

Including Sex, Gender, and Equity in the Action Plan for Pain in Canada

2024



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Introduction

There are 8 million Canadians experiencing chronic pain, often exacerbated by sex and gender related factors along with a range of social, economic, and cultural issues. Interactions between these factors lead to inequities in finding appropriate care, information, and treatments. These inequitable experiences urgently need remedies, best addressed by direct inclusion in Canada's Action Plan.

Some inequities stand out. In particular, more attention is warranted to sex-specific conditions in general and women's health conditions in particular, with respect to research, care, and policies on chronic pain. Women are more likely to experience more severe and recurrent chronic pain than men, be underdiagnosed with chronic pain conditions, disproportionately experience conditions such as arthritis, migraine, and fibromyalgia, and are less likely to receive appropriate pain medication. While much of this can be traced to the historical approach to health research that has utilized a 'male norm' in its design, oversights and omissions of females and women in clinical trials, programs, research, and policies continue.

What This Report Adds

This report reflects on the evidence on these issues and links our findings to the Action Plan goals attached to Canada's National Pain Strategy [1]. We examined the extant evidence on sex and gender related factors affecting chronic pain and their links to a range of cultural and economic factors, in order to derive evidence-informed directions for Canada. Then we applied a comprehensive Sex and Gender Based Analysis Plus (SGBA+) to the evidence, to illuminate the sex, gender, and equity related issues that impact care, research, and policy. Based on these steps, we offer ideas for augmenting [An Action Plan for Canada's Pain Strategy](#).

We make recommendations for enhancing the Action Plan so it will better serve both sexes and all genders in a range of diverse populations in Canada by providing more tailored and precise responses to chronic pain in Canada's health care system. These recommendations will enhance health care provider training and readiness to respond to varied groups of patients and ensure health care systems are adequately positioned to provide support to the 8 million Canadians affected by chronic pain.

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Background

In 2019, the Canadian Pain Task Force was established, and published a foundational report, Chronic Pain in Canada: Laying a Foundation for Action, providing the groundwork for a much-needed pan-Canadian approach to pain management.

The Task force issued a second report in October 2020, Working Together to Better Understand, Prevent, and Manage Chronic Pain: What we Heard, reflecting on consultations with stakeholders and responses to the report, gathered in the context of an opioid overdose crisis and COVID-19. In that second report the Task force called for urgent action on responding to chronic pain and pain management. However, in both reports there was little integration or analysis of either sex or gender related factors affecting the experiences of chronic pain, or the responses to it by the health care system or others.

In 2021, the Task Force released its Action Plan for Pain in Canada, calling for quick action on this costly public health issue by broad based system change, the provision of targeted information to healthcare professionals and the public, and accelerated knowledge translation and research investments. While there was a welcome call in the Action Plan for a sex and gender lens to attenuate women's chronic pain health literacy, there is a real need to fully integrate sex and gender pain science, and a SGBA+ lens, across all action plan goals. This report assists with that.

Our Approach

We searched the existing literature on sex, gender, equity, and chronic pain to establish the evidence base in this area. We applied a SGBA+ to the evidence with a view to identifying important sex, gender and equity related factors that would have an impact on access to appropriate care, treatment, and information in responding to chronic pain. Then we reviewed the Action Plan with these findings in mind, in order to make recommendations for changes in practice and policy in Canada. We examined all sex and gender related issues, but took a particular focus on women's chronic pain, given both historical omissions, and women's disproportionate experience of chronic pain.

Appendix 1 provides details of the research methodology.

Sex, Gender, and Equity Related Issues in Pain

In this section we report on some of the key sex, gender, and equity-related evidence to illustrate the importance of integrating sex and gender across all action plan goals, and in ongoing pain research in Canada. Greaves and Ritz (2022) identified how various approaches to sex and gender research can be distinguished, and how they relate to equity-oriented policies such as SGBA+ (sex and gender based analysis plus) and EDI (equity, diversity and inclusion) efforts [2]. Their schema includes the following: a) sex differences/gender differences, b) sex-related factors /gender-related factors, c) intersectional approaches, d) sex-gender interactions, and e) sexual and gender minority health research. SGBA+ and EDI are policies that rely on sex/gender research to expand sex, gender and equity considerations in care, resource development and programming.

Two recent Canadian reviews underscore the importance of doing more and better sex and gender research on pain [3, 4]. Osborne and Davis (2022) report on sex and gender differences in pain, while

Keogh and Boerner (2024) report on the key challenges in embedding sex and gender into pain research. While these two reviews focus on different aspects of the problems in the current research, they both review the strong evidence base regarding sex and gender related impacts on the experiences of pain, and ultimately, health care responses to pain. They both produce overviews that indicate that sex and gender both matter in how pain is experienced, and have direct implications for treatments, programs, or policies.

Osborne and Davis describe how women and girls are disproportionately affected by chronic pain [3]. They describe sex differences in physiological mechanisms underlying pain, such as involvement of different genes and proteins, and specific hormonal and immunological interactions that affect the transmission of pain signals. These sex differences interact with gender influences to affect how pain is perceived. Sex, gender, and their interactions also have an impact on the efficacy and side effects associated with different treatments.

Further, gender related influences affect the susceptibility to developing chronic pain, how it is expressed, coped with, and perceived, who seeks or is referred to treatment, and what treatment is offered. Accordingly, the authors stress the importance for clinical care professionals to be cognizant of sex/gender assumptions and biases; aware of the many pain conditions that are more common in females and women; attentive to how pain is perceived in sex/gender specific ways; and how treatments may need to be tailored to take into account sex/gender factors and influences.

In both articles, the authors argue for a better understanding of sex and gender concepts and evidence in all research and practice contexts, an end to the conflation of the terms, as well as better understanding of how sex and gender, and their interactions, affect pain [3, 4]. Both lament the historical and ongoing exclusion of female animals from preclinical pain research and the lack of sex specific analyses and reporting about the influence of sex and gender on pain.

Keogh and Boerner [4] describe a number of challenges in the exploration of sex and gender in pain research to date, and recommend the integration of assessing biological, psychological and social factors affecting pain. They describe how sex, gender and equity factors have and can be integrated in hormonal, immunological and psychosocial pain research. They note the importance of moving beyond an understanding how sex, gender and equity factors affect individuals, to “a ‘zoomed out’ view of the systems and structures that maintain and perpetuate a range of inequities in pain care” (p.118). They make recommendations for guidelines for the study and reporting of sex, gender, and pain in research, for intersectional studies and for partnerships with policymakers and organizations that can help translate such research into advocacy for change.

These articles provide clear evidence for the role of sex/gender factors in pain, and recommendations for action in research and practice. Sex and gender factors in pain are often ignored, their importance dismissed and the avenues for improvement mentioned in principle, rather than in concrete ways. As suggested above, structural changes at the system level are required to make a difference in reducing inequitable pain management and treatment. Below we offer additional examples arising from our sex and gender based analysis of the literature and describe how sex, gender and equity considerations can be brought concretely into Canada’s Pain Action plan.

Appendix 2 provides a list of the studies identified and reviewed about sex, gender, chronic pain, and use of prescribed opioids.

Applying Sex- and Gender-Based Analysis Plus

When we apply a SGBA+ to the evidence on chronic pain we can identify numerous implications such as areas for further study, options for tailoring care, redesigning programs, or adjusting treatment approaches. A full and consistent SGBA+ surfaces evidence and questions that could improve treatment, research, and policy for all populations.

Sex- and Gender-Based Analysis+ (SGBA+) is a well-established analytical process used to assess how groups of women, men, girls, boys, and gender-diverse people may be impacted by an experience, program, or policy. In Canada, federal programs and policies are required to undertake SGBA+. There are good reasons for applying this approach to the management of pain:

- **Sex and gender related factors** are key determinants of physical and mental health. They encompass both biological and social factors that impact people's experiences and responses to pain.
- **Equity** is impacted when sex and gender interact with other characteristics and factors, such as income, occupation, age, and ability, to affect health and well-being, and access to equitable care.
- **Sex-related** factors include metabolic, anatomical, genetic, and neurobiological features, all of which affect pain responses and the impact of therapies.
- **Gender-related** factors include roles, relationships, power imbalances and identities that affect experiences of pain, assumptions and stereotypes of care providers, and the likelihood of finding tailored and appropriate resources, care, and pain management.

Sex and gender interact with each other, and intersect with race/ethnicity, dis/ability, age, income, education, and other determinants of health, within a social structure threaded with racism, sexism, ageism, ableism, and other processes that generate additional inequities, differential treatments, and policies. This real life context is complex, making it all the more important to address sex, gender, and equity in the delivery of care and treatment and the design of policies regarding pain.

On the next page, some of the elements of sex-related factors, and gender-related factors are mapped onto diagrams [5] that outline various elements to consider when breaking down evidence, doing research, or analyzing and considering impacts, programs, and remedies. We include selected evidence based examples of female-specific pain issues, and women's experiences of pain, treatment, and care that have a direct impact on aspects of care, research, and data management. SGBA+ will ultimately improve care for all groups, including males and men, but this resource highlights our findings on improving the response to females and women, whose pains continues to be under-researched and under-treated.

In short, sex and gender matter to the study and treatment of pain. All of the sex and gender related factors and processes directly affect individual experiences of pain, the provision of health care, and underpin the call for more precise research and data management. While these issues are in need of redress for females and women in particular, integrating SGBA+ in planning and policy will benefit all populations. Precision medicine, and personalized health care depend on integrating both sex and gender, along with age, race/ethnicity, and other factors into pain management care, treatment, and planning.

Figure 1: Some examples of sex related factors affecting chronic pain in females.

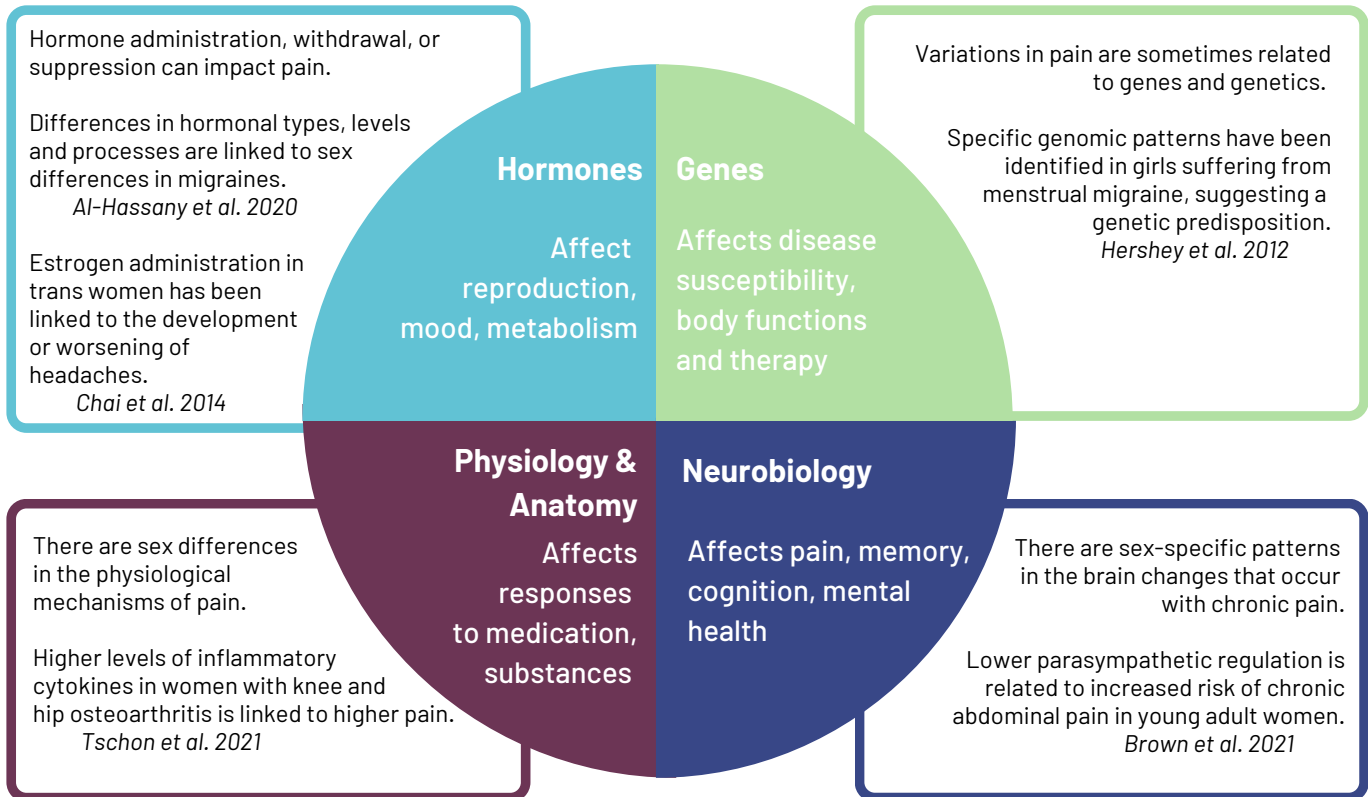
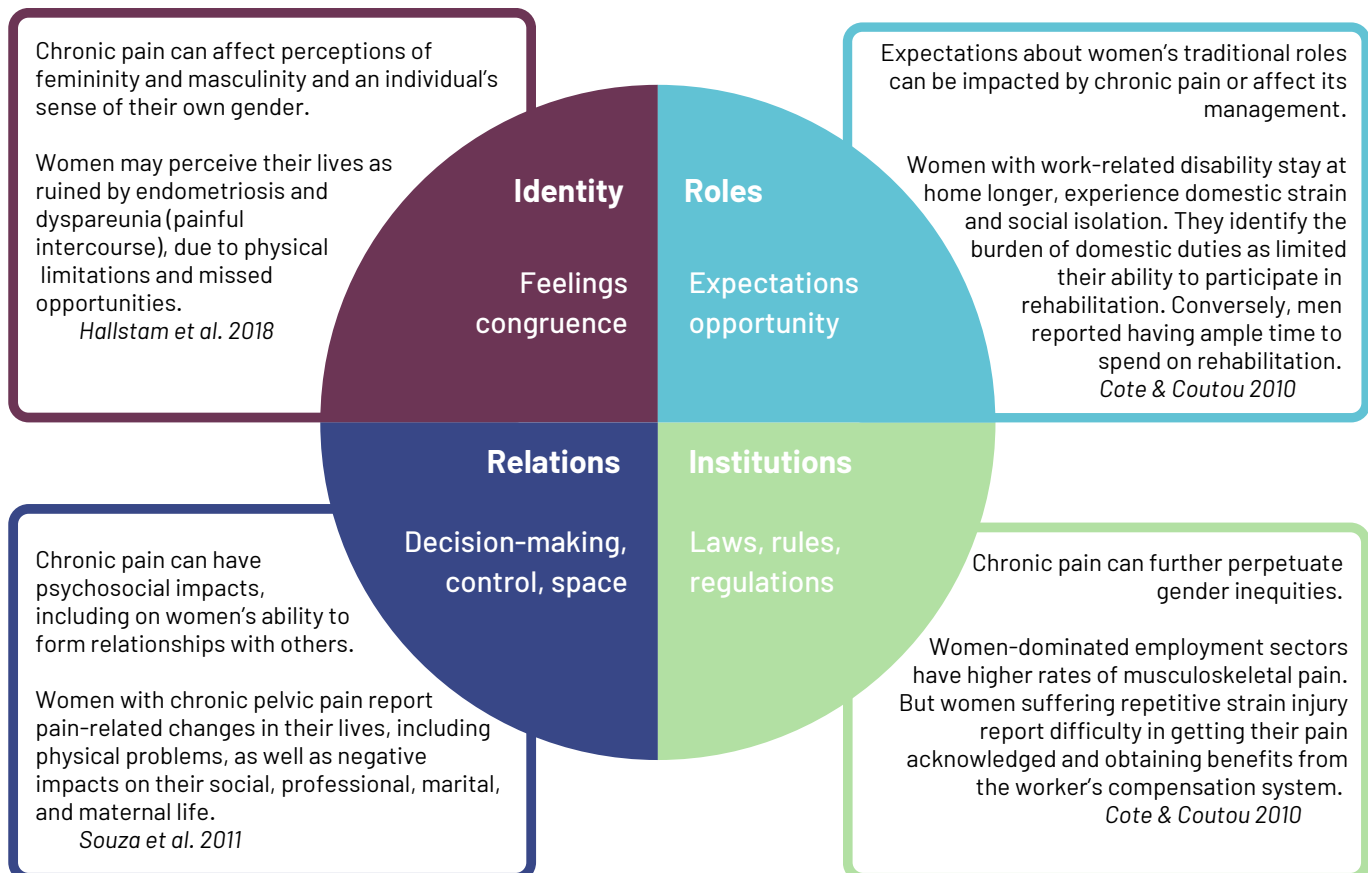


Figure 2: Some examples of gender related factors affecting chronic pain in women.



Linking the Evidence to the Action Plan Goals

Table 1 provides examples of how the evidence related to sex, gender, equity and pain are relevant to some of the key goals of the Action Plan [6]: improving access to care; improving education, information and training; supporting better pain research, and; improving surveillance data management regarding pain.

Table 1 The Action Plan Goals, Sex, Gender and Equity Considerations

Action Plan Goal	Including sex, gender, and equity considerations
<p>Improve access to timely, equitable and person-centered pain care ➡</p> <p>Better care with sex and gender</p>	<p>Sex-related factors and pain</p> <p><i>Certain pain producing conditions are sex specific or more common in one sex. For example, 18% of women have chronic migraines compared to 6% of men. Sixty percent of these women have migraines only with their periods [7].</i></p> <p>Health care providers need to take into consideration sex differences, such as hormonal patterns, in assessing pain conditions and responses to medications.</p> <p>Gender-related factors and pain</p> <p><i>Gendered assumptions affect pain care. For example, women are more often under-diagnosed for chronic pain conditions, compared to men. Women are less likely than men to be referred to radiography and physiotherapy for similar conditions [8]. Further, physicians often rely on gender stereotypes when treating back pain [9].</i></p> <p>Gender biases can create inequities in care based on assumptions about co-occurring mental health concerns, work related pain, pain tolerance, or a need for comprehensive pain management plans.</p> <p>Equity-related influences on pain</p> <p><i>Some populations require tailored analysis and research. For example, estrogen administration in transgender women has been linked to the development and worsening of headache [10].</i></p> <p>Better care for sexual and gender minorities requires specific knowledge of both sex and gender-related factors in pain, management, and potential trajectories.</p>
<p>Increase awareness, education, and specialized training for pain ➡</p> <p>Better prevention and education with sex and gender</p>	<p>Sex-related factors in prevention and education</p> <p><i>Female bodies may present different pain experiences than male bodies. For example, women are more likely to experience simultaneous, multiple pain conditions and severe and recurrent chronic pain, compared to men [11].</i></p> <p>Patient knowledge of sex related factors will support women in asking for the treatment they need and for providers in offering sex-specific tailored care and therapies.</p> <p>Gender-related factors in prevention and education</p> <p><i>Gender-related roles and expectations affect the types of pain experiences and reports regarding pain intensity. For example, gendered norms about sexuality and femininity influence expectations about sex, complicating conditions such as vulvodynia and endometriosis [12, 13].</i></p>

Health care providers need to provide information to women and their partners about the impact of pain conditions on sexuality and consent.

Equity-related influences in prevention and education

Gender, combined with other factors compound pain management and recovery. For example, women on disability leave due to chronic pain conditions report that domestic duties cause them to neglect their rehabilitation, whereas men report no obstacles to following rehabilitation [14].

Programs need to build in tailored gendered supports to improve care, and facilitate recovery and treatment, especially for caregivers.

Support pain research ➔

Better research and implementation with sex and gender

Sex-related factors and research

Sex-related factors are often under studied in chronic pain research but could provide fruitful information [15]. For example, the roles of anatomy and various physiological processes in pain experiences have not been extensively studied. However, sex hormones and genetics have been found to be important, particularly in relation to migraines [7].

Health and social care providers need more research evidence on sex-related factors to accurately diagnose, prescribe medications or develop treatment plans.

Gender-related factors and research

Gendered experiences matter in understanding pain [16]. For example, there is an association between IPV and persistent pain that is not psychological [17]. Female responses to opioids are affected by hormones, and women with opioid use disorder often have co-occurring issues such as depression, trauma, and history of IPV when entering treatment [18].

Health and social care providers and program planners need to anticipate and account for these possibilities among the women they diagnose, treat, and serve, and adjust care and programming accordingly.

Equity-related influences and research

Age, sex, gender, and race can combine to define pain responses. For example, young women experience an increased risk of chronic abdominal pain, due to lower parasympathetic regulation [19]. Among veterans with chronic musculoskeletal pain, Black women and men are less likely than White or Hispanics to use complementary medicine [20].

More research and guidance is needed to tailor responses, care plans, and medications by sex, gender, age, race/ethnicity, and condition.

Monitor population health and health system quality ➔

Sex-related factors and systemic coordination

Measuring incidence, prevalence, and trends by sex matters. For example, 80 – 90% of people diagnosed with fibromyalgia are women [7]. Endometriosis affects 10% of all women [21].

Sex-specific or single sex-dominated conditions require enhanced and detailed monitoring to improve health, especially for under researched and under treated conditions such as those affecting female pain conditions.

**Disaggregated
data collection
and management**

Gender-related factors and systemic coordination

Tracking conditions by gender and gendered roles matters. For example, migraine is affected by shift work, and physically demanding occupations. Female migraine patterns are especially affected by shift work, and male migraine patterns by physically demanding occupations [22].

Surveys collecting data on roles and occupations require gender-disaggregation and monitoring of trends over time. Program funders and policy makers can target their attention to these groups and their specific pain issues.

Equity-related influences require precise measuring

It is crucial to track the unique pain experiences of various subpopulations. For example, among people with opioid dependence, more women than men report chronic pain, and those who are older, and on methadone, report even higher rates of pain [23].

Surveys on issues such as violence, substance use or trauma require integration of sex and gender-related chronic pain questions, so relevant care systems can monitor client pain-related needs.

Appendix 3 provides an infographic version of this table.

Recommendations for Enhancing the Action Plan

- 1. All Action Plan activities and evaluations must integrate SGBA+.**
- 2. Health care provider training needs to integrate sex, gender and equity related information and treatment approaches.**
- 3. Consumer Information must provide information on sex and gender related factors affecting pain, its diagnosis, treatment, and management.**
- 4. Research funding, design, analysis, and reporting must include sex/gender considerations, intersectional issues affecting pain, and follow established SAGER [24] reporting guidelines.**
- 5. Special funding initiatives in sex/gender/equity pain research must be launched to close the gap for females and women, and other under researched populations.**

Recommendation #1. Integrating SGBA+ into Policy and Programs

Regular and evaluated integration of sex, gender and equity considerations in policy and programming is required at every level in Canada's response to pain. The federal government requires a SGBA+ applied to its funded programs and internal initiatives. This is to determine, or predict, what differential impacts of an initiative or condition could be expected on women, men, gender diverse people, and various groups and sub-groups within the population. This model is urgently needed in the Action Plan, along with future documents, projects, and funding initiatives.

Without a consistent and iterative SGBA+ process applied to pain policy, and all Action Plan goals, the issues and inequities connected to sex, gender and inequities will persist indefinitely. The importance of integrating SGBA+ into all Action Plan activities is obvious, as it will result in a wider equity lens and more productive and focused initiatives, care, information, and research. Equally important is using SGBA+ results to define new areas for improving care, information, and research to better understand the pain related needs of the entire population.

Recommendations #2 and #3. Guidance for Health Care Providers and Information for Consumers

Based on our evidence review and formal consultations with researchers and practitioners, along with the results of our SGBA+, we have created numerous resources that address some key needs identified in the Action Plan. More fully described below, they address information, education, and training for health care providers, along with improved information for consumers, particularly women. In most cases, the information provided is pertinent to both groups of readers. Importantly, we also created resources for improving treatment choices including those that overlap with prescription opioids, for both consumers and health care practitioners.

Resources to Improve Care, Information and Training

To address needed improvements in health care provider practice, and information for women consumers, the CEWH has created the following resources, all freely available to access or download.

- [Women, Chronic Pain & Prescription Opioids: Key Facts and Ideas for Action \(infographic\)](#) summarizes the issues on women's pain, and what service providers can do to address women's needs.
- [Pain Management Strategies for Women with Chronic Pain \(infographic\)](#) showcases the most frequently cited interventions for effectively managing women's chronic pain.
- [Women, Chronic Pain & Prescription Opioids \(information sheet\)](#) summarizes how prescription opioids affect women's health, and their role in chronic pain management for women.
- [Women and Prescription Opioids \(information sheet\)](#) describes prescription opioids and their effect on women's health, during pregnancy, and when breastfeeding and parenting.
- [Women and Chronic Pain: An Information Guide for Health and Social Service Providers \(information package\)](#) provides information about women's chronic pain and strategies to support practitioners' practice.
- [Women's Chronic Pain and Prescription Opioid Use: An Educational Guide for Service Providers \(online education guide\)](#) supports health and social service providers in understanding sex and gender factors influencing women's pain and opportunities to offer comprehensive pain management for women in their practice.

Some resources specifically for women patients, and the public

- [Women and Chronic Pain Conditions \(infographic\)](#) brings attention to how women are disproportionately affected by various pain conditions.
- [8 Most Evidenced Treatments for Women's Chronic Pain \(infographic\)](#) to inform women about types of treatments for chronic pain, and what they effectively address.
- [What is Chronic Pain and How Can I Manage It? \(information package\)](#) Is designed for women experiencing chronic pain who want to understand more about their pain and effective strategies to manage their pain.

Recommendations #4 and #5. Research Funding and Agenda-Setting

In addition to these resources, our evidence reviews indicate a clear need for more comprehensive research in pain. In addition to Keough and Boerner's important suggestions for overarching changes in pain research, we recommend a dedicated research agenda priority setting process to integrate sex, gender and equity considerations into research funding programs and initiatives in Canada. Without these shifts, the evidence base upon which health care providers, and consumers base their actions and decisions will not be complete and helpful. This process could be convened nationally, and informed by consumers, researchers, and providers.

Research Gaps

As a broad starting point, we describe some examples of the gaps that emerged in our reviews.

Sex-related factors are not evenly studied for all chronic pain conditions. For example, the role of sex hormones has been documented mostly in relation to migraines and IBS, with some evidence on osteoarthritis and burning mouth syndrome, but not as an integrated and consistent component. Sex-related factors affecting neurobiology have been studied in relation to chronic primary pain, complex regional pain syndrome, migraine, and IBS. The influence of genes has been studied mostly in relation to migraine. In addition, as females show greater opioid analgesia and more side effects than males [25, 26], more research is needed on the pharmacodynamic and pharmacokinetic issues that mediate sex differences in pharmacologic response to analgesics.

Gender-related factors also need more study. The role of gender and its impact on acquiring pain conditions and living with pain is crucial, but still under researched. While there is research on the gendered experiences of women living with endometriosis, dyspareunia, and fibromyalgia, there is less representation of other chronic pain conditions such as migraine, which receives more attention in the sex-related research. Occupational injuries that lead to chronic pain are gendered, as are occupational and daily living pressures such as caregiving. Help seeking for pain is also gendered, and we found research that addressed men living with fibromyalgia and their attitudes towards seeking medical advice. However, while women are more likely to seek medical support, it is less clear what factors contribute to this and how it might differ across chronic pain conditions. Even so, the healthcare system does produce differential experiences for men and women.

For example, women report being mindful of their appearances when seeking medical support in order to be taken seriously by medical staff. Such issues point to the need for gendered education to create safer, welcoming, and non-judgemental clinical spaces for those living with chronic pain, with perhaps tailored responses according to chronic pain diagnoses.

Equity-related factors are critical. There is a lack of robust evidence that reflects the experiences of how age, race, socioeconomic status, education, trauma exposure, and ability affect the experiences of chronic pain for men, women, or gender diverse individuals. To better inform policy and practice, it is clear that further research needs to be conducted with these factors in mind to gain a better understanding of how diverse experiences and social positions, along with sex and gender related factors, inform chronic pain experiences and management practices, and how social processes such as sexism, racism and colonialism contribute to ongoing inequities in responding to pain. These are but a few of the research gaps in the pain literature.

Enacting these five recommendations could enhance the Action Plan and contribute to a more robust response to pain for all Canadians.

References

1. Health Canada, *An Action Plan for Pain in Canada*. May 2021: Ottawa, ON.
2. Greaves, L. and S. Ritz, *Sex, Gender and Health: Mapping the Landscape of Research and Policy*. Int J Environ Res Public Health, 2022. **19**(5).
3. Osborne, N.R. and K.D. Davis, *Sex and gender differences in pain*. International Review of Neurobiology, 2022. **164**: p. 277-307.
4. Keogh, E. and K.E. Boerner, *Challenges with embedding an integrated sex and gender perspective into pain research: Recommendations and opportunities*. Brain, Behavior, and Immunity, 2024. **117**: p. 112-121.
5. Greaves, L. and N. Hemsing, *Sex and Gender Interactions on the Use and Impact of Recreational Cannabis*. Int J Environ Res Public Health, 2020. **17**(2).
6. Canadian Pain Task Force, *An Action Plan for Pain in Canada*. 2021.
7. International Association for the Study of Pain. *Epidemiology of pain in women*. 2007 [cited 2024 February 8]; Available from: https://www.iasp-pain.org/wp-content/uploads/2022/10/Epidemiology-English_References.pdf.
8. Stålnacke, B.M., et al., *Is there a gender bias in recommendations for further rehabilitation in primary care of patients with chronic pain after an interdisciplinary team assessment?* J Rehabil Med, 2015. **47**(4): p. 365-71.
9. Schilter, L.V., et al., *Gender-based differential management of acute low back pain in the emergency department: A survey based on a clinical vignette*. Womens Health (Lond), 2024. **20**: p. 17455057231222405.
10. Delaruelle, Z., et al., *Male and female sex hormones in primary headaches*. The Journal of Headache and Pain, 2018. **19**(1): p. 117.
11. International Association for the Study of Pain. *Pain in Women*. [cited 2024 February 8]; Available from: <https://www.iasp-pain.org/advocacy/global-year/pain-in-women/>.
12. Shallcross, R., et al., *Women's Subjective Experiences of Living with Vulvodynia: A Systematic Review and Meta-Ethnography*. Arch Sex Behav, 2018. **47**(3): p. 577-595.
13. Facchin, F., et al., *The Subjective Experience of Dyspareunia in Women with Endometriosis: A Systematic Review with Narrative Synthesis of Qualitative Research*. Int J Environ Res Public Health, 2021. **18**(22).
14. Côté, D. and M.F. Coutu, *A critical review of gender issues in understanding prolonged disability related to musculoskeletal pain: how are they relevant to rehabilitation?* Disabil Rehabil, 2010. **32**(2): p. 87-102.
15. Chin, M.L., R.B. Fillingim, and T.J. Ness, eds. *Pain in women*. 2013, Oxford University Press: New York, NY.
16. Casale, R., et al., *Pain in Women: A Perspective Review on a Relevant Clinical Issue that Deserves Prioritization*. Pain and Therapy, 2021. **10**(1): p. 287-314.
17. Walker, N., et al., *The experiences of persistent pain among women with a history of intimate partner violence: A systematic review*. Trauma, Violence, & Abuse, 2022. **23**(2): p. 490-505.
18. Huhn, A.S. and K.E. Dunn, *Challenges for Women Entering Treatment for Opioid Use Disorder*. Current Psychiatry Reports, 2020. **22**(12): p. 76.
19. Brown, D., et al., *A scoping review of chronic pain in emerging adults*. Pain Reports, 2021. **6**(1): p. E920.
20. Evans, E.A., et al., *Gender Differences in Use of Complementary and Integrative Health by U.S. Military Veterans with Chronic Musculoskeletal Pain*. Women's Health Issues, 2018. **28**(5): p. 379-386.
21. International Association for the Study of Pain. *Endometriosis and its Association with other Painful Conditions*. [cited 2024 February 8]; Available from: https://www.iasp-pain.org/wp-content/uploads/2022/10/Endometriosis-English_References.pdf.
22. Affatato, O., et al., *Major sex differences in migraine prevalence among occupational categories: a cross-sectional study using UK Biobank*. Journal of Headache and Pain, 2021. **22**(1): p. 145.
23. Latif, Z.-E.H., et al., *Chronic pain among patients with an opioid use disorder*. The American Journal on Addictions, 2021: p. No-Specified.

24. Heidari, S., et al., *Sex and Gender Equity in Research: rationale for the SAGER guidelines and recommended use*. Research Integrity and Peer Review, 2016. **1**(1): p. 2.
25. E. Keogh, K.B., *Challenges with embedding an integrated sex and gender perspective into pain research: Recommendations and opportunities*. Brain, Behavior, and Immunity, 2023.
26. Gandhi, M., et al., *Sex Differences in Pharmacokinetics and Pharmacodynamics*. Annual Review of Pharmacology and Toxicology, 2004. **44**(1): p. 499-523.

Appendix 1: Research Methodology

Scoping Review

- **Figure 1.** PRISMA Flow Diagram for Scoping Review Q1: What are women’s experiences with prescribed opioids for chronic pain?”

Two Literature Reviews

- **Figure 2.** PRISMA Flow Diagram for RQ2 “What are the sex and gender factors affecting chronic pain?”
- **Figure 3.** PRISMA Flow Diagram for RQ3 “How do sex and gender factors impact the efficacy of chronic pain interventions?”

Qualitative Interviews

- 22 Semi-structured Interviews

The *Women’s Chronic Pain and Prescription Opioid Project* was a two-year project led by the Centre of Excellence for Women’s Health and funded by Health Canada. The goal of the project was to create sex, gender, equity, and trauma-informed resources for health and social service providers that reflect women’s lived and living experiences with chronic pain and prescription opioids.

Project activities include a scoping review, literature reviews, qualitative interviews, and consultations with policymakers, health and social service providers, researchers, and women with lived and living experience. The results of these activities have been translated into information sheets, packages, and educational guides available on the Centre of Excellence for Women’s Health website. Here we briefly outline the scoping and literature review methodologies, describe the qualitative interview approach and provide the reference list of all included studies.

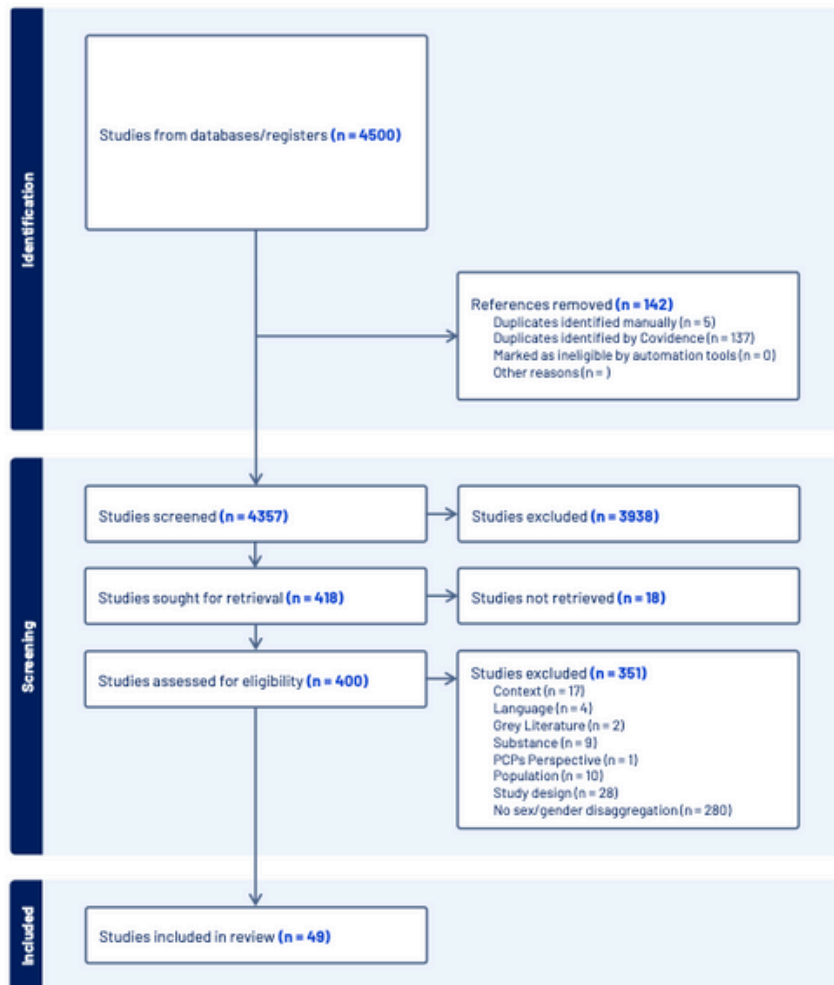
Scoping Review

A scoping review was conducted in April 2022 guided by the question:

1. What are women’s experiences with prescribed opioids for chronic pain?

Four electronic databases, Medline, CINALH, PsycInfo, and Scopus, were searched using keywords inclusive of opioids, views and experiences, and chronic pain conditions. The search produced 5,943 returns and once duplicates were removed, there were 4,357 unique returns included for screening. All screening was completed using Covidence Systematic Review Software from Veritas Health Innovation, Melbourne, Australia. Articles published between 2012 and 2022 were included, if they included women or female’s views, perspectives, perceptions, beliefs, and experiences with prescribed opioids for a chronic pain prescription. Throughout the screening process, we sought experiences such as misuse, barriers, drawbacks, benefits, side effects, tapering, health effects, dependence, and efficacy of opioids for chronic pain conditions. 49 studies were included in the final review. Please see the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) flow diagram adapted by Moher et al. (2009) for the scoping review question, below.

Figure 1. PRISMA Flow Diagram for “What are women’s experiences with prescribed opioids for chronic pain?”



Literature Reviews

Two literature reviews were conducted in July 2023 guided by the questions:

1. What are the sex and gender factors affecting chronic pain?
2. How do sex and gender factors impact the efficacy of chronic pain interventions?

To answer the first question, six databases, MEDLINE, Embase, PsycInfo, International Pharmaceutical Abstracts, Cochrane Database of Systematic Reviews, and Scopus were searched using keywords and MeSH terms inclusive of sex and gender factors and chronic pain. The search produced 1,489 returns and once duplicates were removed, there were 1,475 unique returns included for screening. All screening was completed using Covidence. Articles published between 2013 and 2023 were included if they had a focus on pain and sex and/or gender related factors. 32 studies were included in the final review.

To answer the second question, six databases, MEDLINE, Embase, PsycInfo, International Pharmaceutical Abstracts, Cochrane Library, and Scopus were searched using MeSH terms and keywords related to three main topics: sex and gender factors, chronic pain, and pain management

interventions and options. The search produced 2,389 returns and once duplicates were removed, there were 1,861 unique returns included for screening. All screening was completed using Covidence. Articles published between 2013 and 2023 were included if they reported on women’s sex and/or gender disaggregated outcomes from a wide range of pain management interventions. 38 studies were included in the final review.

Please see the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) flow diagram adapted by Moher et al. (2009) for the literature review questions, below.

Figure 2. PRISMA Flow Diagram for “What are the sex and gender factors affecting chronic pain?”

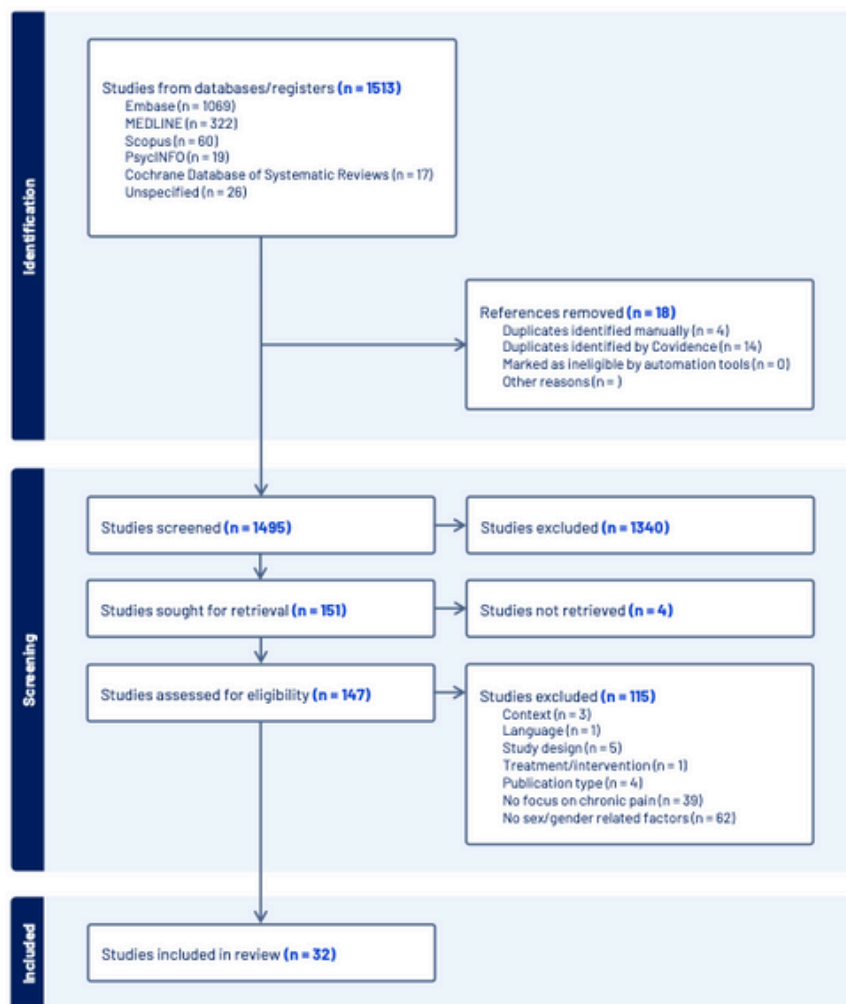
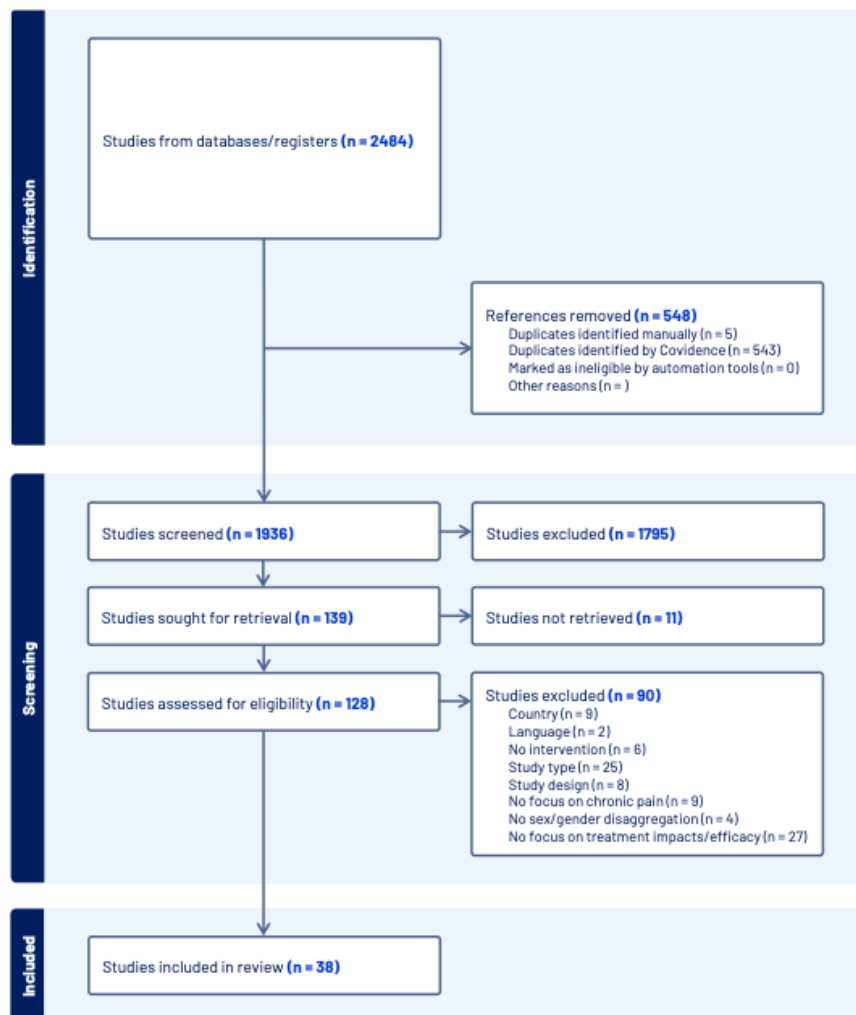


Figure 3. PRISMA Flow Diagram for “How do sex and gender factors impact the efficacy of chronic pain interventions?”



Semi-Structured Interviews

Qualitative interviews were conducted with women who experience(d) chronic pain and prescription opioid use living in BC, Northwest Territories, and the Yukon in late 2022. After receiving ethics approval from the University of British Columbia, women were recruited through the BC Association of Pregnancy Outreach Programs, BC Society of Transition Houses, Victoria Lesbian Seniors Care Society, Victoria Faulkner Transition House, Yellowknife Women's Society, and BC Mental Health and Substance Use Services. Interviews were conducted in-person and over Zoom and led by a researcher with lived experience of chronic pain.

The interviews sought to understand women's experiences and identify their ideas for what health care providers should know about chronic pain and prescribed opioids. Twenty-two women were interviewed. The interviews were transcribed and thematically analyzed and coded in NVivo 12. The diagram above provides some characteristics of the women who participated in the interviews.



22

Women interviewed

13 from BC
4 from NWT
5 from Yukon

24

Longest length of years women reported using opioids for chronic pain management

31

Primary conditions that prompted prescription opioid for pain management.

9

Women still using opioids for pain management at the time of interview.

Appendix 2: List of All Studies Reviewed

Scoping Review - What are women's experiences with prescribed opioids for chronic pain?

- Ait-Daoud, N., Blevins, D., Khanna, S., Sharma, S., Holstege, C. P., & Amin, P. (2019). Women and Addiction: An Update. *Med Clin North Am*, 103(4), 699-711. doi:10.1016/j.mcna.2019.03.002
- Allen, C., Murphy, A., Kiselbach, S., VandenBerg, S., & Wiebe, E. (2015). Exploring the experience of chronic pain among female Survival Sex Workers: a qualitative study. *BMC Family Practice*, 16, 1-8.
- Allen, C., Murphy, A., Kiselbach, S., VandenBerg, S., & Wiebe, E. (2015). Exploring the experience of chronic pain among female Survival Sex Workers: a qualitative study. *BMC Family Practice*, 16, 1-8.
- Arksey, H., & O'malley, L. (2005). Scoping studies: towards a methodological framework. *International journal of social research methodology*, 8(1), 19-32.
- As-Sanie, S., Soliman, A., Evans, K., Erpelding, N., Lanier, R., & Katz, N. (2020). Healthcare utilization and cost burden among women with endometriosis by opioid prescription status in the first year after diagnosis: a retrospective claims database analysis. *Journal of Medical Economics*, 23(4), 371-377.
- As-Sanie, S., Soliman, A. M., Evans, K., Erpelding, N., Lanier, R. K., & Katz, N. P. (2021). Short-acting and long-acting opioids utilization among women diagnosed with endometriosis in the United States: a population-based claims study. *Journal of Minimally Invasive Gynecology*, 28(2), 297-306. e292.
- As-Sanie, S., Till, S. R., Mowers, E. L., Lim, C. S., Skinner, B. D., Fritsch, L., . . . Brummett, C. M. (2017). Opioid prescribing patterns, patient use, and postoperative pain after hysterectomy for benign indications. *Obstetrics & Gynecology*, 130(6), 1261-1268.
- Braden, J. B., Young, A., Sullivan, M. D., Walitt, B., LaCroix, A. Z., & Martin, L. (2012). Predictors of change in pain and physical functioning among post-menopausal women with recurrent pain conditions in the women's health initiative observational cohort. *The Journal of Pain*, 13(1), 64-72.
- Castillo, A. I. M. (2021). "It Just Stopped": Veterans' Experiences of Opioid Discontinuation. University of Arkansas for Medical Sciences.
- Chang, F., & Ibrahim, S. (2017). Perceptions of community-dwelling patients and their physicians on OxyContin® discontinuation and the impact on chronic pain management. *Pain Research and Management*, 2017.
- Cherrier, M. M., Shen, D. D., Shireman, L., Saxon, A. J., Simpson, T., Men, A., . . . Terman, G. W. (2021). Elevated customary alcohol consumption attenuates opioid effects. *Pharmacology Biochemistry and Behavior*, 211, 173295.
- Chiuve, S. E., Kilpatrick, R. D., Hornstein, M. D., Petruski-Ivleva, N., Wegrzyn, L. R., Dabrowski, E. C., . . . Bateman, B. T. (2021). Chronic opioid use and complication risks in women with endometriosis: a cohort study in US administrative claims. *Pharmacoepidemiology and drug safety*, 30(6), 787-796.
- Cichowski, S. B., Rogers, R. G., Komesu, Y., Murata, E., Qualls, C., Murata, A., & Murata, G. (2018). A 10-yr analysis of chronic pelvic pain and chronic opioid therapy in the women veteran population. *Military medicine*, 183(11-12), e635-e640.
- Dailey, D. L., Vance, C. G., Chimenti, R., Rakel, B. A., Zimmerman, M. B., Williams, J. M., . . . Crofford, L. J. (2022). The Influence of opioids on transcutaneous electrical nerve stimulation effects in women with fibromyalgia. *The Journal of Pain*, 23(7), 1268-1281.
- Dassieu, L., Heino, A., Develay, É., Kaboré, J.-L., Pagé, M. G., Hudspith, M., . . . Choinière, M. (2021). Conversations about opioids: impact of the opioid overdose epidemic on social interactions for people who live with chronic pain. *Qualitative Health Research*, 31(9), 1657-1669.
- Dassieu, L., Heino, A., Develay, É., Kaboré, J.-L., Pagé, M. G., Moor, G., . . . Choinière, M. (2021). "They think you're trying to get the drug": Qualitative investigation of chronic pain patients' health care experiences during the opioid overdose epidemic in Canada. *Canadian journal of pain*, 5(1), 66-80.
- Dassieu, L., Kaboré, J.-L., Choinière, M., Arruda, N., & Roy, É. (2019). Chronic pain management among people who use drugs: A health policy challenge in the context of the opioid crisis. *International Journal of Drug Policy*, 71, 150-156.
- Dassieu, L., Kabore, J.-L., Choinière, M., Arruda, N., & Roy, E. (2019). Understanding the link between substance use and chronic pain: A qualitative study among people who use illicit drugs in Montreal, Canada. *Drug and alcohol dependence*, 202, 50-55.
- De Sola, H., Maquibar, A., Failde, I., Salazar, A., & Goicolea, I. (2020). Living with opioids: a qualitative study with patients with chronic low back pain. *Health Expectations*, 23(5), 1118-1128.

- Estes, S. J., Soliman, A. M., Zivkovic, M., Chopra, D., & Zhu, X. (2020). Healthcare resource use and costs associated with opioid initiation among patients with newly diagnosed endometriosis with commercial insurance in the USA. *Advances in Therapy, 37*, 2777-2791.
- Estes, S. J., Soliman, A. M., Zivkovic, M., Chopra, D., & Zhu, X. (2020). The impact of high-risk and chronic opioid use among commercially insured endometriosis patients on health care resource utilization and costs in the United States. *Women's Health, 16*, 1745506520965898.
- Frank, J. W., Levy, C., Matlock, D. D., Calcaterra, S. L., Mueller, S. R., Koester, S., & Binswanger, I. A. (2016). Patients' perspectives on tapering of chronic opioid therapy: a qualitative study. *Pain medicine, 17*(10), 1838-1847.
- Garland, E. L., Reese, S. E., Bedford, C. E., & Baker, A. K. (2019). Adverse childhood experiences predict autonomic indices of emotion dysregulation and negative emotional cue-elicited craving among female opioid-treated chronic pain patients. *Development and Psychopathology, 31*(3), 1101-1110.
- Goetz, T. G., Becker, J. B., & Mazure, C. M. (2021). Women, opioid use and addiction.
- Hachey, L. M., Gregg, J. A., Pavlik-Maus, T. L., & Jones, J. S. (2017). Health implications and management of women with opioid use disorder. *Journal of Nursing Education and Practice, 7*(8), 57-62.
- Hadlandsmyth, K., Stewart, K. R., Paez, M. B., Steffen, M., Meth, M., Reisinger, H. S., & Mosher, H. J. (2019). Patient perspectives on opioids: Views of inpatient veterans with chronic pain. *Pain medicine, 20*(6), 1141-1147.
- Hoffman, K. A., Ponce Terashima, J., McCarty, D., & Muench, J. (2017). Toward a Patient Registry for Cannabis Use: An Exploratory Study of Patient Use in an Outpatient Health-Care Clinic in Oregon. *World medical & health policy, 9*(3), 307-317.
- Huhn, A. S., Tompkins, D. A., Campbell, C. M., & Dunn, K. E. (2019). Individuals with chronic pain who misuse prescription opioids report sex-based differences in pain and opioid withdrawal. *Pain medicine, 20*(10), 1942-1947.
- Kim, C. H., Garcia, R., Stover, J., Ritchie, K., Whealton, T., & Ata, M. A. (2014). Androgen deficiency in long-term intrathecal opioid administration. *Pain Physician, 17*(4), E543.
- Kinnaird, E., Kimergård, A., Jennings, S., Drummond, C., & Deluca, P. (2019). From pain treatment to opioid dependence: a qualitative study of the environmental influence on codeine use in UK adults. *BMJ open, 9*(4), e025331.
- LeResche, L., Saunders, K., Dublin, S., Thielke, S., Merrill, J. O., Shortreed, S. M., . . . Von Korff, M. R. (2015). Sex and age differences in global pain status among patients using opioids long term for chronic noncancer pain. *Journal of women's health, 24*(8), 629-635.
- Ljungvall, H., Rhodin, A., Wagner, S., Zetterberg, H., & Åsenlöf, P. (2020). "My life is under control with these medications": an interpretative phenomenological analysis of managing chronic pain with opioids. *BMC musculoskeletal disorders, 21*, 1-14.
- Manubay, J., Davidson, J., Vosburg, S., Jones, J., Comer, S., & Sullivan, M. Sex differences among opioid-abusing patients with chronic pain in a clinical trial. *J Addict Med. 2015; 9*(1): 46-52. DOI: 10.1097. ADM, 86.
- Margarit, C., Ballester, P., Maria-del-Mar, I., Roca, R., Gomez, L., Planelles, B., . . . Peiro, A. M. (2019). OPRM1 gene interaction with sleep in chronic pain patients treated with opioids. *Pain Physician, 22*(1), 97.
- Martucci, K. T., MacNiven, K. H., Borg, N., Knutson, B., & Mackey, S. C. (2019). Apparent effects of opioid use on neural responses to reward in chronic pain. *Scientific reports, 9*(1), 9633.
- McCrorie, C., Closs, S. J., House, A., Petty, D., Ziegler, L., Glidewell, L., . . . Foy, R. (2015). Understanding long-term opioid prescribing for non-cancer pain in primary care: a qualitative study. *BMC Family Practice, 16*, 1-9.
- Menzies, V., Thacker, L. R., Mayer, S. D., Young, A. M., Evans, S., & Barstow, L. (2017). Polypharmacy, opioid use, and fibromyalgia: a secondary analysis of clinical trial data. *Biological Research For Nursing, 19*(1), 97-105.
- Paterson, C., Ledgerwood, K., Arnold, C., Hogg, M., Xue, C., & Zheng, Z. (2016). Resisting prescribed opioids: a qualitative study of decision making in patients taking opioids for chronic noncancer pain. *Pain medicine, 17*(4), 717-727.
- Ritchie, C. S., Garrett, S. B., Thompson, N., & Miaskowski, C. (2020). Unintended consequences of opioid regulations in older adults with multiple chronic conditions. *The Gerontologist, 60*(7), 1343-1352.
- Sheehy, K. A., Finkel, J. C., Darbari, D. S., Guerrero, M. F., & Quezado, Z. M. (2015). Dexmedetomidine as an Adjuvant to Analgesic Strategy During Vaso-Occlusive Episodes in Adolescents with Sickle-Cell Disease. *Pain Practice, 15*(8), E90-E97.
- St. Marie, B. (2014). Health care experiences when pain and substance use disorder coexist: "just because I'm an addict doesn't mean I don't have pain". *Pain medicine, 15*(12), 2075-2086.

- Swenson, C. W., Kelley, A. S., Fenner, D. E., & Berger, M. B. (2016). Outpatient narcotic use after minimally invasive urogynecologic surgery. *Urogynecology*, *22*(5), 377-381.
- VanDenKerkhof, E. G., Hopman, W. M., Goldstein, D. H., Wilson, R. A., Towheed, T. E., Lam, M., . . . Medd, J. D. (2012). Impact of perioperative pain intensity, pain qualities, and opioid use on chronic pain after surgery: a prospective cohort study. *Regional Anesthesia & Pain Medicine*, *37*(1), 19-27.
- Vowles, K. E., Witkiewitz, K., Pielech, M., Edwards, K. A., McEntee, M. L., Bailey, R. W., . . . Sullivan, M. D. (2018). Alcohol and opioid use in chronic pain: A cross-sectional examination of differences in functioning based on misuse status. *The Journal of Pain*, *19*(10), 1181-1188.
- Weimer, M. B., Macey, T. A., Nicolaidis, C., Dobscha, S. K., Duckart, J. P., & Morasco, B. J. (2013). Sex differences in the medical care of VA patients with chronic non-cancer pain. *Pain medicine*, *14*(12), 1839-1847.
- Wersocki, E., Bedson, J., Chen, Y., LeResche, L., & Dunn, K. M. (2017). Comprehensive systematic review of long-term opioids in women with chronic noncancer pain and associated reproductive dysfunction (hypothalamic-pituitary-gonadal axis disruption). *Pain*, *158*(1), 8-16.
- Young-Wolff, K. C., Klebaner, D., Weisner, C., Von Korff, M., & Campbell, C. I. (2017). Smoking status and opioid-related problems and concerns among men and women on chronic opioid therapy. *The Clinical journal of pain*, *33*(8), 730-737.

Literature Review Question #1 - What are the sex and gender factors affecting chronic pain?

- Adeyemo, M. A., Spiegel, B. M. R., & Chang, L. (2010). Meta-analysis: do irritable bowel syndrome symptoms vary between men and women? *Alimentary pharmacology & therapeutics*, *32*(6), 738-755. doi:<https://dx.doi.org/10.1111/j.1365-2036.2010.04409.x>
- Al-Hassany, L., Haas, J., Piccininni, M., Kurth, T., Maassen Van Den Brink, A., & Rohmann, J. L. (2020). Giving Researchers a Headache - Sex and Gender Differences in Migraine. *Frontiers in Neurology*, *11*((Al-Hassany, Maassen Van Den Brink) Division of Vascular Medicine and Pharmacology, Department of Internal Medicine, Erasmus MC University Medical Center, Rotterdam, Netherlands(Haas, Piccininni, Kurth, Rohmann) Institute of Public Health, Charite - Unive), 549038. doi:<https://dx.doi.org/10.3389/fneur.2020.549038>
- Al-Karagholi, M. A.-M., Kalatharan, V., Ghanizada, H., Dussor, G., & Ashina, M. (2023). Prolactin in headache and migraine: A systematic review of preclinical studies. *Headache*, *63*(5), 577-584. doi:<https://dx.doi.org/10.1111/head.14412>
- Andersen, S., Petersen, M. W., Svendsen, A. S., & Gazerani, P. (2015). Pressure pain thresholds assessed over temporalis, masseter, and frontalis muscles in healthy individuals, patients with tension-type headache, and those with migraine—a systematic review. *Pain*, *156*(8), 1409-1423. doi:<https://dx.doi.org/10.1097/j.pain.0000000000000219>
- Barnish, M., Morgan, H. M., & Barnish, J. (2017). The 2016 HIGH Heels: Health effects And psychosexual Benefits (HIGH HABITS) study: systematic review of reviews and additional primary studies. *BMC public health*, *18*(1), 37. doi:<https://dx.doi.org/10.1186/s12889-017-4573-4>
- Barrington, D. J., Robinson, H. J., Wilson, E., & Hennegan, J. (2021). Experiences of menstruation in high income countries: A systematic review, qualitative evidence synthesis and comparison to low and middle-income countries. *PLoS ONE*, *16*(July), e0255001. doi:<https://dx.doi.org/10.1371/journal.pone.0255001>
- Boiko, O., Barrio-Martínez, S., Priede, A., Ventura, L., Gómez-Carazo, N., Hernández-Abellá, A., . . . González-Blanch, C. (2021). Analysis of the PHQ-15 by individual items: A systematic review and meta-analysis. *Ansiedad y Estrés*, *28*(1), 62-73. doi:10.5093/anyes2022a7
- Brown, D., Schenk, S., Genet, D., Zernikow, B., & Wager, J. (2021). A scoping review of chronic pain in emerging adults. *Pain Reports*, *6*(1), E920. doi:10.1097/PR9.0000000000000920
- Castien, R. F., van der Wouden, J. C., & De Hertogh, W. (2018). Pressure pain thresholds over the cranio-cervical region in headache: a systematic review and meta-analysis. *Journal of Headache and Pain*, *19*(1), 9. doi:<https://dx.doi.org/10.1186/s10194-018-0833-7>
- Chai, N. C., Peterlin, B. L., & Calhoun, A. H. (2014). Migraine and estrogen. *Current Opinion in Neurology*, *27*(3), 315-324. doi:<https://dx.doi.org/10.1097/WCO.0000000000000091>
- Choquet, H., Yin, J., Jacobson, A. S., Horton, B. H., Hoffmann, T. J., Jorgenson, E., . . . Pressman, A. R. (2021). New and sex-specific migraine susceptibility loci identified from a multiethnic genome-wide meta-analysis. *Communications biology*, *4*(1), 864. doi:<https://dx.doi.org/10.1038/s42003-021-02356-y>

- Conversano, C., Ciacchini, R., Orru, G., Bazzichi, M. L., Gemignani, A., & Miniati, M. (2021). Gender differences on psychological factors in fibromyalgia: a systematic review on the male experience. *Clinical and experimental rheumatology*, *39 Suppl 130*(3), 174–185. doi:<https://dx.doi.org/10.55563/clinexprheumatol/73g6np>
- Cote, D., & Coutu, M.-F. (2010). A critical review of gender issues in understanding prolonged disability related to musculoskeletal pain: how are they relevant to rehabilitation? *Disability and rehabilitation*, *32*(2), 87–102.
- Delaruelle, Z., Ivanova, T. A., Khan, S., Negro, A., Ornello, R., Raffaelli, B., . . . Reuter, U. (2018). Male and female sex hormones in primary headaches. *Journal of Headache and Pain*, *19*(1), 117. doi:<https://dx.doi.org/10.1186/s10194-018-0922-7>
- Facchin, F., Buggio, L., Dridi, D., Barbara, G., & Vercellini, P. (2021). The Subjective Experience of Dyspareunia in Women with Endometriosis: A Systematic Review with Narrative Synthesis of Qualitative Research. *International Journal of Environmental Research and Public Health*, *18*(22). doi:<https://dx.doi.org/10.3390/ijerph182212112>
- Fernandez-de-las-Penas, C., Navarro-Santana, M. J., Curiel-Montero, F., Plaza-Manzano, G., Alburquerque-Sendin, F., & Rodrigues-de-Souza, D. P. (2022). Localized and widespread pressure pain hypersensitivity in patients with episodic or chronic migraine: A systematic review and meta-analysis. *Cephalalgia*, *42*(9), 966–980. doi:<https://dx.doi.org/10.1177/03331024221084217>
- Huguet, A., Tougas, M. E., Hayden, J., McGrath, P. J., Chambers, C. T., Stinson, J. N., & Wozney, L. (2016). Systematic Review of Childhood and Adolescent Risk and Prognostic Factors for Recurrent Headaches. *Journal of Pain*, *17*(8), 855–873.e858. doi:<https://dx.doi.org/10.1016/j.jpain.2016.03.010>
- Hunt, K., Adamson, J., Hewitt, C., & Nazareth, I. (2011). Do women consult more than men? A review of gender and consultation for back pain and headache. *Journal of health services research & policy*, *16*(2), 108–117. doi:<https://dx.doi.org/10.1258/jhsrp.2010.009131>
- Kahere, M., Hlongwa, M., & Ginindza, T. G. (2022). A Scoping Review on the Epidemiology of Chronic Low Back Pain among Adults in Sub-Saharan Africa. *International Journal of Environmental Research and Public Health*, *19*(5), 2964. doi:<https://dx.doi.org/10.3390/ijerph19052964>
- Levine, D., & Horesh, D. (2020). Suicidality in Fibromyalgia: A Systematic Review of the Literature. *Frontiers in Psychiatry*, *11*((Levine) Department of Psychology, New York University, New York, NY, United States(Levine) Department of Psychiatry, Massachusetts General Hospital, Boston, MA, United States(Horesh) Department of Psychology, Bar-Ilan University, Ramat Gan, Israel(Horesh), 535368. doi:<https://dx.doi.org/10.3389/fpsy.2020.535368>
- Ma, T., Li, Z.-Y., Yu, Y., Yang, Y., Ni, M.-H., Xie, H., . . . Yan, L.-F. (2022). Gray Matter Abnormalities in Patients with Complex Regional Pain Syndrome: A Systematic Review and Meta-Analysis of Voxel-Based Morphometry Studies. *Brain sciences*, *12*(8). doi:<https://dx.doi.org/10.3390/brainsci12081115>
- Ricoy-Cano, A. J., Cortes-Perez, I., Del Carmen Martin-Cano, M., & De La Fuente-Robles, Y. M. (2022). Impact of Fibromyalgia Syndrome on Female Sexual Function: A Systematic Review with Meta-analysis. *Journal of Clinical Rheumatology*, *28*(2), 574–582. doi:<https://dx.doi.org/10.1097/RHU.0000000000001758>
- Rummens, S., Robben, E., De Groef, A., Van Wambeke, P., Janssens, L., Brumagne, S., . . . Peers, K. (2020). Factors Associated With the Ultrasound Characteristics of the Lumbar Multifidus: A Systematic Review. *PM & R : the journal of injury, function, and rehabilitation*, *12*(1), 82–100. doi:<https://dx.doi.org/10.1002/pmrj.12212>
- Sabo, M. C., Fratila, T. D., Bogariu, A. M., & Dumitrascu, D. L. (2021). Sex-gender differences in irritable bowel syndrome. *European Journal of Clinical Investigation*, *51*(SUPPL 1), 136–137. doi:<https://dx.doi.org/10.1111/eci.13567>
- Schulte, K. J., & Mayrovitz, H. N. (2023). Myocardial Infarction Signs and Symptoms: Females vs. Males. *Cureus*, *15*(4), e37522. doi:<https://dx.doi.org/10.7759/cureus.37522>
- Shallcross, R., Dickson, J. M., Nunns, D., Mackenzie, C., & Kiemle, G. (2018). Women's Subjective Experiences of Living with Vulvodynia: A Systematic Review and Meta-Ethnography. *Archives of sexual behavior*, *47*(3), 577–595. doi:<https://dx.doi.org/10.1007/s10508-017-1026-1>
- Shen, B. Q., Sankaranarayanan, I., Price, T. J., & Tavares-Ferreira, D. (2023). Sex-differences in prostaglandin signaling: a semi-systematic review and characterization of PTGDS expression in human sensory neurons. *Scientific reports*, *13*(1), 4670. doi:<https://dx.doi.org/10.1038/s41598-023-31603-x>
- Souza, P. P., Romao, A. S., Rosa-e-Silva, J. C., Reis, F. C. d., Nogueira, A. A., & Poli-Neto, O. B. (2011). Qualitative research as the basis for a biopsychosocial approach to women with chronic pelvic pain. *Journal of psychosomatic obstetrics and gynaecology*, *32*(4), 165–172. doi:<https://dx.doi.org/10.3109/0167482X.2011.607523>

- Tschon, M., Contartese, D., Pagani, S., Borsari, V., & Fini, M. (2021). Gender and sex are key determinants in osteoarthritis not only confounding variables. A systematic review of clinical data. *Journal of Clinical Medicine*, 10(14), 3178. doi:<https://dx.doi.org/10.3390/jcm10143178>
- Úbeda-D'ocasar, E., Gallego-Sendarrubias, G. M., Guodemar-Pérez, J., & Hervás-Pérez, J. P. (2020). Differences between Men and Women with Fibromyalgia. *Physikalische Medizin Rehabilitationsmedizin Kurortmedizin*, 30(5), 272-282. doi:10.1055/a-1089-8152
- Wang, Z., Yuan, M., Xiao, J., Chen, L., Guo, X., Dou, Y., . . . Zhou, B. (2022). Gray Matter Abnormalities in Patients with Chronic Primary Pain: A Coordinate-Based Meta-Analysis. *Pain physician*, 25(1), 1-13.
- Yousaf, M. S., Alam, M. A., Qadeer, M., Ahmad, F., Riaz, R. H., & Riaz, S. H. (2021). Risk factors in burning mouth syndrome among older adults. *Pakistan Journal of Medical and Health Sciences*, 15(8), 2060-2063. doi:<https://dx.doi.org/10.53350/pjmhs211582060>

Literature Review Question #2 - How do sex and gender factors impact the efficacy of chronic pain interventions?

- Aboussouan, A. B., Mandell, D., Johnson, J., Thompson, N., & Huffman, K. L. (2021). An interdisciplinary chronic pain rehabilitation program effectively treats impairment in sexual function, depression, alexithymia, and pain in women with chronic pelvic pain. *Journal of psychosomatic obstetrics and gynaecology*, 42(4), 261-271. doi:<https://dx.doi.org/10.1080/0167482X.2020.1735341>
- Acker, H., Schmidt-Rathjens, C., Acker, Fandrey, J., & Ehleben, W. (2015). Acupuncture-brain interactions as hypothesized by mood scale recordings. *Medical Hypotheses*, 85(3), 371-379. doi:<https://dx.doi.org/10.1016/j.mehy.2015.05.013>
- Agius, A. M., Jones, N. S., & Muscat, R. (2013). Serial blood serotonin levels in a randomized controlled trial comparing the efficacy of low-dose amitriptyline, amitriptyline with pindolol and surrogate placebo in patients with chronic tension-type facial pain. *Rhinology*, 51(3), 236-242. doi:10.4193/rhin13.019
- Ahlstrand, I., Thyberg, I., Falkmer, T., Dahlstrom, O., & Bjork, M. (2015). Pain and activity limitations in women and men with contemporary treated early RA compared to 10 years ago: the Swedish TIRA project. *Scandinavian journal of rheumatology*, 44(4), 259-264. doi:<https://dx.doi.org/10.3109/03009742.2014.997285>
- Anderson, R. U., Wise, D., Sawyer, T., Nathanson, B. H., & Nevin Smith, J. (2016). Equal Improvement in Men and Women in the Treatment of Urologic Chronic Pelvic Pain Syndrome Using a Multi-modal Protocol with an Internal Myofascial Trigger Point Wand. *Applied psychophysiology and biofeedback*, 41(2), 215-224. doi:<https://dx.doi.org/10.1007/s10484-015-9325-6>
- Arentz, S., Smith, C., Redmond, R., Abbott, J., & Armour, M. (2021). A cross-sectional study of traditional Chinese medicine practitioner's knowledge, treatment strategies and integration of practice of chronic pelvic pain in women. *BMC Complementary Medicine and Therapies*. doi:10.1186/s12906-021-03355-6
- Barrachina, J., Margarit, C., Muriel, J., Lopez-Gil, V., Lopez-Gil, S., Ballester, P., . . . Peiro, A. M. (2022). Sex Differences in Oxycodone/Naloxone vs. Tapentadol in Chronic Non-Cancer Pain: An Observational Real-World Study. *Biomedicines*, 10(10). doi:<https://dx.doi.org/10.3390/biomedicines10102468>
- Boerner, K. E., Eccleston, C., Chambers, C. T., & Keogh, E. (2017). Sex differences in the efficacy of psychological therapies for the management of chronic and recurrent pain in children and adolescents: A systematic review and meta-Analysis. *Pain*, 158(4), 569-582. doi:<https://dx.doi.org/10.1097/j.pain.0000000000000803>
- Brotto, L. A., Basson, R., Smith, K. B., Driscoll, M., & Sadownik, L. (2015). Mindfulness-based group therapy for women with provoked vestibulodynia. *Mindfulness*, 6(3), 417-432. doi:<https://dx.doi.org/10.1007/s12671-013-0273-z>
- Brotto, L. A., Bergeron, S., Zdaniuk, B., & Basson, R. (2020). Mindfulness and cognitive behavior therapy for provoked vestibulodynia: Mediators of treatment outcome and long-term effects. *Journal of consulting and clinical psychology*, 88(1), 48-64. doi:<https://dx.doi.org/10.1037/ccp0000473>
- Brotto, L. A., Yong, P., Smith, K. B., & Sadownik, L. A. (2015). Impact of a multidisciplinary vulvodynia program on sexual functioning and dyspareunia. *The Journal of Sexual Medicine*, 12(1), 238-247. doi:<https://dx.doi.org/10.1111/jsm.12718>
- Brotto, L. A., Zdaniuk, B., Rietchel, L., Basson, R., & Bergeron, S. (2020). Moderators of Improvement From Mindfulness-Based vs Traditional Cognitive Behavioral Therapy for the Treatment of Provoked Vestibulodynia. *The Journal of Sexual Medicine*, 17(11), 2247-2259. doi:<https://dx.doi.org/10.1016/j.jsxm.2020.07.080>

- Castro, S., aacute, nchez, A. M., Aguilar, F., ndiz, M. E., Matar, . . . as, C. (2014). Short-term effects of a manual therapy protocol on pain, physical function, quality of sleep, depressive symptoms, and pressure sensitivity in women and men with fibromyalgia syndrome: a randomized controlled trial. *Clinical journal of pain, 30*(7), 589. doi:https://doi.org/10.1097/AJP.0000000000000008
- Conic, R. R. Z., Caylor, J., Cui, C. L., Reyes, Z., Nelson, E., Yin, S., & Lerman, I. (2022). Sex-specific differences in the efficacy of traditional low frequency versus high frequency spinal cord stimulation for chronic pain. *Bioelectronic medicine, 8*(1), 8. doi:https://dx.doi.org/10.1186/s42234-022-00090-2
- Davis, S. N. P., Bergeron, S., Binik, Y. M., & Lambert, B. (2013). Women with Provoked Vestibulodynia Experience Clinically Significant Reductions in Pain Regardless of Treatment: Results from a 2-Year Follow-Up Study. *Journal of Sexual Medicine, 10*(12), 3080-3087. doi:https://dx.doi.org/10.1111/jsm.12309
- Desjardins, E. L., Brooks, B., Leishear, K., Aronson, R., Howell, M., & Shrikhande, A. A. (2020). A novel, non-opioid treatment protocol for women with chronic pelvic pain syndrome. *PM and R. doi:10.1002/pmrj.12519*
- Driscoll, M. A., Knobf, M. T., Higgins, D. M., Heapy, A., Lee, A., & Haskell, S. (2018). Patient Experiences Navigating Chronic Pain Management in an Integrated Health Care System: A Qualitative Investigation of Women and Men. *Pain medicine (Malden, Mass.), 19*(suppl_1), S19-S29. doi:https://dx.doi.org/10.1093/pm/pny139
- Dubinskaya, A., Horwitz, R., Scott, V., Anger, J., & Eilber, K. (2023). Is it time for doctors to Rx vibrators? A systematic review of pelvic floor outcomes. *Sexual Medicine Reviews, 11*(1), 15-22. doi:https://dx.doi.org/10.1093/sxmrev/qaec008
- Franconi, F., Finocchi, C., Allais, G., Omboni, S., Tullo, V., Campesi, I., . . . Bussone, G. (2014). Gender and triptan efficacy: A pooled analysis of three double-blind, randomized, crossover, multicenter, Italian studies comparing frovatriptan vs. other triptans. *Neurological Sciences, 35*(SUPPL. 1), S99-S105. doi:https://dx.doi.org/10.1007/s10072-014-1750-4
- Giudice, L. C., As-Sanie, S., Arjona Ferreira, J. C., Becker, C. M., Abrao, M. S., Lessey, B. A., . . . Johnson, N. P. (2022). Once daily oral relugolix combination therapy versus placebo in patients with endometriosis-associated pain: two replicate phase 3, randomised, double-blind, studies (SPIRIT 1 and 2). *Lancet. doi:10.1016/S0140-6736(22)00622-5*
- Hasegawa, M., Yamazaki, S., Kimura, M., Nakano, K., & Yasumura, S. (2013). Community-based exercise program reduces chronic knee pain in elderly Japanese women at high risk of requiring long-term care: A non-randomized controlled trial. *Geriatrics & Gerontology International, 13*(1), 167-174. doi:https://dx.doi.org/10.1111/j.1447-0594.2012.00879.x
- Ilgen, M. A., Coughlin, L. N., Bohnert, A. S. B., Chermack, S., Price, A., Kim, H. M., . . . Blow, F. C. (2020). Efficacy of a Psychosocial Pain Management Intervention for Men and Women With Substance Use Disorders and Chronic Pain: A Randomized Clinical Trial. *JAMA psychiatry, 77*(12), 1225-1234. doi:https://dx.doi.org/10.1001/jamapsychiatry.2020.2369
- Kang, S.-K., Lee, Y.-H., Park, H., Ro, J. Y., & Ahn, Q. S. (2018). Effects of intramuscular morphine in men and women with temporomandibular disorder with myofascial pain. *Oral diseases, 24*(8), 1591-1598. doi:https://dx.doi.org/10.1111/odi.12919
- Lami, M. J., Martinez, M. P., Sanchez, A. I., Miro, E., Diener, F. N., Prados, G., & Guzman, M. A. (2016). Gender Differences in Patients with Fibromyalgia Undergoing Cognitive-Behavioral Therapy for Insomnia: Preliminary Data. *Pain practice : the official journal of World Institute of Pain, 16*(2), E23-34. doi:https://dx.doi.org/10.1111/papr.12411
- Leo, R. J. (2013). A systematic review of the utility of anticonvulsant pharmacotherapy in the treatment of vulvodynia pain. *Journal of Sexual Medicine. doi:10.1111/jsm.12200*
- Linda, S., Gunilla, S., Ann-Charlotte, K., & Britt-Marie, S. (2022). SEX AND AGE GROUP FOCUS ON OUTCOMES AFTER MULTIMODAL REHABILITATION FOR PATIENTS WITH CHRONIC PAIN IN NORTHERN SWEDEN. *Journal of Rehabilitation Medicine, 54. doi:10.2340/jrm.v54.2336*
- Lutfi, M., Dalleck, L. C., Drummond, C., Drummond, M., Paparella, L., Keith, C. E., . . . Ramos, J. S. (2023). A Single Session of a Digital Health Tool-Delivered Exercise Intervention May Provide Immediate Relief from Pelvic Pain in Women with Endometriosis: A Pilot Randomized Controlled Study. *International Journal of Environmental Research and Public Health. doi:10.3390/ijerph20031665*
- Murphy, J. L., Phillips, K. M., & Rafie, S. (2016). Sex differences between Veterans participating in interdisciplinary chronic pain rehabilitation. *Journal of rehabilitation research and development, 53*(1), 83-94. doi:https://dx.doi.org/10.1682/JRRD.2014.10.0250

- Myhr, A., & Augestad, L. B. (2013). Chronic pain patients—effects on mental health and pain after a 57-week multidisciplinary rehabilitation program. *Pain management nursing : official journal of the American Society of Pain Management Nurses*, 14(2), 74-84. doi:<https://dx.doi.org/10.1016/j.pmn.2010.09.005>
- Nicosia, F. M., Gibson, C. J., Purcell, N., Zamora, K., Tighe, J., & Seal, K. H. (2021). Women Veterans' Experiences with Integrated, Biopsychosocial Pain Care: A Qualitative Study. *Pain medicine (Malden, Mass.)*, 22(9), 1954-1961. doi:<https://dx.doi.org/10.1093/pm/pnaa481>
- Ornello, R., Ahmed, F., Negro, A., Miscio, A. M., Santoro, A., Alpuente, A., . . . Sacco, S. (2021). Is There a Gender Difference in the Response to onabotulinumtoxinA in Chronic Migraine? Insights from a Real-Life European Multicenter Study on 2879 Patients. *Pain and Therapy*, 10(2), 1605-1618. doi:<https://dx.doi.org/10.1007/s40122-021-00328-y>
- Racine, M., Sole, E., Sanchez-Rodriguez, E., Tome-Pires, C., Roy, R., Jensen, M. P., . . . Cane, D. (2020). An Evaluation of Sex Differences in Patients With Chronic Pain Undergoing an Interdisciplinary Pain Treatment Program. *Pain practice : the official journal of World Institute of Pain*, 20(1), 62-74. doi:<https://dx.doi.org/10.1111/papr.12827>
- Rini, C., Porter, L. S., Somers, T. J., McKee, D. C., DeVellis, R. F., Smith, M., . . . Keefe, F. J. (2015). Automated Internet-based pain coping skills training to manage osteoarthritis pain: A randomized controlled trial. *Pain*, 156(5), 837-848. doi:<https://dx.doi.org/10.1097/j.pain.0000000000000121>
- Schlaeger, J. M., Pauls, H. A., Powell-Roach, K. L., Thornton, P. D., Hartmann, D., Suarez, M. L., . . . Patil, C. L. (2019). Vulvodynia, "A Really Great Torturer": A Mixed Methods Pilot Study Examining Pain Experiences and Drug/Non-drug Pain Relief Strategies. *The Journal of Sexual Medicine*. doi:10.1016/j.jsxm.2019.05.004
- Sinclair, J., Smith, C. A., Abbott, J., Chalmers, K. J., Pate, D. W., & Armour, M. (2020). Cannabis Use, a Self-Management Strategy Among Australian Women With Endometriosis: Results From A National Online Survey. *Journal of Obstetrics and Gynaecology Canada*. doi:10.1016/j.jogc.2019.08.033
- Vallinga, M. S., Spoelstra, S. K., Hemel, I. L. M., van de Wiel, H. B. M., & Weijmar Schultz, W. C. M. (2015). Transcutaneous electrical nerve stimulation as an additional treatment for women suffering from therapy-resistant provoked vestibulodynia: a feasibility study. *The Journal of Sexual Medicine*, 12(1), 228-237. doi:<https://dx.doi.org/10.1111/jsm.12740>
- Vining, R., Onifer, S. M., Twist, E., Ziegler, A. M., Corber, L., & Long, C. R. (2022). Thoracolumbar fascia mobility and chronic low back pain: Phase 2 of a pilot and feasibility study including multimodal chiropractic care. *Chiropractic and Manual Therapies*, 30(1), 46. doi:<https://dx.doi.org/10.1186/s12998-022-00455-z>
- Yang, E. C., Koenig, N. A., Gong, M., Brotto, L. A., Barr, A. M., Lee, T., . . . Geoffrion, R. (2022). Cannabis use preferences in women with myofascial pelvic pain: A survey. *International Urogynecology Journal*. doi:10.1007/s00192-022-05079-8

Other

In addition the articles found through the scoping and literature reviews, the following resources and references that highlighted the prevalence of specific chronic pain conditions among women and females were also included in knowledge products.

- Alberta Health Services. (2020). *Fibromyalgia: Living with Fibromyalgia*. <https://myhealth.alberta.ca/Alberta/Pages/living-with-fibromyalgia.aspx>.
- BC Women's Hospital & Health Centre. (n.d.). *Pelvic Pain/Endometriosis: Health info & resources for patients*. <http://www.bcwomens.ca/health-info/sexual-reproductive-health/pelvic-pain-endometriosis#Endometriosis>.
- Bergeron, S. R., Barbara, D., Wesselmann, U., & Bohm-Starke, N. (2020). *Vulvodynia*. *Nature Reviews Disease Primers*, 6(36). <https://doi.org/10.1038/s41572-020-0164-2>.
- EndoAct Canada. (n.d.). *Endometriosis Awareness in Canada: Introduction*. (n.d.). <https://endoact.ca/>.
- Fedorak, R. N., Vanner, S. J., Paterson, W. G., & Bridges, R. J. (2012). Canadian Digestive Health Foundation Public Impact Series 3: irritable bowel syndrome in Canada. Incidence, prevalence, and direct and indirect economic impact. *Canadian Journal of Gastroenterology*, 26(5), 252-256. <https://doi.org/10.1155/2012/861478>.
- Fitzcharles, M. A. (2017). *What is Fibromyalgia?* *Arthritis Society Canada*. [https://arthritis.ca/about-arthritis/arthritis-types-\(a-z\)/types/fibromyalgia](https://arthritis.ca/about-arthritis/arthritis-types-(a-z)/types/fibromyalgia).

Health Canada. (2008). *It's Your Health: Seniors and Aging - Osteoarthritis*. https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/hl-vs/alt_formats/pacrb-dgapcr/pdf/iyh-vsv/diseases-maladies/seniors-aines-ost-art-eng.pdf.

Heitkemper, M. M., & Jarett, M. (2021). *IBS in women*. The International Foundation for Gastrointestinal Disorders. <https://aboutibs.org/what-is-ibs/ibs-in-women/>.

International Association for the Study of Pain. (2007). *Differences in Pain Between Men and Women*. <https://www.iasp-pain.org/wp-content/uploads/2022/10/PainDifferences-English-References.pdf>.

Kuriya, B. (2023). *What is Rheumatoid Arthritis?* Arthritis Society Canada. [https://arthritis.ca/about-arthritis/arthritis-types-\(a-z\)/types/rheumatoid-arthritis](https://arthritis.ca/about-arthritis/arthritis-types-(a-z)/types/rheumatoid-arthritis).

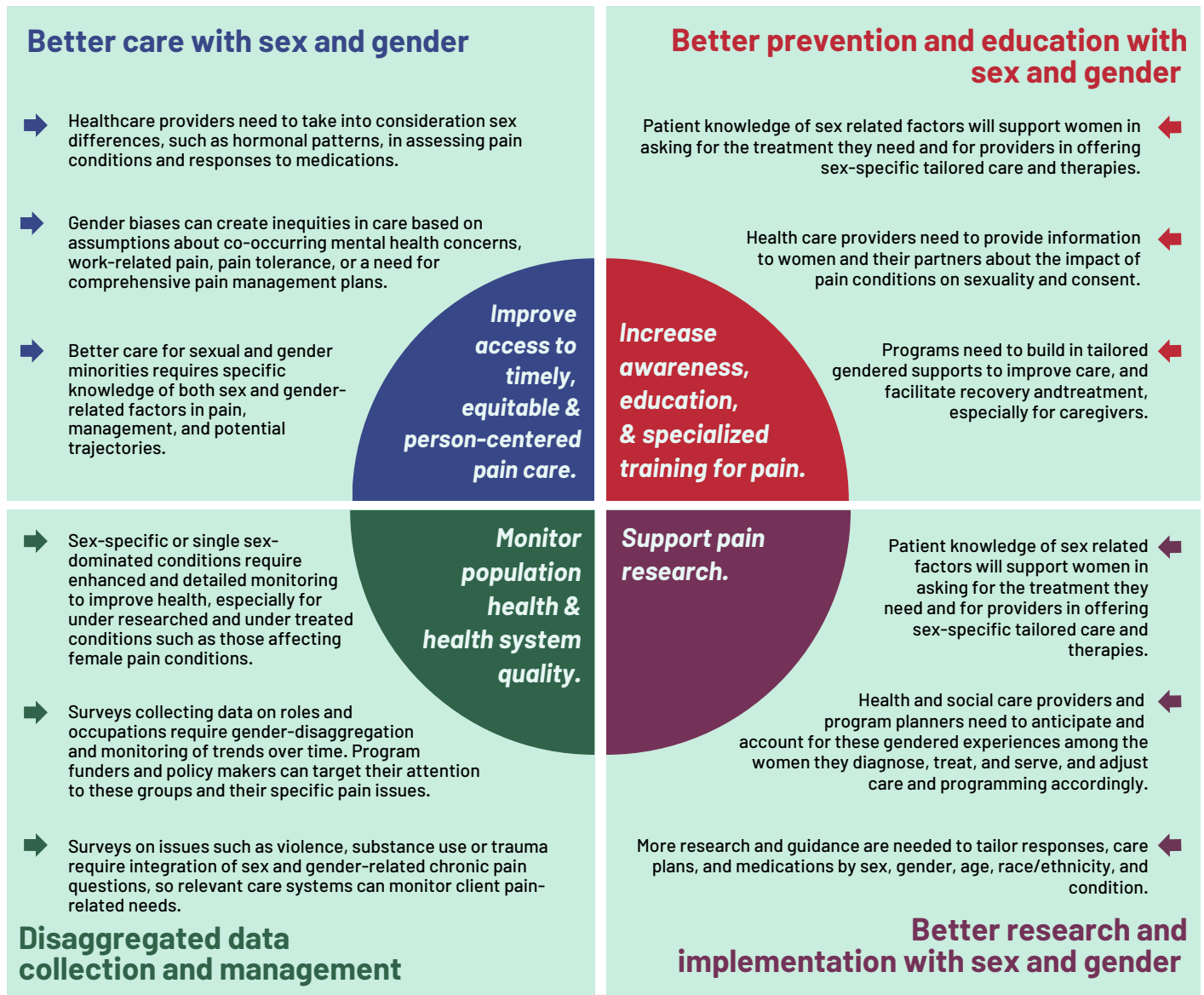
Meana, M., Cho, R., & DesMeules, M. (2004). Chronic Pain: The Extra Burden on Canadian Women. *BMC Women's Health*, 4(Suppl 1), S17-S17. <https://doi.org/10.1186/1472-6874-4-S1-S17>.

Public Health Agency of Canada (2020). *Rheumatoid Arthritis in Canada*. <https://www.canada.ca/en/public-health/services/publications/diseases-conditions/rheumatoid-arthritis.html>.

The TMJ Association. (n.d.). *TMJ Basics*. <https://tmj.org/living-with-tmj/basics/>.

The World Health Organization. (2023). *Osteoarthritis*. <https://www.who.int/news-room/fact-sheets/detail/osteoarthritis>.

Appendix 3: Infographic - Integrating SGBA+ In the Action Plan Goals



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