DOCUMENTING RESEARCH WITH TRANSGENDER, GENDER NON-BINARY, AND OTHER GENDER DIVERSE (TRANS) PEOPLE: AN EVIDENCE MAP AND ETHICAL ANALYSIS

by

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Abstract

This work critically examines and documents the approaches researchers have taken to studying transgender, gender non-binary, and other gender diverse (trans) individuals and communities. It applies systematic review methods, including evidence mapping, to demonstrate new ways of studying researchers and research ethics. This dissertation documents trans research across a broad range of fields and identifies evidence gaps and opportunities for more responsible research with trans individuals and communities. Incorporating mixed methods design, the study includes a systematic evidence map of 690 trans-focused empirical studies published in English in peer-reviewed journals between 2010 and 2014, an ethical analysis examining research challenges and recommendations for positive change, and a cross-sectional study investigating the relative risk of clinical photographs of trans people published in peer-reviewed journal articles appearing openly on the internet. It presents a detailed ethnographic content analysis of key ethical challenges related to research focus and study design, data collection and reporting, data analysis, and publishing practices. Recommendations to researchers, research ethics committees, and publishers highlight the need for vigilance with respect to study design (particularly, attention to how and why we divide people into gender categories and the implications of those choices) and publishing practices (emphasising public engagement, open science, and the potential of critical data studies to increase access to research that includes trans people). This study is innovative, the first of its kind to draw attention to trans people as research subjects, and the first to examine trans research ethics using systematic review methodologies. The Global Trans Research Evidence Map is also unique, incorporating qualitative, quantitative, mixed methods, and clinical research from multiple fields of investigation. This study, by providing critical insights into how to engage in inclusive, respectful, and responsible research with trans individuals and communities, has broader implications for the ethics of research with marginalized communities and for innovations in methods to examine research ethics.

Keywords: Evidence map; Transgender; Gender diverse; Research ethics; Responsible research; Open access; Health; Social determinants of health

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List of Abbreviations

CPATH: Canadian Professional Association for Transgender Health

DSD: Disorders of sex development

ECA: Ethnographic content analysis

EPATH: European Professional Association for Transgender Health

HIV: Human immunodeficiency virus

IP: Internet protocol

LDA: Latent dirichlet allocation

LG: Lesbian and gay

LGBT2Q: Lesbian, gay, bisexual, trans, Two-Spirit, and queer

LGBTQ: Lesbian, gay, bisexual, trans, and queer

MSM: Men who have sex with men

PDF: Portable document format

PRISMA-P: Preferred Reporting Items for Systematic Review and Meta-Analysis

Protocols

QOL: Quality of life

RR: Relative risk

STIs: Sexually transmitted infections

STS: Science and technology studies

Trans: Transgender, gender non-binary, and other gender diverse people

URL: Uniform resource locator

WPATH: World Professional Association for Transgender Health

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Chapter 1: Introduction and Overview

This project investigates the ways researchers study and represent transgender, gender non-binary, and other gender diverse (trans¹) people, underlining ethical challenges and opportunities for change in research practices. Framing this work is a focus on research ethics, systematic review methodologies, and critical data science. More specifically, this work examines tensions related to current and historical research practices, information access, and responsibility in the context of research with individuals and communities that experience intense injustice.

1.1 The Ethics of Research with Trans People

In Western cultures, there is a long history of trans people's interactions with the medical system. These interactions are reflected in diagnostic categories such as transvestic fetishism, gender identity disorder, and gender dysphoria (Lev, 2013). For many trans people, the ability to reflect who we are in the world around us requires some form of medical transition. In addition to changing names or gender markers on official documents, transition can also mean access to hormones and surgeries. While this is certainly not the case for all trans people, for some this is a

¹ The word "trans" is used throughout this manuscript as an umbrella term. Employing trans in this way is not meant to erase or devalue specificities and differences within gender diverse communities. It is also not meant to suggest that all gender non-binary people identify as trans (or vice versa). Language used to describe Two-Spirit people was included in the search terms and in the databases selected as part of the search strategy, however there are no references that focus on Two-Spirit trans experience in the evidence map. As a result, the term Two-Spirit is excluded from the title out of respect and in an effort to foster clearer communication, as advocated in our study recommendations.

necessity. Within current models of care, surgeries and hormones are typically provided by clinicians in medical and psychiatric professions. In addition, in many countries, in order to obtain prescriptions for hormones or approval for feminising or masculinising surgeries, a diagnosis of Gender Identity Disorder, or Gender Dysphoria is often the minimum requirement.

The ways that trans people are required to interact with the medical system have provided research opportunities for clinicians. These opportunities have led to a large body of work related to transsexualism, gender identity disorder (or gender dysphoria), and trans experience². For example, a search of "transgender*" in Scopus returns 7,018 results, in Pubmed, 3,523. As noted by Namaste (2000), this work is typically "preoccupied with issues of origin, etiology, cause, identity, performance, and gender norms" (p. 1).

Despite a large body of research about trans people, there has been little attention devoted to the ethics of these studies (Nelson, 2012; Powell & Foglia, 2014). In a search of peer-reviewed articles, one explored the perspective of trans people in relation to First Personal Authority (Bettcher, 2009) and how people "who do not live in trans communities [can] undertake ethical trans-related research" (Macdonald, 2013, p. 129). In another, Ansara and Hagerty (2011) examined cisgenderism in psychology journals. Although research about trans people has not

² Throughout the manuscript, we refer to "trans experience". While it would be more accurate to refer to trans experiences to reflect the diversity of trans lives, this phrasing can sound awkward. As a result, we use the "trans experience" keeping in mind there is no one trans experience, instead there are multiple experiences that make up the diversity of trans people's lives.

been systematically documented, what we do know suggests cause for concern. For example, Namaste (2000) emphasizes "the irrelevance of most of the existing scholarship" based on the failure to reflect the lived experience of transgender and transsexual people (p. 2). Califia (2003) explains, "Most of the literature about transsexuals has been written by self-proclaimed experts, from a position that claims to be academic or scientific, and therefore objective" (p. 1). Within this context, "[T]o be differently-gendered is to live within a discourse where other people are always investigating you, describing you, and speaking for you: and putting as much distance as possible between the expert speaker and the deviant and therefore deficient subject" (p. 3).

1.2 Holding Researchers Accountable

Groups that experience epistemic oppression (Medina, 2013) have begun to create environments where holding researchers accountable is conceivable. For example, there is a large body of work documenting research abuses against Indigenous peoples including studies by Arbour and Cook (2006), Mello and Wolf (2010), Mosby (2013), and Smith (2012). Authors such as Holloway (2011), Skloot (2010), and Washington (1998), have written extensively about ethical abuses against African Americans, while Carlson (2013), Good, Hill, Reiss, and Bronston (2013), and Sprague (2007) draw attention to research ethics in the context of people labelled with intellectual disabilities. In a related area, researchers have highlighted abuses of people during research enrolment in developing nations (e.g.

Azetsop, 2011; Benatar, 2002; Emanuel, Wendler, Killen, & Grady, 2004). Authors across these fields have underlined problems related to individual and community informed consent, therapeutic misconception, representation, privacy, and confidentiality.

In addition to documenting clear examples and systemic practices, some communities have developed guidelines for researchers willing to shift their behaviours and to do things differently. These documents stand alongside frameworks that identify principles of ethical clinical research (e.g. Emanuel, Wendler & Grady, 2008). Incorporating decolonizing critiques, First Nations, Inuit, and Métis peoples have documented the ways their communities have been researched, the impacts of these practices, and have developed guidelines for appropriate research engagement with Indigenous communities including the *First Nations Principles of OCAP (Ownership, Control, Access, and Possession)* (e.g. Schnarch, 2004). These guidelines include concepts of community consent, but also critique the very research processes themselves as inappropriate in the context of Indigenous cultures and worldview (Smith, 2012).

1.3 The Need for Proof

In order to justify the need for change in research or clinical practice, it is often necessary to provide proof of a problem. This is particularly true when the requests or demands for change come directly from members of marginalized communities. In this study, one objective was to provide evidence of ethical

challenges in research with trans individuals and communities. The need to provide proof is reflected in the manuscripts through the use of language common to fields such as law and journalism including terms such as "investigating", "documenting", "witnessing", and "evidence". This language communicates a tension in relation to the need to make a "case" or to provide "proof". This explains the clear, formal, and explicit (Gough, Oliver, & Thomas, 2012) mixed methods study design I have chosen to document the field of trans research. Grounded in rigorous systematic review methods, the subsequent studies build on this framework to include ethical analysis, ethnographic content analysis, and a cross-sectional design.

1.4 Leveraging Systematic Review Methods to Study Researcher Behaviours

Systematic reviews have been used to explore research ethics in various contexts. Some authors highlight the lack of attention to ethics in evaluating research as part of the systematic review process (e.g. Vergnes, Marchal-Sixou, Nabet, Maret, & Hamel, 2010; Weingarten, Paul, & Leibovivi, 2004). Others have incorporated systematic reviews (or a modified form of systematic review) to examine ethics-focused research (e.g. Mahieu & Gastmans, 2012; Strech, Synofzik, & Marckmann, 2008), or research that includes ethical issues (e.g. Duke & Bennett, 2010; Greenhalgh, Potts, Wong, Bark, & Swinglehurst, 2009). Review methodologies such as systematic reviews, scoping studies, and evidence maps provide an opportunity to study the work of researchers, and more specifically the ways they document their work.

The key elements of systematic reviews are transparency, reproducibility, and accountability (Gough, Oliver, & Thomas, 2012). Built on these foundations, systematic reviews are also viewed as rigorous, and some would say, objective.

These qualities of reviews are useful to those aiming to explore researcher behaviours. Investigating the mechanisms of research injustice requires a form of "researching back" described by Smith "in the same tradition of 'writing back' or 'talking back' that characterizes much of the post-colonial or anti-colonial literature" (2012, p. 8). Critical social science approaches are most appropriate for studying power, oppression, and pathologization. In these ways, a mixed methods review combining systematic review methods with critical social science perspectives can provide the appropriate leverage to document ethical challenges in the ways research is carried out.

1.5 Objectives

The objectives of this study were to:

- apply systematic review methodologies including evidence mapping to demonstrate new ways of studying researchers and research ethics;
- document trans research in the fields of social sciences, sciences, humanities, health, education, and business including information about study topic, sample demographics, and study design;
- 3) assess the use of text mining for study identification;

- 4) identify evidence gaps and opportunities for more responsible research with trans individuals and communities;
- 5) conduct an ethical analysis to identify ethical challenges and recommendations for improved research and publishing practices with trans people; and
- increase access to research that includes trans people for community members, policymakers, and healthcare providers by establishing a webbased evidence map, including a searchable reference database.

The proposed research has the potential to build on knowledge in several fields. At this time there are no evidence maps of trans research. By documenting this broad field of study, this review will increase awareness of existing trans research and evidence gaps. Publishing the map online in the future will also improve access to research for key stakeholders including community members, policymakers, and healthcare providers.

1.6 Research Process

This project is grounded in the creation of an evidence map of trans research.

The original goal was to create a map documenting all empirical research that included trans people published in English in peer-reviewed journals. Early piloting of the screening process was conducted in the summer of 2013. After this, the search strategy was further refined in Fall 2014 with exploratory searches of many trans-

related terms including historical terminology and emerging language. Search terms were identified through online searches of trans blogs and social media, consultation with individual trans, gender non-binary, and Indigenous community members, and discussions with academic librarians. After testing, the final searches including 220 search terms within 54 search strings were conducted over a period of two weeks in January-February 2015.

As described in Chapters 2 and 3, the initial search of 15 academic databases produced 63,004 references. Removing duplicates took three months and was conducted in collaboration with other members of the team in Summer 2015. In total, 25,230 references were identified after duplicates had been removed. In summer 2015, we also piloted the level 1 screening process, together screening 2,393 references. In September 2015, two team members continued the process of screening 25,230 references. We both screened 1,985 references. After reconciling, James Thomas and his team at the EPPI-Centre used the results of the screening to run Latent Dirichlet Allocation (Blei, Ng, & Jordan, 2003) which produced a sorted list of the remaining references. One team member then screened the remaining records (20,854 references), and this process was completed in January 2016.

After all references had been screened, 10,651 were identified for full-text screening. This meant that it was necessary to search and upload over 10,000 references. In order to accomplish the search and retrieval of these articles, I recruited a team of independent contractors from Facebook. I specifically sought out people who had an interest in LGBT2Q-focused work and who wanted to gain

research experience. Sixteen people searched, located, and uploaded PDFs of over 9,000 references to Dropbox. Two members of the team with additional experience were specifically responsible for transferring the files from Dropbox to the associated records in EPPI-Reviewer. 1,192 requests were made through InterLibrary Loans with the bulk of these obtained through Memorial University Health Sciences Library and Memorial University Queen Elizabeth II Library. Additional InterLibrary Loan requests were processed through Dalhousie University and the University of Waterloo. One team member was involved in converting references that had been scanned from books and other formats to a readable format in order to enhance the possibilities of text mining on full-text.

Over time, and in relation to resource constraints, it became clear that it was necessary to limit the focus of the map in order to make the project more manageable. In order to do this, in consultation with my committee, I decided to map peer-reviewed trans-focused journal articles published between 2010 and 2014. From January to June, 2016, a team of six Research Assistants and I were involved in the process of screening 3,533 articles on full-text, with two people reviewing each reference. On a regular basis, team members met over the phone or in person to resolve coding differences. All differences were resolved. At the end of this process, 1,667 articles met the inclusion criteria and 690 were identified as trans-focused.

In Summer 2016, the team began working on data extraction. Together we developed the framework for the evidence map and one team member conducted the first round of data extraction. In Fall 2016, I carried out a second round of data

extraction for the evidence map focusing on the references from each study topic and study design. This process also included searching the dataset for key terms related to each study topic. Data extraction for the evidence map was completed in Winter 2017.

In Fall 2016, I also started to explore different visual methodologies in order to conduct a sub-study of the photographs of trans people in the dataset. Building on the work of Lippman and Brunger (1991), this research was initially focused on a discourse analysis of the photographs themselves. I was interested in the idea of magnifying a very small part of the dataset in order to explore ethical concepts in depth, and to demonstrate different ways other researchers might approach the dataset for future analysis.

Deciding where to focus my attention was partly a choice but partly also an impact of the work. The images that disturbed me the most were autopsy photographs of trans people. I often could not get them out of my head. One in particular returned to me many times. I wanted to know more about the person and their story. This led me to search for additional details about their life based on the information provided in the case report. Through this searching, I came to realize that some of the photographs from the articles were openly available on Google Images. The analysis resulting from my research is meant to support ethical discussion of informed consent practises specific to the publication of photographs like these examined through the lens of critical data science.

1.7 Overview of Dissertation Manuscripts

This dissertation is composed of four manuscripts. In the next section I provide a short description of each chapter.

1.7.1 Documenting Research with Transgender and Gender Diverse People: Protocol for an Evidence Map and Thematic Analysis

In this chapter, I present the protocol for the evidence map following the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) (Moher et al., 2015). Protocols provide an opportunity to describe the proposed review methods in detail, to raise awareness of the planned review and to reduce potential overlap between studies, and to enhance accountability mechanisms both within the team and between the researchers and the broader community. The protocol paper highlights some of the technical difficulties with reviews of trans research, including challenges related to search terms, problems with ways trans data is collected, and studies that combine data from research with gender diverse and sexual minority communities.

1.7.2 Documenting Research with Transgender, Gender Non-Binary, and Other Gender Diverse (Trans) Individuals and Communities: Introducing the Global Trans Research Evidence Map

In this paper, I introduce the Global Trans Research Evidence Map and share results related to study topic, study design, and the intersections of these two areas

of the map for 690 trans-focused references published between 2010 and 2014. Table 3.2 includes all of the trans-focused references with details relating to study topic and study design indicated for each publication. A full list of references is included in Appendix C. This manuscript highlights the top ten most commonly researched topic areas, the bottom ten topics, and explores the uneven distribution of study design within different study topics. Evidence maps also provide an opportunity to identify gaps and opportunities for knowledge synthesis. After presenting information about existing systematic reviews, topics that merit additional attention are identified. Finally, this paper explores the implications of evidence mapping and the need for attention to how future research is carried out.

1.7.3 Failure to Respect Trans People in Research: An Ethical Analysis and Recommendations for Positive Change

The third manuscript provides an opening to explore ethical challenges in the literature in greater depth. While collecting data for the evidence map, I identified multiple examples of a failure to respect trans participants or their personal information. Incorporating ethnographic content analysis (Altheide, 1987), this paper draws attention to key ethical concerns as they relate to research focus and study design, data collection and reporting, data analysis, and publishing practices. Based on these results, five recommendations are identified that provide clear direction for improving the ethics of research with trans people.

1.7.4 The Inclusion of Patient Photographs in Google Images Search Results: Revised Medical Photography Guidelines Required

The fourth paper examines a sample of 94 peer-reviewed publications from 2008 to 2015 that included clinical photographs of trans people. First, a brief description is provided of the photographs in the articles summarizing type of image (face, chest or breasts, genitals, skin graft donor site, or other parts of the body), timing of photograph (pre-, during, or post-surgery, specimens, or autopsy), anonymization, and whether the photograph was in colour or black and white. The focus then turns to whether the photographs were available on Google Images, and whether the original article was available on the internet through open access or other online sites. Thirty-five articles out of a total of 94 publications (37.2%) included at least one photograph that was found on Google Images. In total, 123 out of 605 clinical photographs (20.3%) were found on Google Images. Given current informed consent documents, it is unlikely that patients are being asked to provide consent to distribute their medical photographs in open image repositories such as Google Images. These findings draw attention to the implications of online publishing and to an urgent need for renewed attention to informed consent in medical photography and the associated publishing practices.

We now turn to the papers, looking first at the broad scope of the trans research evidence map, and then shifting our focus to an ethical analysis of current researcher practices, and a specific ethical challenge related to informed consent for

medical photographs in the context of an increasing emphasis on accessibility and open science.

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Co-Authorship Statement

For this dissertation, I developed the study design in consultation with my cosupervisors, Dr. Chris Kaposy, Dr. Fern Brunger, and committee member Dr. Vivian Welch. I conducted data collection and where necessary, I coordinated the activities of research assistants in order to complete the data collection process. I conducted all data analysis in collaboration with Drs. Kaposy, Brunger, and Welch. I wrote the first draft of all chapters, and manuscript co-authors contributed revisions or suggested changes that I incorporated into revised versions.

Chapter 2 was previously published in *Systematic Reviews* under open access (Marshall et al., 2017).

Chapter 3 is in preparation for submission.

Chapter 4 is in preparation for submission.

Chapter 5 forms the basis of a manuscript that was published in the *Journal of Medical Internet Research* under open access (Marshall, Brunger, Welch, Asghari, & Kaposy, 2018).

Chapter 2: Documenting Research with Transgender and Gender Diverse

People: Protocol for an Evidence Map and Thematic Analysis

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Author's Contribution

ZM wrote the initial draft of the protocol and is the guarantor of the review. VW provided methodological guidance and revisions to the manuscript. MS assisted in the identification of databases and reviewed the search strategy. CK and FB are cosupervisors of this project. They provided consultation at all stages of review development and contributed revisions to the manuscript. JT and IS are supporting the use of text mining and contributed to the data collection and synthesis sections of the protocol. All authors read and approved the final manuscript.

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Abstract

Background

There is limited information about how transgender, gender diverse, and Two-Spirit (trans) people have been represented and studied by researchers. The objectives of this study are to (1) map and describe trans research in the social sciences, sciences, humanities, health, education, and business, (2) identify evidence gaps and opportunities for more responsible research with trans people, (3) assess the use of text mining for study identification, and (4) increase access to trans research for key stakeholders through the creation of a web-based evidence map.

Methods

Study design was informed by community consultations and pilot searches. Eligibility criteria were established to include all original research of any design, including trans people or their health information, and published in English in peer-reviewed journals. A complex electronic search strategy based on relevant concepts in 15 databases was developed to obtain a broad range of results linked to transgender, gender diverse, and Two-Spirit individuals and communities. Searches conducted in early 2015 resulted in 25,2423 references after removal of duplicates. Based on the number of references, resources, and an objective to capture upwards of 90% of the existing literature, this study is a good candidate for text mining using

³ Note that the numbers in this chapter may be slightly different from the rest of the dissertation. This is because the protocol paper was published in *Systematic Reviews* earlier in 2017 and we have retained the published text for consistency.

Latent Dirichlet Allocation to improve efficiency of the screening process. The following information will be collected⁴ for evidence mapping: study topic, study design, methods and data sources, recruitment strategies, sample size, sample demographics, researcher name and affiliation, country where research was conducted, funding source, and year of publication.

Discussion

The proposed research incorporates an extensive search strategy, text mining, and evidence map; it therefore has the potential to build on knowledge in several fields. Review results will increase awareness of existing trans research, identify evidence gaps, and inform strategic research prioritization. Publishing the map online will improve access to research for key stakeholders including community members, policymakers, and healthcare providers. This study will also contribute to knowledge in the area of text mining for study identification by providing an example of how semi-automation performs for screening on title and abstract and on full text.

Keywords: Evidence map; Transgender; Gender diverse; Text mining; Research ethics; Responsible research; Research prioritization

⁴ In accordance with the *Cochrane Style Manual*, future tense is used in this manuscript. This is required because protocols are written early in the process of study design to document activities that are planned for the future.

2.1 Background

2.1.1 Rationale

The aim of this review is to map and describe how transgender, gender diverse, and Two-Spirit (trans) people have been studied and represented within and across research in the fields of social sciences, sciences, humanities, health, education, and business. There is limited information about the scope of research focusing on trans individuals and communities. Because many people are not aware of the amount of research that has been conducted, this leads to misunderstandings and miscommunication. These beliefs are highlighted in statements by researchers such as "Limited empirical data are available regarding the mental health and general well-being of the transgender population" (Sjoberg, Walch, & Stanny, 2006, p. 35), "There is a dearth of health research about transgender people" (Reisner, Gamarel, Dunham, Hopwood, & Hwahng, 2013, p. 293), and "Literature regarding the gender variant population is very limited" (Piper & Mannino, 2008, p. 75). Such misunderstandings may be particularly troublesome if trans community members are unaware of research that can potentially inform questions they have about their lives. Despite the lack of specific information, both researchers and community members have highlighted the links between research and the oppression of trans people (Califia, 2003; Namaste, 2000; Stryker, 2008). Systematic research documenting the types of studies that have been conducted over time will provide details about the evidence that does exist and will help to identify opportunities for

more responsible research (Owen, Macnaghten, & Stilgoe, 2012) with gender diverse individuals and communities.

There are multiple challenges that restrict our ability to conduct reviews in the area of trans research. The first relates to the terminology used to describe transgender, gender diverse, and Two-Spirit people and the ways this influences search strategies. Language used to describe gender diverse people varies across stakeholder communities including medical diagnoses, terms used within or by communities, and phrases used across cultures and linguistic groups. As this terminology evolves over time (Reicherzer, 2008), it adds to the number of terms that should be included in strong search strategies. A second challenge relates to subject headings, both in terms of the ways these headings reflect trans experience and their inability to remain up to date with language related to gender diversity (Roberto, 2011). These complications necessitate searches beyond subject headings, a process that is made more complex because it is difficult to search terms such as "trans" or "gender identity" by themselves due to the lack of specificity of these terms to the target study records and the consequent number of irrelevant results this produces. It is also necessary for search strategies to include both databasespecific headings and independent search terms and to include terms such as mastectomy or vaginoplasty that may be relevant to both cisgender and transgender experience. The term cisgender refers to people who identify with the gender they were labelled at birth, also referred to as non-transgender people. Once searches are complete, screening is complicated by difficulties with identifying whether there are

trans participants involved in the studies, or whether the articles are trans-focused, due to information that may be incomplete in the title and abstract. For example, these challenges arise when reviewing references that include trans people as part of larger studies with lesbian, gay, bisexual, trans, and queer (LGBTQ) communities, and surgery-related case reports.

Despite these difficulties, some researchers have attempted to raise awareness of the types of trans research available. One of the earliest examples is an annotated bibliography developed by Denny in 1994. Published in book format, this bibliography includes early articles, books, and community reports. Since then, we have also seen a slow increase in systematic reviews. Primarily focused in the area of trans health (Reisner et al., 2016), researchers have conducted reviews related to gender dysphoria (Eftekhar et al., 2015), HIV (Baral et al., 2013), cancer care (Watters, Harsh, & Corbett, 2014), mental health (Crawford & Hohn, 2015), learning disabilities (Wood & Halder, 2014), support experiences and attitudes of parents of gender variant children (Riggs & Due, 2015), gender identity disorder in twins (Heylens et al., 2012), and aging (Finkenauer, Sherratt, Marlow, & Brodey, 2012). More commonly, we see trans studies included as part of larger reviews focusing on LGBTQ communities, men who have sex with men (MSM), or other marginalized populations (e.g., Collier, van Beusekom, Bos, & Sandfort, 2013; Lee, Matthews, McCullen, & Melvin, 2014).

The proposed research, by incorporating an extensive search strategy, text mining, and evidence map, has the potential to build on knowledge in several fields.

At this time, there are no evidence maps of trans research. By documenting this broad field of study, this review will increase awareness of existing trans research, identify evidence gaps, and inform strategic research prioritization (Snilstveit, Vojtkova, Bhavsar, & Gaarder, 2013) Publishing the map online will also improve access to research for key stakeholders including community members, policymakers, and healthcare providers.

2.1.2 Aim and Objectives

The aim of this review is to map and describe how trans people have been studied and represented within and across multiple fields of research. The objectives are to:

- document trans research in the fields of social sciences, sciences, humanities, health, education, and business including information about study topic, sample demographics, and study design;
- 2) identify evidence gaps and opportunities for more responsible research with trans people;
- 3) assess the use of text mining for study identification; and
- 4) increase access to trans research for community members, policymakers, and healthcare providers by establishing a web-based evidence map, including a searchable reference database.

2.2 Methods

This protocol was prepared in accordance with the Preferred Reporting

Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) (Moher et al.,

2015) (see Appendix A). An evidence map will be developed using the framework

developed by Hetrick, Parker, Callahan, and Purcell (2010) which includes four

steps. Evidence maps are an emerging method (Miake-Lye, Hempel, Shanman, &

Shekelle, 2016) to collate, describe, and catalog knowledge across a broad subject

area (James, Randall, & Haddaway, 2016). This information can then be leveraged by

stakeholders to inform policy and clinical decisions (James et al., 2016).

2.2.1 Eligibility Criteria

As part of the process of developing evidence maps, it is recommended that researchers clarify concepts and engage key stakeholders in considering the potential scope of the review (Bragge et al., 2011). Accordingly, individual consultations were held with members of trans and cisgender communities to discuss terminology, search scope, and potential uses of an evidence map. Based on the results of consultations and pilot searches, the eligibility criteria were established to include all original research studies of any design, reported in English language peer-reviewed journals, that identifiably included trans people or their information, such as medical or surgical case reports with single participants, transfocused qualitative or quantitative research, and population survey data that adequately identify trans or gender diverse participation.

2.2.2 Information Sources

Initial identification of potential databases was based on the goal of obtaining the broadest range of studies about trans people from multiple fields including social sciences, sciences, humanities, health, education, and business. A secondary emphasis was to gather research from countries and cultures around the world. For example, in order to properly capture research about gender diverse Indigenous people, three databases focused on Indigenous and First Nations research were included.

Once a draft list had been identified, overlap analysis of potential databases was conducted by a health sciences librarian (Burnham, 2006; Chen, 2006; Royle & Milne, 2003). Specifically, PubMed was chosen to capture the content not included in MEDLINE through Scopus (Burnham, 2006). Fifteen databases were selected to ensure the identification of diverse study designs (Althuis, Weed, & Frankenfeld, 2014) including Academic Search Premier, Anthropology Plus, Bibliography of Native North Americans, CINAHL, First Nations Periodical Index, Indigenous Studies Portal, LILACS, ProQuest Social Sciences Premium (contains Sociological Abstracts, ERIC, Social Services Abstracts & Applied Social Sciences Index and Abstracts), PsycINFO, PubMed, SciELO, Scopus, Social Work Abstracts, Web of Science, and Women's Studies International.

2.2.3 Search Strategy

Search terms focus on transgender, gender diverse, and Two-Spirit identities and experiences. The search strategy is provided in Appendix B. Because there are multiple terms used for (and/or by) trans people, and this language continues to shift over time (Reicherzer, 2008), the full list of search terms is extensive and consists of terms related to gender identity (e.g., "trans woman"), diagnoses (e.g., "gender identity disorder" and "gender dysphoria"), medical and surgical procedures (e.g., vaginoplasty), terms used in a range of countries and cultures (e.g., hijra, waria, travesti), and language used historically (e.g., "transvestite").

2.2.4 Study Records

2.2.4.1 Data management. The draft search strategy was reviewed with a health sciences librarian. Pilot searches were conducted in January 2015 for each search string in all 15 databases to ensure that the search was specific but not overly sensitive. Full searches were then conducted from January 25 to February 22, 2015, (see Table 2.1). After each search was complete, all references were imported to EndNote and subsequently imported into EPPI-Reviewer V.4.6.0.1 where duplicates were removed. EPPI-Reviewer is a web-based software designed to support the screening, data extraction, and data analysis phases of scoping and systematic reviews. Searches resulted in a total of 63,003 references. After removing duplicates, the total number of references included in the review is 25,242.

2.2.4.2 Selection process. Abstracts will initially be screened based on the information in the title and abstract (level 1). References will be excluded if articles are not written in English, if they are not original research, if they do not include humans, or if they include only cisgender heterosexual people or people diagnosed with disorders of sex development (DSD). If a reference cannot be excluded at level 1, the full text of the article will be uploaded so that it can be screened more thoroughly (level 2).

2.2.4.3 Text mining. The large number of citations retrieved by electronic searches in such a complex and broad topic area inevitably creates workload challenges for reviewers who need to check them all for eligibility. The use of new technologies—text mining and machine learning—have been advanced as potential ways in which screening workload might be reduced (O'Mara-Eves, Thomas, McNaught, Miwa, & Ananiadou, 2015). When used in the context of reference screening in systematic reviews, a process known as "active learning" can be employed, whereby the machine "learns" from a relatively small sample of reviewer decisions and presents to the reviewer a set of references to screen next; the machine then learns from these screened references too, and the process continues in an iterative fashion. While effective at identifying the majority of relevant studies much earlier in the screening process than would otherwise be the case, there is a danger of the machine models becoming "over-fitted" early in the process, and some relevant studies not being identified. In order to reduce this risk, the citations are

grouped together into thematically similar topics using topic modeling using Latent Dirichlet Allocation (Blei, Ng, & Jordan, 2003); these topics can then be utilized as "features" within the machine learning process and also examined manually by reviewers in order to ensure that each topic has been adequately explored for potentially relevant studies.

2.2.4.4 Screening on full text. For full-text screening, two team members will review each reference, and any differences will be reconciled through discussion. Level 2 screening will identify original research that includes trans participants or their information. In addition, at this level we will identify studies that include only trans participants, research with photographs of trans people, research that includes trans participants as part of larger LGBTQ studies, and studies with both cisgender and trans participants. The purpose of identifying these details at level 2 is to support data extraction. After eligibility is confirmed based on a review of the full text, then the extraction of information from each article will begin (level 3).

2.2.4.5 Data collection process. Once all of the English-language peer-reviewed original research that includes trans people or their information has been identified, we will begin data extraction using a standardized data extraction form. The form will be piloted by two reviewers and then data extraction will be conducted by one person, with a second reviewer verifying data extraction results.

2.3 Data Items

Data extraction will focus on creating an evidence map emphasizing the extent and distribution (Katz, Williams, Girard, & Goodman, 2003) of trans research studies. The following information will be collected for mapping: study topic; study design, methods, and data sources; recruitment strategies; sample size and demographics (gender identity, sexual identity, race/ethnicity, age, geographic location, education, and income); terminology used to describe trans people; researcher name and affiliation; geographic location of data collection; funding source; and year of publication. Because we do not extract health-related outcomes, this evidence map has not been registered with PROSPERO.

2.4 Data Synthesis

2.4.1 Evidence map. In their recent systematic review, Miake-Lye et al. (2016) highlighted the user-friendly formats of evidence maps, which often include graphs, visual figures, or a database that is searchable. For example, McCandless and Perkins (2014) created an interactive infographic looking at the evidence for nutritional supplements. In addition, researchers including Snilstveit and colleagues (2013) are contributing to gap maps that visually illustrate both evidence and gaps in research. With this project, the goal is to focus on mapping the information stakeholders are most interested in obtaining such as subject area, study design, and sample demographics. After data extraction is complete, information will be exported from EPPI-Reviewer into a database hosted by RSpace Repository at

Renison University College, University of Waterloo

(http://rspace.uwaterloo.ca/xmlui/). The initial plan is to incorporate an open access searchable database including title, abstract, and journal details, as well as information extracted as part of this evidence mapping process. Once the database has been populated, we will develop additional visually accessible tools that are more accessible to policymakers and community stakeholders, including the ability to combine searches using visual symbols, and to display information using formats such as bubble plots and color-coded summary tables.

2.5 Discussion

This research will map and describe how trans people have been represented and studied within and across multiple fields of research. In addition to identifying the types of research that have been conducted, it will also provide information about which topics have been under-researched, who has been over- or under-included as research participants, and areas where further scoping studies or systematic reviews would be appropriate. Providing this information online will help to improve stakeholder access to research about gender diverse people and will contribute to increased knowledge democracy for transgender, gender diverse, and Two-Spirit individuals and communities. This study will also increase knowledge in the area of text mining for study identification by providing an example of how semi-automation performs for screening on title and abstract and on full text.

Table 2.1 Results of Database Searches

Database	N records
Academic Search Premier	9,477
Anthropology Plus	339
Bibliography of Native North Americans	75
CINAHL	2386
First Nations Periodical Index	41
Indigenous Studies Portal	84
LILACS	738
ProQuest Social Sciences Premium	10,212
ProQuest Subject Terms	2,718
PsycINFO	6,223
PubMed	7,464
SciELO	482
Scopus	11,640
Social Work Abstracts	144
Web of Science	7,641
Women's Studies International	3,320
Total Number of References Retrieved	63,003
Duplicates Removed	37,761
Total Number of References	25,242

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Chapter 3: Documenting Research with Transgender, Gender Non-Binary, and

Other Gender Diverse (Trans) Individuals and Communities: Introducing the

Global Trans Research Evidence Map

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Author's Contribution

ZM wrote the initial draft of the manuscript and is the guarantor of the review. VW provided methodological guidance and revisions to the manuscript. AM codeveloped the evidence map framework and conducted the first round of data extraction. MS assisted in the identification of databases and reviewed the search strategy. CK and FB are co-supervisors of this project. They provided consultation at all stages of review development and contributed revisions to the manuscript. All authors read and approved the final manuscript.

Abstract

There is limited information about how transgender, gender non-binary, and other gender diverse (trans) people have been studied and represented by researchers. The objectives of this study were to: 1) map and describe trans research in the social sciences, sciences, humanities, health, education, and business; 2) identify evidence gaps and opportunities for more responsible research; and 3) increase access to trans research for key stakeholders through the creation of a webbased evidence map. Eligibility criteria were established to include empirical research of any design, that included trans participants or their personal information, and that was published in English in peer-reviewed journals. A complex search of 15 academic databases conducted in early 2015 resulted in 25,230 references after duplicates were removed; this data analysis highlights 690 transfocused articles that met the screening criteria and were published between 2010 and 2014. The ten topics studied most frequently were: 1) therapeutics and surgeries; 2) gender identity and expression; 3) mental health; 4) biology and physiology; 5) discrimination and marginalization; 6) physical health; 7) sexual health, HIV, and sexually transmitted infections (STIs); 8) health and mental health services; 9) social support, relationships, and families; and 10) resilience, well-being, and quality-of-life. This map also highlights the relatively minor attention that has been paid to a number of study topics linked to the social determinants of health including: ethnicity, culture, race, and racialization; housing; income; employment; and space and place. Results of this review have the potential to increase awareness

of existing trans research, to identify evidence gaps, and to inform strategic research prioritization. When aware of this information, it is more likely that trans communities and our allies will be in a position to benefit from existing research and to hold researchers accountable as community awareness increases.

Research Highlights

- Global Trans Research Evidence Map documents 690 diverse trans-focused studies
- New resource facilitates community and clinical engagement with existing research
- Evidence gaps tied to structural oppression including social determinants of health

Keywords

Evidence map; Transgender; Gender diverse; Research ethics; Knowledge synthesis; Social determinants of health

3.1 Introduction

Systematic review methodologies including scoping reviews and evidence maps provide an opportunity to study detailed aspects of knowledge production including what topics are researched, who tends to be studied, what types of methods are used, and how people interact with the products of research. In this way, reviews turn the focus of attention towards the research process and researchers themselves, uncovering new information and increasing the visibility of diverse fields of study.

The aim of this review is to map and describe how transgender, gender non-binary and other gender diverse (trans) people have been studied and represented within and across research in the fields of social sciences, sciences, humanities, health, education, and business. The term "trans" refers to people who "do not conform to prevailing expectations about gender" (Bettcher, 2014, Terminology section, para. 1) and includes transgender, transsexual, and other gender diverse adults; it can also include children and adolescents who are gender creative or gender diverse. In contrast, the term cisgender refers to people who identify with the gender they were labelled at birth, also referred to as non-transgender people (Schilt & Westbrook, 2009). While trans is a self-identification, it also relates to a psychiatric diagnosis (APA, 2013). Transsexual and transgender people diagnosed with gender identity disorder or gender dysphoria have been the subjects of medical and psychiatric research and are described in clinical and social sciences literature. In this review of trans research, we have opted for a broad trans conceptualization

(Feinberg, 1996) that incorporates diverse gender identities and expressions across global contexts. This includes transgender and transsexual people as well as drag queens, butch femmes, Two-Spirit people, hijra, travesti, cross-dressers, and additional non-binary and gender diverse identities and expressions.

There is limited information about the scope of research focusing on trans individuals and communities. Because many people are not aware of the amount of research that has been conducted, this leads to misunderstandings and miscommunication. Such misunderstandings may be particularly troublesome if trans community members are unaware of research that can potentially inform questions they have about their lives. Despite the lack of specific information, both researchers and community members have highlighted the links between research and the oppression of trans people (Califia, 2003; Namaste, 2000; Stryker, 2008). Systematic research documenting the types of studies that have been conducted over time will provide details about the evidence that does exist and will help to identify opportunities for more responsible research (Owen, Macnaghten, & Stilgoe, 2012) with trans individuals and communities.

There are multiple challenges that restrict our ability to conduct reviews in the area of trans research. The first relates to the terminology used to describe transgender, gender non-binary, and Two-Spirit people and the ways this influences search strategies. Language to describe gender diverse people varies across stakeholder communities including medical diagnoses, terms used within communities, and phrases distinct to cross-cultural or linguistic groups. As this

terminology evolves over time (Reicherzer, 2008), it adds to the number of terms that should be included in strong search strategies. A second challenge relates to subject headings, both in terms of the ways these headings reflect trans experience and their inability to remain up to date with language related to gender diversity (Roberto, 2011). These complications necessitate searches beyond subject headings, a process that is made more complex because it is difficult to search terms such as "trans" or "gender identity" by themselves due to the lack of specificity of these terms to the target study records and the consequent number of irrelevant results this produces. It is also necessary for search strategies to include database-specific headings and independent search terms and to include surgical terms such as mastectomy or vaginoplasty that may be relevant to both cisgender and transgender experiences. Once searches are complete, screening is complicated by difficulties with identifying whether there are trans participants involved in the studies, or whether the articles are trans-focused, due to information that may be incomplete in the title and abstract. For example, these challenges arise when reviewing references that include trans people as part of larger studies with lesbian, gay, bisexual, trans, Two-Spirit, and queer (LGBT2Q) communities, and surgery-related case reports. Edmiston et al. (2016) reported similar challenges in their recent systematic review of opportunities and gaps in primary care preventative health services for trans people.

Despite these difficulties, some researchers have attempted to raise awareness of the types of trans research available. Denny published one of the

earliest examples in the form of an annotated bibliography =in 1994. This bibliography included early articles, books, and community reports. Since then, there has been a slow increase in systematic reviews. Primarily health focused (Reisner et al., 2016), researchers have conducted trans-focused reviews related to aging (Finkenauer, Sherratt, Marlow, & Brodey, 2012), cancer care (Watters, Harsh, & Corbett, 2014), gender dysphoria (Eftekhar et al., 2015), HIV (Baral et al., 2013), learning disabilities (Wood & Halder, 2014), and mental health (Hoffman, 2014), . More commonly, trans research is included in larger reviews focusing on LGBT2Q communities, men who have sex with men (MSM), or other marginalized populations (e.g., Collier, van Beusekom, Bos, & Sandfort, 2013; Lee, Matthews, McCullen, & Melvin, 2014).

Incorporating an extensive search strategy, text mining, and evidence map, this study has the potential to build on knowledge in several fields. At this time, there are no evidence maps of trans research. By documenting this broad field of study, this review will increase awareness of existing trans research, identify evidence gaps, and inform strategic research prioritization (Snilstveit, Vojtkova, Bhavsar, & Gaarder, 2013). Publishing the map online will also improve access to research for key stakeholders including community members, healthcare providers, and policymakers.

3.2 Materials and Methods

Evidence maps are an emerging method (Miake-Lye, Hempel, Shanman, & Shekelle, 2016) to "collate, describe, and catalog" knowledge across a broad subject area (James, Randall, & Haddaway, 2016). Stakeholders can then leverage this information to inform policy and clinical decisions (James et al., 2016). This evidence map was developed using the framework developed by Hetrick, Parker, Callahan, and Purcell (2010), which includes four steps: identify objectives, define characteristics to be mapped and eligibility criteria, screen the literature, and chart the evidence within the map. The protocol for this evidence map was previously published (Marshall et al., 2017) in accordance with the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) (Moher et al., 2015) (Appendix A).

3.2.1 Aim and Objectives

The aim of this study was to map and describe how trans people have been studied and represented within and across multiple fields of research. The objectives of the overall study were to:

- apply systematic review methodologies including evidence mapping to demonstrate new ways of studying researchers and research ethics;
- document trans research in the fields of social sciences, sciences, humanities, health, education, and business including information about study topic, sample demographics, and study design;

- identify evidence gaps and opportunities for more responsible research with trans individuals and communities;
- 4) assess the use of text mining and semi-automation for study identification;
- increase access to research that includes trans people for community members, policymakers, and healthcare providers by establishing a webbased evidence map, including a searchable reference database; and
- 6) conduct an ethical analysis to identify ethical challenges and recommendations for improved research and publishing practices with trans people.

This manuscript focuses on objectives 1, 2, 3, and 5.

3.2.2 Eligibility Criteria

As part of the process of developing evidence maps, it is recommended that researchers clarify concepts and engage key stakeholders in considering the potential scope of the review (Bragge et al., 2011). Accordingly, individual consultations were held with members of trans and cisgender communities to discuss terminology, search scope, and potential uses of an evidence map. Based on the results of consultations and pilot searches, the eligibility criteria were established to include empirical research studies of any design with human participants, reported in peer-reviewed journals in English, that identifiably included trans people or their personal information.

3.2.3 Information Sources

Initial identification of potential databases was based on the goal of obtaining the broadest range of studies about trans people from multiple fields. A secondary emphasis was to gather research on a global scale. For example, in order to properly capture research related to gender diverse Indigenous people, three databases focused on Indigenous and First Nations research were included.

Fifteen databases were selected to ensure the identification of diverse study designs (Althuis, Weed, & Frankenfeld, 2014) including Academic Search Premier, Anthropology Plus, Bibliography of Native North Americans, CINAHL, First Nations Periodical Index, Indigenous Studies Portal, LILACS, ProQuest Social Sciences Premium (contains Sociological Abstracts, ERIC, Social Services Abstracts & Applied Social Sciences Index and Abstracts), PsycINFO, PubMed, SciELO, Scopus, Social Work Abstracts, Web of Science, and Women's Studies International.

3.2.4 Search Strategy

Search terms focused on transgender, gender non-binary, gender diverse, and Two-Spirit identities and experiences. Because there are multiple terms used for (and/or by) trans people, and this language continues to shift over time (Reicherzer, 2008), the full list of search terms was extensive and consisted of terms related to gender identity (e.g., "trans woman"), diagnoses (e.g., "gender identity disorder", and "gender dysphoria"), therapeutics and surgical procedures (e.g., vaginoplasty), words used in a range of countries and cultures (e.g., Two-Spirit, hijra, waria,

travesti), and language that was used historically (e.g., transvestite). An example of the search strategy for one academic database is provided in Appendix B.

3.2.5 Data Management

The draft search strategy was reviewed with a health sciences librarian. Pilot searches were conducted in January 2015 for each search string in all 15 databases to ensure that the search was specific but not overly sensitive. Full searches were then conducted from January 25 to February 22, 2015. Searches resulted in a total of 63,004 references (see Table 3.1). After removing duplicates, the total number of references included in the review was 25,230 (see Figure 3.1).

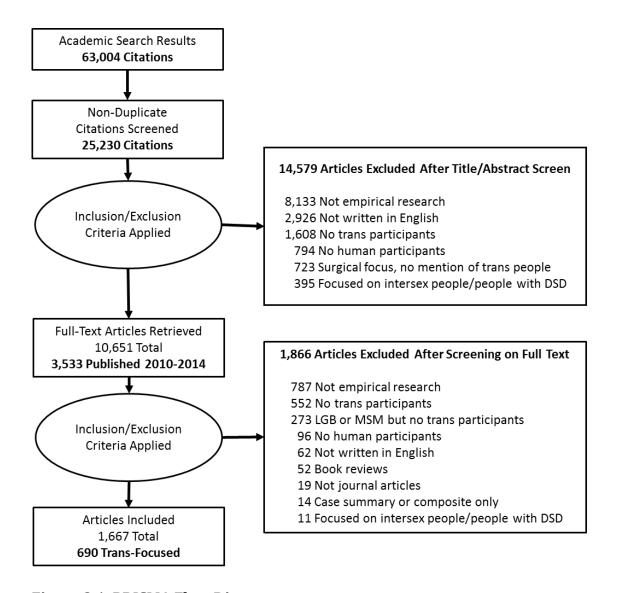


Figure 3.1. PRISMA Flow Diagram

3.2.6 Selection Process

3.2.6.1 Screening on title and abstract. The first author developed the initial approach to screening and two reviewers conducted a pilot review of a random sample of 100 references. This was followed by a follow-up review of a random sample of approximately 10% of the dataset (2,393 references). Differences

were reconciled through discussion and clarification, leading to a refinement of the eligibility criteria. After this, references were randomly allocated into groups of 1,000. Two reviewers screened the first two groups, reconciling differences through dialogue and discussion.

References were screened based on the information in the title and abstract (level 1). Studies were excluded if articles were not written in English, if they were not empirical research, if they did not include humans, or if they included only cisgender heterosexual people or people diagnosed with disorders of sex development (DSD) (sometimes referred to as intersex people). If a reference could not be excluded at level 1, the full text of the article was retrieved and uploaded so that it could be screened more thoroughly (level 2). Any reference with no abstract was automatically screened on full text.

Whether there were any trans participants included in studies was often not clear from the abstracts. For example, in research with a diversity of LGBT2Q participants, authors might have presented the total number of participants in the abstract, or the study may have included trans participants but they were not necessarily mentioned at this level. Early in the screening process it became clear that many disagreements between reviewers were linked to a lack of specificity about sample characteristics in the abstract. As a result, it was necessary to automatically include references with LGBT2Q or MSM samples for screening on full text. In addition, due to the connections between HIV, sex work, and trans populations, all references that mentioned sex workers or people living with HIV as

participants were automatically screened on full text. Lack of specificity was also a challenge with some clinical case studies. As a result, any studies that mentioned trans-specific surgeries or therapeutics were automatically included. Finally, due to diversity within the general population, any studies with a sample size over 1,000 were included. The rationale for this was to verify in the full-text article whether surveys included demographic questions inclusive of trans identities, and whether any trans participants had self-identified.

3.2.6.2 Screening on full text. For full-text screening, two team members reviewed each reference, and any differences were reconciled through discussion. The goal of level 2 screening was to identify original research that included trans participants or their personal information. In addition, at this level we identified three different types of studies: trans-focused, LGBT2Q/MSM, and mixed. Transfocused studies included those with only trans participants as well as those with a cisgender control group. LGBT2Q/MSM studies were studies that included trans people as part of larger studies with sexual and gender diverse participants. Mixed studies were those with both cisgender and trans participants. In addition, studies with photographs were also flagged at this level of screening. The purpose of identifying these details at level 2 was to support data extraction. The evidence map presented here included only trans-focused studies.

3.2.6.3 Data items for mapping. Data extraction focused on creating an evidence map emphasizing the extent and distribution (Katz, Williams, Girard, & Goodman, 2003) of trans research studies. The following information was collected for mapping: study topic, study design, data sources, trans sample demographics, geographic location of data collection, open access availability, and year of publication. This manuscript focuses on data related to study topic and study design.

3.2.7 Data Analysis

3.2.7.1 Study topics. In order to develop a list of study topics for the map, the team started with the social determinants of health (Health Canada, 1994) and frameworks that incorporate both structural health perspectives and individual health behaviours. Models by Ansari, Carson, Ackland, Vaughan, and Serraglio (2003), and Brennan Ramirez, Barker, and Metzler (2008) inspired early conceptualizations of topic areas. After piloting, additional subjects were added to the map that helped to expand the coding framework beyond a health focus. New topics that were added included: arts and creativity; sex work; resilience, well-being and quality of life; and resistance and activism.

In the first phase of data extraction, one reviewer went through each reference to identify key study topics. In coding for study topic, we focused on the stated purpose as identified by the study author(s). While there was no set limit to the number of study topics that could be selected, we aimed for a range of two to four study topics per reference. In the next phase, a second team member reviewed

groups of references by study topic. For example, all references within the study topic of aging or physical health were verified for consistency and topic cohesion. In this phase, some of the more traditional social determinants topics were also renamed to better communicate the subject matter included in that category. For example, natural built environments was reconceptualised as space and place.

In this phase, the second reviewer also conducted word searches within the set of included studies to verify that no relevant references had been excluded. For example, in searching for articles about aging, the dataset was searched for any references that included relevant search terms such as "age", "aging", "elder", "senior", and "old" in the title and/or abstract. This produced larger sets of references for checking but also helped to ensure that studies relevant to each topic were captured within the map.

3.2.7.2 Study design. Because this review included a broad range of quantitative, qualitative, and clinical study types it was not possible to use an existing evidence-based categorization scheme. As a result, two of the co-authors developed a coding framework including the following options: 1) systematic review of randomized controlled trials; 2) randomized controlled trial; 3) nonrandomized controlled trial; 4) case-control study; 5) cohort study; 6) systematic review of descriptive or qualitative studies; 7) cross-sectional study; 8) qualitative study with interviews or focus groups; 9) ethnography or phenomenological qualitative study; 10) historical research; 11) case report, case study, or case series; 12)

autoethnography; 13) basic science; and 14) community-based research or other forms of participatory research.

Clear definitions of each study design were identified using the following sources: systematic reviews (Page et al., 2016), case-control, cohort, and cross-sectional studies (Institute for Work and Health, 2015, 2016; Mann, 2003), case studies (Verschuren, 2003), and case reports and case series (Nissen & Wynn, 2012). In order to be categorized as a systematic review, studies needed to include a clear search strategy or method to identify studies, and to explicitly state their methods of study selection. Because there are limited systematic reviews in the field of trans studies and this evidence map aimed for broad inclusion, we did not require the third criteria from the PRISMA-P definition of a systematic review (explicitly described methods of synthesis) (Page et al., 2016) in order for studies to be included.

One reviewer extracted information about study design and data collection methods from all trans-focused studies. A second reviewer verified the first 10% of the data extraction. After clarifying any differences in coding, additional questions about how to code particular studies were discussed with a third member of the study team. Based on this information reviewer two checked the references within each study design grouping for accuracy and consistency.

3.3 Results

3.3.1 Screening on Title and Abstract

25,230 references were screened based on the information in the title and abstract (level 1). 14,579 references were excluded for the following reasons: 8,133 excluded based on study design, 2,926 were not in English, 1,608 were excluded because they gave no indication that trans people had been participants, 794 did not include human participants (that is, they were based on animal models or relied on documents for analysis), 723 were articles about surgery that did not suggest trans participation, and 395 focused on intersex or DSD experience. 6,915 references met the inclusion criteria based on title and abstract, and an additional 3,736 were included based on no abstract being available (see Figure 3.1).

3.3.2 Screening on Full Text

10,651 references were eligible for screening on full text. Due to resource constraints, the decision was made to focus the first version of the evidence map on the most recent five-year period. As a result, 3,533 references published between 2010 and 2014 were screened on full text.

1,667 articles met the inclusion criteria. 690 articles were trans-focused, 462 included LGBT2Q and/or MSM participants, and 515 included mixed samples. 1,866 studies were excluded based on the following criteria: not empirical research (787 references); no trans participants (552 references); LGB or MSM but explicitly no trans participants (273 references); no human participants (96 references); not

written in English (62 references); book reviews (52 references); not journal articles (19 references); case summary or composite only (14 references); or focused on intersex participants or people diagnosed with DSD (11 references).

The 690 trans-focused articles form the basis of the remaining data analysis for this manuscript (see Appendix C for a full list of the trans-focused references). Data on study topics and study design is the focus of the next section, and is summarized in Appendix D. Combining data about topic and study design provides additional insights into how researchers have chosen to explore trans research topics, including information about areas of over- and under-emphasis, topics that could benefit from knowledge synthesis, and areas that need further attention.

3.3.3 Study Topics

The map included a total of 37 study topics (see Table 3.2). The top ten study topics were: 1) therapeutics and surgeries; 2) gender identity and expression; 3) mental health; 4) biology and physiology; 5) discrimination and marginalization; 6) physical health; 7) sexual health, HIV, and STIs; 8) health and mental health services; 9) social support, relationships, and families; and, 10) resilience, well-being, and quality-of-life (see Figure 3.2).

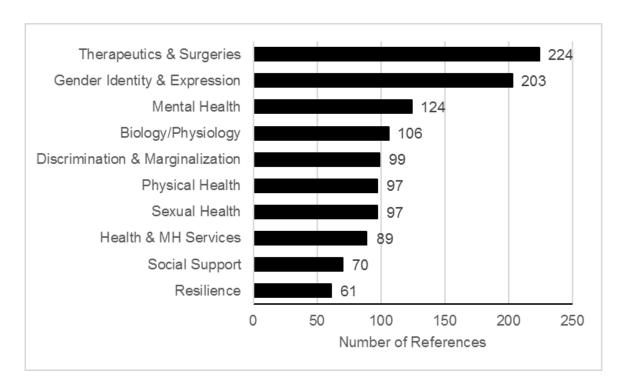


Figure 3.2 Top Ten Study Topics

3.3.3.1 Therapeutics and surgeries. The number one topic area was therapeutics and surgeries, with 224 references. This study topic included gender affirming processes and procedures such as cross-gender hormone treatment, feminizing or masculinizing procedures such as facial feminization surgery, silicone injection, or electrolysis/laser hair removal, and studies focusing on gender affirming surgeries such as orchidectomy and vaginoplasty, chest reconstruction, hysterectomy, and phalloplasty. Also included in this category were studies that detailed surgical procedures and outcomes, research and case reports describing side effects of therapeutics or surgeries, and studies exploring levels of satisfaction with gender affirming medical therapeutics or procedures.

- 3.3.3.2 Gender identity and expression. Gender identity and expression was the second most common study topic with 203 references. While it was not surprising that a trans research evidence map would include a large number of studies focused on gender identity, efforts were made to clearly distinguish this topic area so that it did not include all studies in the review. Areas of focus included: the experience of gender identity, including trans gender identity development; non-binary and other gender diverse identities; gender dysphoria; gender identity disclosure; medical and social transition; and gender identity assessment and diagnosis.
- 3.3.3.3 Mental health. Mental health was the third most common study topic with 124 references. This included diagnoses and/or experiences of depression, anxiety, suicide and other co-occurring mental health diagnoses. This category also included studies documenting the interaction between discrimination, structural oppression, and mental health, and the medicalization and pathologization of gender identity.
- **3.3.3.4 Biology and physiology.** Including 106 studies, the category of biology and physiology includes research at the cellular level, neurological research, bone density studies, and genetic and chromosomal research. In some cases, these studies explored the impacts of medical transition on the physical body. In others,

researchers were attempting to identify the etiology of trans gender identity through twin studies, handedness, and measures of cortical thickness.

3.3.3.5 Discrimination and marginalization. There were a total of 99 papers on the topic of discrimination and marginalization. This included studies about different aspects of discrimination such as harassment, bullying, microaggressions, cisgenderism, transphobia, and other forms of oppression. In addition, this topic included research on the topic of social exclusion, stigma, and marginalization. This topic was distinct from violence and trauma, a subject area that included 47 studies. Verbal abuse, physical abuse, and any other forms of violence or trauma were included in the latter category.

3.3.3.6 Physical health. The area of physical health had 97 studies, including research related to diabetes, cancer, eating disorders, granulomas, meningiomas, and cardiovascular disease. Some studies explored the link between trans-related therapeutics and longer-term health, where others documented complications as a result of surgeries or other medical procedures. Physical health as a study topic was distinct from side effects and impacts of therapeutics and surgeries, and there was little overlap between these two areas of the map. Short-term impacts or complications from surgeries such as chest reconstruction or vaginoplasty were coded within the area of therapeutics and surgeries, whereas longer-term health

impacts that needed their own intervention were classified under the area of physical health.

3.3.3.7 Sexual health, HIV, and STIs. The category of sexual health, HIV, and STIs included 97 studies about sexual behaviors, and HIV and other sexually transmitted infections. The HIV and STI literature included articles linked to testing, treatment and treatment adherence, transmission, and co-infection, as well as literature that connected HIV and STIs to broader syndemic factors. Sexual health literature included studies about sexual behaviors, communication and negotiation of safer sex behavior, and research related to sexual risk factors. Sexual health was differentiated from the study topic of sexuality, which included 52 references and referred more specifically to sexual attraction and sexual identity.

3.3.3.8 Health and mental health services. Health and mental health services was a relatively large area of the map including 89 references. These studies investigated barriers and access to health and/or mental health services, experiences with mental health services, discrimination in healthcare, patient satisfaction, studies of interactions between patients and providers from the trans person's perspective, waitlists, cost-effectiveness, and models of care. This research also explored the impact of barriers to health services on health and mental health.

3.3.3.9 Social support, relationships, and families. Social support, relationships, and families included 70 references. This element of the map included references related to social support and communities, relationships with friends and family, as well as romantic and/or sexual relationships. Social support has been measured and investigated as a factor in relation to health incorporating mental health, physical health, and sexual health. In addition, there were a number of articles related to family support, including family responses to trans children, siblings, or parents.

3.3.3.10 Resilience, well-being, and quality-of-life. The review included 61 articles on the topic of resilience, well-being, and quality of life. In these strength-based articles, researchers often explored alternate, nonpathologizing conceptualizations of trans lives, including experiences of hope, resilience, and community support.

Of the 37 study topics that we categorized, the top 10 most common (listed above) each included at least 50 references. In the mid-range (that is, between the top 10 and the bottom 10), categories included: sexuality; ethnicity, culture, race, and racialization; violence and trauma; early life experiences; resistance and politicization; therapeutic process; intersectionalities; space and place; education; law and criminalization (crime, prisons, incarceration, and policing); research methods; employment; arts and creativity; sex work; substance use; and parenting,

reproduction, and assisted reproduction. The bottom ten topics in the map all included less than 15 references. These were: disability; age and aging; historical perspectives; religion and spirituality; ethics; income; sports and physical activity; housing; Indigeneity; and migration and refugee experiences (see Figure 3.3).

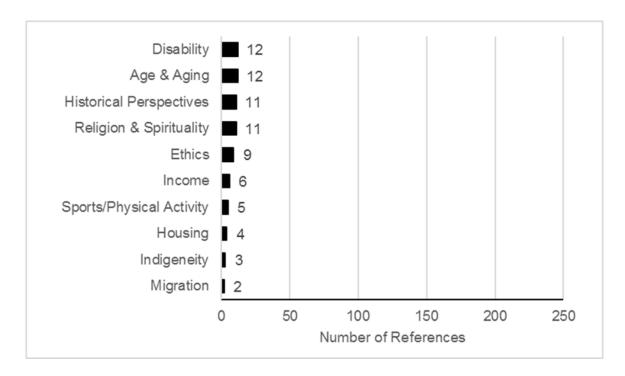


Figure 3.3 Bottom Ten Study Topics

3.3.4 Exploring the Intersections between Study Topic and Study Design

Of the 690 studies in the review, the emphasis was on observational research. Less than 2% were experimental. The frequency of study design across the transfocused dataset was: 1) cross-sectional studies (250 references); 2) case reports, case studies, and case series (182 references); 3) qualitative study with interviews or focus groups (99 references); 4) cohort studies (56 references); 5) ethnographies

or phenomenological studies (37 references); 6) basic science (23 references); 7) systematic reviews of descriptive or qualitative studies (20 references); 8) community-based research or other participatory research (15 references), 9) autoethnographies (8 references); 10) case-control studies (7 references); 11) nonrandomized controlled trials (7 references); 12) historical research (4 studies); and 13) randomized controlled trials (3 references); (see Figure 3.4).

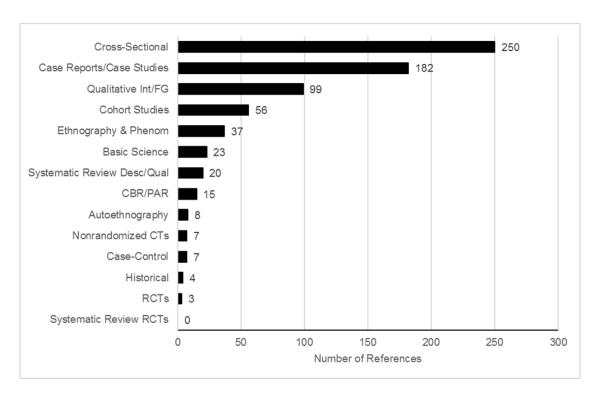


Figure 3.4 Frequency of Study Designs

The most common research was cross-sectional, emphasizing information gathered at one point in time. Within the top 10 study topics, cross-sectional research was most common in the areas of 1) mental health; 2) gender identity and

expression; 3) sexual health, HIV, and STIs; 4) biology and physiology; and 5) therapeutics and surgeries. Cross-sectional research most often involved survey research and clinical measures.

Case reports, case studies, and case series were also very common within the dataset, specifically within the areas of therapeutics and surgeries, and physical health. In these situations, case reports were often used to document novel procedures, surgical complications, or physical side effects related to therapeutics. We also saw the use of case reports and case studies in relation to mental health; gender identity and expression; therapeutic processes; health and mental health services; and sexual health, HIV, and STIs. In the case of health and mental health services, and therapeutic processes, some clinicians reported on client demographics within their clinic, or on the process with specific patients.

Ninety-nine studies included qualitative interviews or focus groups. These methods were particularly relevant when exploring gender identity and expression; discrimination and social exclusion; and social support, relationships, and families. While cross-sectional studies were more frequently used in each of these areas, qualitative interviews and focus groups were the second most common study design for all of these study topics.

3.4 Conclusions

3.4.1 Topics that Received the Most Attention

Study topics that received the most attention from researchers were: 1) therapeutics and surgeries; 2) gender identity and expression; 3) mental health; 4) biology and physiology; 5) discrimination and marginalization; 6) physical health; 7) sexual health, HIV, and STIs; 8) health and mental health services; 9) social support, relationships, and families; and 10) resilience, well-being, and quality-of-life. Comparing these results to Reisner et al.'s (2016) review of health-related outcome categories, there were similarities and differences. For example, both reviews share an emphasis on the following topics: 1) mental health; 2) sexual and reproductive health; 3) stigma and discrimination; and 4) general health. In contrast, two topics that were highlighted in Reisner et al.'s review – substance use, and violence and victimization – did not include a large enough number of studies to be included in the top ten topics of the evidence map. Some of these differences were linked to Reisner et al.'s (2016) emphasis on quantitative health research. Having a broader subject and methodological focus in this study meant that it was possible to incorporate greater diversity into the evidence map including research related to therapeutics and surgeries, health and mental health services, social support, and resilience.

3.4.2 Topics That Received the Least Attention

Topics that have received the least attention include several factors linked to the social determinants of health such as ethnicity and culture, housing, income, employment, and space and place. This review highlights the relatively minor attention invested to date in these study topics and underscores the need to assess whether additional research focused in these areas would be beneficial. For example, given the challenges many trans people face in obtaining employment, research centering on poverty and employment in trans communities, including barriers and facilitators to employment, may be called for. These studies could provide insight into these topics beyond their consideration as risk factors in relation to health and/or mental health.

3.4.3 Areas That Have Been Systematically Reviewed and Opportunities for Knowledge Synthesis

Examining the overlap between the study topics that have received the most attention and existing systematic reviews, there was some positive overlap. For example, gender identity and expression is one of the most researched subject areas and is the topic of five systematic reviews. Similarly, mental health received good attention from researchers and was the focus of five systematic reviews. Sexual health, HIV, and STIs has been the subject of three reviews.

As discussed, therapeutics and surgeries were the most commonly investigated study topic. On the one hand, the ability to conduct reviews in this area

was complicated by study designs that tended to emphasize case reports. That said, researchers have taken several approaches to synthesizing knowledge in this area, including case series and analysis of outcomes linked to specific therapeutic interventions or surgeries (e.g. long-term impact of cross-gender hormone treatment, or complications from silicone injection). In addition, although they were not included here because they did not meet the criteria for systematic reviews, some authors who are also surgeons review their experiences with surgical procedures including outcomes and advances in technique.

While 20 systematic reviews of descriptive and qualitative studies have been conducted, there are opportunities for additional knowledge synthesis related to: specific aspects of gender identity and expression such as disclosure, or social or medical transition; discrimination and marginalization; physical health; health and mental health services; social support, relationships, and families; and resilience, well-being, and quality-of-life. Other topics in the map that received less attention (although they each included at least 15 studies) were: sexuality; ethnicity, culture, race, and racialization; violence and trauma; early life experiences; resistance and politicization; education; law and criminalization; employment; arts and creativity; and sex work. These are all relevant and important topics for future systematic or scoping reviews.

3.5 Limitations

The primary limitations of this study relate to resources and technology. Time and financial resources necessitated limiting the map to studies published between 2010 and 2014. In order to complete the full map, it will be necessary to screen an additional 7,118 references on full text, and references that meet the inclusion criteria will need further data extraction. In addition, to update the map to 2017 would require the searches to be updated and these references would then need to be screened on title and abstract, and where relevant on full text.

Resource constraints have also limited the type of research included in the evidence map. This project is focused on documenting research with trans people from the perspective of human subjects research ethics. As a result, all studies in the map include at least one trans participant. One drawback is that this also means that studies about trans topics that do not include trans people are not currently a part of the evidence map. For example, a study to evaluate the knowledge and awareness of healthcare providers in relation to trans health would not be included unless it explicitly also included one or more trans participants. While these types of studies form part of the larger field of trans research, this work is not visible in the current dataset.

Similarly, the evidence map contains empirical research published in English in peer-reviewed journals. In stating this, it is also important to acknowledge that it does not include solely theoretical, conceptual, or historical work, unless that work is based on original or secondary data analysis with trans participants. There are

also no community research reports (sometimes referred to as "grey" literature), or book chapters. In focusing on one aspect of research with trans participants, our intent was not to contribute to making this other work less visible, or to imply that it does not constitute an important aspect of the broader field of trans studies.

That the map is already out of date before being published points to the critical need for different ways of working. In time, promising new developments in text mining, automation, and semi-automation will allow us to complete large, living reviews and share this information with key stakeholders in a more timely fashion.

3.6 Hesitations: The Implications of Mapping

There is great potential for this evidence map and the accompanying database to be useful to community members, researchers, clinicians, and policymakers. There are also limitations to how useful it can be to community members if information is not presented in an accessible manner. In addition, research itself can be damaging. As noted by Ansara and Hegarty (2012), some research continues to perpetuate pathologizing beliefs and to misgender participants from multiple angles.

The selection of the term "evidence map" is informative. Building on the work of Ahmed (2006) and her approach to following multiple meanings of words and concepts, it is useful to be circumspect about the concept of evidence in relation to evidence-based practice, and about research as a form of evidence. One should be mindful of the implicit goals of empirical research, and question evidence as

"evidence of what?", and "evidence for what?". In addition to providing data, the research papers in this review are themselves a form of evidence, documenting the actions and decisions of researchers and clinicians.

In speaking of evidence maps, we refer as well to evidence gaps. What do *gaps* mean in the context of research about trans people? The word gap suggests that something is absent. But we should ask whether what is missing is something that should be there. What do these gaps hinder and what purpose might they also serve, and perhaps more importantly whom do they serve?

When it comes to trans people and other groups that experience marginalization and oppression, it can be beneficial to exist within gaps. Gaps may be passing zones, areas where trans people are not noticed as often and in these ways escape detection and diagnosis. Just as (racialized) genderqueer and non-binary trans people are more likely to experience violence and harassment, these experiences may also be reflected in who comes under the gaze of researchers and clinicians.

This analysis leads to larger questions about who and what gets studied, who makes these decisions, and what motivates researcher attention. It may be beneficial to consider in what ways the existence of an evidence map may put trans people at greater risk. What responsibility is evoked in generating this type of map?

Critical Data Studies (Dalton, Taylor, and Thatcher, 2016) highlights the connections between "the spatial nature of data" and "the processes of data production and accumulation" (p. 1). Data visualizations such as maps are built on

templates of those that have come before. In some ways, this map is no different. It mirrors a tradition of evidence mapping and borrows from longer-standing frameworks related to social determinants of health and medical framing of experiences. Where this project *is* different is in the ways we consider the potential of digital evidence maps as living documents (Elliott et al., 2014) that can be leveraged to document previous ways of working and to "challenge the legacies of colonialism – to emphasize local knowledge and local control" (Fraley, 2011, p. 422).

In identifying future directions for research and knowledge synthesis, it is critical to engage trans communities and other stakeholders in local and global contexts to determine research priorities. This engagement will help to ensure that the knowledge that is produced is relevant to trans communities and to stakeholders such as policy-makers, healthcare providers, and educators. Within this study, we have taken the approach that it is better for people to be aware of the types of research that are being conducted. These insights make it clearer whose knowledge and perspectives are centred in this work, and it is more likely that trans communities and our allies will be in a position to benefit from existing research and to hold researchers accountable as community awareness increases.

Table 3.1 Search Results

Database	N records
Academic Search Premier	9,477
Anthropology Plus	339
Bibliography of Native North Americans	75
CINAHL	2386
First Nations Periodical Index	41
Indigenous Studies Portal	84
LILACS	738
ProQuest Social Sciences Premium	10,212
ProQuest Subject Terms	2,718
PsycINFO	6,223
PubMed	7,464
SciELO	482
Scopus	11,640
Social Work Abstracts	144
Web of Science	7,641
Women's Studies International	3,320
Total Number of References Retrieved	63,004
Duplicates Removed	37,758
Empty Records Deleted	16
Total Number of References	25,230

Table 3.2 Summary Table of Study Topics and Frequencies

Study Topic	No. of References
Age and aging	12
Arts and creativity	17
Biology and physiology	106
Disability	12
Discrimination and marginalization	99
Early life experiences	40
Education	24
Employment	20
Ethics	9
Ethnicity, culture, race, and racialization	48
Gender identity and expression	203
Health and mental health services	89
Historical perspectives	11
Housing	4
Income	6
Indigeneity	3
Intersectionalities	29
Law and criminalization	24
Mental health	124
Migrant and refugee experiences	2
Other	22
Parenting, reproduction and assisted reproduction	15
Physical health	97
Religion and spirituality	11
Research methods	24
Resilience/well-being/QOL	61
Resistance and politicization	34
Sex work	17
Sexual health, HIV, and STIs	97
Sexuality	52
Social support, relationships, and families	70
Space and place	29
Sports and physical activity	5
Substance use (alcohol and drug use)	16
Therapeutic process	34
Therapeutics and surgeries	224
Violence and trauma	47

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Chapter 4: Failure to Respect Trans People in Research: An Ethical Analysis and Recommendations for Positive Change

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ZM conducted data analysis, wrote the initial draft of the manuscript, and conducted subsequent revisions based on feedback from co-authors. CK provided methodological guidance. FB and VW contributed revisions to the manuscript. All authors read and approved the final manuscript.

Abstract

Recently the European Professional Association for Transgender Health (EPATH) and the World Professional Association for Transgender Health (WPATH) published guidelines identifying recommended linguistic practices for abstract submission to academic conferences. These guidelines resonate with our investigation of 1,667 studies, documenting the approaches researchers take to studying transgender, gender non-binary, and other gender diverse (trans) individuals and communities. Incorporating ethnographic content analysis, we conducted an ethical analysis to explore the ways researchers manage and represent trans people and their personal information in peer-reviewed literature. In what follows, we document ethical challenges in relation to research focus and study design, data collection and reporting, data analysis, and publishing practices. Five changes in practice are recommended: 1) adopt an approach to research and clinical practice that centres gender self-determination; 2) conduct research that is relevant to community stakeholders and attend to reducing research waste; 3) when reporting data use LGBT acronyms with greater specificity; 4) during study design, recruitment, and data collection consider how individual data will be managed if there are low numbers of trans participants, and; 5) use pronouns that reflect participants' gender identities. Linking key concepts from research ethics with concrete documentation of the ways researchers discuss and represent trans people and their personal information in peer-reviewed publications, this manuscript

contributes to new dialogues about empirical research ethics in the social sciences and medicine.

4.1 Introduction

Recently published guidelines from the European Professional Association for Transgender Health (EPATH) and the World Professional Association for Transgender Health (WPATH) outline recommended linguistic practices for abstract submission to their academic conferences (Bouman et al., 2017). These guidelines include a commitment to "respect, dignity, and equality for transgender, transsexual, and gender variant people in all cultural settings" (p. 2), de-psychopathologization, and specific attention to avoid stigmatizing or pathologizing gender and bodily diversity, misgendering language, and reporting or advocating for clinical practices or interventions that are inconsistent with human rights. In addition, some of the recommendations move beyond discussion of language to address confidentiality, consent, and respect in relation to videos, photos, or other visual representations. WPATH guidelines specifically suggest that researchers should collaborate with trans individuals and communities with regard to selecting "language and terminology that is relevant and meaningful to a target population" (Bouman et al., 2017, p. 5). The Canadian Professional Association for Transgender Health (CPATH) is working on a similar set of national guidelines for research involving trans individuals and communities (Devor, Heinz, Bauer, Marshall & Pyne, 2016).

These new guidelines echo calls for greater attention to sexual and gender diversity in study design, data collection, analysis, and research reporting. As this field evolves, some authors have focused on sampling and measurement, including the development of more inclusive questions and optimal question formats (e.g.

Reisner et al., 2016; Tate et al., 2013). Others have identified the need for more nuanced approaches to data analysis (Ansara and Hegarty, 2014; Scout and Gates, 2014) and research agendas (Hanssmann, 2010).

Calls for greater inclusion are motivated by a desire to increase the visibility and awareness of sexual and gender diversity. Stakeholders are interested in this data in order to support the equitable distribution of services (e.g. Greenlee, 2017), and to track current health disparities and shifts over time. This information can be used to advocate for the new programs, or to push for augmented resources for services that may already be in place. Research that is more inclusive also contributes to a body of knowledge focusing on lesbian, gay, bisexual, transgender, queer, and Two-Spirit (LGBTQ2) individuals and communities. From these perspectives, the ability to count people is linked to the argument that people of diverse sexual orientations and gender identities matter (e.g. Harrison-Quintana et al., 2015).

This paper builds on the current energy in this field to look specifically at the ways ethics and empirical research practices intersect. Linking key concepts from research ethics with concrete documentation of the ways researchers discuss and represent trans people and their personal information in peer-reviewed publications, this manuscript contributes to new dialogues about empirical research ethics in the social sciences and medicine.

4.2 Materials and Methods

4.2.1 Aim

The aim of this study was to identify ethical challenges and recommendations for positive change in peer-reviewed research published in English that includes transgender, gender non-binary, and other gender diverse (trans) people.

4.2.2 Design

Evidence maps (Miake-Lye et al., 2016) are a form of systematic review that involve reading and categorizing research content from peer-reviewed journal articles and other relevant sources. While carrying out the data collection to develop an evidence map of trans research, the lead author became interested in the ways researchers manage and represent trans people and their personal information in peer-reviewed literature. Incorporating ethnographic content analysis (ECA) (Altheide, 1987) he took detailed notes during the evidence mapping process, including observations about what research and documentation practices stood out as unusual, problematic, or promising. Notes were collected in one document, and included content area, author name, year, and title of publication, direct quotes from the original source, and relevant page numbers. Detailed information was later transferred to an Excel spreadsheet to assist with data analysis.

4.2.3 Sample

Eligibility criteria were established to include empirical research of any design, that included trans participants or their personal information, and that was published in English in peer-reviewed journals. A search of 15 academic databases conducted in early 2015 resulted in 25,230 references after duplicates were removed. After screening on title and abstract, 10,651 references were eligible for screening on full text. Due to resource constraints, the decision was made to focus on the most recent five-year period. As a result, 3,533 references published between 2010 and 2014 were screened on full text. 1,667 articles met the inclusion criteria. 690 articles were trans-focused, 462 included LGBT2Q and/or MSM participants, and 515 included mixed samples. This ethnographic content analysis focuses on the 1,667 articles that met the inclusion criteria.

4.2.4 Data Analysis

A total of 159 examples were identified from 155 different peer-reviewed publications. Over time, themes began to emerge iteratively from the data as it was collected. At the end of the mapping process, the team reviewed these themes in relation to principles of research ethics (Emanuel et al., 2010). In what follows, we document the ethical challenges associated with current publishing practices based on the process of ethnographic content analysis. Themes are presented according to different phases of the research process including: research focus and study design; data collection and reporting; data analysis, and; publishing practices.

4.3 Results

4.3.1 Research Focus and Study Design

4.3.1.1 Cisnormative world view. A cisnormative world view assumes that people identify with the sex with which they were assigned at birth and that variations from that norm are exceptional and unexpected. From a cisnormative perspective, sex is established at birth, it is closely linked to gender identity, and it does not change during the life course. Customs and societal structures reflect this concept of gender identity. The existence of trans people, who do not necessarily identify with their birth assigned sex, challenges a cisnormative world view and offers ways of understanding gender diversity that denies the obviousness of a match between gender and sex. In this way, it is possible to envision and embrace the diversity of human experience that includes transsexual women and men, gender creative children, and people who are gender non-binary.

Grounded in cisnormative conceptualizations, psychiatrists, psychologists, and physicians have been trained to view trans experience⁵ as a mental illness in need of treatment (Suess, Espineira, & Walters, 2014). Until recently, formal acknowledgment of trans identity without pathologization was impossible. That is, in order to be recognized as trans and to gain access to medical transition, it was necessary to be diagnosed with Gender Identity Disorder, a mental health disorder

⁵ Throughout the paper, we refer to "trans experience". While it would be more accurate to refer to trans experiences to reflect the diversity of trans lives, this phrasing can sound awkward. As a result, we use the "trans experience" keeping in mind there is no one trans experience, instead there are multiple experiences that make up the diversity of trans people's lives.

identified in the *Diagnostic and Statistical Manual of Mental Disorders* (APA, 2013). Depending on context, these practices remain the same. This way of imagining gender identity as a "disorder" is enacted through societal structures and systems and in everyday practices, including, not surprisingly, the practices of researchers who study trans people. In what follows, we examine how cisnormative views are conveyed through research design, data collection and analysis, and in the ways results are presented.

4.3.1.2 Reinforcing gender binaries. Aside from being grounded in cisnormative assumptions about a one-to-one correspondence between sex and gender, trans research is also influenced by broader framings of gender binarism, where sex and gender are each classified into "two distinct, opposite, and disconnected forms of masculine and feminine" (Phoenix & Ghul, 2016, p. 200). In contrast to gender binarism, gender can be considered a multiplicity (Linstead & Pullen, 2006), or as one aspect of the diversity of human experience that includes cisgender and transgender people who identify as women or men, as well as people who are gender non-binary, those who identify as genderqueer, gender fluid, or androgynous, and those who identify as agender. Beliefs about gender are concretized in the design of data collection tools, and in the ways data are analyzed. There are signs that help the reader to discern whether and to what extent researchers have adopted unproblematized cisnormative and/or binary assumptions about gender. For example, referring to "opposite sexes" or "both males

and females" suggests that the researcher believes there are only two genders and they may have been less likely to conceptualize their research to be inclusive of people who identify as non-binary, or even non-cisgender.

Binarism and cisnormativity are sometimes conflated, which for researchers means that they may assume that all trans people are non-binary. This is not the case. Some trans people identify as men, some as women, and others as gender non-binary. Failure to acknowledge these differences is invalidating, but more than this it demonstrates a lack of understanding of trans people's identities and experiences. Questions that reflect this epistemology can also be confusing for trans participants and lead to invalid data that is not possible to interpret. For example, if a survey asks people to indicate if they are male, female, or gender non-binary, this poses a dilemma for trans people who identify as male or female. Data based on this type of question mean that respondents in the male and female response categories will include both transgender and cisgender people, and researchers will have no way of clarifying this information. In this example, if researchers reported that the gender non-binary respondents were the only trans participants, this also communicates an underlying belief that trans people cannot be only "male" or "female" in the ways

⁶ It is important to be aware of additional subtle distinctions in the ways these questions are worded. For example, if cisgender people are asked their gender, and transgender people are asked for their gender identity, this reinforces the belief that cisgender people have gender, but transgender people have gender identities (Motola, 2012; Reed, 2014). We do not want to reinforce these ideas about trans lives and have attempted to attend to this in the way this manuscript is written.

that cisgender people identify. This perpetuates stigmatizing narratives that suggest trans people are not "real" men or women.

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4.3.1.3 Research not identified as a priority by trans people. Research about trans people reflects the interests and needs of researchers, clinicians, and funders. It is unclear how often decisions about research topics, or the identification of research questions, have been informed by the perspectives of trans individuals, communities, or other stakeholders. For most, there is no discussion of connection to communities or their role in determining project focus. Instead, some authors describe how the purpose of the project relates either to their own learning goals (Kaufmann, 2010a) or to expanding knowledge in the field as a whole. Current practice supports the increased participation of people with lived experience in research prioritization (Johansson, 2014). The involvement of people whose lives are affected by policy or research decisions contributes in ways that may not have formerly been considered (Brett et al., 2014). There are 15 community-based research studies in the dataset that describe how trans community members were

involved in the initiation or development of the projects themselves (e.g. Davidmann, 2014; Travers et al., 2013). In the context of limited resources to fund research initiatives, engaging key stakeholders including trans people in identifying research priorities will help to increase the relevance of the information that is produced.

4.3.1.4 Study designs emphasize descriptive methods. Recent attention has turned to the importance of reducing research waste and increasing the value of research contributions (Moher et al., 2016). In the dataset, the majority of studies are descriptive, including cross-sectional surveys, exploratory qualitative studies, and clinical case reports. There are no systematic reviews of randomized controlled trials, and 21 systematic reviews of descriptive or qualitative research. While we do not intend to reinforce a positivist view that prioritizes randomized controlled trials and meta-analyses, it is important to question what designs are being implemented and who benefits from the results of current approaches to study design.

In some situations, qualitative research provides new insights into specific aspects of trans identities and experience. For example, research conducted by Singh (2013) explores aspects of resilience for young trans women of colour who are trauma survivors. In addition to enhancing our understanding of young racialized trans women, these results help to shift the field away from deficits and towards a greater focus on the strengths of members of the population being studied. In contrast to the intent of such studies, some authors use their interactions with trans

people to document their own personal growth. A case in point is Kaufmann (2010b), who documents a response from a trans woman who was negatively impacted by the way the author originally represented her experiences (2007). This author has gone on to publish additional peer-reviewed manuscripts (e.g. 2014) exploring this topic and potential framing and reframing of this participant's narrative. While these publications may benefit the author and other cisgender academics who are attempting to enhance their ability to conduct research on trans people, it is harder to understand how these publications directly benefit trans people.

The example of case reports is not so clear-cut. Case reports document novel or rare medical circumstances and have traditionally been used for discovery and teaching (Packer, Katz, Iacopetti, Krimmel, & Singh, 2017). In the case of trans surgeries, there are a limited number of surgeons who conduct gender affirming procedures such as vaginoplasty, facial feminization, chest reconstruction, or phalloplasty. For trans people and their practitioners seeking detailed information about these procedures and potential complications, case reports can be of value. This is particularly true in the absence of clinical trials or other forms of study design. However, these publications also have the potential to augment the reputation of particular surgeons and to draw attention to their areas of expertise, possibly increasing their business and personal wealth. While the contribution of single case reports may benefit trans people in the way they address surgical techniques, side-effects, and complications, their contribution to evidence-informed

practice is not always clear. We would argue that the value of case reports depends on how the information is used, whether the publication contributes to increased stigmatization of trans people, and whether researchers use existing case reports to conduct meta-analyses (Vandenbroucke, 2001) or to develop more robust research.

4.3.2 Data Collection and Reporting

4.3.2.1 Collapsing gender identity and sexual diversity. There are a number of ways researchers group trans people with sexually diverse participants, and this happens at different stages of the research process. For example, in some population health studies, participants are asked their gender at the start of the survey with the choice of male or female. Then later in relation to sexual orientation they are asked, are you "a member of the 'gay, lesbian, bisexual, or transgendered community"? (Perrella, Brown, & Kay, 2012, p. 90). When this question is asked with a single yes or no response option, it is not possible to determine individual numbers of gay, lesbian, bisexual, or transgender participants separately. It also means that it is not feasible to assess diversity within LGBT respondents related to other aspects of intersecting identities such as ethnicity, gender, income, or employment.

Alternately, in qualitative research, authors may identify a certain number of LGBT or LGBTQ participants with no additional information about participant characteristics (Binnie, 2014; Das, 2012). Sometimes authors explain that this practice is to preserve the anonymity of their sample, which makes sense from one

perspective, but this also means that it is not possible to be certain whether trans people participated or in what numbers. Apart from the methodological challenges this poses in relation to various forms of knowledge synthesis, reporting information in this format conflates gender and sexual identity, erases specific aspects of trans experience, and fails to account for potential differences within LGBTQ communities.

A further difficulty occurs when there is no room for trans people to identify their sexual identity because of the ways the questions are posed. For example, if questions about gender include two choices (male or female), and questions about sexual identity include single response options from a list of gay, lesbian, bisexual, transgender, then respondents are not able to identify as both transgender and lesbian (White, Barnaby, Swaby, & Sandfort, 2010). As awareness of the diversities of sexual and gender identities grows, researchers are developing measures that allow people to more accurately reflect their experiences, including the work of Frohard-Dourlent, Dobson, Clark, Doull, and Saewyc (2017), Katz-Wise, Reisner, Hughto, and Keo-Meier (2016), and Westbrook and Saperstein (2015).

4.3.2.2 Non-specific use of LGBT acronyms. There are two challenges related to the non-specific use of LGBT-related acronyms. One situation occurs when authors use trans-inclusive acronyms (e.g. LGBTQ or LGBT2Q) to refer to their participants but on closer examination of the sample demographics, no trans people are included. A further concern relates to the visibility of trans participants at

different levels of the publication including title, abstract, and body of the text. Some authors do not mention trans people in the title or abstract, but identify trans people when describing sample demographics. For example, the title of a study by Stroup, Glass, and Cohn (2014) identifies bisexual, gay, and lesbian students, "The adjustment to U.S. rural college campuses for bisexual students in comparison to gay and lesbian students: An exploratory study", however 5.3% of the sample is transgender. It should be noted that this also happens in relation to bisexual participants and sexually diverse participants with identities outside lesbian and gay sexual identity categories. These practices either erase trans participants or draw the reader's attention towards gay and lesbian experiences, reinforcing their centrality. That it also takes more work for the reader to determine whether there are trans participants or not, means that the contribution of these participants is more likely to be overlooked and excluded from knowledge synthesis projects.

4.3.2.3 Grouping all trans people together. Sometimes researchers only document the total number of trans participants, and are unable to distinguish between different groups of trans participants because of the ways that questions are posed. For example, in some surveys participants are asked whether they are female, male, or transgender and asked to select one option. Similarly, at times respondents are offered four or five choices under the sexual orientation question that includes trans or transgender as a response option. The benefit of these separate options is that the reader may be able to determine the total number of

possible to identify diversity within the trans sample, including the number of people who identify as trans women, trans men, gender non-binary, people of transgender experience, or other gender identities. These practices may also be echoed when it comes to reporting, when all trans and gender diverse participants are combined, making it unrealistic to decipher the diversity of gender identities within the sample. For example, in McElroy, Everett, and Zaniletti's (2011) study, "The data were also divided into heterosexual category and SGM [sexual and gender minority] category. Anyone who did not self-define themselves as male or female from the gender question and straight/heterosexual from the sexual orientation question was classified as SGM status" (p. 441).

One of the impacts of these practices of informational erasure (Bauer et al., 2009) is that it becomes very difficult to identify who is impacted by structural forms of oppression including violence, discrimination, and poverty. For example, although trans women (including racialized trans women) who are sex workers are more likely to experience violence and criminalization, current approaches to reporting may lead the reader to erroneously believe that all trans people are equally at risk (Namaste, 2005). This has further ramifications in that beliefs about who is affected by oppression and inequities can influence decisions about resource allocation including program and research funding.

4.3.2.4 Referring to trans women as men who have sex with men (MSM).

In some publications, authors describe the sample as MSM but later in a demographics table, results section, or footnote, they identify the number of trans female participants. Although there is increasing awareness of the ways it is highly inappropriate to refer to trans women as MSM, this practice continues (Parker, Aggleton, & Perez-Brumer, 2016). For example, a study by Rhodes et al. (2010), begins with the following statement: "A community-based participatory research partnership explored HIV risk and potentially effective intervention characteristics to reduce exposure and transmission among immigrant Latino men who have sex with men living in the rural south-eastern USA" (p. 797). Subsequently, the authors note "two participants self-identified as male-to-female transgender" (p. 797). As noted by Kaplan, Sevelius, and Ribeiro (2016):

... the problematic conflation of trans feminine individuals and MSM in much of the existing HIV literature ... has stymied progress in slowing the HIV epidemic in the most at-risk groups, including those who do not fit neatly into binary notions of gender and sex. (p. 824)

4.3.3 Data Analysis

4.3.3.1 Collecting data from trans people but excluding their data from analysis. As researchers become increasingly aware of the existence of trans people, learn more about how to access trans people through recruitment, and ask questions that are inclusive of trans experience, trans people's data becomes more

visible. However, this increased awareness in itself does not guarantee that trans people's information will be included in data analysis. For example, in some studies researchers report that due to the small number of trans participants in the overall sample, they are unable to include this data in the analysis. Researchers typically explain this with statements such as, "Individuals who self-identified as transgender (n = 35) were also excluded from the analytical dataset due to the small sample size and focus on gender comparisons" (Yuan, Duran, Walters, Pearson, & Evans-Campbell, 2014, p. 10464); "This project incorporated terminology for both queer and trans spectra; however, very few respondents identified along the trans spectrum and therefore were not included in our final subset" (Patridge, Barthelemy, & Rankin, 2014, p. 79); or "... too few clients (<1%) reported their sexual orientation as 'questioning' or 'transgender' to include in the study..." (Lipsky et al., 2012, p. 403). While it may be methodologically necessary to exclude trans participants from analysis due to small numbers of participants, this possibility should be clarified during recruitment and when obtaining consent in relation to the costs and benefits for trans people. Potential participants have a right to know if their data may be excluded due to small trans sample sizes. Failing to include these details during the consent process means that trans people are likely not fully informed when agreeing to participate. If it is clear their data will not inform study results this information needs to be made clear up-front.

4.3.3.2 Erasing trans participants from systematic reviews. Similar to the ways trans participants may be excluded from analysis in single studies, researchers also exclude trans participants from analysis in some systematic reviews. For example, Buller, Devries, Howard, and Bacchus (2014) provide detailed descriptions of the study samples in their review. One of the references included in the review was a study by Feldman, Diaz, Ream, and El-Bassel (2008) with participants who described themselves as gay, bisexual, homosexual, transgender, and queer. Despite this, when Buller et al. (2014) report on the sample demographics of each of the studies in their systematic review, they erase the transgender, bisexual, and queer participants from their summary of study demographics and instead describe the participants as solely gay and bisexual. This renaming practice fails to acknowledge diversity within LGBTO communities and instead misrepresents the data (and participants) from the original studies. In this way, even though the original researchers accurately reported their sample demographics, the authors of the systematic review revert to more mainstream practices of erasure and oversimplification.

4.3.3.3 Collecting data from trans people but analyzing their data according to birth assigned sex. When faced with the situation of low numbers of trans people, some researchers have chosen not to exclude trans data, but rather to combine it with larger subsamples. For example, some researchers explain that in order to include information from trans people they group them together with

people from the same birth assigned sex. This practice is most often observed in studies of men who have sex with men (Solomon et al., 2014). The classification of trans experiences in these ways reflects an underlying bias against the legitimacy of trans gender identities as valid, a form of epistemic injustice that has implications beyond political correctness. For example, Kapusta (2016) has underscored the moral contestability of misgendering.

4.3.4 Publishing Practices

4.3.4.1 Misgendering. Authors tend to handle pronouns in one of four ways. They refer to the person by their chosen gender identity, they refer to them by their birth assigned sex, they refrain from referring to the participant's gender, or they refer to them by different pronouns before and after gender affirming surgeries. Unless authors explicitly address their choice of pronouns, it can be difficult to discern this information. However there are many examples of authors who use birth assigned sex pronouns to refer to people who have pursued cross-sex hormones or gender affirming surgeries. For example, in referring to a patient pursuing facial feminization surgery the authors comment, "The case of a 39-year-old male-to-female transgender patient who underwent feminization of his masculine forehead is presented. Surgical techniques to feminize his forehead were as follows" (Cho & Jin, 2012, p. 1207). Similarly, from Rieger et al. (2013), "All implants originated from women, except for two that were removed from men undergoing gender reassignment" (p. 768). These examples underline the ways

some clinicians refuse to acknowledge gender identity even after gender affirming surgeries.

4.3.4.2 Misuse of trans terminology. While it is true that terminology for trans and gender diverse people continues to evolve, there are clear examples of misuse of trans terminology in the literature. One example refers to trans women as male transsexuals throughout the manuscript (Jarolim et al., 2009). There are also examples of authors who use trans terms as nouns rather than as adjectives. For example, "Participants perceived that adulterated injection liquid silicone is used widely among transgender as a cheaper means to augment physical appearance" (Wallace, 2010, p. 439); "Photographic research conducted with people of transgender and men who have sex with men in West Bengal, India, explored sexualities as phenomenologically apprehended" (Boyce & Hajra, 2011, p. 3); or "We examine community collectivization among female sex workers and high-risk men who have sex with men and transgenders" (Saggurti et al., 2013, p. S55). Within current Western contexts, referring to trans people in these ways appears to demonstrate a lack of respect; using transgender as a noun rather than an adjective communicates a reductive framing of participants' identities. In these circumstances, researchers demonstrate a simultaneous interest in trans people as objects of study, alongside a failure to appreciate and acknowledge trans people's experiences.

4.3.4.3 Emphasis on biology in reporting gender identity. The emphasis on bio/logics (Van Anders, 2014) over gender identity in analyzing and reporting results is also seen in the dataset. For example, as Wells et al. (2013) report, "This coding was based on the assigned sex of the respondents and those to whom they were attracted" (p. 315). Similarly, Newcomb, Heinz, Birkett, and Mustanski (2014) asked participants to identify their birth sex (options: male or female), sexual identity (options: male, female, male-to-female transgender, or female-to-male transgender) and sexual orientation (options: gay, lesbian, bisexual, questioning/unsure/other). Despite investigator efforts to gain more nuanced information about sexual orientation and gender identity with these questions, they went on to analyze their data according to birth assigned sex as described here, "Our study indicates that LGBT birth sex differences in smoking may be more similar to those found in general populations than was previously believed. However, over time male-born LGBT youth decreased their odds and rate of smoking, while femaleborn LGBT youth simultaneously escalated their rate of smoking and appeared to catch up to their male-born counterparts ..." (Newcomb et al., 2014, p. 562). This grouping of trans people according to their birth assigned sex fails to respect the gender identity of participants. While it may simplify reporting or data analysis, it does so at the expense of the participants' own understanding of their lives and experience.

4.3.4.4 Publishing images of trans people requires consideration of ethical principles. It is not uncommon to see photographs of trans people in case reports. Examples include photographs of people during surgical procedures, as well as pre- and post-surgical photos demonstrating the outcomes of surgical procedures often highlighting the torso or genital area. Other types of photographs include images taken during and after autopsies, archival images, and photographs taken as part of arts-based projects or artistic initiatives. Although best practice guidelines exist (Graf et al., 2007) in most cases there is no indication of whether informed consent was obtained to publish these images in peer-reviewed journals. Because some images include participants' faces or unique body markings such as tattoos, concerns about informed consent become more pressing.

Opinion is divided about the need to obtain informed consent for photographs that are non-identifiable (Hood, Hope, & Dove, 1998). In addition, while some journals have very explicit guidelines for the inclusion of medical photographs ("Use of Images", n.d.), there are diverse perspectives depending on discipline and journal. Diverging policies and practices complicate our understanding of informed consent in the context of trans people and their medical images.

Discussions of transition-related outcomes that belittle or further stigmatize trans people. In case reports, some clinicians describe surgical outcomes in ways that further stigmatize trans people, suggesting that trans bodies are not legitimate. For example, Jarolim et al. (2009) state, "for male transsexuals, surgery can provide

a cosmetically acceptable imitation of female genitals" (p. 1643). In other instances, authors highlight the functionality of trans affirming surgeries, particularly as they relate to the sexual experience of partners. One author went so far as to comment, "My responsibility is to make our patients a 'turn on'." (Reed, 2011, p. 172). While on the one hand these comments may speak to priorities identified by surgeons (and some trans people), they also fail to acknowledge the multiple meanings trans people may hold in relation to their bodies and gender affirming surgeries.

4.3.4.5 Use of clinical assessment data or medical records with no discussion of explicit consent. There are multiple studies within the dataset that summarize clinic data from patient medical records. The majority do not discuss informed consent and many refer to enrolling consecutive clinic patients. It is important to flag the complex dynamics that may influence the process of obtaining informed consent to participate in research from patients who are attempting to simultaneously gain access to social or medical transition at gender identity clinics or specialty surgical services. In these instances, it unlikely that patients who are attempting to gain access to treatment such as hormones or surgeries would be in a position to decline the request to participate in research carried out within the same service.

The requirement for informed consent to analyze de-identified health administrative data varies. In some countries, "fair processing notices" "are sent to data subjects to inform them that personal data are being processed for stated

purposes" (Council of Canadian Academies, 2015). In others, there is no requirement to inform patients of the use of anonymized health information. Given the challenges presented by trans research in relation to respect for participants and the compromised nature of free and informed consent in the context of trans healthcare, these more permissive regimes are ethically lacking. This will be addressed further in the section on recommendations.

4.3.4.6 Case examples shared without anonymization or documented

consent. Within the dataset there are multiple case reports that document therapeutic or surgical interventions. Most case reports follow standard anonymization procedures and include patient age, ethnicity, gender identity, geographic location, and medical procedure. While these approaches to anonymization may meet accepted thresholds it may be important to consider additional factors in the context of trans people. For example, in situations where there are few surgeons who specialize in a specific procedure such as vaginoplasty or phalloplasty, if the case report focuses on a particular complication or outcome, it may be possible for the person to be identified by others in their community. Where genital or surgical photos are used, this practice may be of particular concern.

A separate issue relates to publications focusing on therapeutic process that include shorter case summaries relating to one or more patients. There are a number of publications of this type in the dataset. Here, case summaries may include the documentation of detailed dialogue between therapist and patient, content of

dreams (Borg Jr., 2011), or reports of specific experiences in clients' day-to-day lives. Informed consent is not mentioned in these circumstances, drawing attention to the need for further investigation to clarify whether trans people are aware of their inclusion in these types of publications.

4.4 Recommendations

These ethical concerns could be addressed in the following five key steps.

1. Adopt an approach to research and clinical practice that centres gender self-determination (Stanley, 2014). A shift towards embracing gender diversity and experience within the context of self-determination would help to address challenges linked to pathologization and the stigmatizing and at times highly disrespectful language used to describe trans bodies and experiences.

As part of this first step, it is also necessary to acknowledge differences between conceptualizations of gender as binary and biologically based, and a broad diversity of genders determined by multiple factors. Ermine's (2007) conceptualization of ethical space, developed in relation to research involving Indigenous communities, is helpful in clarifying the need for respectful engagement of difference across transgender and cisgender thought-worlds. For example, if cisgender experience was de-centered, researchers would be less likely to emphasize biology or genetics in reporting gender identity.

2. Conduct research that is relevant to community stakeholders and attend to reducing research waste. In order to make research more relevant, useful, and

accessible, Chalmers and Glasziou (2009) and Moher et al. (2016) underline the importance of: i) public engagement in research prioritization; ii) appropriate research design, conduct, and analysis; and iii) accessible, full research reports. Taking these steps would make it more likely that research that is funded and carried out is relevant to trans people and other stakeholders, that study designs would include a range of methods including experimental and intervention research, and that research would be more available to the public through open access and other forms of publication.

Closer attention to the design of data collection tools to allow for the full participation of transgender and cisgender people would also improve data quality and respectful representations of trans experience. Specifically, questions about gender identity and sexual identity need to be asked separately. If participants are being asked who they are attracted to, this list needs to include more than standard male or female responses. This increase of options would then make room for the sexual experiences of those who are specifically attracted to trans people – allowing researchers, for example, to move away from referring to cisgender male partners of trans women as MSM.

3. When reporting data use LGBT acronyms with greater specificity. For example, if there are only lesbian and gay (LG) participants in the sample, it is detrimental to include a B or a T when describing sample demographics.

Researchers should also report trans sample demographics separately. If there are 18 Two-Spirit people, 14 genderqueer participants, 55 trans women, and 42 trans

men in the study, report this information, not total numbers of trans participants.

Researchers need to respect the gender identity of trans women and refrain from grouping these participants together with MSM. As well, when conducting systematic reviews if researchers are describing sample demographics, they should be inclusive of trans experience by documenting trans participants alongside cisgender sample demographics.

4. During study design, recruitment, and data collection consider how data will be managed if there are low numbers of trans participants. Ideally, this will be communicated to trans people during the consent process so that potential participants can make an informed decision about whether to enroll in the study. Failure to inform trans participants that their data will be excluded or that it will be analyzed according to birth assigned sex is a misrepresentation of the research process.

Also on the topic of informed consent, there are variations in the type of consent required for identifiable and de-identified health information. In many cases, analysis of de-identified health information does not require individual patient consent. Nonetheless, given the level of medicalization experienced by trans people alongside dual clinician-researcher roles, a more conservative approach to trans data access is recommended.

Documenting informed consent within peer-reviewed publications, as recommended by the Committee on Publication Ethics, would also clarify whether participants have given explicit written consent for their photographs or their health

information to be included in peer reviewed publications. As outlined in journal consent policies such as *BMJ*, it is recommended that authors obtain and document explicit permission to publish information in open access publications and that participants are given the opportunity to view article content before submission.

Added attention to confidentiality in relation to case reports, case summaries, and the use of medical photographs is also recommended. As noted above, current approaches to anonymization may meet standard thresholds, however it is important to consider additional factors in the context of trans people.

5. Use pronouns that reflect the gender identity of participants. Misgendering is only one sign of disrespect, however it is an important one (Kapusta, 2016). Similarly, "trans" should not be used as a verb or a noun. As a result, referring to transgenders, an individual as transgendered, or transgendering is not advised.

Current challenges underscore the need for a trans research ethics group

(e.g., at a national or regional level) to review research that has implications for trans people, so that in the absence of the need for individual informed consent, at least trans communities (through a Trans Research Advisory Committee structure) are consulted about research that has implications for trans people. Such an Advisory Committee structure could function similarly to best practices for research engaging Indigenous communities, as these practices are defined in Canada. For example, if we follow the spirit of Chapter 9 of the Canadian Tri Council Policy Statement governing research involving human subjects (CIHR, NSERC, & SSHRC, 2014) as it applies to research with Indigenous communities, similar consultation

with representatives of the trans community could be part of research ethics review, in particular where research relies on secondary use of anonymized health information and does not require individual informed consent.

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Chapter 5: The Inclusion of Patient Photographs in Google Images Search

Results: Revised Medical Photography Guidelines Required

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Author's Contribution

ZM conceptualized this study, conducted data collection and analysis, and wrote the initial draft of the manuscript. He is the guarantor for this research. SA and VW provided guidance concerning statistical analysis. All co-authors contributed revisions to the manuscript, and read and approved the final manuscript.

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Abstract

Objectives To assess the availability of patient clinical photographs from published journal articles in Google Images search results and the factors impacting this availability.

Design Cross-sectional study using data from an evidence map of research with transgender, gender non-binary, and other gender diverse (trans) participants.

Data sources A comprehensive search of 15 academic databases was developed in collaboration with a health sciences librarian. There were no date or language limiters. Initial search results were imported to EPPI-Reviewer and resulted in 25,230 references after duplicates were removed. Study topic and study design were the focus of data extraction.

Eligibility criteria for selecting studies Eligibility criteria were established to include empirical research of any design, that included trans participants or their personal information, and that was published in English in peer-reviewed journals.

Study sample All articles published between 2008 and 2015 with medical photographs of trans participants were identified.

Main outcome measure Percentage of clinical photographs of published journal articles available on Google Images. For each reference, images were individually numbered in order to track a total of 605 medical photographs. We used Relative Risk to assess the association between availability of the clinical photograph on Google Images and the following factors: whether the article was openly available online (open access, Researchgate.net, or Academia.edu), whether the article

included genital images, if the photograph was in colour, and whether the photographs were located on the journal article landing page.

Results 94 articles with medical photographs of trans participants were identified. 35 out of a total of 94 publications (37.2%) included at least one medical photograph that was found on Google Images. The ability to locate the article freely online contributes to the availability of at least one image from the article on Google Images (RR = 2.05; 95% CI 1.08 to 3.87).

Conclusions This is the first study to document the existence of medical photographs from peer-reviewed journals appearing in Google Images search results. Almost all of the images we searched for included sensitive photographs of patient genitals, chests, or breasts. Given that is unlikely that patients consented to sharing their personal health information in these ways, this constitutes a risk to patient privacy. Based on the impact of current practices, revisions to current informed consent policies and guidelines are required.

5.1 Introduction

This paper is about the collision of three factors: a growing emphasis on sharing research through open access publication, an increasing awareness of big data and its potential uses, and an engaged public interested in the privacy and confidentiality of their personal health information. One conceptual space where this collision is brought into sharp relief is with the open availability of patient medical photographs from peer-reviewed journals in the search results of online image databases such as Google Images.

Researchers, funders, policymakers, and the public promote the importance of open access research publications (Carroll, 2010). In some instances, this perspective is communicated through public access mandates established by research institutions, funders, or governments (Harnad, 2011). Open access publications allow us to share information more widely with relevant stakeholders including the public, policymakers, and clinicians. Increased access to research supports the principles of accountability, replicability, transparency, and equity. Such access has the potential to reduce research waste and has been promoted as a core component of the Responsible Research and Innovation framework¹ (Owen, Macnaghten, & Stilgoe, 2012).

¹ Responsible Research and Innovation is, "an attempt to govern the process of research and innovation with the aim of democratically including, early on, all parties concerned in anticipating and discerning how research and innovation can or may benefit society" (Burget, Bardone, & Pedaste, 2017, p. 9). This process forms part of the European Framework Programmes and has six core dimensions: engagement, gender equality, science education, open access, ethics, and governance ("Regulation (EU) No 1291/2013," 2013).

While open access publishing is being increasingly embraced, big data and access to massive online databases is expanding. Google Images was launched in 2001 and in its first year included 250 million images (Zipern, 2001). It is estimated that it now has over 1 trillion indexed images (Blodget, 2008). Google obtains its images from crawling websites² and indexing those images within its searchable database (Brown, 2017). Given the way Google Images works, it is perhaps not surprising to learn that photographs from peer-reviewed publications are available online. Physicians and their patients may not realize that sensitive medical photographs published in closed and open access publications are now also freely available within these image databases.

Clinical photographs form part of the patient medical record (Naidoo, 2009). Some have argued that patients also own or at least co-own their medical images (Hood, Hope, & Dove, 1998). As such, it is important to attend to the ethical aspects of capturing, storing, transfer, and use of these images (Stieber, Nelson, & Huebner, 2015). Current guidelines underline the need for prior written consent from patients before taking clinical photographs, using them for teaching or research purposes, or publishing them in peer-reviewed journals, books, or pharmaceutical publications (Supe, 2003). Similarly, some journals - including *BMJ* - call for written consent from patients (and photographers) before publication (e.g. "Uses of Images", n. d.). Within

² According to Dhenakaran and Sambanthan (2011), "[a] web crawler is a program, which automatically traferses the web by downloading documents and following links from page to page" (p. 265). They are used primarily "by search engines to gather data for indexing" (p. 265).

this context, clinicians are expected to balance the importance of medical photography for education, research, and clinical care, with the ethical principle of patient autonomy, including informed consent and confidentiality (Hood et al., 1998), and respect for patients. It is doubtful that current medical photography consent forms include permission to publish clinical photographs on Google Images.

In many countries, transgender, gender non-binary, and other gender diverse (trans) people are required to work with clinicians in order to access medical transition. These mandatory interactions can create complex dynamics between patients and healthcare providers, including challenges related to voluntary and informed consent in the contexts of clinical research and medical photography. While the privacy and confidentiality of medical photographs are important for all patients, privacy breaches when it comes to trans people carry an increased possibility of harm. This risk exists because trans people experience heightened rates of discrimination, harassment, and violence (Stotzer, 2009; Walters, Paterson, Brown, & McDonnell, 2017), particularly those who are visibly gender non-binary or whose trans identities become known to individuals in their lives who may not have been previously aware of this information (Bettcher, 2007).

In this study, we identified a sample of peer reviewed publications that included clinical photographs of trans people and searched for the publications and their associated photographs on Google Images. The objective of this study was to assess the availability of patient clinical photographs from published journal articles in Google Images search results and the factors impacting this availability. The

results of this study will inform privacy and informed consent guidelines in relation to the publication of medical photographs in peer-reviewed journals, including recommendations for clinicians and publishers.

5.2 Methods

The sample for this cross-sectional study was identified from an evidence map of peer-reviewed empirical research including transgender, gender non-binary, and other gender diverse (trans) people. In order to develop the original dataset, a comprehensive search strategy was developed in collaboration with a health sciences librarian, and included 220 trans-related search terms and 15 academic databases from the fields of health, education, social science, business, and the humanities. For further details about the search strategy, study identification, and inclusion and exclusion criteria please see the study protocol paper (Marshall et al., 2017).

The inclusion criteria were designed to identify empirical research published in English in peer-reviewed journals that included trans participants. The initial search produced 25,230 references after duplicates were removed and, 10,651 met the initial screening criteria. After screening on full text, 153 references published between 2008 and 2015 were identified that met the inclusion criteria and included photographs. Using a census sampling method, 94 articles with medical photographs of trans participants were identified (see Appendix E for a full list of this sample).

For each reference, images were individually numbered in order to track a total of 605 medical photographs.

5.2.1 Google Images Search

For each publication, the first author (ZM) searched for the reference in Google Images using the full title of the article in quotation marks. This approach was selected after piloting several different strategies including searching for the full title without quotation marks, searching for the last name of the first author and the first few words of the title, or the last name of the first author and keywords in the title. The aim was to find an approach that was consistent, feasible, and that could be easily replicated. Searching for the title in quotation marks produced the most focused results, typically including two to four pages of images.

The Tor Browser is, "a proxy that masks the location information and browsing history of the user, allowing for anonymous use of the Internet" (Macrina, 2015, p. 18). This browser was used to conduct searches in order to minimize the influence of Google Analytics. For each individual search, a new identity was established within the Tor Browser and the internet protocol (IP) address for the last location in the Tor circuit was documented. Results for each search were saved in portable document format (PDF). Any images identified from the search were compared to the photographs in the original article. For each image that was a match, we saved an electronic copy of the photograph. In addition, we clicked the

hyperlink to "Visit Webpage" in order to determine the original source of the photograph. Results from the source webpage were also saved as a PDF.

One of the reasons for saving the searches as PDFs is that the results of Google Images searches are not static and there is the potential they will change over time. For this reason, it was important to have clear documentation of search results and images that were located as part of the search. Details of each search were saved in an Excel spreadsheet including the last name of the study first author, image identification number, uniform resource locator (URL) for the image, the URL for the source webpage, IP address from the Tor Browser, search date, and details about whether the image was found or not. All searches were conducted between May 21 and June 23, 2017.

5.2.2 Online Availability Search

As part of the data collection process, we were also interested in knowing whether the publication was available through open access and whether this might influence whether the photographs were located on Google Images. A strategy for checking whether references were available through open access was developed with the team's health sciences librarian. One reviewer coded 10% of the transfocused studies. A second reviewer verified the data extracted. Based on this information, we took two steps to check for open access using Google Scholar, PubMed, Researchgate.net and Academia.edu. We searched the title of the article in

quotation marks using Google Scholar. If the article was listed, we clicked through to either the paywall³ or to the PDF.

Because some articles are available through the National Library of Medicine (https://www.nlm.nih.gov/) but are not available through Google Scholar (e.g. *Journal of American Public Health Association*), we also searched for all references in PubMed. In addition, we searched for each reference on Researchgate.net and on Academia.edu, two social networking sites where researchers can share preprints and PDFs of academic publications. While Google Scholar often includes information about whether a PDF is available on Researchgate.net or Academia.edu this is not always the case.

5.2.3 Dataset Demographics

In order to characterize the data at the level of individual photographs, we identified the following information for each photograph: 1) body location: face, chest, genitals, skin graft site, other; 2) population: trans women (including male-to-female transsexuals and people on the trans feminine spectrum), trans men (including female-to-male transsexuals and people on the trans masculine spectrum), and other; 3) timing: pre-surgery or -treatment (including pre-operative), during surgery or treatment, post-surgery or -treatment (including

rding to Siovaag "A navwall is a digital mechanism that senarates

³ According to Sjovaag, "A paywall is a digital mechanism that separates paid content from free content on a website." (2016, p. 306).

immediately post-operative), specimen, autopsy, and other; 4) anonymization: anonymized, not anonymized, or not applicable; and 5) whether the image was in colour or black and white. Images that were not photographs (such as X-rays and magnetic resonance images) were not included in this sample. Although such images may constitute personal health information they are often considered separately from photographs: for clarity, we maintained a focus on medical photographs in this study.

5.2.4 Patient Involvement

This study sits within a larger project focused on the development of an evidence map documenting research with trans individuals and communities. As part of the process of constructing evidence maps, it is recommended that researchers clarify concepts and engage key stakeholders in considering the potential scope of the review (Bragge et al., 2011). Accordingly, individual consultations were held with members of trans and cisgender communities to discuss terminology, search scope, and potential uses of study results. In addition, people from sexual and gender diverse communities were hired as research assistants on the project when possible. This specific project focused on the inclusion of medical photographs of trans patients in online image repository search results did not involve consultation with patients or trans community members.

There will be an emphasis on patient and community involvement during the

dissemination phase, including presentations at relevant trans health conferences and community events.

5.3 Results

5.3.1 Google Images Availability

Thirty-five articles out of a total of 94 publications (37.2%) included at least one photograph that was found on Google Images. When we searched the photographs individually, 123 out of 605 clinical photographs in the articles (20.3%) were found on Google Images.

5.3.2 Online Availability

Thirty-six (38.3%) of the references were available through open access at the journal website, journal publishers, or through PubMed. In addition, we checked for the availability of articles on other websites including Researchgate.net, Academic.edu, and institutional repositories. Fifty-five references (58.5%) were available through at least one of these channels, meaning that article content was freely accessible.

5.3.3 Dataset Demographics

The average publication included six (6) photographs, with a range of 1-29 images. In total, 605 photographs were included in the sample. The information presented in this section relates to analysis at the level of individual photographs.

Photographs most commonly included genitals (48.4%), chest or breasts (21.7%), skin donor site (primarily forearm or leg) (10%), and face (8.1%) (see Figure 5.1).

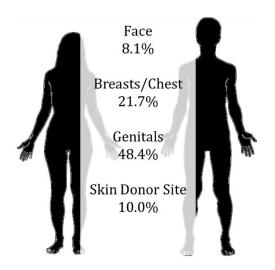


Figure 5.1 Characteristics of Clinical Photographs

According to descriptions provided, 63.8% of the individual photographs were of trans men or female-to-male trans people, 35.2% were of trans women or male-to-female trans people, and 1% could not be easily categorized. In terms of timing, 22.0% of images were taken before treatment or surgery, 32.0% of images were taken during surgery, and 37.4% were taken post-surgery or after treatment. In addition, 3.1% of images were of specimens, and 3.3% were autopsy photographs. Eighty percent of the images were printed in colour, and 20% in black and white.

Fifty-eight of the 605 images, included identifiable elements including faces, full-body autopsy images, or potentially recognizable tattoos. For 14 of the 58 photographs, authors made anonymization attempts. This included placing small

black boxes (Dempf, 2010; Mihm, 2010) or black bars (Dickerson, 2013) over the person's eyes. In one case, the authors taped a large piece of paper over the image covering the person's nose, eyes, and forehead (Murty, 2010). For 43 of the 58 photographs with identifiable elements, there were no attempts at anonymization.

5.3.4 Factors Affecting Google Images Availability

In order to understand what factors might be contributing to the number of clinical photographs available on Google Images, we calculated the relative risk (RR) of availability on Google Images across specific factors which we expected might play a role based on the belief that Google may be filtering images of genitals from their search results. We also felt that article availability on web-based platforms could influence whether photographs were included in Google Images search results. In addition, because of the ways Google crawls websites, we thought that if photographs were visible from the original landing page⁴, then they might be more likely to appear in search results. As noted in Figure 5.2 the ability to locate a PDF of the article online through open access, Researchgate.net, or Academia.edu is one factor that contributes to the availability of at least one image from the article on Google Images (RR = 2.05, 95% confidence interval 1.31, 3.67). This means that if the article is freely available online, there is 2.05 times the risk of finding an image

ding page (n d): "the part of a website that you reach first wh

⁴ Landing page (n.d.): "the part of a website that you reach first when you click on a link on the internet".

from that article on Google Images. Relative risk was also calculated for the following factors: colour photographs (RR = 1.06, 95% confidence interval 0.54, 2.06); photographs visible on journal landing page (RR = 0.92, 95% confidence interval 0.53, 1.61); pre- or post-surgery images of genitals (RR = 0.74, 95% confidence interval 0.44, 1.26).

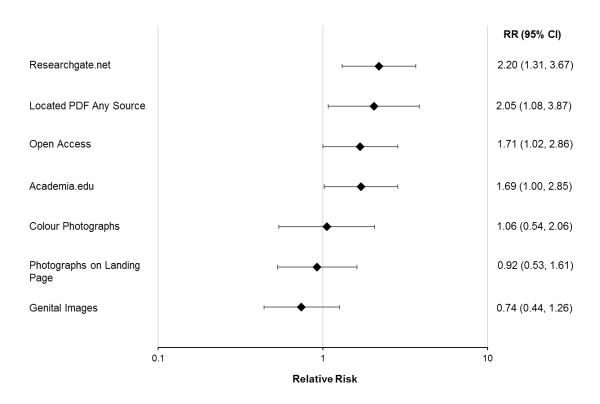


Figure 5.2 Relative Risk and 95% Confidence Intervals for the Factors Affecting Google Images Availability of Clinical Photographs

5.4 Discussion

In this cross-sectional study, we sought to determine what percentage of images from a census sample of peer-reviewed journal articles was available on Google Images. Thirty-five articles out of a total of 94 (37.2%) included at least one

photograph that was found on Google Images, and the likelihood was two times higher for articles that were openly available through open access or other webbased platforms. In total, 123 out of 605 clinical photographs (20.3%) were found on Google Images. Given that is unlikely that patients consented to sharing their personal health information in these ways, this constitutes a risk to patient privacy, and for research studies this likely also poses a problem in relation to research ethics guidelines.

5.4.1 Strengths and Limitations of the Study

To our knowledge, this is the first study to document the existence of medical photographs from peer-reviewed journals appearing in Google Images search results. One of its strengths is the systematic, documented approach to searches across a range of platforms including Google Scholar, PubMed, Researchgate.net and Academia.edu.

At this time, there are no other studies with which to compare our results.

This study included published clinical studies focused specifically on trans people.

Given the emphasis on medical transition and gender affirming surgeries, it is likely that these publications include a higher number of genital, chest, or breast photographs than a random sample related to the overall population.

There are also other potential image databases we could have searched. In developing our search strategy we tried several alternatives, however it is important to note that some image search engines filter out results that are not family or child-

friendly. With the number of sensitive photographs in our dataset, it was necessary to select a search engine with the potential to clearly adjust these settings: Google Images provided this option (although it is unclear how many of the images may have been filtered out because they include pictures of genitals or breasts).

One of the challenges has been to figure out the best way to search for images. After piloting several strategies, we focused on searching for the title of the article in quotation marks. This approach was more specific and led to a smaller number of search results than other search options. As technology develops, it will be possible to compare multiple search strategies, and to search directly by image without using text. Google Image currently has this option but we did not have the image files at the beginning of our searches in order to pursue this strategy.

Another difficulty is that the results of searches on Google Images are not static. This means that over time the results will shift and medical photographs found during this search may not appear in the future. Similarly, images that were not found as part of this study could appear in future searches. Another challenge with this search is that sometimes images from one article in the dataset would appear in the results of a search for a different article. It appears that sometimes this was because of overlapping authors on the research teams, but at other times this seemed to be linked to the keywords (e.g. phalloplasty or vaginoplasty). We did not include this information in our results, but this is an area for future attention.

When considering these challenges, it is important to keep the larger purpose of this study in mind. We were interested in determining what percentage of medical

photographs from a sample of peer-reviewed journal articles were available on Google Images. While the specific results related to each photograph and article matter, the more important finding is the overall number of images we were able to find on Google Images and the implications for patients, clinicians, policymakers, and publishers.

5.4.2 Implications for Patients, Clinicians, Policymakers, and Publishers

In 37.2% of the articles in this dataset, at least one medical photograph was located on Google Images. Almost all of the images we searched for included graphic photographs of patient genitals, chests, or breasts. Many of the pictures were taken during surgery, or include pre- and post-surgical images. A number included patient faces or other identifying features with no attempts at anonymization. Some photographs included full-body images of people who are deceased, at times displayed in ways that did not preserve human dignity.

For trans people, the ability to control access to information about their lives as people who are transgender, transsexual, gender non-binary has concrete ramifications linked to disclosure. This includes decisions about personal health information including medical photographs. Trans people experience heightened rates of discrimination, harassment, and violence (Stotzer, 2009; Walters, Paterson, Brown, & McDonnell, 2017), particularly those who are visibly gender non-binary or whose trans identities become known to individuals in their lives who may not have been previously aware of this information (Bettcher, 2007). There are a limited

number of surgeons and other medical specialists who provide care to trans patients. Typically, within a state or geographic region there may be only one or two providers who specialize in performing specific types of gender affirming surgeries. In Canada for example, there is only one clinic in the country where vaginoplasties and phalloplasties are conducted. These circumstances contribute to heightened privacy and confidentiality concerns for trans patients: the limited number of surgeons means that patients can more easily be identified based on the combined information provided in medical photographs alongside descriptive case reports. While there may be value in the use of medical photographs for education, clinical care, and research, there are serious ethical issues to consider in relation to the visibility of medical images in public search results: these concerns are enhanced for trans individuals.

There are multiple intervention points to address this situation. The first strategy is to inform patients as part of the written informed consent process that their medical photograph(s) could appear in online image databases, including the search results from Google Images. In addition to current guidelines indicating that patients should be shown a copy of any photographs that will be published as part of case reports or other medical publications, they need to be aware of the potential for their photograph to become more widely available on the internet. Current research with patients in the field of dermatology suggests that patients are more open to having their images shared between medical practitioners than via websites (Hacard et al., 2013).

As part of informing patients, institutional policies for medical photography and guidelines for clinicians will also need to reflect the risk of medical photographs appearing openly online. Similarly, journal guidelines for the use of medical images should address these possibilities and any steps being taken to mediate these risks.

A second strategy is to determine how online image databases are accessing medical photographs from peer-reviewed publications. While this may be facilitated by open access publishing, there are articles that are not available through open access or other online websites where the photographs still appear in Google Images search results. This week Google recently changed its policies to state that it will remove, "confidential, personal medical records of private people" from its search results (Bergen, June 26, 2017). While it is currently unclear whether this will affect photographs published in peer-reviewed journals, it would be helpful to have additional information about this shift in practice and whether other search engines will institute equivalent policies.

Another option is for journal publishers to take a different approach to the ways medical photographs are shared online. For example, some publishers have medical photographs available as PowerPoint files but these can only be accessed behind their paywall. As part of the chain of stakeholders who are sharing patient medical information, publishers also have a responsibility to consider the implications of patient photographs being shared through massive searchable image repositories such as Google Images.

5.4.3 Conclusion

As we move towards an increasing emphasis on Open Science (Fecher & Friesike, 2014), the need for critical perspectives is paramount (Boyd & Crawford, 2012). Clinicians, researchers, and policymakers must respect patient autonomy, including attention to patient confidentiality, privacy, and informed consent. When taken, medical photographs form part of the patient record and as such are subject to guidelines concerning the privacy of patient health information, regardless of the type of image and whether or not the patient is recognizable. In terms of copyright, these images may also be owned or co-owned by patients themselves. As part of research studies, medical photographs constitute part of the confidential data contributed by participants. Based on the impact of current practices, revisions to current informed consent policies and guidelines are required. In addition to the need for informed consent documents that detail all potential uses of medical photographs, it is recommended that renewed written informed consent be documented for each use of the image(s) (Hacard et al., 2013). These new informed consent policies should be developed in collaboration with patients, with particular attention to images that may be published in online peer-reviewed publications or other online formats.

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Chapter 6: Summary

This work critically examines and documents the approaches researchers have taken to studying transgender, gender non-binary, and other gender diverse (trans) individuals and communities. It applies systematic review methodologies, including evidence mapping, to demonstrate new ways of studying researchers and research ethics. Presented in four manuscripts, the first two focus on the Global Trans Research Evidence Map, including the initial protocol paper describing the methods involved in developing the evidence map (Marshall et al., 2017) (Chapter 2). One of the key contributions of the protocol paper is to identify and describe the challenges with carrying out reviews in the field of trans studies, including difficulties related to search terms and the ways researchers incorporate LGBT2Q and other non-specific language linked to sexual orientation and gender identity.

The evidence map is an ambitious project that includes peer-reviewed empirical literature published in English from many countries in the world. Previous systematic reviews have focused on specific methods or areas of investigation. By including research from all fields of study and a range of empirical methods, the Global Trans Research Evidence Map makes a unique contribution to the literature. Results presented in Chapter 3 provide detailed insights into the topics researchers have chosen to study and the distribution of different types of study design.

Chapters 4 and 5 provide examples of new approaches to studying research and researchers using the dataset. The definition of research was purposely broad and included a full range of qualitative, quantitative, mixed methods, and clinical

studies. Chapter 4 includes an ethical analysis of research in the dataset published between 2010 and 2014. Using ethnographic document analysis (Altheide, 1987), we document examples of failure to respect trans participants at multiple research stages including research focus and study design, data collection and reporting, data analysis, and publishing practices. Based on their lived experience, many marginalized communities have started to develop mechanisms to hold researchers accountable. This includes the development of research guidelines and publishing policies. In Chapter 4, we suggest five recommendations for researchers, clinicians, publishers, funders and other stakeholders. This information will also be relevant for community members looking to track changes in publishing practices or other observable behaviours in the future.

In Chapter 5, we explore a different element of the dataset, narrowing in on trans-focused clinical publications that include photographs. With this project, we were able to leverage the dataset to explore the ways our interactions with technology, increased electronic access, and global search engines may be impacting the ways clinicians, researchers, and the public, think about the privacy of medical information and informed consent.

6.1 Implications

This study presents the first evidence map of trans-focused research. One of the great strengths of this research is the potential for more meaningful stakeholder interaction with existing trans research. Until now, it has not been uncommon for researchers to state that there is limited trans research, or for community members to be unsure where to find studies related to social or medical transition. The results of this dissertation will increase awareness of and access to research that includes trans people.

This research also contributes to evidence review methods. The field of evidence mapping is relatively new and there are few studies that describe how to conduct subject mapping. Chapter 3 provides detailed information developing a study topic list and the two-step process we used to identify and confirm study topics in the creation of this evidence map.

The process of creating the evidence map also provided unique contributions in two areas. Discussed in the protocol paper (Chapter 2), a key strength was documenting a comprehensive search strategy to identify a broad range of research with trans participants. A second contribution was to identify the challenges with developing a systematic search strategy and screening procedures when reviewing research with trans participants.

The dataset collected for the evidence map has also provided a source of interest to leading researchers in the field of semi-automation and systematic reviews. With over 25,000 references, and over 10,000 articles that met the initial screening criteria based on title and abstract, this a large-scale review. In partnership with the EPPI-Centre at University College London, the dataset was identified a good candidate for exploring the potential usefulness of text mining and semi-automation. While the results of the text mining analysis and the usefulness of

semi-automation to identify study topics are not the focus of this dissertation, the dataset itself will make a valuable contribution to our understanding of machine learning and how technology can improve our ability to conduct large-scale reviews with greater resource efficiency.

Leveraging evidence mapping to study researcher behaviour is also new way of studying research ethics. While we typically consider systematic reviews and scoping reviews as a way to study research, here we employ these methods to investigate researchers and their research practices. This novel shift in thinking may provide new tools for researchers in the fields of empirical ethics, science and technology studies (STS), feminist technoscience, and sex and gender research.

A specific example is presented in Chapter 5. This research is the first to identify specific examples of patient medical photographs published in peer-reviewed journal articles that are publicly available in open searchable image databases such as Google Images. As a result of the results shared here, clinicians, researchers, and publishers need to re-examine their current practices and to revise current informed consent practice in light of patient privacy policies. It is hoped that this research will contribute to revised policies and practices in order to address these ethical concerns.

This study is one of the first to document trans people as research subjects. It is both informed by, and contributes to, a larger body of work written by people from marginalized communities in response to research practices that present ethical challenges. People from trans communities and allies have started to present

research guidelines through the World Professional Association for Transgender Health, the European Professional Association for Transgender Health, and the Canadian Professional Association for Transgender Health. The existing guidelines and the recommendations provided here provide important opportunities for researchers, clinicians, publishers, and other stakeholders to more fully honour trans individuals and communities.

6.2 Limitations

As noted in the protocol paper (Chapter 2), the conceptualization of trans identities used in developing the search strategy and the inclusion and exclusion criteria is broad. It includes trans and gender diverse people in local and global contexts, including attention to gender expressions. This means that the dataset includes research with cross-dressers, femme queens, transsexuals, travestis¹¹, and gender creative kids. This decision was not meant to erase the specificity of different queer or trans identities but to be highly inclusive in the development of the dataset and the evidence map.

In relation to research with Two-Spirit and other Indigenous trans people globally, the search strategy included search terms related to Two-Spirit identities as well as 52 terms to describe Indigenous gender diverse people across 31 cultures ("A Map of Gender-Diverse Cultures", 2015). In addition, three Indigenous-specific

¹¹ Travesti is a term used in South America to describe people who were assigned male at birth and who now identify and live as female (Klein, 1999).

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databases were included in order to increase the number of relevant articles.

Despite this, there is very little research in the trans-focused dataset that focuses on Indigenous trans or Two-Spirit people. One of the reasons for the low level of representation in the evidence map is that, depending on the characteristics of the sample, the study may be included in the LGBT/MSM group, or in the mixed group of studies.

In relation to language of publication, initial database searches included no language limiters. Two additional databases were included as part of the original search strategy in order to ensure the broadest geographic and culture inclusion within the evidence map. The SciELO database includes references from Brazilian journals, and the LILACS databases include articles from over 600 medical journals from Latin America and the Caribbean (Clark, 2002). Resource constraints mean that the evidence map currently includes only materials published in English, however any references not written in English were identified in the dataset as Exclude on Language (3,157 references) in order to allow for future potential inclusion.

One other point of clarification: the evidence map was initially developed in relation to the ethics of research with human participants. As a result, studies that do not include trans people were excluded from the dataset. This means that research with the family members of trans people, or with healthcare providers, or educators who are not trans themselves, is not included here. This research is also

part of the broader field of trans studies and its exclusion from the evidence map is not meant to imply otherwise.

6.3 Future Research

The results presented here include the first iteration of the evidence map, but in order to maximize the potential of the dataset, there is more work to be done focusing on additional data extraction related to sample demographics, an online searchable website, identifying a reliable search hedge, determining the effectiveness of text mining and semi-automation, enhancing the content of the dataset, and connecting with trans research participants and researchers to explore the nuances of their experiences.

6.3.1 Data Extraction Related to Sample Demographics

In the original research protocol, we identified plans to extract sample demographic data. This work has been complicated by the ways gender identity and ethnicity data are collected and reported in peer-reviewed journal articles. In the next phase of this evidence mapping process, there are plans to extract demographic data about sample participants, recruitment methods, and geographic location where research was conducted from each of the trans-focused studies including information about gender identity, age, and ethnicity. This more detailed analysis of sample demographics will help us to answer questions about justice in relation to

research inclusion, and to discuss issues of potential homogenization in the literature.

6.3.2 Launch Online Searchable Website

A key objective is to share the results of the evidence map through an accessible online searchable website. Once complete, this website will include results of the initial phase of data extraction including trans-focused publications from 2010 to 2014. The next step in this project will be to screen the remaining articles on full text to determine whether they are trans-focused, LGBT/MSM, or mixed samples. Once these publications are added to the dataset, the next priority will be to update the searches and to run the searches on a regular basis in order to continue screening and updating dataset content.

6.3.3 Identify Search Hedge

A search filter or search hedge is a predefined search strategy designed to retrieve a high percentage of relevant search results (Wilczynski & Haynes, 2002). Given that it is not possible to use the term "trans" or "gender identity" to accurately identify all research relating to trans and gender diverse people, it is important to determine a more reliable search strategy that is less sensitive and more specific than the one used for this review. For example, a large number of references related to surgeries such as mastectomy, hysterectomy, and orchiectomy were not trans-

specific. Knowing under what conditions these terms are used when trans people are included would save time at level 1 and 2 screening.

In addition, one of the goals will be to check the reliability of subject headings from different databases. For example, PubMed has a transsexualism MeSH term. With the final list of references that meet the inclusion criteria, it will be helpful to know how many of those are included in the transsexualism subject heading and if the references are not included, which headings they are coded under within different academic databases. As the first step in any review, this is an important potential intervention point in order to decrease the amount of time spent screening on title and abstract, reference retrieval, and screening on full text. Once all of the references in the dataset have been screened on full text, we will develop a search hedge to identify research with trans and gender diverse participants.

6.3.4 Determine Effectiveness of Semi-Automation

Semi-automation is another tool that can help improve the process of screening on title and abstract. With this review, after two human reviewers screened the first 4,526 references, Latent Dirichlet Allocation (LDA) was used to sort the remaining references by relevance (Blei, Ng, & Jordan, 2003). After screening an additional 4,990 references, results were again reviewed using LDA and the remaining references were again ranked by relevance.

In addition to screening references, there are two other stages where it is possible to incorporate forms of text mining or semi-automation. One is for

screening on full text. As our ability to extract information using computers becomes more advanced, our ability to screen on full text will be improved. This work will be supported by a shift to more specific language on the part of researchers. The more we can clearly identify participants from abstracts and demographic information provided within full-text articles, the easier it will be to accurately complete screening activities.

6.3.5 Enhance Content of Database

3,157 references were excluded from screening because they were not published in English. It is hoped that with increased resources, it will be possible to include research published in a greater diversity of languages. The research included in the dataset also includes only peer-reviewed publications. A great deal of research with trans people has been conducted in communities and published in reports or other forms of "grey" literature. Ideally the evidence map will be able to include all forms of empirical research over time, with the potential for researchers and community members to upload research to the website directly.

6.3.6 Understanding the Perspectives of Research Participants and Researchers

Beyond these more technical aspects of the database, the results of this work suggests that it would be helpful to speak with trans people about their experiences as willing or unwilling research participants. The ethical analysis presented here is

based on information in peer-reviewed journal articles shaped by publishing norms and the perspectives of the authors and reviewers. Future studies will explore the experiences of trans people who have been involved with research, including studies that use health administrative data. A second area for further exploration includes speaking with researchers themselves about ethical challenges, including how clinician-researchers are obtaining informed consent in the complexity of clinical contexts.

6.4 Reflections

There were a number of tensions I experienced in carrying out this research. The first relates to the need to provide proof of problematic practices in order to justify the need for change. What counts as an appropriate justification seems to depend on who is being asked to do something differently. As a trans researcher who is identifying the necessity for change from primarily cisgender clinicians, researchers, and other stakeholders, the need for clear evidence directly influenced all decisions linked to study design and data analysis.

In the current climate, calls for increased attention to the ways we acknowledge the lives of trans and other marginalized people are often criticized as examples of political correctness and attempts at silencing. I have struggled in this work to determine how best to document the ways researchers treat and represent trans people within this field. There are multiple perspectives represented in the dataset, at times ranging from intense disrespect to careless disregard. In

documenting these negative examples, I did not want to distract from the progressive work of many researchers and clinicians. I have also tried to find the right words to convey problems with the ways some investigators are conducting their research. I did not want to overdramatize, and I also did not want to minimize what is currently happening.

During data collection, sometimes I was shocked by the images and the text in the articles, sometimes I was saddened. At other times, I felt I was becoming desensitized to the information I was immersed in. When I needed grounding, I turned to three main sources for inspiration and support. The first touchstone was the work of Indigenous and African American scholars such as Willie Ermine (2007), Linda Tuhiwai-Smith (2012), and Harriet Washington (2006) whose work in the field of research ethics has inspired me to think differently and to remember the intense efforts of other communities in attempting to address long-term research injustices. A second source were my notes from individual consultations with trans community members conducted early in the process of designing this project. There I found encouragement and a reminder of the larger imperative of this work.

6.5 Recommendations

This dissertation calls for change in a number of areas including the ways researchers collect and analyse data, the ways trans people are represented in peer-reviewed publications, as well as in certain publishing practices. Because this study is focused on peer-reviewed publications, journal publishers are also implicated in

current practices and need to review and revise their ways of working. Funders and those who review funding proposals may want to consider applications in relation to the results of the evidence map. Research Ethics Board members could also reflect on the recommendations from the ethical analysis as part of their review process.

I hope that the results of this research will be useful to the broad community of gender diverse people and their families, clinicians, researchers, funders, editors and other stakeholders, and that these findings will contribute to transforming current research and clinical publishing practices. I have a vision of the Global Trans Research Evidence Map as an opportunity for dynamic, sustainable exchange that includes community reports, peer-reviewed journal articles, and a creative mix of research publications. I look forward to contributing to this evolution and to seeing how it will unfold.

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Appendix A: PRISMA-P (Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols) 2015 Checklist

Section and topic	Item No	Checked	Source		
ADMINISTRATIVE INFORMATION					
Title:					
Identification	1a	\checkmark	Title page		
Update	1b	NA			
Registration	2	NA			
Authors:					
Contact	3a	✓	Title page		
Contributions	3b	\checkmark	Page 12		
Amendments	4	NA			
Support:					
Sources	5a	✓	Page 12		
Sponsor	5b	NA			
Role of sponsor or	5c	\checkmark	Page 12		
funder					
INTRODUCTION					
Rationale	6	✓	Page 3-5		
Objectives	7	✓	Page 5-6		
METHODS					
Eligibility criteria	8	✓	Page 6-7		
Information sources	9	✓	Page 7		
Search strategy	10	✓	Page 8		
Study records:					
Data management	11a	\checkmark	Page 8		
Selection process	11b	\checkmark	Page 8-10		
Data collection	11c	✓	Page 10		
process					
Data items	12	✓	Page 10		
Outcomes and	13	NA			
prioritization			_		
Risk of bias in individual studies	14	NA			
Data synthesis	15a	NA			

	15b	NA	
	15c	NA	
	15d	\checkmark	Page 10-11
Meta-bias(es)	16	NA	
Confidence in	17	NA	
cumulative evider	nce		

NA – Not applicable

Appendix B: Search Strategy for PubMed

#	Query
3	transsex*[TIAB] OR transex*[TIAB] OR transgender*[TIAB] OR travesti*[TIAB] OR transvesti*[TIAB] OR gender identity disorder*[TIAB] OR gender dysphori*[TIAB] OR two-spirit*[TIAB]
7	sex reassignment[TIAB] OR sexual reassignment[TIAB] OR gender reassignment[TIAB] OR gender confirmation[TIAB] OR sex change operation*[TIAB]
9	transman[TIAB] OR transmen[TIAB] OR "trans man"[TIAB] OR "trans men"[TIAB] OR "trans person"[TIAB] OR "trans persons"[TIAB] OR "trans people"[TIAB] OR "trans individual"[TIAB] OR transwoman[TIAB] OR transwomen[TIAB] OR "trans woman"[TIAB] OR "trans women"[TIAB] OR "trans identity"[TIAB] OR "trans identities"[TIAB] OR "trans youth"[TIAB] OR "trans parent"[TIAB] OR "trans parents"[TIAB] OR "trans elder"[TIAB] OR "trans senior"[TIAB] OR "trans seniors"[TIAB] OR "pregnant man"[TIAB] OR "pregnant men"[TIAB]
11	LGBT*[TIAB] OR GLBT*[TIAB] OR BLGT*[TIAB] OR BGLT*[TIAB] OR LBGT*[TIAB] OR GBLT*[TIAB]
13	transmasculin*[TIAB] OR transfeminin*[TIAB] OR genderqueer*[TIAB] OR gender queer*[TIAB] OR genderfluid*[TIAB] OR "gender fluid"[TIAB] OR gender varian*[TIAB] OR gender nonconform*[TIAB] OR autogynephil*[TIAB] OR gender identity clinic*[TIAB] OR gender identity service*[TIAB]
14	transphobi*[TIAB] OR cisgender*[TIAB] OR cisnorm*[TIAB] OR transfeminis*[TIAB] OR "trans feminist"[TIAB] OR "trans feminism"[TIAB] OR berdache*[TIAB] OR tranny[TIAB] OR eunuch[TIAB] OR "gender bender"[TIAB] OR bigender*[TIAB] OR cross-dress*[TIAB] OR co-gender[TIAB] OR third gender[TIAB] OR third sex[TIAB] OR gender binar*[TIAB] OR assigned female at birth[TIAB] OR assigned female at birth[TIAB] OR trigender[TIAB] OR drag king[TIAB] OR drag queen[TIAB]
25	harry benjamin[TIAB] OR HBIGDA[TIAB] OR WPATH[TIAB]
27	trans-sexual*[TIAB] OR trans-gender*[TIAB]

(gender[TIAB] AND trans[TIAB]) NOT ("fatty acid" OR "trans fat" OR "trans fats" OR "trans membrane" OR "trans pars plana vitrectomy" OR all-trans OR fatty OR rabbit OR rabbits OR rat OR rats OR sheep OR pig OR pigs OR bear OR bears OR dolphin OR dolphins OR Hb Baden OR trans-1 OR trans-2 OR trans-3 OR trans-3' OR trans-4 OR trans-7 OR trans-8 OR trans-9 OR trans-10 OR trans-11 OR trans-abdominal OR transacting OR trans-activation OR trans-anal OR trans-anastomotic OR trans-anorectal OR trans-aortic OR trans-apical OR trans-arterial OR trans-associations OR trans-atlantic OR Trans-bronchial OR trans-canal OR trans-canalicular OR trans-carveol OR trans-catheter OR trans-cerebellar OR trans-cervical OR trans-choroidal OR trans-cinnamaldehyde OR trans-CMF OR trans-conjunctival OR trans-corneal OR trans-cranial OR trans-cultural OR trans-cutaneous OR trans-dermal OR trans-diagnostic OR trans-disciplin* OR Trans-Dniester OR trans-endothelial OR trans-epidermal OR trans-epithelial OR transesophageal OR trans-factors OR trans-fascially OR trans-femoral OR transfemoral OR *transferase OR Transferrin OR trans-fistula OR trans-focal OR trans-gene OR transgeneration* OR trans-generic OR trans-genic OR transgenic OR trans-golgi OR trans-gulf OR trans-hernial OR Trans-Himalaya OR trans-historic* OR trans-iliac OR transillumination OR trans-impedance OR trans-imperial OR trans-infection OR transinstitution* OR trans-interactive OR trans-lamina OR trans-laryngeal OR trans-linalool OR trans-lycopene OR tran-sition OR translate OR translation* OR trans-luminal OR trans-mammary OR trans-mandibular OR trans-marrow OR trans-mediterranean* OR trans-membrane OR Trans-Mexican OR transmitral OR trans-muconic OR transmural OR transnation* OR trans-nation* OR trans-nonachlor OR trans-obturator OR transoesophageal OR trans-operative OR trans-oral OR trans-pacific OR trans-placental OR transplant OR transport OR trans-professional OR transpupillary OR trans-radial OR trans-region* OR trans-renal OR trans-ritual OR trans-sac OR trans-scleral OR transsection* OR trans-sectoral OR transcription OR trans-signalling OR trans-situational OR trans-SOF OR trans-species OR trans-sphenoidal OR trans-sphincter* OR trans-stenotic OR trans-sternal OR trans-stimulatory OR trans-styloid OR trans-sylvian OR transtetrhydrocanabinol OR trans-theoretical OR trans-thoracic OR trans-tibial OR transtramadol OR trans-tricuspid OR trans-tympanic OR trans-umbilical OR trans-vitreal OR trans-zygomatic OR transsex* OR transgender* OR transex* OR "gender identity disorder" OR "gender dysphoric" OR "gender dysphoria" OR LGBT* OR cardiac OR aorta OR marine OR multiple sclerosis OR Tasman OR allele OR gene OR lung OR lungs) gender minorit*[TIAB] (gender divers*[TIAB] AND (sexual[TIAB] OR sexuality[TIAB] OR sexualities[TIAB])) NOT (board[TIAB] OR corporate[TIAB] OR corporation[TIAB] OR employment[TIAB] OR LGBT*[TIAB] OR transgender*[TIAB] OR transsex*[TIAB] OR transex*[TIAB] OR gender

- 32
 - identity disorder[TIAB] OR gender dysphori*[TIAB])
 - gender identit*[TIAB] AND (sex[TIAB] OR sexual[TIAB] OR sexualit*[TIAB]) NOT (LGBT*[TIAB] OR transgender*[TIAB] OR transsex*[TIAB] OR transex*[TIAB] OR gender identity disorder[TIAB] OR gender dysphori*[TIAB] OR "disorders of sex development"[TIAB])

38	Hijra[TIAB] OR hirja[TIAB] OR kothi[TIAB] OR kathoey[TIAB] OR muxe[TIAB] OR "sworn virgin"[TIAB] OR fa-afafine[TIAB] OR fakafefine[TIAB] OR Nadleehi[TIAB] OR Fakaleiti[TIAB] OR Bakla[TIAB] OR Calabai[TIAB] OR calalai[TIAB] OR (waria[TIAB] NOT "Waria Valley") OR (Acault[TIAB] AND Myanmar) OR (Metis[TIAB] AND Nepal) OR Aravani[TIAB] OR Xanith[TIAB] OR Skoptsy[TIAB] OR mahuwahine[TIAB] OR mahu[TIAB]
42	Femminiello[TIAB] OR basivi[TIAB] OR Ninauposkitzipxpe[TIAB] OR Winkte[TIAB] OR Lhamana[TIAB] OR Dilbaa[TIAB] OR Alyha[TIAB] OR Hwame[TIAB] OR Muxhe[TIAB] OR Guevedoche[TIAB] OR machi-embra[TIAB] OR Quariwarmi[TIAB] OR Whakawahine[TIAB] OR Wakatane[TIAB] OR Bissu[TIAB] OR "Khwaja Saraa"[TIAB] OR Sekrata[TIAB] OR Mashoga[TIAB] OR Ashtime[TIAB] OR Burrnesha[TIAB] OR kocek[TIAB] OR (Mino[TIAB] AND Benin)
50	metoidioplast*[TIAB] OR phalloplast*[TIAB] NOT (deficiency OR augmentation OR congenital OR cadaver* OR aphallia OR penectomy OR "disorders of sex development" OR "disorder of sex development" OR DSD OR "androgen insensitivity syndrome" OR burn OR burns OR cancer OR cancers OR cancerous)
51	Vaginectomy[TIAB] NOT ("disorder of sex development" OR "disorder of sex development" OR DSD OR carcinoma OR carcinomas OR adenocarcinoma* OR congenital* OR "Mayer-Rokitansky-Küster-Hauser" OR "herlyn-werner-wunderlich" OR intersex* OR "vaginal agenesis" OR neovagina OR tumor OR tumors OR tumour* OR cancer OR cancers OR cancerous OR malignant* OR malignancy* OR oncolog* OR Mullerian OR dog OR dogs OR canine OR rat OR rats OR Colpocleisis OR prolapse)
52	(mastectom*[TIAB] OR chest reconstruction[TIAB]) NOT (tumour* OR tumor OR tumors OR "breast cancer" OR radiation OR chemotherapy OR mammogram OR mammography OR carcinoma* OR "breast reconstruction" OR malignant OR malignancies OR radiotherapy OR oncological OR thoracic OR oncology OR adipose OR liver* OR cancer OR cancers OR cancerous OR prophylactic OR diabetes OR diabetic* OR opioid OR gynecomastia* OR BRCA OR gene OR "breast augmentation" OR goat* OR dog OR dogs OR canine OR mice OR mouse OR rat OR rats OR "chronic kidney disease" OR "juvenile mammary hypertrophy" OR scoliosis OR biopsy OR congenital OR encephalopathy OR tamoxifen OR Gitelman OR rabbit* OR "periductal mastitis" OR "breast volume" OR "necrotizing fasciitis" OR "bariatric surgery" OR "breastfeeding" OR cow OR cows OR calf OR abdominoplasty OR mastoidectomy OR cadaver* OR Tasman)
53	(vaginoplast*[TIAB] OR neovagina[TIAB]) NOT ("disorders of sex development" OR "disorder of sex development" OR DSD OR congenital* OR "androgen insensitivity syndrome" OR intersex* OR muller* OR agenes* OR Mayer-Rokitansky-Kuster-Hauser OR MRKH OR "Bardet Biedl" OR "cloacal exstrophy" OR oncolog* OR sarcoma* OR carcinoma* OR cancer OR cancers OR cancerous OR burn* OR cat OR cats OR kitten OR calf)

54	(orchiectomy[TIAB] OR orchidectomy[TIAB] OR penectomy[TIAB]) NOT (prostate OR neoplasm* OR cancer OR cancers OR cancerous OR carcinom* OR oncolog* OR tumour OR tumor OR tumours OR tumors OR malignant OR malignancy OR malignancies OR benign OR seminoma OR torsion OR tortion OR undescended OR "androgen insensitivity syndrome" OR congenital* OR "disorders of sex development" OR "disorder of sex development" OR DSD OR hernia* OR vasculitis OR lymphoma* OR sarcoma* OR gangrene* OR cyst OR cysts OR aneurysm* OR mice OR mouse OR rat OR rats OR canine* OR deer OR pig OR pigs OR wether* OR "sea otter" OR cattle OR stallion* OR rabbit* OR hamster* OR cat OR cats OR chicken* OR monkey* OR bull OR turtle* OR animal* OR sheep OR tortoise* OR horse* OR dog OR dogs OR elephant* OR primate* OR hippopotamus OR veterinar* OR pig OR pigs OR buck* OR reptile* OR boar* OR lizard* OR bear*)
55	Genitoplasty[TIAB] NOT ("disorders of sex development" OR "disorder of sex development" OR DSD OR congenital* OR intersex* OR "androgen insensitivity syndrome")
56	(silicone[TIAB] AND trans[TIAB]) NOT (trans-fistula OR trans-tibial OR trans-choroidal OR trans-dermal OR trans-scleral OR trans-cutaneous OR trans-cranial OR trans-CMF OR "fatty acid" OR trans-gene OR tran-sition OR trans-1 OR trans-2 OR trans-3 OR trans-4 OR trans-7 OR trans-8 OR trans-9 OR trans-11 OR trans-membrane OR trans-impedance OR trans-epidermal OR all-trans OR trans-SOF OR trans-cinnamaldehyde OR trans-abdominal OR trans-sphincter* OR trans-carveol OR trans-obturator OR trans-anal OR trans-tympanic OR trans-aortic OR trans-mandibular OR trans-zygomatic OR rat OR rats OR rabbit OR rabbits OR sheep OR trans-stimulatory OR trans-endothelial OR trans-conjunctival OR trans-apical OR trans-vitreal OR trans-radial OR trans-sylvian OR trans-anorectal OR trans-femoral OR trans-canalicular OR trans-sac OR "trans pars plana vitrectomy" OR transpupillary OR transport OR trans-placental OR trans-mammary OR trans-illumination OR trans-arterial OR trans-catheter OR trans-renal OR trans-sternal OR trans-tetrhydrocanabinol)
57	(hair removal[TIAB] AND trans)
58	(electrolysis[TIAB] AND trans) NOT (trans-L OR trans-configuration OR trans-N OR trans-granular OR trans-position OR trans-3 OR electrochemical OR electrochemistry OR trans-form OR trans-bis OR trans-array OR chemistry OR rabbit OR rabbits OR glaucoma OR cochlear OR pacemaker OR eyelid)
59	facial feminization[TIAB] OR facial feminisation[TIAB]
60	tracheal shave[TIAB] OR chondrolaryngoplasty[TIAB] OR cricothyroidopexy[TIAB]
64	Transgendered persons[MESH] OR Transsexualism[MESH] OR Sex Reassignment Procedures[MESH] OR Sex Reassignment Surgery[MESH] OR Health Services for Transgendered Persons[MESH] OR Transvestism[MeSH]
66	(female to male[TIAB]) AND FTM[TIAB]
68	(male to female[TIAB]) AND MTF[TIAB]

Appendix C: Full List of Trans-Focused References

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Appendix D: Summary Table of Trans-Focused Studies

First Author and Year of Publication	Study Topic	Study Design	Data Collection Method/Data Source
Abdullah (2012)	Discrimination and marginalizationSex work	• Qualitative - interviews or FGs	• Interviews • Focus Groups
Abelson (2014)	Violence and trauma Gender identity and expression	• Qualitative - interviews or FGs	• Interviews
Adams (2013)	 Physical health Therapeutics and surgeries	• Case Report/Case Study/Case Series	• Clinical Records
Adenuga (2012)	Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Agrawal (2013)	Physical healthSexual health, HIV, and STIsTherapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Ahlin (2014)	Therapeutics and surgeries	Cohort studies	Clinical Records
Ahmadzad-Asl (2011)	Gender identity and expression	Cross-sectional	Clinical Records
Ahmed (2014)	Discrimination and marginalization	Cross-sectional	• Survey - in person
Ainsworth (2010)	• Resilience/well-being/QOL • Therapeutics and surgeries	• Cross-sectional	• Survey - online • Survey - in person
Akhtar (2012)	Other Sexual health, HIV, and STIs	• Cross-sectional	• Clinical Samples/Materials • Survey - in person
Alameddine (2011)	 Physical health Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Algars (2012)	Gender identity and expressionMental health	• Qualitative - interviews or FGs	• Interviews

	• Physical health		
Alhabshi (2011)	Biology and physiology Physical health	Case Report/Case Study/Case Series	Clinical Records
Altaf (2012)	• Sex work • Sexual health, HIV, and STIs	• Cross-sectional	• Clinical Samples/Materials • Survey - in person
Altman (2012)	Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Altomare (2013)	Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Amend (2013)	Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Aminsharifi (2012)	Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Amirian (2011)	Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Anderson (2014)	Therapeutics and surgeries	• Cohort studies	Clinical Records
Andrasik (2014)	Research methodsSexual health, HIV, and STIs	• Qualitative - interviews or FGs	• Focus Groups
Andreazza (2014)	Biology and physiologyEarly life experiences	• Case Report/Case Study/Case Series	• Clinical interview • Interviews
Ansara (2012)	Discrimination and marginalizationMental health	• SR Desc and Qual	• Journal Articles - Review
Antoszewski (2012)	Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical interview
Aramburu (2013)	 Gender identity and expression Other Social support, relationships, and families 	• Qualitative - interviews or FGs	• Interviews

Arsenault (2012)	 Arts and creativity Gender identity and expression Religion and spirituality Resistance and politicization 	Autoethnography	• Not Discussed
Asscheman (2011)	Physical health Therapeutics and surgeries	Cohort studies	• Clinical Records • Other
Auer (2013a)	Biology and physiology	Cohort studies	Clinical Records
Auer (2013b)	 Gender identity and expression Mental health Research methods 	Case-control	Clinical interview
Auer (2014)	Gender identity and expression Sexuality	Cohort studies	• Survey - in person
Ayanian (2013)	Physical health Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Baba (2011)	 Gender identity and expression Physical health Therapeutics and surgeries 	Cross-sectional	Clinical interview
Bailey (2014)	Health and mental health services Mental health	Cross-sectional	• Survey - online
Balgos (2012)	 Violence and trauma Ethnicity, culture, race, and racialization Resistance and politicization 	Ethnography or phenomenology	• Interviews • Observation
Bandini (2011)	Violence and trauma Early life experiences Mental health	Cross-sectional	Clinical interview

Baradkar	Physical health	• Case Report/Case	Clinical Records
(2011)	Thy steat nearest	Study/Case Series	Similar Records
Baral (2013)	Sexual health, HIV, and STIs	SR Desc and Qual	• Journal Articles - Review
Barišić (2014)	Mental health	Cross-sectional	• Clinical interview • Other
Barnes (2013)	Physical health Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Barnett (2013)	Arts and creativityResistance and politicizationSpace and place	• Qualitative - interviews or FGs	• Interviews
Bauer (2012)	• Indigeneity • Sexual health, HIV, and STIs	• Cross-sectional • CBR/PAR	• Survey - online • Survey - in person
Bauer (2013)	• Sexuality • Sexual health, HIV, and STIs	• Cross-sectional • CBR/PAR	• Survey - online • Survey - in person
Bauer (2014)	 Discrimination and marginalization Health and mental health services 	• Cross-sectional • CBR/PAR	• Survey - online • Survey - in person
Bazargan (2012)	Discrimination and marginalizationViolence and traumaMental health	Cross-sectional	• Survey - in person
Beagan (2012)	Employment Gender identity and expression	• Qualitative - interviews or FGs	• Interviews
Benotsch (2013)	Mental health Substance use (alcohol and drug use)	Cross-sectional	• Survey - in person
Benson (2013)	Gender identity and expressionHealth and mental health services	Ethnography or phenomenology	• Interviews

Bento (2012)	Gender identity and	Ethnography or	• Interviews
Denito (2012)	_	phenomenology	• Interviews
	expression	phenomenology	
	Sexuality		
Bentz (2010)	Biology and physiology	Cohort studies	• Clinical
	Therapeutics and surgeries		Samples/Materials
			• ,
Berkowitz	Arts and creativity	Ethnography or	• Interviews
(2010)	Discrimination and	phenomenology	 Observation
	marginalization		
	Employment		
	• Income		
	• Resilience/well-being/QOL		
	, 5, 1		
Berry (2012)	Therapeutics and surgeries	Cohort studies	Clinical Records
Bethea (2013)	Gender identity and	• Qualitative -	• Interviews
	expression	interviews or FGs	
	Social support,		
	relationships, and families		
Bhatta (2014)	Sexual health, HIV, and STIs	Cross-sectional	• Survey - in person
Diames (2012)	. Dialoguand physiologu	Basic Science	• Clinical
Bianca (2012)	Biology and physiology	Basic Science	
			Samples/Materials
Bith-Melander	Ethnicity, culture, race, and	• Ethnography or	• Interviews
(2010)	racialization	phenomenology	• Focus Groups
	Health and mental health	F	
	services		
Blackburn	Arts and creativity	• Qualitative -	• Interviews
(2014)	Education	interviews or FGs	
	Resistance and		
	politicization		
	Sexuality		
Blanchard	Gender identity and	Cross-sectional	Clinical interview
(2010)	expression		
	Mental health		
	Sexual health, HIV, and STIs		
Plagnish (2012)	• Condonidantity and	• Cross sostianal	• Clinical Degards
Blosnich (2013)	Gender identity and expression	Cross-sectional	Clinical Records
	expression		

	Mental health		
Blumer (2012)	Gender identity and expression Mental health	SR Desc and Qual	• Journal Articles - Review
Bockting (2013)	 Discrimination and marginalization Mental health Resilience/well-being/QOL Social support, relationships, and families 	Cross-sectional	• Survey - online
Bodoin (2014)	Gender identity and expression Health and mental health services	Cross-sectional	• Survey - online
Bogliolo (2014)	Therapeutics and surgeries	Case Report/Case Study/Case Series	Clinical Records
Bolger (2014)	Gender identity and expression Mental health	Cross-sectional	• Survey - online • Online sources
Boqun (2013)	Biology and physiology	Basic Science	• Clinical Samples/Materials
Borg (2011)	 Violence and trauma Mental health Therapeutic process	Case Report/Case Study/Case Series	Clinical Records
Boske (2011)	Discrimination and marginalization Violence and trauma Education	• Case Report/Case Study/Case Series	Clinical Records
Boza (2014)	 Discrimination and marginalization Violence and trauma Mental health Social support, relationships, and families 	• Cross-sectional	• Survey - online

Bradford (2013)	Discrimination and marginalization Health and mental health services Other	• Cross-sectional • CBR/PAR	• Survey - online • Survey - in person
Brennan (2012)	Sexual health, HIV, and STIs	• Cross-sectional • CBR/PAR	• Interviews • Survey - in person
Brewster (2012)	 Employment Gender identity and expression Research methods	• Cross-sectional	• Survey - online
Brewster (2014)	 Employment Gender identity and expression	Qualitative - interviews or FGsEthnography or phenomenology	• Survey - online
Briones (2011)	• Employment • Resilience/well-being/QOL	• Qualitative - interviews or FGs	• Interviews
Brown (2010)	 Discrimination and marginalization Gender identity and expression Health and mental health services Law and criminalization Physical health Therapeutics and surgeries 	Case Report/Case Study/Case Series	• Other
Brown (2012)	Employment	• Qualitative - interviews or FGs	• Interviews
Brown (2013)	Gender identity and expression	• Qualitative - interviews or FGs	• Interviews
Brown (2014)	 Discrimination and marginalization Health and mental health services Law and criminalization 	• Other	• Other

Browne (2010)	Discrimination and marginalization	• Cross-sectional • Qualitative -	• Focus Groups • Survey - online
	 Health and mental health services Resistance and politicization Space and place 	interviews or FGs • CBR/PAR	• Survey - in person
Brunocilla (2012)	Therapeutics and surgeries	Cross-sectional	• Clinical Samples/Materials
Bucci (2014)	Therapeutics and surgeries	Case Report/Case Study/Case Series	Clinical Records
Budge (2010)	Employment Gender identity and expression	• Qualitative - interviews or FGs	• Interviews
Budge (2013a)	Mental health Resilience/well-being/QOL	Cross-sectional	• Survey - online
Budge (2013b)	 Discrimination and marginalization Gender identity and expression Resilience/well-being/QOL Social support, relationships, and families 	• Qualitative - interviews or FGs	• Interviews
Budge (2014)	 Mental health Resilience/well-being/QOL Social support, relationships, and families 	Cross-sectional	• Survey - online
Bui (2013)	Biology and physiology Therapeutics and surgeries	Nonrandomized CT	• Clinical Samples/Materials
Burdge (2014)	Gender identity and expression Resilience/well-being/QOL	Ethnography or phenomenology	• Interviews
Burke (2014a)	Biology and physiology Early life experiences	Cross-sectional	• Clinical Samples/Materials • Clinical interview

Burke (2014b)	Biology and physiologyEarly life experiencesGender identity and expression	• Case-control	Clinical Samples/Materials
Busari (2013)	Gender identity and expression Resilience/well-being/QOL	• Nonrandomized CT	• Survey - in person
Caldarera (2011)	 Gender identity and expression Therapeutics and surgeries	Cross-sectional	Clinical Records
Camp (2011)	Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Can (2011)	Gender identity and expression Law and criminalization	Case Report/Case Study/Case Series	Archival records
Capitan (2014)	Therapeutics and surgeries	• Case Report/Case Study/Case Series	• Clinical Records • Survey - in person
Carella (2013)	• Physical health • Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Carobene (2014)	Biology and physiologySex workSexual health, HIV, and STIs	Basic Science	Clinical Samples/Materials
Carrillo (2010)	Biology and physiology	Cross-sectional	• Clinical Samples/Materials
Case (2012)	Biology and physiologyGender identity and expression	Cross-sectional	• Survey - online
Caudwell (2014)	 Education Gender identity and expression Research methods Sports/Physical activity 	• Qualitative - interviews or FGs	• Interviews

Cebula (2010)	Physical health	Case Report/Case	Clinical Records
000aia (2010)	Therapeutics and surgeries	Study/Case Series	Gilliana records
Cerezo (2014)	 Health and mental health services Intersectionalities Migrant and refugee experiences Resilience/well-being/QOL Social support, relationships, and families 	• Qualitative - interviews or FGs	• Interviews
Cerwenka (2014a)	 Mental health Sexuality Sexual health, HIV, and STIs Social support, relationships, and families 	Cross-sectional	Clinical interview
Cerwenka (2014b)	• Sexuality • Sexual health, HIV, and STIs	Cross-sectional	Clinical interview
Chan (2013)	 Physical health Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Chandra (2010)	• Biology and physiology • Therapeutics and surgeries	Cohort studies	• Clinical Samples/Materials
Chang (2011)	 Mental health Sexuality Therapeutic process	Case Report/Case Study/Case Series	Clinical Records
Chekir (2012)	Biology and physiology Therapeutics and surgeries	Cross-sectional	Clinical Samples/Materials
Chen (2011)	Sexual health, HIV, and STIs	Cross-sectional	Clinical Records
Cho (2012)	Therapeutics and surgeries	Case Report/Case Study/Case Series	Clinical Records
Church (2014)	 Gender identity and expression Parenting, reproduction, and assisted reproduction Social support, 	Cross-sectional	Clinical interview Interviews

	relationships, and families		
Cohen (2011)	 Physical health Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Cohen-Kettenis (2011)	Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Colebunders (2014)	Physical health Therapeutics and surgeries	Case Report/Case Study/Case Series	• Clinical Records
Colizzi (2013)	Biology and physiologyMental healthTherapeutics and surgeries	Cohort studies	• Clinical Samples/Materials • Clinical interview
Colizzi (2014)	Mental health Therapeutics and surgeries	Cohort studies	Clinical interview
Connell (2010)	 Employment Gender identity and expression Resistance and politicization 	• Qualitative - interviews or FGs	• Interviews
Connell (2010)	Gender identity and expression Historical perspectives	• Qualitative - interviews or FGs	• Interviews
Conron (2012)	Physical health Research methods	Cross-sectional	• Other
Costa (2014)	 Gender identity and expression Health and mental health services Therapeutics and surgeries 	Case Report/Case Study/Case Series	Clinical Records
Costantino (2013)	 Biology and physiology Resilience/well-being/QOL Sexual health, HIV, and STIs Therapeutics and surgeries 	Cohort studies	Clinical Samples/Materials Clinical interview Interviews
Cosyns (2014)	Biology and physiology Therapeutics and surgeries	Cross-sectional	• Clinical Samples/Materials

			• Survey - in person
Cotton (2014)	 Discrimination and marginalization Early life experiences Education Social support, relationships, and families 	• Case Report/Case Study/Case Series	Clinical Records
Cousino (2014)	 Early life experiences Gender identity and expression Health and mental health services Mental health 	• Cross-sectional	Clinical Records
Cregten- Escobar (2012)	Therapeutics and surgeries	Cohort studies	Clinical Records
Cruz (2014)	 Discrimination and marginalization Health and mental health services 	Cross-sectional	• Survey - online • Survey - in person
Cupisti (2010)	Biology and physiologyTherapeutics and surgeries	Cohort studies	Clinical Samples/Materials Clinical interview
d'Ythurbide	Physical health	Case Report/Case	Clinical Records
(2012)	Therapeutics and surgeries	Study/Case Series	
da Silva (2011)	Biology and physiology	Basic Science	• Clinical Samples/Materials
Daniolos (2013)	 Early life experiences Gender identity and expression Therapeutic process 	• Case Report/Case Study/Case Series	Clinical Records
Dargie (2014)	 Gender identity and expression Mental health Physical health Sexuality Social support, 	• Cross-sectional	• Survey - online

	relationships, and families		
Dasgupta (2012)	Mental health	• Case Report/Case Study/Case Series	Clinical interview
Davey (2014)	 Mental health Resilience/well-being/QOL Social support, relationships, and families 	Cross-sectional	• Survey - online • Surveys - mail
Davies (2013)	Health and mental health services	Cross-sectional	• Survey - in person • Surveys - mail
Davis (2014)	 Mental health Sexuality Therapeutics and surgeries	Cross-sectional	• Survey - online • Survey - in person • Surveys - mail
de Lind van Wijngaarden (2013)	 Discrimination and marginalization Violence and trauma Sexual health, HIV, and STIs 	• Qualitative - interviews or FGs	• Interviews
de Ronde (2011)	Biology and physiology Therapeutics and surgeries	• RCT	• Clinical Samples/Materials
De Santis (2010)	Health and mental health services Sexual health, HIV, and STIs	Case Report/Case Study/Case Series	Not Discussed
de Vries (2010)	Disability Early life experiences Gender identity and expression	Cross-sectional	Clinical Records Clinical interview
de Vries (2011a)	Gender identity and expression Mental health	Cross-sectional	Clinical interview
de Vries (2011b)	 Age and Aging Mental health Sexuality	Cross-sectional	Clinical interview
de Vries (2011c)	Gender identity and expressionMental health	Cohort studies	Clinical interview

	• Therapeutics and surgeries		
de Vries (2012)	 Ethnicity, culture, race, and racialization Gender identity and expression Income Intersectionalities Sexuality 	Ethnography or phenomenology	• Interviews • Observation
de Vries (2014)	Mental healthResilience/well-being/QOLTherapeutics and surgeries	Cohort studies	Clinical interview
Deipolyi (2010)	 Physical health Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Deliktas (2014)	Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Dempf (2010)	Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Dessy (2014)	• Biology and physiology • Therapeutics and surgeries	• Nonrandomized CT	Clinical Records
Devereaux (2010)	Discrimination and marginalizationHistorical perspectives	Historical	Archival records
Dhand (2010)	 Health and mental health services Physical health Therapeutics and surgeries 	• Case Report/Case Study/Case Series	• Clinical Records • Interviews • Observation
Dhejne (2011)	 Law and criminalization Mental health Physical health Therapeutics and surgeries	Cohort studies	Clinical Records
Dhejne (2014)	 Gender identity and expression Health and mental health services Law and criminalization 	Cross-sectional	Clinical Records

	• Therapeutics and surgeries		
Dhillon (2011)	 Ethics Mental health Therapeutics and surgeries	Case Report/Case Study/Case Series	Clinical Records
Di Ceglie (2014)	DisabilityGender identity and expression	Cross-sectional	Clinical interview
Dickerson (2013)	 Violence and trauma Mental health Substance use (alcohol and drug use) 	Case Report/Case Study/Case Series	Clinical Records
Dickey (2012)	Gender identity and expressionSexuality	• Qualitative - interviews or FGs	• Interviews • Survey - demographic only
Dietert (2013)	 Early life experiences Education Resistance and politicization Social support, relationships, and families 	• Qualitative - interviews or FGs	• Interviews
Dispenza (2012)	Discrimination and marginalizationEmployment	• Qualitative - interviews or FGs	• Interviews
Djordjevic (2013)	Therapeutics and surgeries	Case Report/Case Study/Case Series	Clinical Records
Doan (2010)	 Discrimination and marginalization Gender identity and expression Resistance and politicization Space and place 	Autoethnography	• Not Discussed
Doorduin (2014)	Gender identity and expressionSexuality	• Qualitative - interviews or FGs	• Interviews

dos Ramos	• Piology and physiology	Cross-sectional	• Clinical
Farias (2011)	Biology and physiologySex work	• Cross-sectional	Samples/Materials
ranas (2011)			- '
	Sexual health, HIV, and STIs		• Survey - in person
Dowshen	Religion and spirituality	Cross-sectional	Clinical interview
(2011)	• Resilience/well-being/QOL		
(===)	• Sexual health, HIV, and STIs		
du Preez (2012)	Gender identity and	Historical	Archival records
	expression		
	Historical perspectives		
Dubois (2012)	Biology and physiology	• Cross-sectional	Clinical
	Discrimination and		Samples/Materials
	marginalization		Clinical interview
	Gender identity and		Interviews
	expression		
	Therapeutics and surgeries		
D (2012)	D: : : : 1	C	C 1:
Dugan (2012)	Discrimination and	Cross-sectional	• Survey - online
	marginalization		
	• Education		
	• Social support,		
	relationships, and families		
Duisin (2014)	Mental health	• Cross-sectional	Clinical interview
Dziengel (2014)	Gender identity and	 Autoethnography 	• Not Discussed
	expression		
	Health and mental health		
	services		
	Intersectionalities		
	Physical health		
	Resistance and		
	politicization		
	Sexuality		
	Therapeutics and surgeries		
Foldund (2012)	Discrimination and	• Casa Danant /Casa	• Clinical Records
Ecklund (2012)	marginalization	• Case Report/Case Study/Case Series	• Gillical Recolus
		Judy/ Gase Series	
	Early life experiencesEthnicity, culture, race, and		
	racialization		
	Intersectionalities		
	Mental health		
	• MEHITAL HEALTH		

	Social support, relationships, and familiesTherapeutic process		
Edelman (2011)	Discrimination and marginalization Violence and trauma Ethnicity, culture, race, and racialization Sex work Law and criminalization Resistance and politicization Space and place	• Qualitative - interviews or FGs	• Interviews
Edelman (2014)	 Discrimination and marginalization Gender identity and expression Other Sexuality Sexual health, HIV, and STIs Space and place 	Ethnography or phenomenology	• Interviews • Online sources
Edwards- Leeper (2012)	 Gender identity and expression Health and mental health services 	Case Report/Case Study/Case Series	Clinical Records
Effrig (2011)	 Discrimination and marginalization Violence and trauma Education Mental health 	Cross-sectional	Clinical interview
Ehrensaft (2010)	 Early life experiences Gender identity and expression Social support, relationships, and families Therapeutic process 	• Case Report/Case Study/Case Series	Clinical Records
Ehrensaft (2013)	Early life experiencesEducationGender identity and	• Case Report/Case Study/Case Series	Clinical Records

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	expression • Mental health • Resilience/well-being/QOL • Social support, relationships, and families • Therapeutics and surgeries • Therapeutic process		
Ehsanzadeh	Mental health	• Case Report/Case	 Clinical Records
(2014)	Therapeutics and surgeries	Study/Case Series	
Eisner (2012)	 Violence and trauma Ethnicity, culture, race, and racialization Resistance and politicization Sexuality 	Autoethnography	Observation
El Muayed	Physical health	Case Report/Case	Clinical Records
(2010)	Therapeutics and surgeries	Study/Case Series	
Elamin (2010)	Physical healthTherapeutics and surgeries	SR Desc and Qual	• Journal Articles - Review
Elaut (2010)	Biology and physiologySexualityTherapeutics and surgeries	Cross-sectional	• Clinical Samples/Materials • Survey - in person
Ellis (2014)	 Discrimination and marginalization Gender identity and expression Space and place 	Cross-sectional	• Survey - online
Erich (2010a)	 Discrimination and marginalization Ethnicity, culture, race, and racialization Resilience/well-being/QOL Social support, relationships, and families 	Cross-sectional	• Surveys - mail
Erich (2010b)	Discrimination and marginalizationEthnicity, culture, race, and	Cross-sectional	• Surveys - mail

	. 1		
	racialization • Intersectionalities • Resilience/well-being/QOL		
Ertemi (2011)	Biology and physiology	Basic Science	Clinical Samples/Materials
Esteva de Antonio (2013)	 Health and mental health services Therapeutics and surgeries	• Case Report/Case Study/Case Series	Not Discussed
Ettner (2012)	 Discrimination and marginalization Gender identity and expression Physical health 	• Cross-sectional	Clinical Records
Ewan (2014)	Gender identity and expressionMental healthPhysical health	• Case Report/Case Study/Case Series	Clinical Records
Fabbre (2014)	 Age and Aging Employment Gender identity and expression Social support, relationships, and families 	• Qualitative - interviews or FGs	• Interviews • Observation
Fabbri (2014)	Biology and physiologyParenting, reproduction,and assisted reproduction	Basic Science	Clinical Samples/Materials
Faccini (2010a)	DisabilityViolence and traumaMental healthTherapeutic process	• Case Report/Case Study/Case Series	Clinical Records
Faccini (2010b)	 Disability Violence and trauma Law and criminalization Mental health Sexual health, HIV, and STIs Therapeutic process 	• Case Report/Case Study/Case Series	Clinical Records

Faccini (2012)	 Disability Violence and trauma Mental health Sexual health, HIV, and STIs Therapeutic process 	• Case Report/Case Study/Case Series	Clinical Records
Faccio (2013)	 Gender identity and expression Parenting, reproduction, and assisted reproduction Social support, relationships, and families 	• Qualitative - interviews or FGs	• Interviews
Fallon (2012)	Therapeutic process	Case Report/Case Study/Case Series	Clinical Records
Feldman (2014a)	Sexual health, HIV, and STIs	• Cross-sectional	• Interviews • Survey - online
Feldman (2014b)	 Gender identity and expression Mental health Therapeutics and surgeries 	• Case Report/Case Study/Case Series	Clinical Records
Fernandes (2014)	Physical health Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Fernández (2014a)	Biology and physiology	Basic Science	Clinical Samples/Materials
Fernández (2014b)	Biology and physiology Gender identity and expression	Basic Science	• Clinical Samples/Materials
Ferron (2010)	 Age and Aging Health and mental health services Sexual health, HIV, and STIs 	• Case Report/Case Study/Case Series	Clinical Records
Fink (2014)	 Arts and creativity Intersectionalities Other Resistance and politicization Sexuality 	Autoethnography	Online sources

	Social support,relationships, and familiesSpace and place		
Finkenauer (2012)	Age and Aging Discrimination and marginalization	SR Desc and Qual	• Journal Articles - Review
Firth (2014)	 Violence and trauma Early life experiences Gender identity and expression Mental health 	• SR Desc and Qual • Other	Clinical Records Journal Articles - Review
Fischer (2011)	 Physical health Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Fisher (2010)	Gender identity and expression Mental health	Cross-sectional	Clinical interview
Fisher (2013)	Gender identity and expression	Cross-sectional	Clinical interview
Fisher (2014)	 Mental health Therapeutics and surgeries	Cross-sectional	Clinical interview
Fletcher (2014)	• Housing • Sexual health, HIV, and STIs	Cross-sectional	Clinical interview
Flor-Henry (2010)	Biology and physiology	• Cross-sectional	• Clinical Samples/Materials
Fontanari (2013)	Biology and physiology Violence and trauma	Cross-sectional	Clinical Samples/Materials
Francis (2014)	 Discrimination and marginalization Education Gender identity and expression Resistance and politicization Space and place 	• Qualitative - interviews or FGs	• Interviews

Furuhashi (2011)	Early life experiencesGender identity and expressionMental health	• Case Report/Case Study/Case Series	Clinical interview
Gabrielli (2010)	• Sexual health, HIV, and STIs • Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Galupo (2014a)	Social support, relationships, and families	Cross-sectional	• Survey - online
Galupo (2014b)	 Discrimination and marginalization Sexuality Social support, relationships, and families 	• Cross-sectional	• Survey - online
Galupo (2014c)	 Gender identity and expression Other Social support, relationships, and families 	• Cross-sectional	• Survey - online
Ganor (2013)	Biology and physiology Sexual health, HIV, and STIs	Basic Science	• Clinical Samples/Materials
Garaffa (2010a)	Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Garaffa (2010b)	Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Garcia (2011)	Employment Sex work Income Space and place	Ethnography or phenomenology	• Observation
Garcia (2014)	Sexual health, HIV, and STIs Therapeutics and surgeries	Cohort studies	• Clinical Records • Clinical Samples/Materials • Interviews
García- Malpartida (2010)	Physical health Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records

Garofalo (2012)	Sexual health, HIV, and STIs	Cohort studies	Clinical interview
Gelfer (2013a)	Therapeutics and surgeries	Cohort studies	• Clinical Samples/Materials
Gelfer (2013b)	Therapeutics and surgeries	Cohort studies	• Clinical Samples/Materials
Gervasoni (2011)	 Physical health Sexual health, HIV, and STIs Therapeutics and surgeries	Case Report/Case Study/Case Series	Clinical Records
Giami (2011)	Sexual health, HIV, and STIs	SR Desc and Qual	• Journal Articles - Review
Giami (2014)	 Gender identity and expression Therapeutics and surgeries	Cross-sectional	• Surveys - mail
Godoy (2010)	Physical health	• Case Report/Case Study/Case Series	• Clinical Records
Goldblum (2012)	 Discrimination and marginalization Violence and trauma Education Mental health 	• Cross-sectional	• Survey - online • Survey - in person
Golub (2010)	 Discrimination and marginalization Religion and spirituality Resilience/well-being/QOL Sexual health, HIV, and STIs Social support, relationships, and families 	• Cross-sectional	Clinical interview
Gómez-Gil (2010)	Biology and physiology	Case Report/Case Study/Case Series	Clinical interview
Gomez-Gil (2011)	Biology and physiology	Cross-sectional	Clinical Records
Gomez-Gil (2012a)	Mental health Research methods	Cross-sectional	Clinical interview
	1	1	l .

Gómez-Gil	Mental health	Cross-sectional	Clinical Records
(2012b)	Therapeutics and surgeries		Clinical interview
Gómez-Gil (2013)	• Other	Cross-sectional	• Clinical Records • Clinical interview
Gómez-Gil (2014)	• Resilience/well-being/QOL	Cross-sectional	Clinical interview
Gonzalez (2012)	• Mental health • Resilience/well-being/QOL	Cross-sectional	• Survey - online
Goodrich (2012)	EducationSocial support,relationships, and familiesSpace and place	• Qualitative - interviews or FGs	• Interviews
Gooren (2013a)	 Physical health Resilience/well-being/QOL Social support, relationships, and families Therapeutics and surgeries 	Cross-sectional	Clinical interview
Gooren (2013b)	Physical health Therapeutics and surgeries	Cohort studies	Clinical Records
Gooren (2014)	Physical health	• Cohort studies	Clinical Records
Gorin-Lazard (2012)	• Resilience/well-being/QOL • Therapeutics and surgeries	Cross-sectional	Clinical interview
Gorin-Lazard (2013)	 Mental health Resilience/well-being/QOL Therapeutics and surgeries	Cross-sectional	Clinical interview
Govier (2010)	Biology and physiology	Cross-sectional	Clinical Samples/Materials Clinical interview
Gower (2010)	 Discrimination and marginalization Employment Gender identity and expression 	• Case Report/Case Study/Case Series	Not Discussed

Goyal (2014)	 Gender identity and expression Substance use (alcohol and drug use) 	• Case Report/Case Study/Case Series	• Clinical Records
Graham (2014a)	Discrimination and marginalization Violence and trauma Education Ethnicity, culture, race, and racialization Law and criminalization Intersectionalities Religion and spirituality Resilience/well-being/QOL Space and place	• Qualitative - interviews or FGs	• Interviews
Graham (2014b)	 Ethnicity, culture, race, and racialization Gender identity and expression Social support, relationships, and families 	• Qualitative - interviews or FGs • CBR/PAR	• Interviews
Grant (2010)	Physical health Therapeutics and surgeries	Case Report/Case Study/Case Series	Clinical Records
Grossman (2011)	 Discrimination and marginalization Mental health Resilience/well-being/QOL Social support, relationships, and families 	• Cross-sectional	Clinical interview Interviews
Grynberg (2010)	Biology and physiology Therapeutics and surgeries	Basic Science	Clinical Records
Guadamuz (2011)	• Ethnicity, culture, race, and racialization • Sexual health, HIV, and STIs	Cross-sectional	• Clinical Samples/Materials • Survey - in person
Gupta (2012)	Mental health Substance use (alcohol and drug use)	• Case Report/Case Study/Case Series	Clinical Records

Guzman-Parra (2014)	 Discrimination and marginalization Mental health Substance use (alcohol and drug use) 	Cross-sectional	Clinical interview
Hagen (2014)	 Discrimination and marginalization Health and mental health services 	• Qualitative - interviews or FGs	• Interviews
Hahn (2014)	Biology and physiology	Cross-sectional	Clinical Samples/Materials
Haines (2014)	 Gender identity and expression Intersectionalities Parenting, reproduction, and assisted reproduction 	Cross-sectional	• Survey - online
Hakeem (2012)	 Gender identity and expression Health and mental health services Mental health Therapeutic process 	Case Report/Case Study/Case Series	Not Discussed
Hamdan (2012)	Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Hancock (2012)	Therapeutics and surgeries	• Case Report/Case Study/Case Series	• Clinical Samples/Materials • Clinical interview
Hancock (2013)	 Health and mental health services Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Hansen-Reid (2011)	 Ethnicity, culture, race, and racialization Law and criminalization Therapeutic process 	Case Report/Case Study/Case Series	Not Discussed

Physical health	Case Report/Case	Clinical Records
Sexual health, HIV, and STIsTherapeutics and surgeries	Study/Case Series	
Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Biology and physiology Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Gender identity and expression	Cross-sectional	Clinical interview
• Sex work • Sexual health, HIV, and STIs	• Case Report/Case Study/Case Series	Clinical Samples/Materials
Therapeutics and surgeries	Cross-sectional	• Surveys - mail
 Early life experiences Health and mental health services Therapeutics and surgeries 	Cohort studies	Clinical Records
Mental health	Cross-sectional	• Clinical interview • Survey - in person
Mental health Therapeutics and surgeries	Cohort studies	Surveys - mail
• Sex work • Sexual health, HIV, and STIs	• Case Report/Case Study/Case Series	Clinical Records
Biology and physiology Therapeutics and surgeries	Cross-sectional	Clinical Samples/Materials
Biology and physiology	• Cross-sectional	• Clinical Samples/Materials • Clinical interview
Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
	 Sexual health, HIV, and STIs Therapeutics and surgeries Biology and physiology Therapeutics and surgeries Gender identity and expression Sex work Sex work Sexual health, HIV, and STIs Therapeutics and surgeries Early life experiences Health and mental health services Therapeutics and surgeries Mental health Mental health Therapeutics and surgeries Sex work Sex work Sexual health, HIV, and STIs Biology and physiology Therapeutics and surgeries Biology and physiology Therapeutics and surgeries Biology and physiology Therapeutics and surgeries 	 Sexual health, HIV, and STIs Therapeutics and surgeries Case Report/Case Study/Case Series Biology and physiology Therapeutics and surgeries Gender identity and expression Sex work Sexual health, HIV, and STIs Therapeutics and surgeries Case Report/Case Study/Case Series Cross-sectional Early life experiences Health and mental health services Therapeutics and surgeries Mental health Cross-sectional Mental health Therapeutics and surgeries Sex work Sex work Sexual health, HIV, and STIs Biology and physiology Therapeutics and surgeries Biology and physiology Therapeutics and surgeries Case Report/Case Study/Case Series Biology and physiology Therapeutics and surgeries Case Report/Case Study/Case Series Therapeutics and surgeries Case Report/Case Study/Case Series Therapeutics and surgeries Case Report/Case Study/Case Series Case Report/Case Study/Case Series

Hoffman (2014)	Mental health	SR Desc and Qual	• Journal Articles - Review
Holmberg (2010)	Biology and physiology	• Cross-sectional	• Clinical Samples/Materials • Survey - in person
Hongal (2014)	Physical health	Cross-sectional	• Interviews
Horvath (2014)	 Mental health Sexual health, HIV, and STIs Space and place Substance use (alcohol and drug use) 	Cross-sectional	• Survey - online
Hoshiai (2010)	Gender identity and expressionMental health	Cross-sectional	Clinical Records Clinical interview
Hotton (2013)	 Discrimination and marginalization Resilience/well-being/QOL Sexual health, HIV, and STIs Substance use (alcohol and drug use) 	• Cross-sectional	• Survey - in person
Humphries- Waa (2014)	 Ethnicity, culture, race, and racialization Health and mental health services Physical health Therapeutics and surgeries 	• SR Desc and Qual	• Journal Articles - Review
Hunt (2014)	Health and mental health services	• Cross-sectional	• Interviews • Survey - online
Hwahng (2014)	 Violence and trauma Ethnicity, culture, race, and racialization Income Intersectionalities Sexual health, HIV, and STIs 	Cohort studies Ethnography or phenomenology	Clinical interview Interviews

Iantaffi (2011)	 Gender identity and expression Sexuality Sexual health, HIV, and STIs Social support, relationships, and families 	• Cross-sectional	• Interviews • Survey - online
Ikeda (2013)	Biology and physiology Therapeutics and surgeries	• Case-control	• Clinical Samples/Materials • Clinical interview
Inoubli (2011)	Biology and physiology	Basic Science	Clinical Records
Ishikawa (2014)	Biology and physiologyParenting, reproduction, and assisted reproduction	Basic Science	Clinical Samples/Materials
Jackowich (2014)	Age and AgingGender identity and expression	Case Report/Case Study/Case Series	Clinical Records
James (2011)	 Discrimination and marginalization Ethnicity, culture, race, and racialization Health and mental health services Space and place Therapeutic process 	• Case Report/Case Study/Case Series	Clinical Records
Janssen (2013)	 Gender identity and expression Mental health Social support, relationships, and families Therapeutic process 	Case Report/Case Study/Case Series	Clinical Records
Jauk (2013)	Discrimination and marginalization Violence and trauma Resilience/well-being/QOL Resistance and politicization	Ethnography or phenomenology	InterviewsObservationOther

Jefferson (2013)	Discrimination and marginalization Ethnicity, culture, race, and racialization Intersectionalities Mental health Resilience/well-being/QOL	• Cross-sectional	Clinical interview
Jenness (2014)	Gender identity and expression Law and criminalization	• Qualitative - interviews or FGs	Clinical Records Interviews
Johansson (2010)	 Gender identity and expression Therapeutics and surgeries	Cohort studies	Clinical interview
Johnson (2014)	 Education Gender identity and expression Research methods Sexuality 	• Qualitative - interviews or FGs • CBR/PAR	• Focus Groups • Other
Jokic-Begic (2014)	 Mental health Resilience/well-being/QOL Therapeutics and surgeries	Cross-sectional	• Survey - online
Judge (2014)	 Gender identity and expression Health and mental health services Therapeutics and surgeries 	Cross-sectional	Clinical Records
Junger (2014)	Biology and physiology	Cross-sectional	• Clinical Samples/Materials
Kalra (2013)	 Ethnicity, culture, race, and racialization Gender identity and expression Mental health Resilience/well-being/QOL Sexual health, HIV, and STIs 	Cross-sectional	Clinical interview

Kannan (2010)	 Discrimination and marginalization Health and mental health services Physical health Therapeutics and surgeries 	Case Report/Case Study/Case Series	Clinical Records
Kannangara (2012)	Biology and physiology Physical health	• Case Report/Case Study/Case Series	Clinical Records
Karpel (2013)	Mental health Therapeutics and surgeries	Case Report/Case Study/Case Series	Clinical Records
Kaufmann (2010a)	Gender identity and expression Research methods	• Qualitative - interviews or FGs	• Interviews
Kaufmann (2010b)	Discrimination and marginalization Ethics Gender identity and expression Historical perspectives Research methods Resistance and politicization	• Qualitative - interviews or FGs	• Interviews
Kaufmann, J. (2014)	Gender identity and expression Research methods	• Qualitative - interviews or FGs • Other	• Interviews
Kaufmann, U. (2014)	• Biology and physiology • Therapeutics and surgeries	• RCT	• Clinical Samples/Materials
Kauth (2014)	 Gender identity and expression Health and mental health services 	Cross-sectional	Clinical Records
Kedia (2013)	Biology and physiology	Basic Science	Clinical Samples/Materials
Kern (2014)	Early life experiencesHealth and mental health services	Case Report/Case Study/Case Series	Clinical Records

	Social support,relationships, and familiesTherapeutic process		
Khan (2010)	 Physical health Therapeutics and surgeries	Case Report/Case Study/Case Series	Clinical Records
Khatchadourian (2014)	 Gender identity and expression Health and mental health services Parenting, reproduction, and assisted reproduction Therapeutics and surgeries 	Cohort studies	Clinical Records
Khazal (2014)	DisabilityEthicsPhysical healthTherapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Khoosal (2011)	Social support,relationships, and familiesTherapeutics and surgeries	Cross-sectional	• Clinical Records • Surveys - mail
Kim (2010)	Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Kim (2012)	Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
King (2012)	Gender identity and expressionMental healthTherapeutic process	• Case Report/Case Study/Case Series	Clinical Records
Király (2013)	Biology and physiology	Basic Science	Clinical Samples/Materials
Kise (2011)	 Gender identity and expression Mental health Therapeutic process 	• Case Report/Case Study/Case Series	Clinical Records

Knight (2013)	 Physical health Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Kosenko (2010)	 Discrimination and marginalization Other Sexual health, HIV, and STIs 	• Qualitative - interviews or FGs	• Interviews
Kosenko (2011a)	Sexual health, HIV, and STIs	• Qualitative - interviews or FGs	• Interviews
Kosenko (2011b)	Sexual health, HIV, and STIs	• Qualitative - interviews or FGs	• Interviews
Kosenko (2013)	Discrimination and marginalization Health and mental health services	• Cross-sectional	• Survey - online • Surveys - mail
Kozee (2012)	Gender identity and expressionResearch methods	Cross-sectional	• Survey - online
Kranz (2014a)	Biology and physiology	Cross-sectional	Clinical Samples/Materials
Kranz (2014b)	Biology and physiology	Cross-sectional	Clinical Samples/Materials
Krell (2013)	 Arts and creativity Ethnicity, culture, race, and racialization Intersectionalities Resistance and politicization Therapeutics and surgeries 	Ethnography or phenomenology	InterviewsObservationOnline sources
Kreukels (2011)	Therapeutics and surgeries	• SR Desc and Qual	• Journal Articles - Review
Kreukels (2012)	 Gender identity and expression Health and mental health services 	• Cross-sectional	Clinical interview

Krishnan (2012)	Physical health	• Case Report/Case Study/Case Series	• Clinical Records
Krum (2013)	Education Housing Space and place	Cross-sectional	• Survey - online
Ku (2013)	Biology and physiology Discrimination and marginalization	Nonrandomized CT	• Clinical Records • Clinical Samples/Materials • Clinical interview
Kuhn (2011)	Biology and physiologyPhysical healthTherapeutics and surgeries	Cross-sectional	• Clinical Samples/Materials • Clinical interview
Kumar (2012)	 Ethnicity, culture, race, and racialization Gender identity and expression Mental health Resilience/well-being/QOL 	Case Report/Case Study/Case Series	Clinical Records
Künzel (2011)	Biology and physiology Therapeutics and surgeries	Cohort studies	• Clinical Samples/Materials
Kuper (2012)	Gender identity and expressionSexuality	Cross-sectional	• Survey - online
Kuper (2014)	Ethnicity, culture, race, and racialization Gender identity and expression Intersectionalities Resilience/well-being/QOL Sexuality	• Qualitative - interviews or FGs	• Interviews
Kurahashi (2013)	Biology and physiology Therapeutics and surgeries	Nonrandomized CT	• Clinical Records • Clinical Samples/Materials
Kyoya (2014)	Biology and physiology Parenting, reproduction,	Basic Science	Clinical Samples/Materials

	and assisted reproduction		
Laidlaw (2013)	 Ethics Physical health Therapeutics and surgeries	Case Report/Case Study/Case Series	Clinical Records Interviews
Lauerma (2010)	Violence and trauma Law and criminalization	• Case Report/Case Study/Case Series	Clinical Records
Law (2011)	Employment Gender identity and expression	Cross-sectional	• Survey - online • Survey - in person
Lawrence (2010)	 Ethnicity, culture, race, and racialization Gender identity and expression Sexuality 	• SR Desc and Qual	• Journal Articles - Review
Lee (2012)	Physical health Therapeutics and surgeries	Case Report/Case Study/Case Series	Clinical Records
Leibowitz (2011)	Early life experiences Health and mental health services	Case Report/Case Study/Case Series	Clinical Records
Leinung (2013)	Health and mental health services Therapeutics and surgeries	Cross-sectional	Clinical Records
Lemaire (2014)	Disability Gender identity and expression	Case Report/Case Study/Case Series	Clinical Records
Lemma (2012)	Arts and creativity Gender identity and expression	• Qualitative - interviews or FGs	• Interviews
Lemma (2013)	Gender identity and expression Therapeutic process	Case Report/Case Study/Case Series	Clinical Records
Levitt (2014a)	Discrimination and marginalization Gender identity and	• Qualitative - interviews or FGs	• Interviews

	expression		
Levitt (2014b)	Early life experiencesGender identity and expressionSexuality	• Qualitative - interviews or FGs	• Interviews
Levy (2013)	Gender identity and expressionReligion and spirituality	• Qualitative - interviews or FGs	• Interviews
Lewis (2011)	 Discrimination and marginalization Gender identity and expression Resistance and politicization Space and place 	• Qualitative - interviews or FGs	• Interviews
Leyngold (2014)	Physical health	• Case Report/Case Study/Case Series	Clinical Records
Liedtke (2012)	 Physical health Sexual health, HIV, and STIs	• Case Report/Case Study/Case Series	Clinical Records
Light (2014)	Parenting, reproduction, and assisted reproduction	Cross-sectional	• Survey - online
Lin (2013)	 Physical health Therapeutics and surgeries	Case Report/Case Study/Case Series	Clinical Records
Lin (2014)	Biology and physiologyGender identity and expression	Nonrandomized CT	• Clinical Samples/Materials • Clinical interview
Lombardo (2013)	Biology and physiologyTherapeutics and surgeries	Basic Science	• Clinical Samples/Materials
Longfield (2011)	Ethnicity, culture, race, and racializationSexual health, HIV, and STIs	Cross-sectional	• Survey - in person
Lopez (2011)	Physical health	Case Report/Case Study/Case Series	Clinical Records

Luders (2012)	Biology and physiology	• Cross-sectional	• Clinical Samples/Materials
Luecke (2011)	Early life experiences Education	• Case Report/Case Study/Case Series	• Interviews • Archival records
Macdonald (2013)	 Ethics Gender identity and expression Intersectionalities Research methods Resistance and politicization 	Autoethnography	Not Discussed
Macdonnell (2012)	 Employment Gender identity and expression Health and mental health services Physical health Resilience/well-being/QOL 	• Qualitative - interviews or FGs	• Interviews
Maglione (2014)	 Physical health Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Maguen (2010)	Mental health	Cross-sectional	• Survey - in person
Mahalingam (2014)	Law and criminalization Therapeutics and surgeries	• Other	• Other
Males (2010)	 Physical health Sexual health, HIV, and STIs Therapeutics and surgeries	Case Report/Case Study/Case Series	Clinical Records
Mandlis (2011)	Discrimination and marginalization Law and criminalization	• Ethnography or phenomenology	Observation Archival records
Manieri (2014)	 Biology and physiology Health and mental health services Resilience/well-being/QOL Therapeutics and surgeries 	• Cohort studies	Clinical Samples/Materials Clinical interview

Mann (2011)	 Arts and creativity Ethnicity, culture, race, and racialization Gender identity and expression 	• Other	• Observation
Marciano (2014)	 Gender identity and expression Other Resilience/well-being/QOL Social support, relationships, and families 	Ethnography or phenomenology	Online sources
Marcus (2013)	Gender identity and expressionTherapeutic process	• Case Report/Case Study/Case Series	Clinical Records
Maree (2014)	 Discrimination and marginalization Employment Health and mental health services Therapeutic process 	• Qualitative - interviews or FGs	• Interviews
Martin (2011)	Physical health	Case Report/Case Study/Case Series	Clinical Records
Martins (2013)	Sexual health, HIV, and STIs	Cross-sectional	Clinical interview
Mastronikolis (2013)	Biology and physiologyTherapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Masumori (2014)	 Physical health Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Mathew (2013)	 Health and mental health services Physical health Therapeutics and surgeries 	• Case Report/Case Study/Case Series	Clinical Records
Maycock (2014)	OtherPhysical healthTherapeutics and surgeries	• SR Desc and Qual	• Journal Articles - Review

Mazumder	Violence and trauma	Case Report/Case	Clinical Records
(2013)	Law and criminalization	Study/Case Series	
McDuffie	Gender identity and	Cross-sectional	Clinical Records
(2010)	expression		
	Health and mental health		
	services		
McMullin	Arts and creativity	Autoethnography	Not Discussed
(2011)	• Ethnicity, culture, race, and		
	racialization		
	Gender identity and		
	expression		
	Migrant and refugee		
	experiences		
Meier (2011)	Mental health	• Cross-sectional	• Survey - online
	• Resilience/well-being/QOL		
	Social support,		
	relationships, and families		
	Therapeutics and surgeries		
Meier (2013a)	Gender identity and	Cross-sectional	Survey - online
	expression		
	• Sexuality		
Meier (2013b)	Mental health	Cross-sectional	• Survey - online
Melei (2013b)	• Social support,	• Cross-sectional	Survey - Offiffie
	relationships, and families		
	relationships, and families		
Mendonca	Physical health	Case Report/Case	Clinical Records
(2012)	Therapeutics and surgeries	Study/Case Series	Gillion Troop as
(===)			
Mepham (2014)	Health and mental health	Cross-sectional	Surveys - mail
	services		
	Therapeutics and surgeries		
Merryfeather	Discrimination and	• SR Desc and Qual	Clinical Records
(2014)	marginalization	• Other	• Other
	Health and mental health		• Journal Articles -
	services		Review
Meybodi	Mental health	Cross-sectional	Clinical interview
(2014a)			

Meybodi (2014b)	Mental health	• Cross-sectional	Clinical interview
Mihm (2010)	Physical health Sexual health, HIV, and STIs	• Case Report/Case Study/Case Series	Clinical Records
Miller (2012)	Discrimination and marginalization Ethnicity, culture, race, and racialization Sex work Gender identity and expression Intersectionalities Sexuality Sexual health, HIV, and STIs Space and place	• Qualitative - interviews or FGs	• Interviews • Focus Groups
Miner (2012)	• Other • Research methods	• Cross-sectional	• Survey - online
Mishra (2012)	EthicsParenting, reproduction, and assisted reproductionSexual health, HIV, and STIs	Case Report/Case Study/Case Series	Clinical Records
Miyajima (2012)	Biology and physiologyPhysical healthTherapeutics and surgeries	Cohort studies	• Clinical Samples/Materials
Miyajima (2014)	Mental health	Cross-sectional	Clinical interview
Mizock (2011)	Mental health	• Case Report/Case Study/Case Series	Clinical Records
Mizock (2014)	 Discrimination and marginalization Employment Mental health Resilience/well-being/QOL 	• Qualitative - interviews or FGs	• Interviews • Survey - in person
Mokonogho (2010)	Housing Mental health	• Case Report/Case Study/Case Series	Clinical Records

Monsour (2014)	 Gender identity and expression Social support, relationships, and families 	• Qualitative - interviews or FGs	• Interviews
Monstrey (2011)	Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Moody (2013)	 Indigeneity Mental health Resilience/well-being/QOL Social support, relationships, and families 	• Cross-sectional	• Survey - online • Surveys - mail
Moreman (2010)	 Arts and creativity Ethnicity, culture, race, and racialization Gender identity and expression Intersectionalities Sexuality Space and place 	Ethnography or phenomenology	• Observation
Morgan (2012)	Gender identity and expression	• Qualitative - interviews or FGs	• Interviews
Motmans (2012)	Physical health Resilience/well-being/QOL	Cross-sectional	• Survey - online • Surveys - mail
Motmans (2014)	Gender identity and expression	Cross-sectional	• Clinical Records • Surveys - mail
Muccino (2014)	Violence and trauma Law and criminalization	• Case Report/Case Study/Case Series	Clinical Records
Mueller (2010)	• Biology and physiology • Therapeutics and surgeries	Cohort studies	• Clinical Samples/Materials
Mueller (2011)	Biology and physiology Therapeutics and surgeries	• Cohort studies	• Clinical Samples/Materials
Muhr (2013)	Employment Gender identity and expression	• Qualitative - interviews or FGs	• Interviews

Mullen (2013)	Discrimination and marginalization Gender identity and expression Resilience/well-being/QOL Social support, relationships, and families	• Qualitative - interviews or FGs	• Interviews
Murad (2010)	 Mental health Resilience/well-being/QOL Sexual health, HIV, and STIs Therapeutics and surgeries 	• SR Desc and Qual	• Journal Articles - Review
Murray (2013)	 Gender identity and expression Mental health Physical health Therapeutic process 	Case Report/Case Study/Case Series	Clinical Records
Murty (2010)	 Physical health Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Nadal (2012)	Discrimination and marginalizationGender identity and expression	• Qualitative - interviews or FGs	• Focus Groups
Nadal (2014)	Discrimination and marginalization Resilience/well-being/QOL	• Qualitative - interviews or FGs	• Focus Groups
Nagoshi (2012)	 Gender identity and expression Intersectionalities Sexuality	• Qualitative - interviews or FGs	• Interviews
Nakamura (2013)	Biology and physiology Therapeutics and surgeries	Cohort studies	Clinical Samples/Materials Clinical interview
Nash (2011)	 Gender identity and expression Resistance and politicization Sexuality 	• Qualitative - interviews or FGs	• Interviews

	Space and place		
Nawata (2010)	Biology and physiologyGender identity and expression	• Cross-sectional	Clinical Samples/Materials
Nemoto (2011)	 Discrimination and marginalization Violence and trauma Ethnicity, culture, race, and racialization Sex work Mental health Social support, relationships, and families 	Cross-sectional	Clinical interview
Nemoto (2012)	 Employment Sex work Sexual health, HIV, and STIs	• Cross-sectional	• Survey - in person
Nemoto (2014)	Sexual health, HIV, and STIs	Cross-sectional	Clinical interview
Neto (2012)	Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Nichols (2010)	 Violence and trauma Sex work Law and criminalization Intersectionalities Sexuality 	• Qualitative - interviews or FGs	• Interviews • Focus Groups
Nichols (2013)	 Arts and creativity Discrimination and marginalization Education Research methods 	• Qualitative - interviews or FGs	• Interviews
Nieder (2011)	 Age and Aging Gender identity and expression Health and mental health services Sexuality 	• Cross-sectional	Clinical interview

Nikolic (2012)	 Physical health Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
	- Therapeuties and surgeries	Study/ dase series	
Nistal (2013)	Biology and physiology	Basic Science	Clinical Records Clinical Samples/Materials
Nordmarken (2014)	 Gender identity and expression Resistance and politicization Therapeutics and surgeries 	Autoethnography	• Not Discussed
Nuru (2014)	 Gender identity and expression Intersectionalities Other Social support, relationships, and families 	• Other	• Online sources
Nuttbrock (2010)	 Age and Aging Violence and trauma Mental health	• Cross-sectional • CBR/PAR	• Interviews
Nuttbrock (2011)	Gender identity and expressionSexuality	Cross-sectional	• Interviews
Nuttbrock (2012)	 Gender identity and expression Mental health Research methods Social support, relationships, and families 	• Cross-sectional • CBR/PAR	• Interviews
Nuttbrock (2013)	Violence and trauma Mental health Sexual health, HIV, and STIs	• Cohort studies • CBR/PAR	• Clinical Samples/Materials • Interviews
Nuttbrock (2014a)	Violence and trauma Mental health	Cohort studies	• Interviews
Nuttbrock (2014b)	Discrimination and marginalization Violence and trauma	Cohort studies	• Interviews

	- Montal hlel-		
	Mental health Substance use (alcohol and drug use)		
Ocha (2012)	 Ethnicity, culture, race, and racialization Sex work Gender identity and expression Sexuality 	Ethnography or phenomenology	• Interviews
Offman (2014)	 Gender identity and expression Parenting, reproduction, and assisted reproduction Therapeutic process 	Case Report/Case Study/Case Series	Clinical Records
Oh (2012)	Biology and physiologyTherapeutics and surgeries	• Cross-sectional	• Clinical Samples/Materials • Clinical interview
Operario (2011)	Sexual health, HIV, and STIsSocial support, relationships, and families	Cross-sectional	• Survey - in person
Operario (2014)	 Discrimination and marginalization Sexual health, HIV, and STIs Substance use (alcohol and drug use) 	Cross-sectional	• Survey - in person
Oster (2010)	• Physical health • Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Ott (2010a)	Biology and physiologyPhysical healthTherapeutics and surgeries	• Cohort studies	Clinical Records
Ott (2010b)	Therapeutics and surgeries	Cohort studies	Clinical Records
Ott (2011)	Biology and physiology Therapeutics and surgeries	• Cohort studies	Clinical Records
Paap (2010)	Gender identity and expression	Cohort studies	Clinical interview

	• Therapeutics and surgeries		
Paap (2011)	 Gender identity and expression Mental health Research methods 	Cross-sectional	Clinical interview
Pacchiarotti (2013)	Biology and physiologyParenting, reproduction, and assisted reproduction	Basic Science	• Clinical Samples/Materials
Page (2013)	Gender identity and expressionSexuality	• Qualitative - interviews or FGs	• Interviews
Palmer (2012)	 Biology and physiology Gender identity and expression Therapeutics and surgeries 	Cross-sectional	• Clinical Samples/Materials • Survey - in person
Park (2014)	 Physical health Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Parkinson (2014)	Disability Gender identity and expression	• Case Report/Case Study/Case Series	Clinical Records
Parola (2010)	Resilience/well-being/QOLSexual health, HIV, and STIsTherapeutics and surgeries	• Cross-sectional • Qualitative - interviews or FGs	Clinical interview Interviews
Pasterski (2014)	Disability Gender identity and expression	Cross-sectional	Clinical interview Interviews
Pattison (2013)	 Physical health Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Patton (2010)	 Ethnicity, culture, race, and racialization Gender identity and expression Mental health Therapeutic process 	• Case Report/Case Study/Case Series	Clinical Records

Pauley (2014)	 Early life experiences Gender identity and expression Social support, relationships, and families Therapeutic process 	• Case Report/Case Study/Case Series	• Clinical Records
Pawa (2013)	 Sex work Health and mental health services Sexual health, HIV, and STIs 	Cohort studies	• Survey - in person
Pelusi (2014)	Biology and physiologyResilience/well-being/QOLTherapeutics and surgeries	• RCT	• Clinical Samples/Materials • Clinical interview
Perrin (2010)	Early life experiencesGender identity and expressionTherapeutic process	• Case Report/Case Study/Case Series	• Clinical Records
Perrone (2010)	Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Perry (2014)	Violence and trauma Discrimination and marginalization	• Qualitative - interviews or FGs	• Interviews
Perucchi (2014)	 Discrimination and marginalization Health and mental health services 	• Other	• Observation
Petricevic (2014a)	Biology and physiologyTherapeutics and surgeries	Basic Science	• Clinical Samples/Materials
Petricevic (2014b)	Biology and physiologyTherapeutics and surgeries	Basic Science	• Clinical Samples/Materials
Pieper (2012)	 Discrimination and marginalization Historical perspectives Law and criminalization Sports/Physical activity 	Historical	Archival records

Pimenoff (2011)	 Health and mental health services Therapeutics and surgeries	Cohort studies	Clinical Records Surveys - mail
Planchenault (2010)	 Gender identity and expression Other Social support, relationships, and families 	• Other	Online sources
Plemons (2013)	 Health and mental health services Space and place Therapeutics and surgeries 	Ethnography or phenomenology	• Observation
Pollock (2012)	Early life experiences Gender identity and expression	• Qualitative - interviews or FGs	• Interviews
Poompruek (2014)	 Gender identity and expression Substance use (alcohol and drug use) Therapeutics and surgeries 	Ethnography or phenomenology	• Interviews • Focus Groups • Observation
Porch (2014)	 Ethics Health and mental health services Mental health Therapeutic process 	• Case Report/Case Study/Case Series	Clinical Records
Porter (2013)	Age and Aging Religion and spirituality	Cross-sectional	• Survey - online
Prabawanti (2011)	• Sex work • Sexual health, HIV, and STIs	Cross-sectional	• Clinical Samples/Materials • Survey - in person
Prabawanti (2014)	Sexual health, HIV, and STIs	Cross-sectional	• Survey - in person
Prinsloo (2011)	 Gender identity and expression Other Social support,	• Qualitative - interviews or FGs	• Interviews • Online sources

	relationships, and families		
Prunas (2014)	Mental health Resilience/well-being/QOL	Cross-sectional	Clinical interview
Puri (2014)	Mental health Substance use (alcohol and drug use)	Case Report/Case Study/Case Series	Clinical Records
Rachlin (2010)	 Health and mental health services Therapeutics and surgeries	Cross-sectional	• Survey - online
Raigosa (2013)	Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Rametti (2011a)	Biology and physiology	Cross-sectional	• Clinical Samples/Materials
Rametti (2011b)	Biology and physiology	Cross-sectional	• Clinical Samples/Materials
Rametti (2012)	• Biology and physiology • Therapeutics and surgeries	Cohort studies	• Clinical Samples/Materials
Rankin (2012)	Education Gender identity and expression	Cross-sectional	• Interviews • Survey - online
Rapues (2013)	Research methods Sexual health, HIV, and STIs	Cross-sectional	• Clinical Samples/Materials • Survey - in person
Reback (2012)	Sex work Health and mental health services Sexual health, HIV, and STIs	Cohort studies	Clinical interview
Reback (2014)	Sexual health, HIV, and STIs Substance use (alcohol and drug use)	Cross-sectional	• Survey - in person
Reed (2011)	Health and mental health services	Case Report/Case Study/Case Series	Clinical Records

	• Therapeutics and surgeries		
Rehan (2011)	Physical health	Cross-sectional	• Clinical Samples/Materials
Reicherzer (2012a)	 Arts and creativity Ethnicity, culture, race, and racialization Gender identity and expression Resistance and politicization 	• Qualitative - interviews or FGs	• Interviews
Reicherzer (2012b)	 Arts and creativity Employment Ethnicity, culture, race, and racialization Resilience/well-being/QOL 	• Qualitative - interviews or FGs	InterviewsObservationArchival records
Reinsmith- Jones (2013)	Gender identity and expressionReligion and spirituality	• Ethnography or phenomenology	• Interviews
Reisner (2010)	 Gender identity and expression Health and mental health services Sexuality Sexual health, HIV, and STIs 	• Cross-sectional • Qualitative - interviews or FGs	• Interviews • Survey - in person
Reisner (2013)	 Mental health Physical health Resilience/well-being/QOL Sports/physical activity SECONDARY 	• Cross-sectional • Qualitative - interviews or FGs	• Focus Groups • Survey - in person
Reisner (2014a)	 Violence and trauma Discrimination and marginalization Ethnicity, culture, race, and racialization Health and mental health services Indigeneity 	Cross-sectional	• Survey - online • Survey - in person

Reisner (2014b)	 Law and criminalization Intersectionalities Physical health Discrimination and marginalization Social support, relationships, and families Substance use (alcohol and 	• Cross-sectional	• Survey - in person
Reisner (2014c)	• Research methods	• Case-control • Cross-sectional	• Survey - in person
Reisner (2014d)	Other Sexual health, HIV, and STIs	Cross-sectional	Clinical Records
Remacle (2011)	Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Repessé (2013)	Physical healthSexual health, HIV, and STIs	• Case Report/Case Study/Case Series	Clinical Records
Rezwan (2014)	Physical health Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Richards (2013)	Gender identity and expression Space and place	• Qualitative - interviews or FGs	• Interviews
Riggle (2011)	 Gender identity and expression Resilience/well-being/QOL Resistance and politicization 	Cross-sectional	• Survey - online
Riggs (2014)	Discrimination and marginalization Health and mental health services	Cross-sectional	• Survey - online
Rijn (2013)	Gender identity and expressionMental healthSocial support,	Cross-sectional	Clinical interview

	relationships, and families		
Riley (2013)	 Early life experiences Gender identity and expression Social support, relationships, and families 	• Qualitative - interviews or FGs	• Survey - online
Roberts (2014)	Biology and physiology Therapeutics and surgeries	Basic Science	Clinical Records
Roerink (2014)	Physical health Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Rolle (2014)	Biology and physiology Therapeutics and surgeries	Case-control	• Clinical Samples/Materials
Rooke (2010)	 Arts and creativity Gender identity and expression Research methods Resistance and politicization Space and place 	• Qualitative - interviews or FGs • Other • CBR/PAR	• Interviews • Focus Groups • Observation
Rosiek (2014)	Discrimination and marginalization Research methods	Ethnography or phenomenology	• Interviews • Observation
Ross (2012)	Violence and trauma Sex work Historical perspectives Law and criminalization Resistance and politicization Space and place	Historical	Interviews Archival records
Rotondi (2011a)	Mental health	• Cross-sectional • CBR/PAR	• Survey - online • Survey - in person
Rotondi (2011b)	Mental health	• Cross-sectional • CBR/PAR	• Survey - online • Survey - in person

Rotondi (2013)	Therapeutics and surgeries	• Cross-sectional • CBR/PAR	• Survey - online • Survey - in person
Rowniak (2011)	 Gender identity and expression Sexuality Sexual health, HIV, and STIs	Ethnography or phenomenology	• Interviews
Rowniak (2013)	Gender identity and expressionSexuality	• Ethnography or phenomenology	• Interviews
Rupp (2010)	 Arts and creativity Gender identity and expression Resistance and politicization 	Ethnography or phenomenology	InterviewsFocus GroupsObservationArchival records
Sahastrabuddhe (2012)	• Other • Religion SECONDARY • Sexual health, HIV, and STIs	Cross-sectional	• Survey - in person
Saketopoulou (2011)	Early life experiences Ethnicity, culture, race, and racialization Gender identity and expression Health and mental health services Income Intersectionalities Mental health Therapeutic process	Case Report/Case Study/Case Series	• Clinical Records
Saketopoulou (2014)	 Violence and trauma Early life experiences Gender identity and expression Therapeutic process 	Case Report/Case Study/Case Series	Clinical Records
Saltzburg (2010)	 Gender identity and expression Resilience/well-being/QOL Resistance and politicization 	• Qualitative - interviews or FGs	• Focus Groups

	Sexuality		
Salvador (2012)	Social support,relationships, and familiesTherapeutics and surgeries	Cohort studies	• Survey - in person
Samkhaniyani (2013)	Mental health Other	Cross-sectional	Clinical interview
Santarnecchi (2012)	Biology and physiology	Cross-sectional	• Clinical Samples/Materials
Santos (2014a)	 Sexual health, HIV, and STIs Substance use (alcohol and drug use) 	Cross-sectional	• Clinical Samples/Materials • Survey - in person
Santos (2014b)	 Health and mental health services Other Sexual health, HIV, and STIs 	• Cross-sectional	• Clinical Samples/Materials • Survey - in person
Saravanan (2014)	Physical health	Cross-sectional	• Clinical Samples/Materials • Survey - in person
Sarrau (2014)	 Physical health Therapeutics and surgeries	Case Report/Case Study/Case Series	Clinical Records
Saunders (2011)	 Gender identity and expression Health and mental health services Mental health 	• Case Report/Case Study/Case Series	Clinical Records
Schagen (2012)	Biology and physiologyGender identity and expression	Cross-sectional	Clinical Records Clinical interview
Schenck (2010)	Physical health Therapeutics and surgeries	Case Report/Case Study/Case Series	Clinical Records
Schilt (2014)	Gender identity and expressionSexuality	• Qualitative - interviews or FGs	• Interviews • Observation

	• Sexual health, HIV, and STIs		
Schöning (2010)	Biology and physiology Therapeutics and surgeries	Cross-sectional	• Clinical Samples/Materials • Survey - in person
Schor (2011)	Arts and creativityReligion and spiritualityResistance and politicization	• Qualitative - interviews or FGs	• Interviews
Schwartz (2010)	 Arts and creativity Age and Aging Historical perspectives Resistance and politicization 	Ethnography or phenomenology	• Not Discussed
Seal (2012)	Therapeutics and surgeries	• Case-control	• Clinical Records
Seelman (2014a)	 Discrimination and marginalization Violence and trauma Education Intersectionalities Space and place 	• Qualitative - interviews or FGs	• Interviews
Seelman (2014b)	 Discrimination and marginalization Education Gender identity and expression 	Cross-sectional	• Survey - online • Survey - in person
Seemanthini (2011)	Mental health	• Cross-sectional	• Survey - in person
Sevelius (2010)	 Health and mental health services Sexual health, HIV, and STIs 	Cross-sectional	• Survey - in person
Sevelius (2013)	 Discrimination and marginalization Ethnicity, culture, race, and racialization Health and mental health services Intersectionalities 	• Qualitative - interviews or FGs	• Interviews

Sevelius (2014a)	 Sexual health, HIV, and STIs Social support, relationships, and families Discrimination and marginalization Health and mental health services Intersectionalities Sexual health, HIV, and STIs 	• Qualitative - interviews or FGs	• Interviews • Focus Groups
Sevelius (2014b)	Sexual health, HIV, and STIs	Cross-sectional	• Survey - in person
Sexton (2010)	Law and criminalization Intersectionalities	Cross-sectional	• Clinical Records • Interviews
Shao (2011)	 Physical health Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Shepard (2013)	 Health and mental health services Historical perspectives Housing Resistance and politicization Social support, relationships, and families 	• Qualitative - interviews or FGs	Interviews Observation Archival records
Shipherd (2010)	Discrimination and marginalization Health and mental health services Mental health	• Cross-sectional	• Survey - in person
Shipherd (2011)	 Discrimination and marginalization Violence and trauma Mental health Physical health 	Cross-sectional	• Survey - in person
Shipherd (2012)	Health and mental health services	Cross-sectional	• Survey - in person
Shrestha (2011)	Health and mental health services	Cross-sectional	Clinical Records

	Sexual health, HIV, and STIs		
Shvartsbeyn (2011)	 Physical health Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Silva- Santisteban (2012)	Sexual health, HIV, and STIs	Cross-sectional	• Clinical Samples/Materials • Survey - in person
Simon (2011)	 Early life experiences Gender identity and expression Mental health Social support, relationships, and families 	Cross-sectional	Clinical interview
Simon (2013a)	Biology and physiology	Cross-sectional	Clinical Samples/Materials Clinical interview
Simons (2013b)	 Mental health Resilience/well-being/QOL Social support, relationships, and families 	Cross-sectional	• Survey - in person
Singh (2010)	 Early life experiences Gender identity and expression Research methods 	• Cross-sectional	Clinical interviewSurvey - onlineSurvey - in personSurveys - mail
Singh (2011a)	 Discrimination and marginalization Resilience/well-being/QOL Resistance and politicization 	Ethnography or phenomenology	• Interviews
Singh (2011b)	 Discrimination and marginalization Violence and trauma Early life experiences Ethnicity, culture, race, and racialization Intersectionalities Resilience/well-being/QOL 	Ethnography or phenomenology	• Interviews

Cingh (2012-)	- Diagnimination and	- Ethnomusul	- Intomrious
Singh (2013a)	 Discrimination and marginalization Ethnicity, culture, race, and racialization Intersectionalities Other Resilience/well-being/QOL 	Ethnography or phenomenology	• Interviews
Singh (2013b)	 Discrimination and marginalization Education Health and mental health services Resilience/well-being/QOL Social support, relationships, and families Space and place 	Ethnography or phenomenology	• Interviews
Singh (2014)	Discrimination and marginalization Resilience/well-being/QOL	• Ethnography or phenomenology	• Interviews
Sitek (2012)	Biology and physiology	Cross-sectional	Clinical Samples/Materials
Siverskog (2014)	 Age and Aging Discrimination and marginalization Health and mental health services Intersectionalities 	• Qualitative - interviews or FGs	• Interviews
Skagerberg (2013a)	Mental health	• Cross-sectional	• Survey - in person • Surveys - mail
Skagerberg (2013b)	Early life experiences Mental health	• Cross-sectional	Clinical Records
Skugarevsky (2011)	 Violence and trauma Sexual health, HIV, and STIs Substance use (alcohol and drug use) 	• Case Report/Case Study/Case Series	Clinical Records
Socias (2014a)	Discrimination and marginalization	Cross-sectional	• Survey - in person

	Health and mental health services Other		
Socias (2014b)	 Gender identity and expression Law and criminalization	Cross-sectional	• Survey - in person
Soleman (2014)	Biology and physiologyTherapeutics and surgeries	Cross-sectional	• Clinical Samples/Materials • Clinical interview
Soley-Beltran (2011)	 Gender identity and expression Historical perspectives Resistance and politicization 	• Qualitative - interviews or FGs	• Interviews • Focus Groups • Online sources
Song (2011)	Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Spack (2012)	 Early life experiences Gender identity and expression Health and mental health services Mental health Therapeutics and surgeries 	• Cross-sectional	Clinical Records
Spack (2013)	 Gender identity and expression Health and mental health services Therapeutics and surgeries Therapeutic process 	• Case Report/Case Study/Case Series	Clinical Records
Speer (2013)	 Discrimination and marginalization Health and mental health services 	• Qualitative - interviews or FGs	• Interviews
St Peter (2012)	 Health and mental health services Physical health	• Case Report/Case Study/Case Series	Clinical Records

	Therapeutics and surgeries		
Steensma (2011)	Early life experiencesGender identity and expressionSexuality	• Qualitative - interviews or FGs	• Interviews
Steensma (2013)	 Early life experiences Gender identity and expression Mental health Sexuality Social support, relationships, and families 	Cohort studies	• Surveys - mail
Steensma (2014)	 Early life experiences Education Mental health Social support, relationships, and families 	Cross-sectional	Clinical interview Other
Stephens (2011)	Sexual health, HIV, and STIs	Cross-sectional	Clinical Samples/Materials Clinical interview
Stotzer (2011)	 Ethnicity, culture, race, and racialization Resilience/well-being/QOL Social support, relationships, and families 	• Cross-sectional	• Survey - in person
Stotzer (2014)	Law and criminalization	SR Desc and Qual	• Journal Articles - Review
Strain (2011)	 Gender identity and expression Mental health Resilience/well-being/QOL 	Cross-sectional	• Survey - in person
Suchet (2011)	 Gender identity and expression Therapeutic process	• Case Report/Case Study/Case Series	Clinical Records

Sultana (2012)	 Discrimination and marginalization Ethnicity, culture, race, and racialization Social support, relationships, and families 	• Cross-sectional • Qualitative - interviews or FGs	• Interviews • Survey - in person
Summers (2014)	Mental health Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Syed (2013)	 Ethnicity, culture, race, and racialization Gender identity and expression Mental health Religion and spirituality Therapeutic process 	Case Report/Case Study/Case Series	Clinical Records
Tagg (2012)	 Discrimination and marginalization Ethics Sports/Physical activity	• Qualitative - interviews or FGs	• Interviews
Tavakkoli (2014)	Therapeutics and surgeries	• Cohort studies	• Clinical Samples/Materials • Clinical interview
Tayade (2011)	 Gender identity and expression Physical health Therapeutics and surgeries 	Case Report/Case Study/Case Series	Clinical Records
Taylor (2011)	Sexual health, HIV, and STIs	Cohort studies	• Survey - in person
Taylor (2013)	Ethics Health and mental health services Resistance and politicization	Ethnography or phenomenology	• Interviews
Taziaux (2012)	Biology and physiology	Basic Science	Clinical Samples/Materials

Tchang (2014)	Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Ten Kulve (2011)	 Age and Aging Biology and physiology Therapeutics and surgeries	Nonrandomized CT	• Clinical Samples/Materials
Terada (2011)	 Gender identity and expression Mental health	Cross-sectional	Clinical RecordsClinicalSamples/MaterialsClinical interview
Terada (2012a)	Gender identity and expressionMental health	• Cross-sectional	Clinical interview
Terada (2012b)	Early life experiencesEducationGender identity and expression	Cross-sectional	Clinical interview
Testa (2012)	Violence and traumaMental healthSubstance use (alcohol and drug use)	• Cross-sectional	• Survey - online • Survey - in person • Surveys - mail
Testa (2014a)	 Discrimination and marginalization Violence and trauma Research methods Resilience/well-being/QOL Social support, relationships, and families 	• Cross-sectional	• Survey - online
Testa (2014b)	 Gender identity and expression Mental health Resilience/well-being/QOL Social support, relationships, and families 	• Cross-sectional	• Survey - online
Thione (2014)	Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records

Thomas (2013)	Therapeutics and surgeries	Cohort studies	Clinical Records
Thornhill (2010)	 Health and mental health services Sexual health, HIV, and STIs Social support, relationships, and families 	Case Report/Case Study/Case Series	Clinical Records
Tomada (2013)	Biology and physiology Therapeutics and surgeries	Basic Science	• Clinical Samples/Materials
Torwane (2014)	Physical health	Cross-sectional	• Clinical Samples/Materials • Survey - in person
Tourbach (2011)	Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Traish (2010)	Therapeutics and surgeries	SR Desc and Qual	• Journal Articles - Review
Travers (2011)	 Gender identity and expression Resistance and politicization Social support, relationships, and families Sports/Physical activity Space and place 	• Qualitative - interviews or FGs	• Interviews • Observation
Trevor (2013)	Gender identity and expression Health and mental health services	SR Desc and Qual	• Journal Articles - Review
Turo (2013)	 Physical health Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Ung Loh (2014)	 Gender identity and expression Religion and spirituality Social support, relationships, and families 	• Qualitative - interviews or FGs	• Interviews

Urban (2011)	 Health and mental health services Physical health Therapeutics and surgeries	Case Report/Case Study/Case Series	• Clinical Records
Usmani (2012)	Mental health Sexual health, HIV, and STIs	Case Report/Case Study/Case Series	Clinical Records
Van Caenegem (2012)	Biology and physiologyTherapeutics and surgeries	Cross-sectional	• Clinical Samples/Materials • Clinical interview
Van Caenegem (2013a)	Biology and physiology	Cross-sectional	• Clinical Samples/Materials • Clinical interview
Van Caenegem (2013b)	Biology and physiology Therapeutics and surgeries	Cross-sectional	• Clinical Samples/Materials • Clinical interview
Van Devanter (2012)	• Ethnicity, culture, race, and racialization • Sexual health, HIV, and STIs	• Qualitative - interviews or FGs	• Interviews • Survey - in person
Vanderlaan (2011)	 Biology and physiology Ethnicity, culture, race, and racialization Gender identity and expression Sexuality 	Cross-sectional	• Survey - in person
VanderLaan (2013)	 Biology and physiology Ethnicity, culture, race, and racialization Gender identity and expression Sexuality 	• Cross-sectional	• Interviews • Observation
VanKim (2014)	EducationPhysical healthSports/Physical activity	• Cross-sectional	• Survey - online
Vasey (2010)	Biology and physiologySexualitySocial support,	Cross-sectional	• Survey - in person

	relationships, and families		
Veale (2012)	 Gender identity and expression Resistance and politicization Sexuality 	Cross-sectional	• Survey - online • Surveys - mail
Veale (2014)	Gender identity and expressionSexuality	Cross-sectional	• Survey - online • Surveys - mail
Vegter (2013)	Gender identity and expression	Ethnography or phenomenology	• Interviews
Velayudhan (2014)	DisabilityMental healthSexual health, HIV, and STIs	Case Report/Case Study/Case Series	Clinical Records
Verma (2011)	Discrimination and marginalizationEmploymentIncome	Ethnography or phenomenology	• Observation
Victor (2014)	Biology and physiology Therapeutics and surgeries	Cohort studies	• Clinical Samples/Materials
Vigneswaran (2013)	Therapeutics and surgeries	Case Report/Case Study/Case Series	Clinical Records
Vinay (2010)	 Discrimination and marginalization Mental health Therapeutic process 	Case Report/Case Study/Case Series	Clinical Records
Visnyei (2014)	 Physical health Therapeutics and surgeries	Case Report/Case Study/Case Series	Clinical Records
Vitelli (2010)	Violence and trauma Mental health	Cross-sectional	Clinical interview
Vivek (2013)	 Discrimination and marginalization Ethnicity, culture, race, and racialization 	Cross-sectional	• Survey - in person

	Gender identity and expression		
Vujović (2014)	Biology and physiology Early life experiences	Cross-sectional	• Clinical Samples/Materials
Vukadinovic (2014)	Therapeutics and surgeries	• Case Report/Case Study/Case Series	• Clinical Records • Interviews
Wagner (2010)	Therapeutics and surgeries	Cohort studies	Clinical Records
Walinsky (2010)	 Gender identity and expression Health and mental health services Intersectionalities Resilience/well-being/QOL Space and place 	• Qualitative - interviews or FGs	• Interviews • Focus Groups
Wallace	Research methods	• Qualitative -	• Interviews
(2010a)	Therapeutics and surgeries	interviews or FGs	
Wallace (2010b)	 Health and mental health services Therapeutics and surgeries	• SR Desc and Qual • Cross-sectional	• Interviews • Survey - in person • Journal Articles - Review
Wallace (2014)	 Parenting, reproduction, and assisted reproduction Therapeutics and surgeries 	• Case Report/Case Study/Case Series	Clinical Records
Wallien (2010)	Violence and trauma Discrimination and marginalization Education Gender identity and expression Social support, relationships, and families	Cross-sectional	• Survey - in person
Walsh (2014)	 Physical health Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records

Weigert (2013)	Physical health Therapeutics and surgeries	Cohort studies	• Clinical Records • Clinical interview
Weyers (2010c)	Biology and physiology Health and mental health services Therapeutics and surgeries	Cross-sectional	Clinical RecordsClinicalSamples/MaterialsClinical interview
Weyers (2010a)	 Biology and physiology Health and mental health services Therapeutics and surgeries 	Cross-sectional	• Clinical Records
Weyers (2010b)	Biology and physiologySexualitySexual health, HIV, and STIsTherapeutics and surgeries	• Cross-sectional	• Clinical Samples/Materials • Clinical interview
Wierckx (2011a)	Biology and physiologySexual health, HIV, and STIsTherapeutics and surgeries	Cross-sectional	• Clinical Samples/Materials • Surveys - mail
Wierckx (2011b)	Resilience/well-being/QOLSexual health, HIV, and STIsTherapeutics and surgeries	• Cross-sectional	• Clinical Samples/Materials • Surveys - mail
Wierckx (2012a)	Biology and physiologyPhysical healthTherapeutics and surgeries	• Cross-sectional	ClinicalSamples/MaterialsSurvey - in personSurveys - mail
Wierckx (2012b)	Parenting, reproduction, and assisted reproduction	Cross-sectional	• Clinical Records
Wierckx (2012c)	Parenting, reproduction, and assisted reproduction	Cross-sectional	• Clinical Samples/Materials • Surveys - mail
Wierckx (2013)	Physical health Therapeutics and surgeries	• Case-control	Clinical RecordsSurvey - onlineSurvey - in personSurveys - mail

Wierckx	Physical health	Case Report/Case	Clinical Records
(2014a)	Therapeutics and surgeries	Study/Case Series	- Gillical Records
Wierckx (2014b)	SexualitySexual health, HIV, and STIsTherapeutics and surgeries	Cross-sectional	• Survey - online • Surveys - mail
Wierckx (2014c)	Physical health Therapeutics and surgeries	SR Desc and Qual	• Journal Articles - Review
Wierckx (2014d)	Biology and physiology Therapeutics and surgeries	Cohort studies	• Clinical Records • Clinical Samples/Materials • Survey - in person
Wierckx (2014e)	Biology and physiology Therapeutics and surgeries	• Cohort studies • Cross-sectional	• Clinical Samples/Materials • Survey - in person
Wight (2014)	 Discrimination and marginalization Other Social support, relationships, and families Space and place 	• Ethnography or phenomenology	Online sources
Williams (2012)	 Violence and trauma Discrimination and marginalization Health and mental health services Mental health Physical health 	• Case Report/Case Study/Case Series	Clinical Records
Williams (2013)	 Gender identity and expression Sexuality Sexual health, HIV, and STIs Space and place 	• Qualitative - interviews or FGs	• Interviews
Wilson (2010)	 Sexual health, HIV, and STIs Social support, relationships, and families 	• Cross-sectional	• Survey - in person

Wilson (2011)	Discrimination and	Ethnography or	• Interviews
wilson (2011)	 Discrimination and marginalization Ethnicity, culture, race, and racialization Sexual health, HIV, and STIs 	phenomenology	- Interviews
Wilson (2012)	 Sexual health, HIV, and STIs Social support, relationships, and families 	Ethnography or phenomenology	• Interviews
Wilson (2013)	 Discrimination and marginalization Violence and trauma Ethnicity, culture, race, and racialization Health and mental health services Sexual health, HIV, and STIs 	• Qualitative - interviews or FGs	• Interviews
Wilson, D. (2014)	Health and mental health services	• Cross-sectional	Clinical Records
Wilson, E. (2014a)	 Gender identity and expression Other Therapeutics and surgeries	• Cross-sectional	• Survey - in person
Wilson, E. (2014b)	Sexual health, HIV, and STIs	• Cross-sectional	• Clinical Samples/Materials • Survey - in person
Winograd (2014)	 Early life experiences Gender identity and expression Therapeutic process 	• Case Report/Case Study/Case Series	Clinical Records
Witten (2014)	 Age and Aging Disability Intersectionalities Physical health	• Cross-sectional	• Survey - online
Wood (2013)	 Early life experiences Gender identity and expression Health and mental health 	Cross-sectional	Clinical Records

	services		
Wood (2014)	Disability Gender identity and expression	SR Desc and Qual	• Journal Articles - Review
Woods (2013)	Violence and traumaEthnicity, culture, race, and racializationLaw and criminalization	Cross-sectional	• Survey - in person
Xavier (2013)	Discrimination and marginalization Violence and trauma Health and mental health services Sexual health, HIV, and STIs	• Qualitative - interviews or FGs	• Interviews • Focus Groups
Yadegarfard (2013)	 Discrimination and marginalization Gender identity and expression Mental health Sexual health, HIV, and STIs 	Cross-sectional	• Survey - in person
Yarhouse (2012)	Gender identity and expressionReligion and spirituality	• Cross-sectional • Ethnography or phenomenology	• Survey - online
Yavorsky (2013)	 Discrimination and marginalization Violence and trauma Gender identity and expression Space and place 	• Qualitative - interviews or FGs	• Interviews
Yerke (2011)	 Gender identity and expression Historical perspectives Sexuality Therapeutics and surgeries 	• Qualitative - interviews or FGs	• Interviews
Zanghellini (2010)	Discrimination and marginalizationEthnicity, culture, race, and	• Qualitative - interviews or FGs	• Interviews • Survey - in person

	racializationLaw and criminalizationParenting, reproduction, and assisted reproduction		
Zhang (2010)	Therapeutics and surgeries	• Case Report/Case Study/Case Series	Clinical Records
Zhao (2014)	Biology and physiology Therapeutics and surgeries	Cohort studies	Clinical Records
Zito (2013)	 Ethnicity, culture, race, and racialization Gender identity and expression Historical perspectives Research methods 	• Qualitative - interviews or FGs	• Interviews
Zitz (2014)	 Gender identity and expression Social support, relationships, and families 	• Qualitative - interviews or FGs	• Interviews
Zubiaurre- Elorza (2013)	Biology and physiology	Cross-sectional	• Clinical Samples/Materials
Zubiaurre- Elorza (2014)	Biology and physiology Therapeutics and surgeries	Cohort studies	• Clinical Samples/Materials • Clinical interview
Zucker (2011)	 Early life experiences Health and mental health services Mental health Therapeutics and surgeries 	Cross-sectional	Clinical Records Clinical interview
Zucker (2012a)	 Early life experiences Gender identity and expression Health and mental health services Sexuality 	• Cross-sectional	Clinical interview

Zucker (2012b)	Early life experiences	• Case Report/Case	Clinical Records
	Gender identity and	Study/Case Series	
	expression		
	Health and mental health		
	services		
	Mental health		
	Therapeutic process		

Appendix E: Full List of Clinical Studies with Medical Photographs

- Adenuga, P., Summers, P., & Bergfeld, W. (2012). Hair regrowth in a male patient with extensive androgenetic alopecia on estrogen therapy. *Journal of the American Academy of Dermatology, 67*(3), e121-e123.
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