

# **Shadow Systems of Care: Unpaid Care Work and the Leaky Pipeline for Women in SETT**

Prepared for the  
Canadian Coalition of Women in Engineering, Science, Trades and Technology  
(CCWESTT)

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May 2025

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# Introduction

The reliance on unpaid work, disproportionately carried out by women, has significant implications for the labour market participation of women, including women in Science, Engineering, Trades and Technology (SETT).

While globally policymakers and researchers acknowledge the importance of STEM (science, technology, engineering, and mathematics) education and jobs for economic growth and innovation<sup>1</sup>, women remain significantly underrepresented in SETT fields in most countries around the world (Speer, 2021). In Canada women make up less than 25% of those employed in STEM careers. While 34% of Canadians with a STEM degree are women, only 23% of those actually working in science and technology occupations are women (Statistics Canada, 2019). This phenomenon is often referred to as the “leaky pipeline”, an analogy that describes how women's participation in STEM steadily declines at each stage of education and career development (Liu et al., 2019).

According to Freedman et al. (2023), this leaky pipeline can be attributed to a range of persistent and structural barriers that women in STEM face including gender and racial discrimination, sexual harassment, and negative workplace climates.

While women remain underrepresented across STEM fields, the situation is even more stark in the skilled trades. Women make up less than 8% of skilled trades employees in Canada, and only 14.8% of the Red Seal workforce, significantly below their 48.2% representation across all occupations. When traditionally female-dominated service trades such as cook, baker, and hairstylist are excluded, the proportion drops to just 5.2%. Only a handful of trades, such as baking, painting and decorating, and a few niche specializations, have seen even modest increases in women’s participation, underscoring the persistent gender gap in Canada’s skilled trades workforce. This gap is the largest for racialized women, trans women, newcomer women, and women with disabilities (Pay Equity Office, 2023).

Moreover, women make up less than 2% of the workforce in nine specific trades, including industrial electrician, automotive service technician, electrical powerline worker, HVAC mechanic, construction millwright, plumber, oil and fuel mechanic, bricklayer, and heavy-duty equipment mechanic (Canadian Apprenticeship Forum, 2023).

In Canada, consistent barriers to gender diversity and inclusion in the skilled trades continue to create “leaks in the pipeline.” According to Centre for Innovation in Campus Mental Health, (n.d.), there exist significant barriers to women entering and completing apprenticeships and moving on to become journey people. For example, while women represent 4.8% of construction

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<sup>1</sup> Stefani et al. (2024) highlight three central reasons why this disparity warrants attention. First, from an equity standpoint, all individuals should have the opportunity to pursue fields of interest free from gender-based biases or societal expectations. Second, given that STEM occupations are typically associated with higher wages, the gender imbalance in these fields contributes to enduring income disparities and diminished financial security for women over the course of their lives. Finally, in light of the current and projected shortages of STEM professionals in the labour market, enhancing women's participation in these fields is increasingly recognized as vital to addressing workforce demands.

apprenticeship registrations across Canada, only 2% go on to complete their programs. In another example, in carpentry, over 70% of women leave within the first two years of their apprenticeship.

Research has shown that women in many trades face numerous obstacles to both entry and long-term success, with unsafe physical conditions, unwelcoming workplaces, harassment, discrimination, isolation, and hostile work environments. Additional stressors—including ill-fitting personal protective equipment (PPE), limited hands-on training, physical overcompensation, and a lack of clean and accessible bathroom facilities, further compound these challenges (Curtis et al., 2022).

Another barrier is the burden of unpaid care work—including care for children, the elderly, other household members, and extended family members with care needs—which continues to place a significant strain on women in SETT overall, yet remains insufficiently explored in both research and policy.

This paper presents a review of the existing literature on unpaid caregiving and its impact on women's participation in science, engineering, trades and technology (SETT) careers. It brings together research from across disciplines to highlight how both childcare and eldercare responsibilities contribute to women's underrepresentation and attrition in these fields, with a particular emphasis on the often-overlooked effects of eldercare.

## The Gendered Burden of Care in Canada

Over the past 35 years, beginning with the restructuring of the Canadian health care system in the early 1990s, Canada's social infrastructure has been systematically scaled back. During this time, the federal government began privatizing crown corporations, contracting out public service work, and gradually withdrawing from its role in providing and supporting care work (Ilcan, 2009). Since 1995, Canadian governments have consistently spent less than the OECD average on social services, reinforcing this pattern of retrenchment (Jarrett, 2021). As a result, the responsibility for care has increasingly shifted to the nonprofit sector, informal networks, and the homes of individual citizens (Wilson et al., 2002).

This withdrawal, widely understood as being driven by neoliberal logics that position care as a private practice (Power et al., 2022), has intensified the burden on unpaid labour, specifically unpaid care and domestic work. Nowhere in the world do men perform as much care work as women (Coffey et al., 2020). In all societies, despite cultural variations, women continue to take on a greater share of unpaid care responsibilities (OECD, 2019), with research showing that women typically spend disproportionately more time on unpaid care work than men. Globally, 76% of unpaid domestic work is carried out by women, who devote an average of four hours and 25 minutes each day to unpaid care work—more than three times the one hour and 23 minutes typically spent by men (ILO, 2018). Worldwide, women perform 12.5 billion hours of unpaid care work daily, equivalent to 1.5 billion people working full-time, eight-hour days without pay (Coffey et al., 2020).

In Canada, women perform about 1.5 more hours of unpaid work than men each day and spend approximately 60% more time on unpaid care work than men (Faraday, 2021), regardless of their financial contributions to household income (Criado Perez, 2019).

Care is the foundation of both economies and societies. Unpaid care work (UCW), estimated to contribute US\$10.8 trillion to the global economy annually, or approximately 9% of global GDP (Coffey et al., 2020), is vital to societal well-being and economic resilience.

Since at least the early 1960s, feminist scholars have emphasized the critical role of care in sustaining and nurturing life, exposing the exploitation of these labours and their political significance (Mendelin & Hall, 2025). Recent scholarship has introduced the concept of shadow infrastructures of care (Power et al., 2022) as a new analytical framework for understanding the often-overlooked, backgrounded, or compartmentalized dimensions of care. This perspective draws attention to the informal, invisible, and marginalized forms of caregiving that operate alongside, or beneath, formal care systems, revealing the essential yet frequently undervalued labour that sustains individuals and communities.

UCW and domestic work encompass all the activities that support individuals in meeting their needs, including caring for children, the elderly, people with disabilities, and people facing illness, as well as teaching, cooking, cleaning, and providing household necessities (Cherie Blair Foundation for Women & CARE International, 2024; ESCAP/ASEAN, 2021). According to the International Labour Organization (ILO), UCW includes three main types of activities: performing domestic tasks for one's own household, providing care to household members, and offering support to other households and the broader community (Charmes, 2019).

## The Economic Value of Caregiving in Canada

Caregiving plays a significant role in the lives of many Canadians. According to the Canadian Centre for Caregiving Excellence (2022), half of all Canadians will take on a caregiving role at some point in their lives, collectively spending 5.7 billion unpaid hours on caregiving each year. Despite its essential role in sustaining life and societal functioning, unpaid care work has long been treated as an externality by traditional economic systems.

In Canada, the economic value of unpaid caregiving is estimated at \$97.1 billion annually, based on research by the Research on Aging Policies and Practices (RAPP) at the University of Alberta. This figure reflects the value of the 5.7 billion hours of care provided by family caregivers. According to the National Economic Accounts Division at Statistics Canada, the value of unpaid household work, including caregiving, is estimated at \$860.2 billion, equivalent to 37.2% of Canada's nominal GDP in 2019. This surpasses the economic contributions of the manufacturing, wholesale, and retail sectors combined (Statistics Canada, 2022).

## Eldercare and the Gendered Burden

In 2022 alone, over half of Canadian women aged 15 and older, nearly 8.4 million women, provided care to children or adults in need of support (Statistics Canada, 2023). As the demand for care grows, particularly with an aging population, the burden on informal caregivers is expected to intensify in the coming decades.

The proportion of Canadians aged 65 and older is projected to increase from 18.5% in 2021 to 25.9% by 2068 (Statistics Canada, 2022). Meanwhile, the population aged 85 and older is expected to more than triple, from 871,000 to 2.3 million (Lee et al., 2024). Given that only about 7% of Canadian seniors reside in collective dwellings with access to formal care, while the vast majority remain in private homes, eldercare is becoming an increasingly urgent public health issue in Canada and beyond (Dong, 2022).

In Canada, as in much of the world, the vast majority of eldercare is provided informally and unpaid. Women continue to shoulder most of this work. Approximately 23% of Canadian women provide care to adults with long-term health conditions or disabilities (Koshmaganbetova et al., 2024).

According to Moghadam et al. (2010) the most common eldercare arrangements involve daughters caring for aging parents or wives caring for their husbands. While men are increasingly contributing to eldercare, women remain the primary caregivers. Among adult children, daughters are significantly more likely than sons to provide eldercare—particularly when sons have sisters, who often take on a larger caregiving burden (Misra et al., 2023). Moreover, caregiving tasks differ by gender: men are more likely to handle tasks such as managing finances or yard work, while women tend to perform physically demanding and time-intensive tasks such as bathing, cleaning, and household maintenance.

## Nonprofit Organizations and the Gendered Economy of Care

The nonprofit sector is an increasingly vital part of the Canadian economy. It plays a central role in sustaining communities and delivering services in health care, education, recreation, the arts, and social services (Mendelin & Hall, 2025). As demographics shift and public policy reforms reshape service delivery, nonprofit organizations have become critical in addressing the unmet needs left by public and private sector gaps (Evans & Knepper, 2022).

In the current context of neoliberal austerity, privatization, and fiscal restraint, governments at all levels have increasingly offloaded responsibility for social service provision onto the nonprofit sector (Kosny & MacEachen, 2010). In response, nonprofit organizations have stepped in to fill the widening gaps in care and community services (Mendelin & Hall, 2025).

Volunteerism remains a cornerstone of nonprofit sector capacity in Canada. In 2018, 79% of Canadians aged 15 and older participated in some form of volunteer work, contributing approximately 2.5 billion hours (Statistics Canada, 2019). Hospital-based volunteer work accounted for the highest number of formal volunteer hours, underscoring the sector's contribution to healthcare.

Canada's nonprofit sector is a major driver of the national economy, employing 2.7 million people and generating \$226 billion in economic activity, equivalent to 8.2% of the country's GDP. Beyond paid work, around 13 million volunteers contribute nearly 2 billion hours each year to strengthening communities across the country (Imagine Canada, 2025).

While executive staff in many nonprofits, especially large health organizations, are often competitively compensated, much of the sector continues to rely on a so-called "passion bonus", the notion that lower wages are offset by the intrinsic value of doing meaningful work (Phillips & Wyatt, 2022). Despite the equity-oriented mission of many nonprofit organizations (NPOs), research shows that they can also reproduce marginalization and inequality—particularly among service providers and volunteers (Tulli-Shah et al., 2024; Kosny & MacEachen, 2010). This dynamic is partly tied to the sector's association with "feminine-coded" work. Roles in caregiving, education, and social services have evolved from unpaid or voluntary labour and are often perceived as "soft" or gendered occupations (Kosny & MacEachen, 2010).

As with unpaid household labour, community care in nonprofit, charitable, and social service settings is predominantly performed by women, who comprise 77% of the workforce in Canada's community-based nonprofit sector (Jensen, 2022). Women, and particularly immigrant and racialized women, are overrepresented in precarious roles characterized by low wages, limited access to benefits or pensions, and short-term, unstable contracts—often in caregiving-related positions (Phillips & Wyatt, 2022).

According to Statistics Canada's 2018 General Social Survey on Giving, Volunteering, and Participating, 44% of women volunteered through organizations, compared to 38% of men. Women were also more likely to engage in formal volunteering activities, particularly in older age groups. Among youth aged 15 to 30, there was no significant gender difference in volunteer rates (49% for women and 42% for men). However, among older adults, women were significantly more likely to volunteer than men.

## The Consequences of Unpaid Care Work on Women's Career in Science, Engineering, Trades and Technology

Unpaid care work significantly shapes women's labour market participation and contributes to substantial disruptions in their careers—including in science, engineering, trades and technology, (SETT).

Faraday et al. (2020) argue that women's disproportionate share of unpaid care work is the largest barrier to their participation in the labour market, limiting access to quality jobs, better working conditions, and higher earnings. The Gates Foundation highlights that globally, women spend nearly three times more hours on unpaid care work than men, with this imbalance leading to reduced workforce participation and economic productivity. The foundation notes that in 2018, an estimated 606 million working-age women worldwide considered themselves unavailable for employment or were not seeking work because of unpaid care responsibilities, compared with 41 million men (Gates Foundation, 2020).

According to Carers Canada, across Canada 15% of unpaid caregivers reduce their work hours, 40% miss days of work, 26% take a leave of absence, 10% turn down job opportunities, and 6% eventually leave the workforce altogether. These disruptions come at a significant cost, including lost wages, reduced career advancement, and diminished retirement income.

While recent research directly examining the effects of unpaid care work on SETT careers remains limited, earlier studies from the United States point to how caregiving responsibilities disproportionately borne by women hinder career progression in these fields. For example, Jean, Payne, and Thompson (2014) found that limited access to affordable and reliable childcare significantly restricts women's ability to meet the professional demands of SETT careers. These challenges were echoed in earlier findings by Preston (2004), who identified family responsibilities as a key factor in women leaving STEM fields. Supporting this, Martinez et al. (2007) reported that 21% of women—compared to only 7% of men—rank childcare as a top consideration when making career decisions.

More recent data reinforce these concerns. Myers (2023) found that the majority of parents in STEM careers cite childcare as a primary barrier to career advancement. While 96% of respondents stated that career growth was important over the next one to three years (with 65% rating it as very important), 67% of parents reported that childcare responsibilities were impeding their progress. Among those interested in pursuing further education, nearly all (98%) said access to childcare was essential, with 66% identifying it as very important.

These caregiving responsibilities also lead to planned career breaks, which can delay re-entry into the workforce, reduce pursuit of leadership roles, and increase attrition during key transition points. Preston (2006) showed that among women in science and technology who planned to have children, 64% anticipated taking a career break of one to five years. Fewer than 15% expected to return to work before their youngest child was one year old. Similarly, Myers (2023) found that 17% of surveyed STEM professionals left the field due to mismatched work hours and childcare availability. Among parents of children under six who left STEM, 23% cited incompatible work hours, 19% cited shift conflicts, and 11% left to become stay-at-home parents due to a lack of childcare options.

The career consequences of caregiving are particularly pronounced for early-career women. Shah et al. (2021) found that over 40% of women faculty in STEM fields left academia after the birth of their first child. Much of this attrition is linked to the unequal division of domestic labour and caregiving responsibilities, which continue to fall more heavily on women.

This trend aligns with broader research, Cech and Blair-Loy (2019) found that 43% of women leave full-time STEM employment after their first child. Compared to new fathers, new mothers are significantly more likely to leave the workforce, reduce their hours, or transition to part-time roles. These gender disparities persist across disciplines, racial and ethnic groups, and other social factors, underscoring the systemic nature of the issue.

Women in the trades report similar experiences. Work-life balance is a key factor in their career choices, particularly given their ongoing responsibility for unpaid care work, including childcare, housework, and increasingly, eldercare. The cumulative burden of this unpaid labour can discourage women from entering or remaining in non-traditional occupations like the trades. Financial barriers further exacerbate the issue, especially for those trying to re-enter the workforce after time away for caregiving. The need for funding to cover childcare, transportation, and job-specific materials, such as tools, equipment, or safety clothing, is often unmet. For many women, especially in male-dominated sectors like the trades, adding formal training or work obligations onto existing caregiving duties only deepens the strain (The Hypatia Association, 2008).

Together, these findings reveal persistent structural incompatibilities between caregiving and the demands of SETT careers—barriers that disproportionately impact women and contribute to the loss of skilled talent in these sectors.

## The Impact of Eldercare on Women in SETT

Some researchers suggest that elder caregiving is poised to equal, or even surpass, childcare as the primary work-family issue of the twenty-first century. However, while the impact of childcare on women's careers has been studied to some extent, the effects of eldercare remain significantly underexplored—particularly for women in SETT.

The economic literature broadly agrees that unpaid informal eldercare often necessitates substantial adaptations to caregivers' working lives. Numerous studies report a negative relationship between eldercare responsibilities and labour market participation (Schmitz & Westphal, 2017; Mussida & Patimo, 2023; Colombo et al., 2011).

Schneider et al. (2013) summarize that informal eldercare can spill over into paid employment in multiple ways. Caregivers may miss work due to scheduled appointments or unexpected emergencies, such as falls. Eldercare often imposes significant time demands, which heighten time scarcity and increase the opportunity costs of remaining in the workforce. As the time required for caregiving rises, many individuals reduce their work hours or leave the labour market altogether. Schneider et al. point to evidence from OECD countries showing that even a 1% increase in time spent on caregiving can raise the likelihood of labour market exit by 10%. Expedited labour market exit is particularly common among caregivers to elderly family members.

Female caregivers are more likely than their male counterparts to reduce working hours or decline job opportunities to meet caregiving demands (Paulson et al., 2017). These adjustments

can have long-term consequences, including income loss, diminished pension contributions, and reduced chances for future employment or promotion (Heger & Korfhage, 2020).

In one of the few studies that explicitly explores the impact of eldercare on women in STEM, Jean, Payne, and Thompson (2014) identify eldercare as a fourth major family-related barrier—alongside childcare, household duties, and spousal responsibilities. They note that women who provide eldercare may be perceived as less committed to their work, especially if caregiving interferes with professional obligations. Compared to those providing childcare or support to other dependents, women with eldercare duties report having less access to flexible work options, less supervisory support, and lower job security. While both childcare and eldercare can create disruptions, eldercare is often more unpredictable due to the likelihood of sudden health crises, such as strokes or hospitalizations, which require urgent and intensive care.

## Conclusion

Unpaid caregiving remains a critical yet insufficiently addressed factor influencing women's participation and advancement in SETT careers. While childcare has garnered some attention in both research and policy, eldercare, an increasingly pressing issue given Canada's rapidly ageing population, continues to be largely overlooked. As the need for elder support intensifies, so too will the caregiving demands placed on women, limiting their availability for full-time employment, advancement opportunities, and participation in sectors facing significant labour shortages.

In addition, women's disproportionate burden within other "shadow" care infrastructures, such as the nonprofit sector, where they represent the majority of the workforce—remains almost entirely absent from current labour market discourse. Despite their vital role in sustaining essential services through unpaid or underpaid labour, these contributions are rarely acknowledged in policy strategies aimed at achieving gender equity in SETT professions or the broader economy.

This literature review underscores the urgent need for a broader, intersectional understanding of care work, one that accounts for how unpaid labour within households and communities not only sustains the formal economy but also constrains women's full participation in it. As Canada faces growing skills gaps spurred by population aging coupled with technological change (Statistics Canada, 2022), failure to address the burden of unpaid care work risks diminishing the country's productive capacity. Recognizing and supporting caregivers, especially those providing eldercare, is essential to designing inclusive policies, supportive infrastructures, and research agendas that reflect the realities of women's labour and secure long-term workforce resilience.

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