keep your name confidential, and the insights you offer me will only be used to improve patient educational resources.

If you would like, I can set up a meeting invite and send to your email. Alternatively, if you would like, you can send me a date and time that would work for you to provide me with your expertise. If you have any questions or concerns, please feel free to contact me at cherisse.mcmain@islandhealth.ca or by phone at 778-269-4799.

Kind Thanks,

Cherisse McMain

Consultation Questions for Leadership

1. Can you please tell me from a regional perspective what the status of pre-surgical optimization (PSO) within Island Health?
2. What are some of the challenges and areas for improvement associated with PSO within Island Health?
3. If PSO is not an established regional practice, how do you see self-guided optimization material as a potential solution?
4. Tell me about any existing educational materials that you know of for pre-surgical optimization within Island Health?
5. What are your thoughts on these materials in achieving their intended goals?
6. In what ways do you believe the existing pre-surgical optimization resources could be improved or expanded within Island Health?
7. What are the pathways to implementation or integration of self-guided PSO materials within Island Health?
8. Do you have any other thoughts or questions regarding the project?

Consultation Questions for Clinical Staff

1. Tell me about what elements of pre-surgical optimization you feel are the most critical in preventing surgical complications.
2. Can you tell me about any pre-surgical optimization materials that are provided to patients within Island Health?
3. What are your thoughts on these materials in achieving their intended goals?
4. In what ways do you believe the existing pre-surgical optimization resources could be improved or expanded within Island Health?
5. What content do you feel would be important to include in a self-guided pre-surgical optimization guide for older adults?
6. What types of common questions do you typically hear from patients regarding optimization elements that they would like to know more about?
7. Do you have any other thoughts or questions regarding the project?

Appendix C Pre-Surgical Optimization Resources

Notes:

Images:

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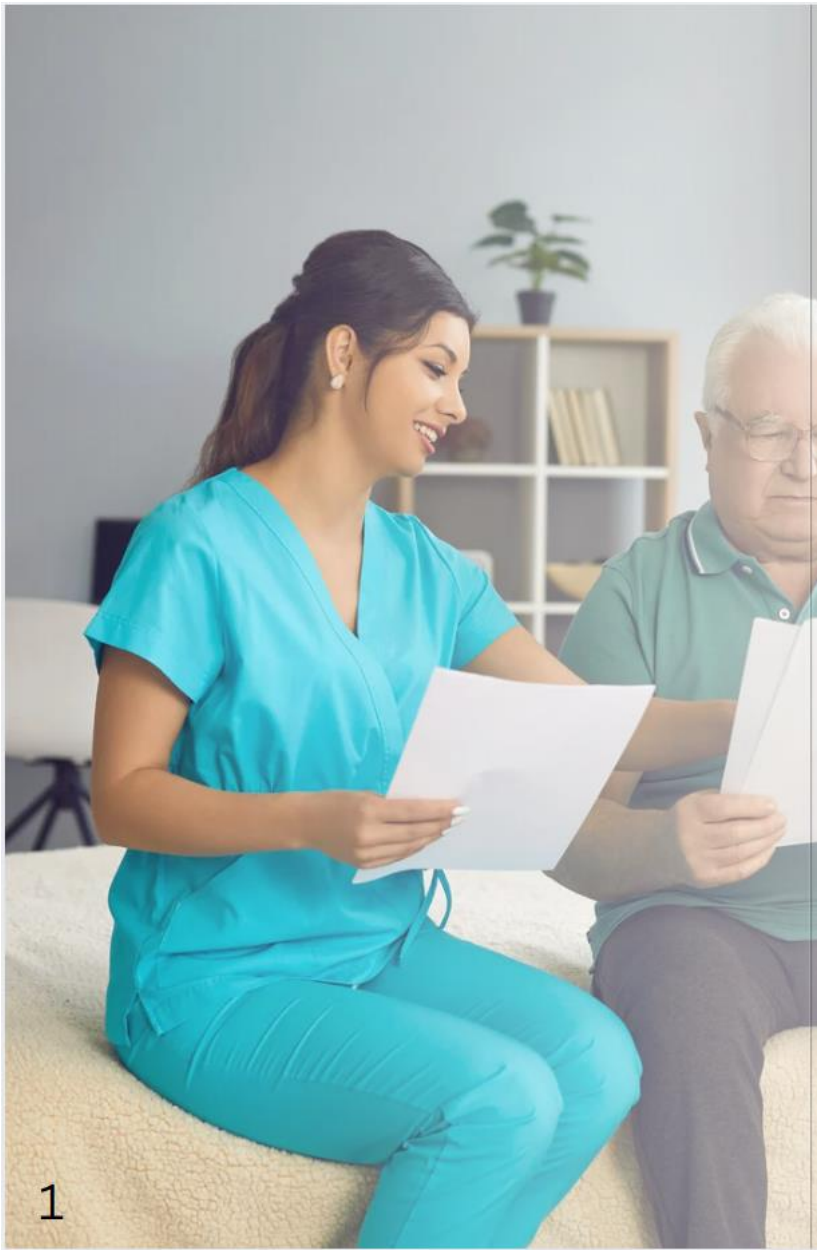

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Why Quitting Before My Surgery is Important

It is best if you quit smoking as soon as you know you are having surgery.

Smoking & Anesthesia

Anesthesia is the medicine that is used so your operation can be done without pain. Smoking makes your body less able to cope with stress of this medicine and can cause confusion (delirium).

Delayed Healing & Infection

Smoking slows the healing process of skin, muscles and bones. People who smoke also have a much higher risk of serious wound infections. This is a good reason to quit before your operation. If you want to heal quickly and avoid infection, quitting smoking is the best option.

3

Breathing Problems

Smoking damages the tiny hair-like structures in your lungs that work to keep your lungs clear. Smoking before surgery greatly increases your chances of getting pneumonia after surgery.

Blood Clots and Stroke Risk

Smoking combined with the stress on your body during surgery increases the risk for blood clots. This abnormal clotting can cause a stroke. The abnormal blood clotting caused by smoking cigarettes can also cause blood clots in your lungs and other parts of your body.

Your risk of serious infection is much higher if you smoke before surgery.

Stress on Your Heart

Nicotine in cigarettes increases the heart rate and blood pressure. It also decreases oxygen flow which is critical during surgery. Smoking can disturb the regular beating of your heart. Abnormal heart beats can cause serious complications during surgery.

By quitting smoking the length of time you need to recover in the hospital after surgery might be shorter.

4

How to Quit Smoking Before My Surgery

When Should I Quit?

It is best if you can quit smoking as soon as you know you are going to have surgery. The benefits of quitting smoking start the moment you stop and continue to get better the longer you have quit. If you have not quit, stopping at least 12 hours before surgery will help reduce your risk of complications.

Approaches to Quitting

You can stop smoking by slowly cutting down on the number of cigarettes. You can choose a quit date and slowly reduce until your quit day.
You can also quit 'cold turkey'. Cold turkey means you quit suddenly without smoking aids or support. Some people find quitting cold turkey difficult, and without support, many people start again.

5

Use Many Methods to Help Quit

Did you know that your chances of quitting DOUBLES if you access support as well?

Using many methods like counselling and nicotine replacement medicine can help increase your chances of quitting before surgery. There are many cost-free options for both counselling and nicotine replacement medicine. Counselling is also available over the phone. More information on resources available to you can be found in the following pages. All of these supports are free and available to those who have difficulty travelling or leaving their home.

6

Medications to Help Me Quit Before My Surgery

Nicotine Replacement Therapy (NRT)

Nicotine is the addictive substance in cigarettes. When you have lower nicotine levels in your blood it causes the uncomfortable withdrawal feelings. Nicotine replacement therapy (NRT) provides your body with nicotine, without the harmful chemicals to help reduce withdrawal symptoms. NRT is available in many different forms, including:

Gum

Lozenge

Patch

Nicotine replacement therapy is an effective way to help you quit and control your cravings before surgery. It is most effective when combined with counselling.

Residents of British Columbia can get 12 weeks of free prescription medications or Nicotine Replacement each calendar year to help quit smoking. Talk to your doctor or pharmacist for help.

Prescription Medication

There are prescription pills to help you quit smoking before surgery. These pills change how nicotine works within your brain to reduce cravings and do not contain nicotine.

If you are prescribed one of these medications to help you quit smoking, please let your nurse navigator know so they can add it to your medicine list.

If you do not have a nurse practitioner or family doctor, your pharmacist can now prescribe these medications. Please contact your pharmacy for an appointment.

Who Can Help Me Quit Smoking Before My Surgery?

We are all Here to Help You

Your healthcare team all know that quitting smoking is one of the most important things you can do for a safer surgery, better recovery and improved overall health. Talk to anyone on your healthcare team for support.

My Nurse Navigator

Your nurse navigator is connected to local supports, tools and resources to help you quit smoking. Many are also trained coaches to encourage you on your journey.

My Family Doctor

Your family doctor or nurse practitioner can also help you quit smoking before surgery. They can also prescribe medication to help you quit.

My Family and Friends

Your family and friends can be an important source of support during your journey to quit smoking. Tell them you are planning to quit smoking and let them know how they can best support you. Support might look like daily phone calls, distracting you while experiencing cravings or helping you access nicotine replacement therapy.

Telephone Councilors

1-877-455-2233

The province of British Columbia offers free counselling to help you quit smoking. These councilors can help you:

- Identify your strengths and supports to help you quit.
- Develop your motivation to quit.
- Identify triggers and develop problem solving skills to help you quit.

Resources Available to Help Me Quit Before Surgery

My Pharmacist

British Columbia pharmacists are able to provide you with medications and nicotine replacement therapy free of charge. Call your pharmacy for more information.

My Pharmacy Phone:

My Nurse Navigator

Your nurse navigator at the pre-admission clinic is able to help you navigate getting the help you need to quit smoking before your surgery. Call them if you need support or help getting resources or access to quit smoking.

My Nurse Phone:

QuitNow BC

QuitNow BC is a free program to help British Columbian's quit smoking. They offer support groups, counselling, information and support.

1-877-455-2233 | quitnow.ca

Talk Tobacco

Talk Tobacco is a culturally focused support program for Indigenous people in BC.

1-833-998-8255 | talktobacco.ca

Notes:

Notes:

The 'Self Optimization Series' is a collection of booklets aimed at enhancing your health prior to surgery, which will help in your recovery. Ask your nurse navigator about the additional booklets available in this series.

8

14

Notes:

Images:

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Contents

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What Supplements Should I Consider? 7

Who Can Help Me Eat Better Before My Surgery? 9

Resources Available to Help Me Improve My Nutrition. 11

Why it is Important for Me to Improve My Nutrition Before Surgery?

Nutrition:

Eating a balanced diet rich in vitamins, minerals, and proteins will support tissue repair and boost your immune system. Eat foods like lean meats, fish, whole grains, fruits, and vegetables, which provide essential nutrients to help you during and after surgery. Drinking lots of water is equally important.

Increased Energy Requirements

Your body needs lots of energy during and after surgery. It is important to ensure that your body has adequate energy stores that you need for healing after surgery and lessen the stress on the body caused by surgery.

Your body can burn as much energy as an intense and lengthy workout during surgery, which is why it is important to have lots of energy stores from eating the right foods.

3

Surgery can Cause Muscle Loss

When your body uses all of its stored sugars and proteins during surgery it begins to break down muscle tissue for energy, leading to muscle loss. This can decrease your strength and make your surgical recovery time longer and more difficult.

Eating Well Before Surgery Can Help You:

- Reduce the risk of surgical complications.
- Be stronger and have more energy after surgery.
- Reduce the risk of wound infections after surgery.
- Be discharged from hospital sooner and feeling better.

4

Increasing My Protein Intake Before Surgery

What is Protein?

Protein is a building block to heal tissues after surgery. It is considered one of the most important nutrients to help your body prepare for surgery. Both animal and plant based protein can help you prepare for surgery. The main goal is to increase your protein intake starting **2 to 4 weeks before surgery**.

Sources of Animal Protein

- Milk, cheese and yogurt
- Meat, chicken, fish, eggs
- Protein powders made of whey

Sources of Plant Protein

- Soy based foods like tofu
- Lentils, peas and beans
- Seeds and nuts
- Protein powders made from soy

Amount of Protein

You should aim to eat 4 meals that each have 25-30 grams of protein each day. Your protein should be a total of 100 to 120 grams per day. The Nutrition Facts labels will show you how many grams of protein are in 1 serving of that food as shown in the example on the following page.

Snacking Counts Too

If you find cooking or eating 3 large meals per day difficult, you can try eating 6 smaller snacks per day. Snacking is a great way to get more protein in your diet. Here are some protein snack ideas:

- Nuts
- Cottage cheese
- Greek yogurt
- Hard boiled eggs
- Cheese and crackers
- Protein drinks

Serving Size

Amount of Protein in that Serving

Nutrition Facts
Valeur nutritive
Per 1 cup (250 mL) / par 1 tasse (250 mL)

Amount / Teneur	% Daily Value / % valeur quotidienne
Calories / Calories 80	
Fat / Lipides 0 g	**0 %**
Saturated / saturés 0 g + Trans / trans 0 g	**0 %**
Cholesterol / Cholestérol 0 mg	
Sodium / Sodium 115 mg	**5 %**
Carbohydrate / Glucides 12 g	**4 %**
Fibre / Fibres 0 g	**0 %**
Sugars / Sucres 11 g	
Protein / Protéines 9 g	
Vitamin A / Vitamine A	15 %
Vitamin C / Vitamine C	0 %
Calcium / Calcium	30 %
Iron / Fer	0 %
Vitamin D / Vitamine D	45 %

What Supplements Should I Consider?

What are Supplements?

Supplements are products that are taken by mouth to add nutrients to your diet. If you are not getting enough nutrients, supplements can help you achieve your nutritional needs. Some important supplements that you may want to consider before surgery are protein, omega-3 and a multivitamin. Supplements come in many different forms such as:

- pills
- powders
- bars
- ready made beverages

Omega-3 Fat Suppliments

Our bodies do not make omega-3, fats, so they must be obtained through diet. Omega-3 helps your body prevent clots, reduce swelling, lower blood pressure. Omega-3 can be found in fish, oils and seeds. If you do not eat much of omega-3 fats in your diet you may want to consider an omega-3 supplement. Talk to your doctor or pharmacist if omega-3 is right for you before your surgery.

Protein Supplements

If you have a decreased appetite, protein supplements can help you get the protein you need before surgery. Protein supplements come in many appetizing forms and others are not flavoured and can be mixed into foods like soup, pudding and smoothies.

Multivitamins

A multivitamin is a vitamin that helps with wound healing and recovery before and after surgery. You may also want to talk to your healthcare team about taking a multivitamin especially before and after surgery. Ask your nurse navigator if a multivitamin is a good idea and when you will need to stop it before surgery.

Who Can Help Me Eat Better Before Surgery?

We are all Here to Help You

Your healthcare team all understand that healthy eating is one of the most important things you can do for a safer surgery, better recovery and improved overall health. Do not hesitate to reach out to any of your healthcare team for support and guidance.

My Nurse Navigator

Your nurse navigator is connected to local supports, tools and resources to help you improve your nutrition intake before surgery.

My Family Doctor

Your family doctor or nurse practitioner can also help you determine what supplements and nutritional support is right for you.

My Family and Friends

Your family and friends can be a valuable source of support as you walk towards healthier eating before surgery. Tell them how they can best support you. Support can look like assistance with cooking, grocery shopping, reading food labels and connecting you with other supports in the community.

Free Dietician Support

Call 8-1-1

The province of British Columbia offers free dietician support for residents. These dieticians can help you:

- Develop a specialized plan to increase your dietary protein
- Answer any questions you have about eating healthy before surgery.
- Support the nutritional needs of patients before and after surgery.

Resources Available to Help Me Improve My Nutrition

More Than Meals Program

250-656-5537

Delivery of three meals per week delivered by volunteers to seniors. Cost is based on income and delivery is free.

Better Meals Program

1-888-838-1888

Delivery of healthy nutritious food. Menu items are available in diabetic, high protein, and pureed menus and cost is based on income. Free weekly delivery.

Good Food Box Program

250-753-9393

The Good Food Box program is a low cost option for all that includes 7-9 varieties of whole fruits and vegetables. This program has delivery available for those who have mobility and transportation issues.

Monthly Nutritional Supplement Program

If your care team feels supplementation is needed before your surgery and you can not afford it, speak to your nurse navigator to help access these supplements free of cost.

My Nurse Navigator

Your nurse navigator at the pre-admission clinic is able to help you navigate getting the help you need to improve your nutrition before your surgery. Call them if you need support or help getting resources. They can also provide you with a free high protein recipe book.

My Nurse's Phone:

Notes:

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Notes:

The 'Self Optimization Series' is a collection of booklets aimed at enhancing your health prior to surgery, which will help in your recovery. Ask your nurse navigator about the additional booklets available in this series.

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Notes:

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Why it is Important for Me to Increase Physical Activity Before My Surgery?

Increasing your physical activity before surgery is important because it increases your overall fitness. Increased fitness helps you recover faster by strengthening your ability overcome physical stress of surgery which can reduce complications, shorten your hospital stay and help you feel better sooner. You should aim for at least 150 minutes of exercise per week. Some key benefits of exercising before surgery include:

Improved Heart Health

Moving your body strengthens both your heart and lungs, allowing them to function more efficiently during and after surgery. This helps ensure your body receives sufficient oxygen and nutrients it needs to heal.

Increased Muscle Strength

Strong muscles will help you with recovery activities like getting out of bed and walking which will help you get back to your normal faster.

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Shorter Hospital Stay

Recovering faster by having improved physical fitness will allow you recover faster and be discharged from hospital sooner.

Improved Mental Health

Exercise can help reduce stress levels before surgery, promoting a more positive mindset during recovery.

Reduced Risk of Complications

Improving your physical fitness before surgery helps reduce the risk of serious complications such as pneumonia, blood clots and wound infections.

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Setting Realistic Exercise Goals & Motivation

Set Goals that are Specific and Measurable

Establish clear and specific goals that are easy to monitor. For instance, a specific and measurable goal could be to swim twice a week.

Aim for at least 150 minutes of exercise per week.

Start With Small Goals

Any form of exercise is good as long as you are moving your body. Start with smaller and more manageable goals and work up to more difficult goals as you progress. Even if you are unable to exercise standing up there are other things you can do. The main goal is to ensure that you are moving your body. Choose exercises that are within your abilities.

Exercise With Others

Some people find they are more motivated when exercising with others. Having a workout partner can help you stay consistent with your exercise goals and help you stay focused.

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Find Exercise You Enjoy

Whether it's dancing, cycling, hiking, or yoga, choosing something you love will make it easier to stay committed. Engaging in activities that bring you joy not only enhances your physical health but also boosts your mental health. Remember, the best exercise is the one you look forward to doing.

Track Your Progress

Tracking your progress can also help with motivation. It is a great way to see where you started and how far you have come. There are many ways in which you can track your progress like:

- Keeping a written diary of your exercises.
- Apps on a smart phone like the Active 10 walking tracker.

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Activities to Increase My Physical Activity Before My Surgery

There are many great ways to start moving your body before surgery. Here are some great ideas to help you get started.

Chair & Bed Exercises

Chair and bed exercises are types of exercises that are good for those who have limited mobility. Ask your nurse navigator for the bed and chair exercises information sheet.

Swimming

Swimming is another great option to help you get your body moving before surgery. It is low impact which makes it easier on sore joints and those who have arthritis. Swimming helps work both the heart and lungs. There are many water based group fitness classes where you can exercise with others.

Yoga

Yoga is a gentle and effective way to increase flexibility, balance, and strength, especially for those preparing for surgery. Yoga also incorporates breathing exercises which can be helpful to calm worries.

Dancing

Dancing is a fun and effective way to enhance physical fitness while elevating your mood. It promotes coordination and flexibility, making it an excellent choice for reducing stress and preparing both your body and mind for surgery.

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Who Can Help Me Increase My Physical Activity?

We are all Here to Help You

Your healthcare team all understand that moving your body is one of the most important things you can do for a safer surgery, better recovery and improved overall health. Do not hesitate to reach out to any of your healthcare team for support and guidance.

My Nurse Navigator

Your nurse navigator is connected to local supports, tools and resources to help you increase your physical activity before surgery.

My Family Doctor

Your family doctor or nurse practitioner can also help you determine what kind of exercise is right for you.

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My Family and Friends

Your family and friends can be a valuable source of support as you increase your physical activity before surgery. Support might include assistance with transportation, an exercise partner, help finding a class and connecting you with other supports in the community.

Free Exercise Support

Call 8-1-1

The province of British Columbia offers free exercise support for residents. These exercise professionals can help you:

- Develop a specialized plan to increase your physical activity
- Answer any questions you have about exercise.
- Help connect you with local exercise supports within your community.

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Resources Available to Help Me Increase My Physical Activity

Choose to Move
604-629-0965

Choose to Move is a province-wide, free program designed for older adults. There are options to complete it from home or in person and exercises are accessible to people of all abilities.

Activ-Age
1-250-746-7665

Activage is a group-led physical activity program for inactive older adults. This is a fun and social program to help you move your body.

Vancouver Island Recreation Services Line

778-835-3195

Your local recreation services office offers a variety of activities specifically designed to increase the physical activity for older adults. They also manage pools and other centers in your community. Call this number to find what activities are currently available for older adults.

Leisure Economic Access Pass

Your local municipality offers supports for those in financial need to access free exercise facilities and programs within your community. Your nurse navigator can help you access the form to apply.

My Nurse Navigator

Your nurse navigator at the pre-admission clinic is able to help you navigate getting the help you need to increase your physical activity before your surgery. Call them if you need support or help getting resources.

My Nurse's Phone: _____

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Notes:

The 'Self Optimization Series' is a collection of booklets designed to enhance your health prior surgery, which will help in your recovery after surgery. Ask your nurse navigator about the additional booklets available in this series.