POWERING EQUITY: ADVANCING DIVERSITY, INCLUSION, AND MENTAL & PHYSICAL HEALTH IN THE ELECTRICAL SKILLED TRADES

2026 ANNUAL REPORT

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Ontario Electrical League (OEL)

Final Report

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We acknowledge and honour the land on which the University of Toronto (UofT) operates and where the research activities are performed. We acknowledge the Anishinaabe peoples, the Haudenosaunee Confederacy, the Huron-Wendat, the Anishinaabeg, Chippewa, and the Métis peoples. This land is also part of the Dish with One Spoon Treaty territory, a treaty between the Anishinaabe, Mississauga's of the Credit, and Haudenosaunee that bound them to share the territory and protect the land.

We recognize the enduring presence of Indigenous peoples on this land and seek to honour their contributions past, present, and future. We commit to solidarity with Indigenous communities to ensure their rights, cultures, and histories are respected and uplifted.

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1. Executive Summary

In collaboration with the Ontario Electrical League (OEL), this report presents the findings of the 2025–2026 Skills Development Fund Round 5 (SDF5) project, conducted by the ReSTORE Lab at the University of Toronto. Building on four previous rounds of SDF research, this phase continues a multi-year effort to understand and improve health, well-being, and workforce sustainability among apprentices, journeypersons, and small- to medium-sized enterprise (SME) owners in Ontario's electrical sector.

Ontario's electrical workforce is central to meeting the province's housing, infrastructure, electrification, and climate-resilience goals. At the same time, the sector continues to face persistent labour shortages, an aging workforce, low representation of women and other equity-deserving groups, and ongoing pressures on small businesses. The SDF program was designed to address these challenges by generating practical, sector-specific evidence to support targeted interventions, particularly for non-unionized SMEs with limited time and resources to develop their own health, safety, and equity initiatives.

The SDF5 project used mixed-methods, sequential explanatory design, combining an online REDCap survey with semi-structured interviews. During the 2025–2026 period, 25 new participants were recruited through OEL Roadshows, chapter meetings, contractor outreach and email invitations, including apprentices, journeypersons, and SME owners. These data were then integrated into a pooled quantitative dataset spanning five years of research (SDF1–SDF5), comprising 188 electrical workers across Ontario. This dataset includes validated measures of musculoskeletal (MSK) symptoms, sleep quality, psychological distress, burnout, job satisfaction, and health-related quality of life. In parallel, two qualitative studies were conducted: one exploring organizational culture, equity, diversity and inclusion (EDI), and mental health with 52 workers and employers; and a second, with 12 SME owners, focusing on SME owner stress, coping strategies, and the realities of running small electrical businesses.

Across the pooled quantitative sample, MSK symptoms remain among the most universal health issues affecting electrical workers' functioning, health, and well-being. Over nine in ten participants reported at least one MSK symptom in the past year, with the lower back and shoulders most affected. These physical strains are consistent with the demands of electrical work, which often involves lifting, awkward postures, overhead tasks, and repetitive movements. Workers who reported more MSK symptoms also tended to report greater fatigue, difficulties recovering between shifts, and lower satisfaction with their jobs.

Sleep quality emerged as a central factor in the SDF5 analyses. Statistical models showed that poorer sleep was consistently associated with higher psychological distress, higher burnout, lower mental health scores, and a greater likelihood of reporting dissatisfaction with work. These associations remained evident even after accounting for factors such as age and years of trade experience. Qualitative interviews help explain these patterns:

participants described early start times, long commutes, physically demanding days, and difficulty "switching off" work-related stress at home, all of which contribute to inadequate or disrupted sleep. Together, these findings highlight sleep and fatigue as high-leverage intervention points with direct implications for safety, productivity, and retention.

Psychological distress and burnout were present at moderate levels across the pooled sample, indicating substantial ongoing emotional and physical strain. The data show that distress and burnout are closely linked to MSK pain, poor sleep, and workload pressures, reinforcing that physical and mental health cannot be treated as separate issues. Distress and burnout, in turn, are tied to workers' job satisfaction and their intentions to remain in or leave the trade.

The SDF5 findings also reveal important equity and role-specific differences. Apprentices, who make up a large proportion of the pooled dataset, reported significantly higher psychological distress than more experienced workers. This aligns with interview accounts describing financial insecurity, variable work hours, pressure to prove oneself, and limited control over tasks and schedules during the early stages of a career. While relatively few women in the sample reported higher distress and burnout than men. Their qualitative accounts describe sexist comments, biased assumptions about competence, uncertainty about accommodations (such as during pregnancy), and isolation as the only woman on a crew or in a company. These results are consistent with previous SDF cycles and with broader literature on women in male-dominated trades.

SME owners and employers face distinct but related pressures. In the pooled quantitative data, their levels of distress and burnout were comparable to those of workers. Qualitative interviews revealed that owners often juggle multiple roles (electrician, supervisor, estimator, administrator, and business manager) while contending with staffing shortages, tight deadlines, and financial uncertainty. Many owners described struggling to balance these competing demands with family and personal responsibilities and relying on informal coping strategies such as stepping away from the jobsite briefly, talking with trusted peers, or drawing on family support. Owner well-being, in turn, influences crew morale, communication, and the overall workplace climate.

The qualitative analyses of organizational culture and EDI provide further context for the quantitative patterns. Participants reported that "old-school" attitudes and toughness norms remain influential in parts of the sector, discouraging open discussion of mental health and sometimes normalizing exclusionary language. Women, newcomers, racialized workers, and persons with disabilities described experiencing biased assumptions, unequal task allocation, and a lack of clarity about accommodations or supports. At the same time, workers and employers identified practical, feasible strategies to improve inclusion, such as mentorship and buddy systems, early-career exposure to diverse tasks, clear anti-harassment policies, and simple informational resources tailored for small businesses.

Taken together, the SDF5 findings affirm that musculoskeletal strain, sleep disruption, psychological distress, burnout, and EDI-related barriers are longstanding, interconnected challenges in Ontario's electrical sector. They also show that these pressures are not evenly distributed: apprentices, women, workers in micro-sized firms, and SME owners bear a disproportionate share of the burden. These patterns have direct implications for apprenticeship completion, worker retention, and the province's ability to meet its skilled trades and infrastructure targets.

The report concludes with a set of evidence-based recommendations for OEL, SME employers, training partners, and the Government of Ontario. These include integrating fatigue and sleep health into safety and apprenticeship training; developing simple ergonomic guidance and micro-break strategies for high-risk tasks; strengthening mental health literacy and supervisor skills; advancing EDI through practical, low-burden tools; and piloting implementation-ready resources in small and medium-sized firms under future SDF programming. In early 2026, an observational study with journeyperson electricians will further deepen this evidence base by capturing objective data on physical workload and ergonomic risk in real-world settings.

Overall, the SDF5 project demonstrates the value of a sustained industry–academic partnership in generating actionable knowledge. By centring the lived experiences of workers and SME owners, and by focusing on realistic, SME-friendly solutions, this work supports Ontario's broader goals of building a resilient, inclusive, and healthy electrical workforce for the years ahead.

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2. Background and Rationale

This section outlines the context and rationale for the SDF5 project within Ontario's electrical sector. It summarizes the workforce and training environment, the health and well-being factors influencing retention and productivity, and persistent equity, diversity, and inclusion (EDI) gaps that affect participation in the trade. This background also situates SDF5 within the multi-year OEL–ReSTORE Lab partnership and clarifies why continued evidence generation and implementation-focused work is needed.

2.1 Ontario's Electrical Sector: Context and Rationale

Ontario's electrical sector is a foundational component of the province's economy and infrastructure. Electrical contractors and their workforce support residential, commercial, institutional, and industrial projects that are directly tied to Ontario's housing objectives, modernization of public infrastructure, and broader electrification efforts. In parallel, skilled trades are increasingly positioned as "in-demand" pathways for stable employment and economic growth, supported by federal and provincial initiatives that aim to strengthen training pipelines and workforce participation [1–3].

Entry into the electrical trade typically occurs through apprenticeship pathways that combine formal training with extensive work-based learning. National apprenticeship data show the scale and importance of this training system and also underscore the need to strengthen completion and progression outcomes to sustain labour supply in high-demand trades [4,5]. At the same time, workforce supply pressures are intensified by demographic change and persistent recruitment gaps, creating a need not only to attract new entrants but also to reduce preventable attrition among those already working in the sector [1,6].

Equity, diversity, and inclusion (EDI) are closely linked to this sustainability challenge. Sector-level evidence indicates that women and other equity-deserving groups remain underrepresented in the skilled trades compared to their share of the general population, limiting the available talent pool and reinforcing longstanding barriers to entry and retention [4,7]. Within the Ontario electrical context, SDF4 reporting similarly noted that women's participation in this sector remains well below the broader workforce average [8].

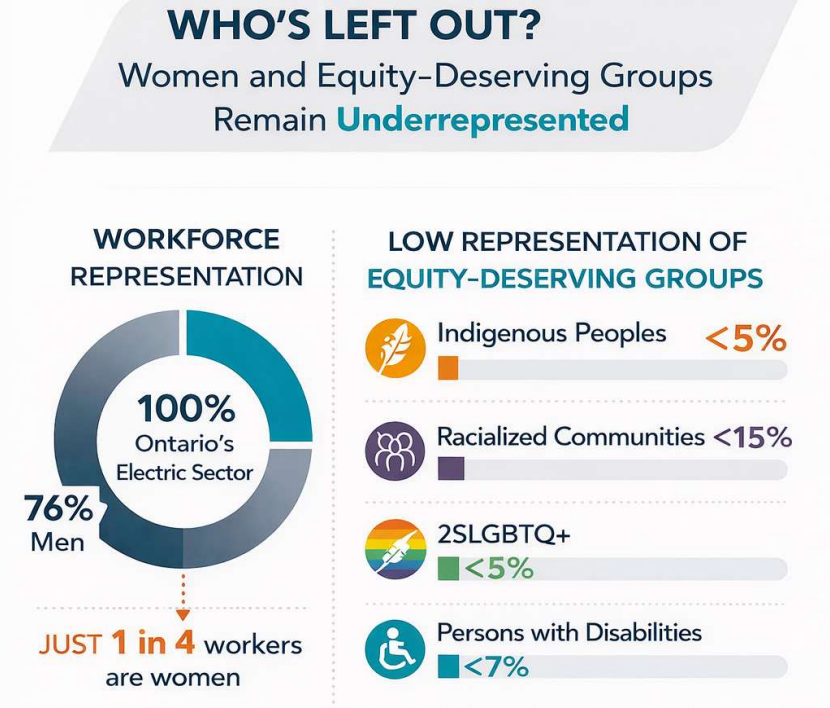
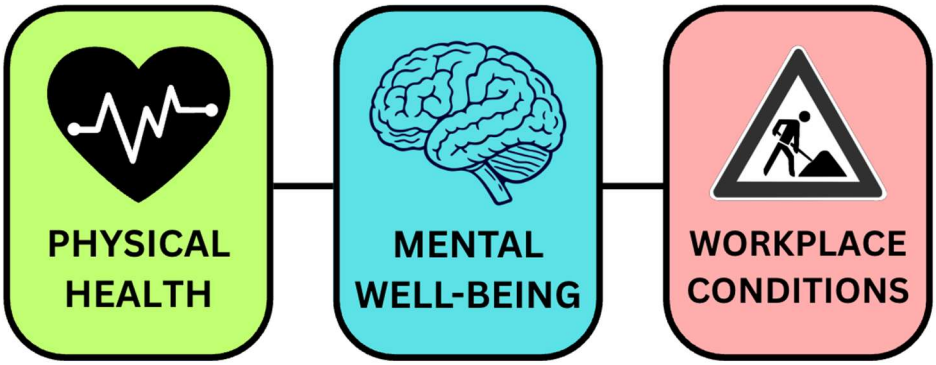


Figure 1: Low represented equity-deserving groups in the Electrical Sector of Ontario

Alongside workforce supply issues, a growing body of occupational health and safety research shows that skilled trades work is associated with substantial physical demands and elevated risk for injury and disability over time. Construction and trade work commonly involve repetitive exertion, material handling, constrained postures, and high task variability, conditions that are consistently linked in the literature to musculoskeletal (MSK) disorders and long-term occupational disability outcomes [9,10]. These physical risk exposures have direct implications for workforce participation and retention, particularly

in sectors where experienced workers are critical to productivity, safety, and apprenticeship mentoring.

In Ontario's electrical sector, evidence from the multi-year OEL–ReSTORE Lab partnership has documented that workforce sustainability must be understood through a combined lens of physical health, mental well-being, and workplace conditions. Earlier SDF analyses and peer-reviewed outputs from this program have reported meaningful levels of burnout and related mental health outcomes among electrical workers, reinforcing the importance of psychosocial health as a workforce issue rather than a clinical concern [11,12]. Consistent with this, the SDF4 report highlighted ongoing patterns of worker strain and emphasized the need for practical supports that fit the operating realities of small- to medium-sized electrical businesses [8].



Qualitative evidence from Ontario construction skilled trades further illustrates how organizational culture and leadership practices shape whether workplaces become supportive and inclusive or whether barriers persist. In the qualitative study embedded in this research program, participants described challenges such as sexism, biased beliefs about competency, and uneven leadership responses to inclusion concerns, alongside actionable strategies to improve workplace culture and support worker well-being [13]. These findings reinforce that EDI is not separate from workforce retention; rather, it is a practical determinant of who enters the trade, who feels supported, and who stays.

Taking together, this evidence base supports the rationale for SDF5 as the next step in a multi-year applied research trajectory. Building on the established foundation of SDF1–SDF4, the SDF5 project extends ongoing data collection and analysis while placing greater emphasis on identifying modifiable factors and translating evidence into supports that OEL member companies can feasibly adopt. The intended contribution is to strengthen recruitment and retention by addressing the interconnected drivers of worker health, workplace well-being, and inclusive participation within Ontario's electrical small- and medium-sized business environment [8,11–13].

2.2 Evolving Workforce Challenges in the Skilled Trades

Ontario's skilled trades sector is facing sustained workforce pressure such as demographic change, rising infrastructure and housing demand, and shifting labour market expectations converge. Provincial reporting has repeatedly identified a persistently tight labour market, including high levels of unfilled positions across the economy, with construction among the sectors most affected by these pressures [14]. At the same time, sector-level forecasts indicate that Ontario construction demand remains significant over the coming decade, while retirements and replacement needs continue to place strain on the availability of experienced tradespeople [15].

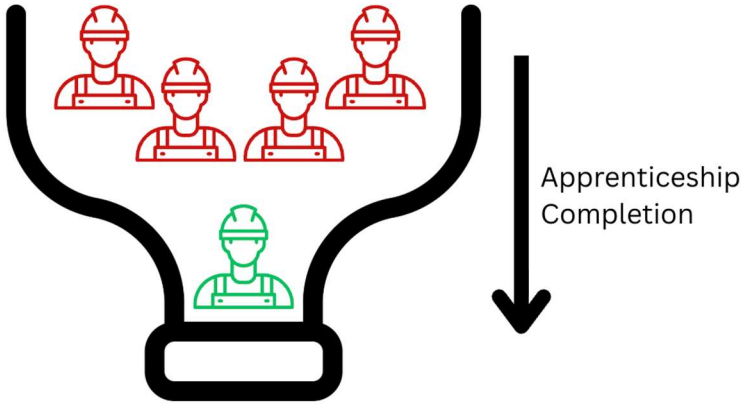
One of the most persistent structural challenges is workforce aging and the pace of retirement compared to that of new entrants. Labour market outlooks emphasize that replacing retiring workers, alongside meeting growth demand, requires stronger and more reliable pathways into apprenticeship and certification [15]. These pressures have practical consequences for employers, particularly businesses operating with limited staffing flexibility, where absences, turnover, and gaps in supervisory capacity can quickly disrupt productivity and project delivery.

Representation gaps further constrain workforce sustainability. Women remain markedly underrepresented in several Red Seal trades, including electrician-related occupations, where women comprise less than 2% of the workforce in multiple trades categories, based on the 2021 Census analysis [16]. Low representation is not simply a pipeline issue. It is reinforced by workplace culture, limited mentorship and role modelling, and inconsistent accommodation practices, all of which can influence both entry and retention. The result is a narrowing of the available talent pool at a time when labour demand remains high, and the sector needs to expand participation to meet Ontario's economic and infrastructure priorities [14].

Small and medium-sized enterprises, which are central to electrical contracting, experience additional constraints that can intensify these workforce challenges. Smaller

firms often operate with lean administrative capacity and fewer structured resources for training coordination, mentoring, return-to-work planning, or workforce planning. Under conditions of cyclical demand and deadline-driven project work, these constraints can make it difficult to sustain consistent apprenticeship supports, especially when employers must balance training needs against immediate operational requirements. In practice, the consequences of injury, absenteeism, or turnover may be magnified in smaller teams, as even brief disruptions can affect scheduling and competitiveness.

Apprenticeship progression and completion remain a key bottleneck. National apprenticeship evidence indicates that by the end of the expected program duration, fewer than one in five apprentices had completed certification, with substantial proportions continuing beyond the expected timeline or discontinuing training [5]. Pathway monitoring similarly shows that discontinuation and delayed certification remain common outcomes over time, reinforcing the importance of early-career supports that stabilize participation and reduce preventable attrition [17].



Finally, recruitment and retention are shaped not only by labour market conditions but also by awareness and perceptions of the trades. Ontario has implemented initiatives to increase student and community exposure to skilled trades careers, reflecting the recognized need to strengthen recruitment pipelines and improve understanding of skilled trades pathways [1]. Building a resilient electrical workforce, therefore, requires coordinated, evidence-informed approaches that address recruitment, apprenticeship progression, retention, and worker well-being together. The SDF5 project contributes to this objective by strengthening multi-year evidence relevant to planning and by supporting practical implementation of feasible strategies within the operating realities of Ontario's electrical SMEs.

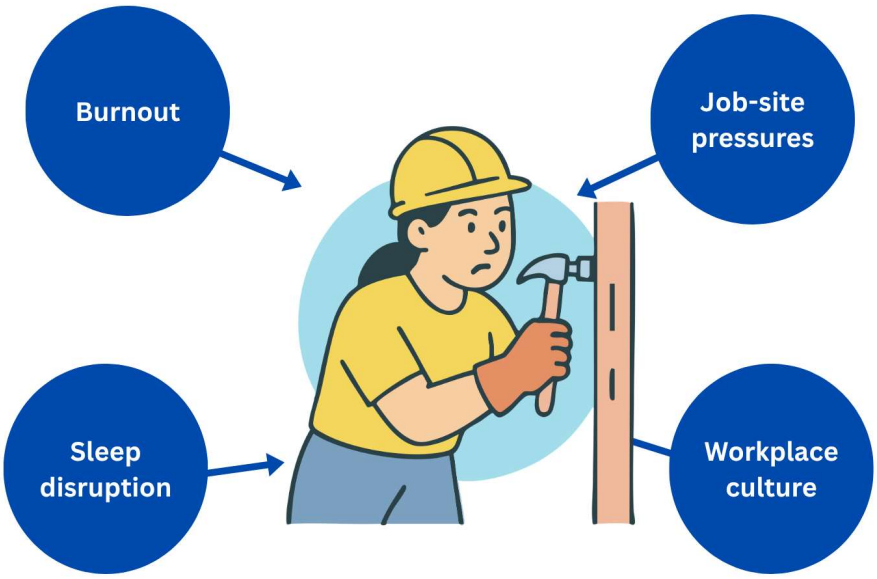
2.3 Health and Well-Being in the Electrical Sector

Health and well-being are central determinants of workforce sustainability in Ontario's electrical sector, particularly where project delivery depends on a stable, healthy workforce. Evidence generated through the OEL–ReSTORE Lab Skills Development Fund

(SDF) research program has consistently shown that electrical work is associated with a combination of physical demands and psychosocial pressures that can affect day-to-day functioning, safety performance, productivity, and long-term retention [11,12,18].

From an occupational health perspective, electrical work involves exposure to task demands that are well-established risk factors for musculoskeletal strain in construction and skilled trades settings. The broader ergonomic literature indicates that repetitive exertion, awkward and sustained postures, material handling, and variable job-site conditions can contribute to musculoskeletal symptoms and longer-term concerns about work ability [9,10]. Within the Ontario electrical context, program publications and SDF reporting reinforce that musculoskeletal burden remains an important workforce issue that warrants continued prevention-oriented attention as part of a retention and sustainability strategy [11,18].

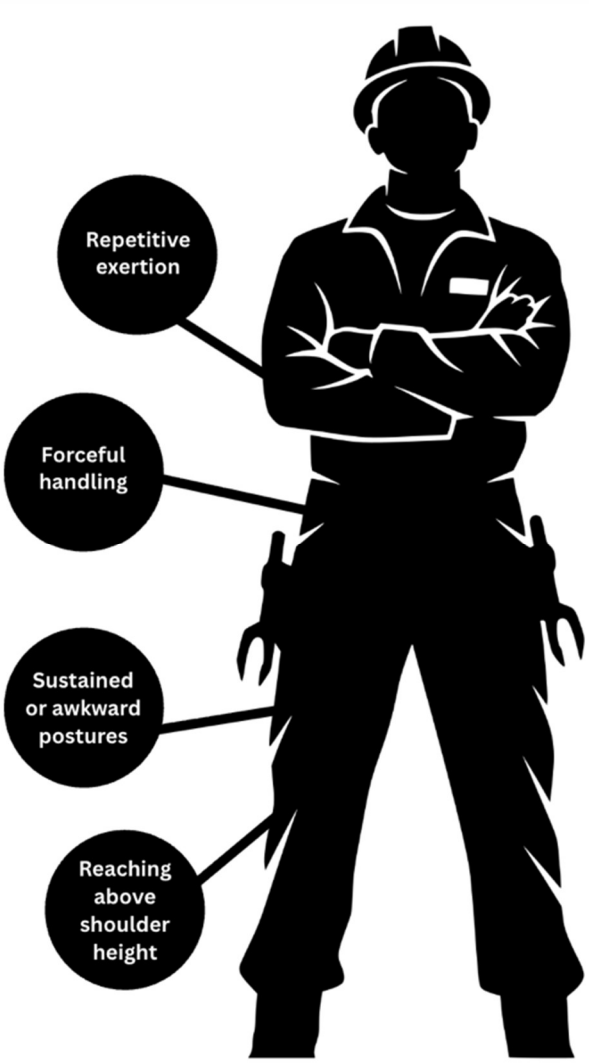
In parallel, the SDF evidence base emphasizes the relevance of psychosocial health, including burnout, psychological distress, and recovery challenges such as sleep disruption. These issues are important not only because they affect individual well-being, but also because they influence operational outcomes that matter to employers and policymakers, including absenteeism, presenteeism, reduced job satisfaction, and intentions to leave the trade [12,18]. The program's research has highlighted that health risks are shaped by work organization and context, including schedule demands, job-site pressures, and workplace culture, rather than being explained solely by individual factors [11,13].



SME employers and owners operate within these same constraints while also carrying additional responsibility for staffing, supervision, project deadlines, and business continuity. Qualitative research conducted within this program indicates that owners frequently manage competing demands and limited resources and often rely on informal coping and support strategies in the absence of structured organizational supports [19]. This owner perspective is important for implementation planning because employer well-being, managerial capacity, and resource constraints directly influence what can realistically be adopted and sustained in smaller electrical businesses.

Taken together, the rationale for SDF5 is to continue strengthening an integrated understanding of workforce sustainability by examining physical health, mental well-being, and the workplace conditions that influence both. Building on earlier SDF cycles and related publications, SDF5 advances an implementation-oriented approach that supports feasible, sector-relevant strategies for prevention and support in Ontario's electrical SMEs, while maintaining attention to equity and inclusion as workforce sustainability priorities [11,13,18].

2.4 Musculoskeletal Health and Physical Demands



Electrical work is physically demanding and routinely involves exposures that are widely recognized as contributors to work-related musculoskeletal disorders (WMSDs), including repetitive exertion, forceful handling, sustained or awkward postures, and frequent reaching or working at or above shoulder height. Authoritative ergonomics guidance highlights these exposures as common MSK risk factors across occupations, including construction and trades work [20–22].

In Ontario, the significance of MSK prevention is reflected in provincial and system-level attention to MSD prevention and enforcement. Prevention initiatives and guidance emphasize that MSK injuries remain a common and costly category of workplace harm, with implications for time loss, work capacity, and return-to-work outcomes [23–25].

The peer-reviewed construction ergonomics literature further supports the relevance of MSK risk in trades settings, with evidence syntheses documenting high MSK symptom burden among construction workers and consistent associations with physically demanding work and repetitive or awkward tasks [9]. Within the Ontario electrical context, the multi-year OEL–ReSTORE Lab SDF program has similarly identified MSK burden as a recurring workforce issue, supporting the need for practical prevention strategies that can be implemented in electrical SMEs [18].

For small- and medium-sized businesses, MSK prevention is also an operational issue. Smaller firms typically have limited flexibility to reassign tasks, cover absences, or introduce specialized programs; as a result, even short-term restrictions can disrupt scheduling, increase strain on remaining workers, and affect delivery timelines. These realities reinforce the need for recommended MSK strategies for the sector to be feasible and scalable, aligning with Ontario guidance that provides “quick-start” MSD prevention resources tailored to smaller workplaces [23].

2.5 Sleep, Fatigue, and Psychosocial Strain

Sleep and fatigue are increasingly recognized as core occupational health and safety considerations in construction and skilled trades environments. Fatigue can arise from insufficient or disrupted sleep, long work hours, early start times, and irregular schedules, and it can impair attention, reaction time, and decision-making. In workplace guidance, these risk factors are consistently highlighted because fatigue affects both physical functioning and psychological capacity, particularly in safety-sensitive work [26–29].

In construction-adjacent settings, empirical research also supports the relevance of sleep for safety and performance. For example, longitudinal evidence in a construction worker sample has linked insomnia symptoms with poorer safety behaviours and greater injury risk over time, underscoring that sleep is not only a personal health issue but also a workplace safety and productivity issue [30]. At a systems level, fatigue has been framed as a predictable and manageable risk that can be addressed through practical measures such as work planning, workload pacing, recovery opportunities, and supervisor awareness [21,31].

Psychosocial strain is shaped by how work is organized, including production pressures, tight timelines, variable job-site conditions, and safety-critical responsibilities. Research in the Canadian construction context has emphasized how job stress and safety performance are influenced by organizational conditions and climate, reinforcing that psychosocial factors are not separate from operational outcomes [32]. For skilled trades, these pressures may be amplified during peak project periods or when staffing is constrained, increasing the likelihood of sustained high demand with limited recovery.

Workplace culture also plays a central role in whether workers seek help early or delay support until problems escalate. The broader literature on mental health in construction and other male-dominated industries describes how masculine norms and stigma can discourage disclosure, normalize “pushing through,” and contribute to delayed help-seeking [33,34]. This context is important for intervention planning because training, messaging, and support pathways must be designed in ways that are credible, practical, and culturally acceptable within job-site realities.

Within the OEL–ReSTORE Lab SDF research program, sleep, fatigue, and mental health have remained recurring considerations across successive project cycles, reinforcing the rationale for SDF5’s continued emphasis on practical, implementation-oriented strategies that strengthen worker well-being and retention while aligning with SME operating constraints [12,18,35].

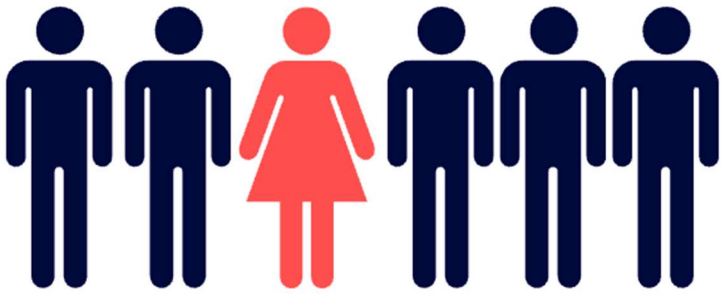
2.6 Psychological Distress and Mental Health Challenges

Psychological distress and broader mental health concerns are increasingly recognized as workforce sustainability issues in construction and skilled trades, given their influence on safety, productivity, absenteeism, and retention. In safety-sensitive work, stress and distress can affect concentration, decision-making, and risk tolerance. They can also

contribute to longer-term outcomes such as burnout and early exit from the workforce. Evidence from the OEL–ReSTORE Lab SDF program has consistently identified mental health and burnout as important concerns among electrical workers in Ontario, reinforcing the value of integrating mental health into sector planning rather than treating it as an individual issue alone [11,12,35].

Early-career workers, including apprentices, face pressures that can shape mental well-being and persistence in the trade. Apprentices often navigate variable work hours, changing job sites, and the ongoing demands of formal training and certification requirements. National apprenticeship research indicates that delayed completion and discontinuation are common, underscoring that the early years of apprenticeship are a vulnerable period where barriers can accumulate and affect progression [5]. Within the Ontario electrical context, program evidence also emphasizes that experiences during apprenticeship are strongly linked to longer-term retention and workforce stability [8,35].

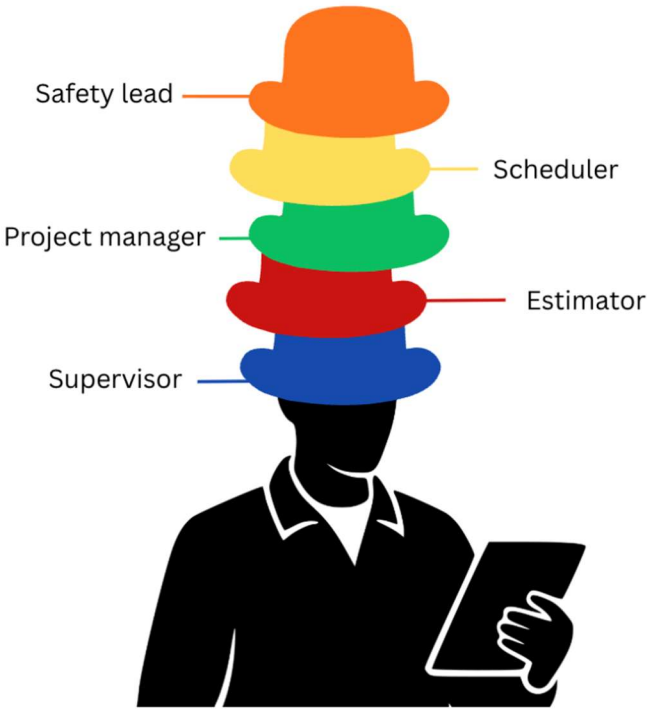
Women and other underrepresented groups may experience additional, cumulative psychosocial stressors, particularly in male-dominated trade environments. Qualitative evidence from Ontario's construction skilled trades points to the role of workplace culture, including discrimination, biased beliefs, and the practical impacts of limited leadership support, which can increase stress and reduce psychological safety for equity-deserving workers [13]. In turn, these conditions can reinforce hypervigilance, discourage help-seeking, and create environments in which workers must consistently prove their competence to gain equal access to opportunities. These dynamics have direct implications for retention and inclusion strategies across the electrical sector [7,13].



Beyond training and culture, the electrical sector also involves work organization and labour market conditions that can contribute to stress over time. Workers may face long commutes and travel to job sites, time-sensitive project delivery demands, exposure to hazards, and periods of employment uncertainty. When combined with high physical workload and limited recovery opportunities, these factors can contribute to sustained stress and emotional exhaustion, with potential downstream effects on well-being and job performance. Research in construction and similar work settings supports that mental distress is meaningfully associated with occupational conditions and can coexist with

injury and pain, reinforcing the need for integrated approaches that address physical and psychosocial factors together [11,34,35].

2.7 Distinct Pressures on SME Owners



Small business owners in the electrical sector face distinct occupational demands that differ from those of employees and apprentices. In addition to performing or overseeing technical work, owners commonly hold multiple operational roles at once, such as supervisor, estimator, project manager, scheduler, safety lead, and administrator. This “multi-hat” reality is a defining feature of many SMEs and can translate into sustained long work hours, high responsibility, and limited recovery time, particularly during peak project periods or when staffing is tight. These conditions align with broader Canadian evidence showing that business owners and entrepreneurs experience frequent mental health challenges and high stress associated with responsibility burden, uncertainty, and workload [36–38].

From a workplace health perspective, owners are also exposed to common psychosocial risk factors for stress. These include high job demands, competing priorities, limited control over external constraints, and pressure to meet deadlines and client expectations. Canadian occupational health guidance consistently identifies these factors as drivers of workplace stress and reduced well-being, with downstream effects on fatigue, mental health, job satisfaction, and performance [39,40]. In the SME context, these pressures may be amplified by limited internal capacity to delegate administrative work, cover absences, or pause operations without financial consequence.

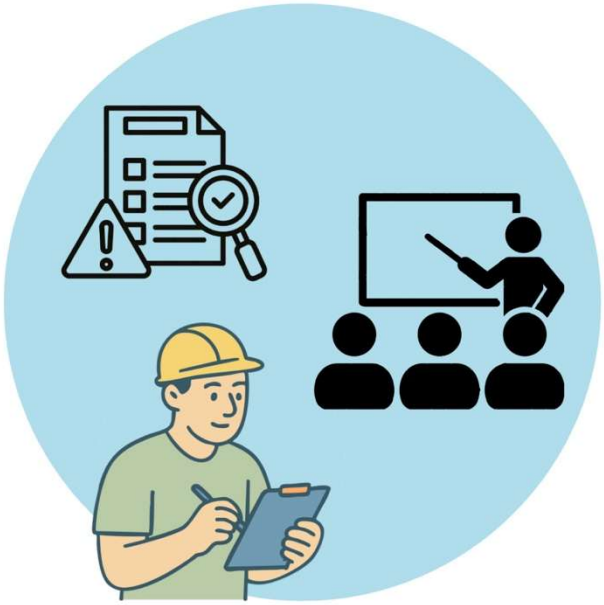
International and peer-reviewed literature also highlights that SME owner-managers are often underrepresented in occupational health research, despite being at elevated risk due to long working hours and financial stress. Research focused on SME owner-managers describes how these structural pressures can contribute to poorer well-being and can constrain participation in formal workplace mental health initiatives, reinforcing the importance of brief, feasible supports that fit the realities of small firms [41]. Canadian small business advocacy and survey reporting similarly notes that many owners experience

mental health strain while simultaneously being less likely to seek supports for themselves than for their employees [38,42].

Within the OEL–ReSTORE Lab SDF program, qualitative work with SME owners further underscores the centrality of owner experience to implementation planning. Owners described the importance of schedule management, boundaries, and flexibility as practical ways to maintain functioning while meeting business demands. At the same time, the same operational constraints that drive owner stress can limit the feasibility of more time-intensive or resource-heavy programs, underscoring the need for "right-sized" approaches that are low-burden, staged, and aligned with SME workflows [19].

2.8 Systemic Gaps in Support and Resource Availability

Across the construction trades, there is a well-documented implementation gap between "knowing what good looks like" in occupational health and safety and having the time, staffing, and systems to consistently put it into practice. This gap is often most pronounced in smaller businesses, where owners and supervisors manage multiple operational responsibilities in parallel and may not have dedicated capacity for formalized health and safety programming, recordkeeping, or structured people-management processes [43,44]. Practical guidance for small and micro businesses emphasizes that occupational health and safety requirements still apply. Still, that implementation commonly depends on simple, low-burden systems such as checklists, basic procedures, training documentation, and routine hazard identification processes that can be maintained alongside day-to-day production work [45].



In this context, "right-sized" supports are essential. Evidence syntheses focused on small firms suggest that interventions are more likely to be adopted and sustained when they are feasible within limited time and administrative capacity, and when they combine practical training with straightforward processes (for example, brief audits or structured walkthroughs) rather than relying on complex standalone programs [43,44]. A staged implementation approach is also consistent with Canadian and international guidance on workplace psychological health and psychosocial risk management, which emphasizes manageable steps, leadership commitment, and continual improvement rather than one-time activities [46,47].

In addition to physical hazards, Ontario employers are increasingly expected to address psychosocial risks that can affect workers' mental health and well-being. Global guidance highlights that improving mental health at work requires attention to working conditions, including job demands, work organization, and supportive supervision, rather than focusing solely on individual-level education [48,49]. For SMEs in the electrical sector, this reinforces the value of tools that integrate physical safety and mental health into normal operations, such as simple supervisor conversation guides, brief fatigue and recovery practices, accessible referral pathways, and practical templates that support respectful workplaces [46,47].

Finally, implementation is strengthened when resources are easy to locate, credible, and designed for SMEs. National resources have increasingly focused on practical supports for small and medium-sized businesses, including portals and tools intended to reduce the burden of "starting from scratch" [50]. This implementation lens is important for SDF5 because workforce sustainability depends not only on identifying risks but also on equipping employers with feasible supports that can be embedded into daily planning, supervision, and work design across diverse electrical workplaces.

2.9 Equity, Diversity, and Inclusion: Persistent Gaps and Opportunities

Equity, diversity, and inclusion (EDI) are foundational to a resilient and future-ready electrical workforce in Ontario. In practical terms, EDI matters because it shapes who enters the trades, who is supported to complete training, who is retained in good jobs, and who advances into leadership. A workforce that reflects Ontario's communities also strengthens the sector's ability to meet demand by widening the talent pool and improving retention through safer, more respectful, and more supportive workplaces [51].

Despite sustained efforts across Canada to increase participation from underrepresented groups, major representation gaps persist in the skilled trades, including in electrical occupations. Census-based reporting from the Canadian Apprenticeship Forum shows that in multiple trades, women comprise less than 2% of the workforce, including industrial electricians. This "low representation" reality is not a short-term fluctuation; it reflects long-standing structural patterns that require continued attention to recruitment, apprenticeship completion, and retention supports [51].

Representation gaps are also shaped by how entry pathways operate in practice. Skilled trades participation is influenced by access to information, early exposure, sponsorship and hiring networks, and the availability of supportive training environments. For many groups, including women, newcomers, Indigenous peoples, racialized workers, and persons with disabilities, barriers can arise at multiple points along the pathway, starting with awareness and recruitment and extending to job placement, supervision quality, workplace culture, and access to accommodations. Ontario has explicitly framed increasing participation from underrepresented groups as part of broader workforce and economic inclusion priorities, including skilled trades entry and training initiatives [52].

Importantly, these inequities are not explained only by "interest" or "pipeline" considerations. National strategy work focused on women in trades emphasizes that workplace conditions, culture, and systems strongly influence whether women remain in the trades once they enter. This includes issues such as bias and harassment, limited mentorship and peer networks, inconsistent access to safe and appropriate facilities and equipment, and uneven access to skill-building opportunities. When these conditions are present, they can increase turnover, reduce apprenticeship completion, and discourage future entrants who do not see the trade as a place where they can thrive [53]

Within the context of the OEL–ReSTORE Lab SDF program, EDI has therefore been treated not as an "add-on," but as a workforce sustainability issue that interacts with health, retention, and organizational performance. The rationale for continuing EDI-focused work in SDF5 is to support practical, feasible steps that electrical SMEs can implement, steps that strengthen respectful workplaces, improve supervisory capacity, and reduce avoidable barriers that contribute to attrition [54].

2.10 Underrepresentation and Limited Access to Opportunities

Women remain substantially underrepresented in electrician-related trades in Canada, including several Red Seal trades where women comprise less than 2% of the workforce [16]. This low representation is shaped by barriers that begin well before entry into apprenticeship. National strategy and monitoring work on women in trades consistently identifies limited exposure to skilled trades pathways, persistent gender stereotypes about "fit" and capability, and uneven access to early hands-on opportunities as factors that reduce recruitment and, importantly, retention [51,53]. Once in the trade, women may also face workplace conditions that affect their ability to access learning opportunities and advance, including isolation, limited mentorship, and environments where they must repeatedly demonstrate competence to be treated equitably [51,53].

In the Ontario skilled trades context, qualitative evidence from our program's EDI-focused interviews in construction trades provides concrete examples of how these barriers can appear in day-to-day workplace experiences, including sexist language, assumptions about women's role on job sites, and biased judgments about competence [13]. These cultural dynamics are important to acknowledge in the Background because they influence apprenticeship completion, retention, and the effectiveness of recruitment initiatives. They also highlight why "representation" is not only a pipeline issue, but also a workplace environment issue that requires practical supervisory capacity and clear expectations for respectful conduct [13,51].

Representation and access challenges also affect newcomers and racialized workers in apprenticeship pathways. Federal reporting indicates that, historically, immigrants and visible minorities have been underrepresented among apprentices relative to their share of the Canadian population, pointing to barriers related to awareness, access to sponsorship or hiring networks, and navigation of training systems [3]. Within skilled trades workplaces, qualitative evidence from our Ontario interviews also described how language differences can be treated as a proxy for competence, and how "fit" judgments or informal gatekeeping can limit opportunities for certain workers to access varied tasks and skill-building experiences [13]. In practice, these barriers can reduce exposure to the full scope of trade learning, weaken belonging, and contribute to avoidable attrition.

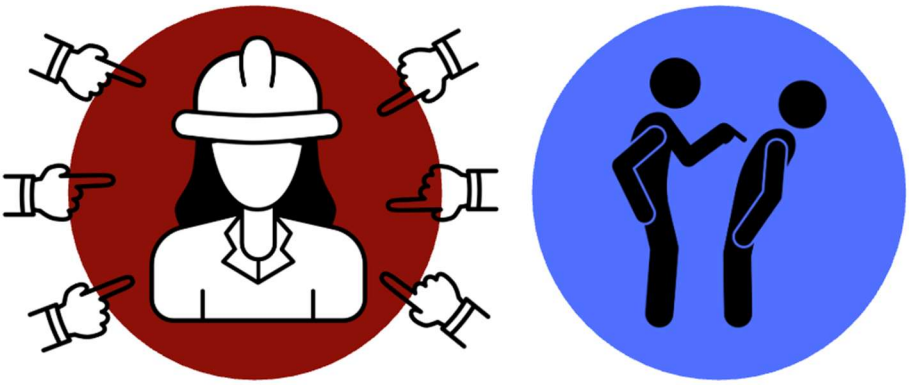
For Indigenous workers and other equity-deserving groups, barriers may also relate to access to training and employment opportunities that align with community needs and geographic realities, as well as broader structural inequities that shape educational and labour market transitions [55]. Taken together, the literature and our program evidence reinforce that improving access and retention requires strategies that address both entry pathways and workplace conditions. This includes mentorship and peer supports, inclusive supervision skills, clear anti-harassment expectations, and day-to-day practices that ensure equitable access to training opportunities and respectful treatment across diverse crews [13,51,53].

2.11 Workplace Culture and the Normalization of Exclusion

Across Ontario's construction skilled trades, workplace culture is often shaped by informal norms, long-standing hierarchies, and "fit" expectations that can unintentionally (and sometimes overtly) exclude people who do not match the traditional profile of the trade. In our Ontario qualitative study with skilled trades employers and workers, participants described how exclusion can be reinforced through everyday interactions such as disrespectful humour, dismissive comments, and unprofessional language, as well as through assumptions about who is "suited" for the work [13]. While some workers framed these behaviours as "normal" or part of a tough work environment, the same accounts illustrate how normalized conduct can create barriers to belonging and participation for equity-deserving groups.

Importantly, culture-related concerns were not limited to interpersonal behaviour. Participants also described how informal power structures and inconsistent leadership responses can shape whether concerns are addressed, minimized, or ignored [13]. Where reporting pathways are unclear or perceived as risky, workers may remain silent, withdraw from team spaces, or rely on supports outside the workplace rather than raising concerns internally. This dynamic can reduce psychological safety and weaken the conditions that enable workers to speak up early, whether the issue concerns harassment, discrimination, safety, or well-being [13,46].

These cultural pressures can intersect with the broader stigma that continues to influence mental health disclosure and help-seeking in male-dominated industries. Evidence from construction-sector research indicates that masculine norms and concerns about appearing "weak" can discourage workers from acknowledging distress and seeking support, particularly when workplaces implicitly reward stoicism and self-reliance [33,56]. Within the SDF research program, qualitative findings similarly highlight that the workplace social climate (including leadership tone and peer dynamics) can influence whether workers feel safe to raise concerns, request accommodations, or access supports [13].



Finally, the practical realities of small- and medium-sized businesses can intensify these challenges. Many SMEs operate with lean supervisory structures and limited formal HR capacity, which can make it difficult to respond consistently to interpersonal conflict, discrimination, or evolving workforce needs. In this context, strengthening everyday supervisory skills (communication, conflict resolution, clear expectations, and psychologically safe practices) becomes a central lever for preventing exclusionary norms from becoming embedded and for supporting a respectful, stable workforce [33,46]. Together, these insights reinforce the idea that culture is not a "soft" issue for the electrical sector; it is directly tied to retention, team functioning, and workforce sustainability.

2.12 Supervisory Capacity and Systemic Gaps

A consistent message emerging from the Ontario skilled trades qualitative evidence base is that day-to-day supervision is a key determinant of whether workplaces are experienced

as respectful, safe, and inclusive. In smaller contractors and other SMEs, supervisory practices are often shaped by informal norms and "learning by doing," rather than structured people-management training or standardized procedures. As a result, how interpersonal conflict, bias-related incidents, accommodation needs, and mental health concerns are handled can vary widely across crews and job sites, even within the same organization [13].

This context is not a reflection of poor intent. Many owners and lead hands want to support their teams, but may feel unequipped to navigate sensitive issues such as gender dynamics, communication barriers, or psychological distress in ways that are consistent, fair, and compliant with expectations. Where supervisory confidence and skill are limited, misunderstandings can escalate, trust can erode, and psychological safety can decline, thereby undermining retention and team performance [13,46].

The SME operating environment can also intensify these challenges. Lean staffing and tight project timelines leave limited time for coaching, documentation, or formal follow-up. Evidence syntheses focused on small enterprises suggest that interventions are most likely to be sustained when they strengthen practical leadership and simple routines, rather than relying on complex or administrative-heavy programs that are difficult to maintain in small workplaces [43,44].

For these reasons, workforce sustainability efforts in the electrical sector benefit from prioritizing "right-sized" supervisory capacity building. This includes clear expectations for respectful conduct, basic conflict resolution and communication skills, and practical guidance for responding to mental health and accommodation needs. This approach aligns with recognized guidance on managing psychosocial risks at work, which emphasizes leadership practices, consistent processes, and continual improvement as foundations for psychologically safe workplaces across organizational sizes [46,47].

2.13 Opportunities for Change: Practical and Worker-Led Solutions

The research and practice literature on workforce retention and inclusion in the skilled trades increasingly emphasizes that meaningful EDI progress is achieved through practical, daily changes in how work is organized, supervised, and supported, rather than through one-time messaging or standalone initiatives. Within the OEL–ReSTORE Lab Skills Development Fund program, qualitative work in Ontario construction skilled trades reinforces that workers and employers view solutions as most feasible when they are embedded into normal jobsite routines, reinforced through leadership behaviours, and supported with clear expectations and usable resources [13,19]. This implementation lens is particularly relevant for small and medium-sized businesses, where time and administrative capacity are limited and where support must be simple enough to use during busy periods.

A first set of opportunities involves strengthening peer connection and practical mentorship in ways that fit how crews already operate. Evidence from the Ontario

qualitative interviews highlights the value of mentorship and buddy systems for apprentices and underrepresented workers, particularly in reducing isolation, building confidence, and increasing access to informal learning and on-site problem-solving [13]. In the context of this program's quantitative findings, which show that distress and burnout patterns differ by role and gender across cohorts, structured peer support represents a feasible approach for supporting early-career workers and improving retention without requiring large-scale organizational infrastructure [11,12].

A second opportunity is to invest in inclusive, practical supervision skills that strengthen everyday people-management capacity. Qualitative evidence indicates that crews and owners benefit when lead hands and supervisors are equipped with basic skills in respectful communication, conflict resolution, bias awareness, and mental health literacy, because these skills influence psychological safety and the consistency of responses to interpersonal issues [13]. This is especially important in SMEs where supervisory practices are often informal, and leaders are expected to manage complex situations without formal HR support. Building "supervisor-ready" tools and short training elements can help translate EDI principles into consistent jobsite practices [13,19].

A third opportunity is to support SMEs with clear, actionable protocols that define expectations and responses. Ontario qualitative findings underscore the importance of anti-harassment and anti-discrimination expectations that are easy to communicate, include practical reporting pathways, and outline what fair action looks like when concerns arise [13]. In an SME environment, where informal norms can shape behaviour quickly, clear protocols can reduce ambiguity and help handle incidents consistently.

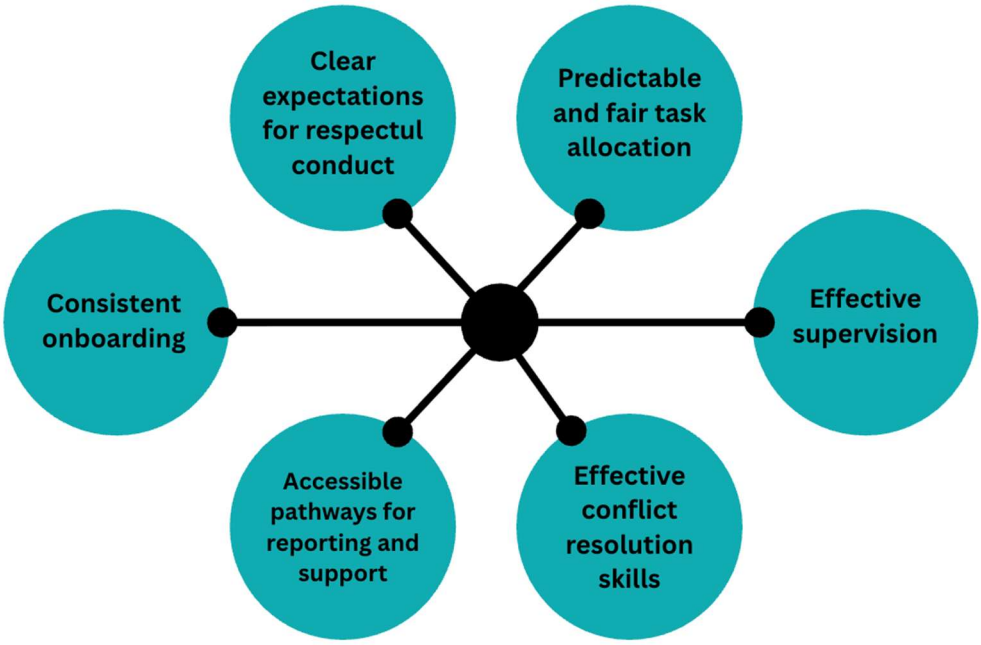
Finally, participants' recommendations highlight that inclusion is closely tied to how work and learning opportunities are distributed. Qualitative findings from Ontario construction skilled trades point to the importance of ensuring equitable exposure to skill-building tasks, rather than repeated assignment to undesirable or narrowly defined duties, particularly for apprentices and workers from underrepresented groups [13]. This aligns with workforce sustainability goals because access to varied tasks is directly connected to competence development, confidence, and longer-term retention. In practical terms, EDI-informed scheduling and task assignment can be framed as operational fairness and training quality, not as an additional administrative requirement.

Overall, the evidence base suggests that many of the most promising changes are achievable within SME constraints when employers are provided with practical guidance and ready-to-use tools. These solutions are best positioned as low-burden, implementation-ready supports that reinforce respectful culture, strengthen supervision, and improve access to learning opportunities, while complementing the program's broader focus on health and well-being across Ontario's electrical sector [11–13,19].

2.14 Embedding EDI as a Daily Operational Standard

Evidence from occupational health and workplace inclusion practice consistently indicates that equity, diversity, and inclusion (EDI) improvements are most effective when they are integrated into routine operations, rather than treated as stand-alone policies, annual training, or one-time commitments. In safety-sensitive and team-based work like the electrical trades, everyday practices such as how crews communicate, how tasks and learning opportunities are assigned, how concerns are raised and addressed, and how supervisors model respectful conduct largely determine whether workers experience psychological safety and fair access to opportunities. Guidance on psychological health and psychosocial risk management also emphasizes that sustained improvement depends on leadership behaviours, consistent processes, and continual reinforcement in daily work routines, not only on individual awareness [46,47,49].

This operational view of EDI is particularly relevant for small and medium-sized businesses (SMEs). SMEs often have limited administrative capacity and few formal HR structures, which means implementation approaches must be practical, clear, and easy to maintain during busy periods. Evidence on small business health and safety implementation highlights that uptake is more likely when organizations are supported with simple routines, tools, and leadership practices that can be embedded into existing workflows [43,44]. In this context, EDI becomes actionable when it is translated into concrete, repeatable practices such as consistent onboarding, clear expectations for respectful conduct, predictable and fair task allocation, effective supervision and conflict resolution skills, and accessible pathways for reporting and support [13].



Embedding EDI into daily operations is also a workforce sustainability strategy. Representation gaps in the trades, including extremely low participation of women in several electrician-related trades, continue to constrain the talent pool at a time when recruitment and retention pressures remain high [16,51]. Strengthening inclusive work environments helps ensure that workers who enter the trade can remain, progress, and contribute fully across their careers. In the SDF program context, the role of workplace culture and leadership has been repeatedly identified as central to both well-being and inclusion outcomes, reinforcing the rationale for implementation-ready supports that help OEL members operationalize EDI within real jobsite and SME realities [13,46,47].

2.15 Alignment with Ontario's Strategic Priorities and the UN Sustainable Development Goals (SDGs)

Ontario is experiencing rapid economic and infrastructure growth that depends on a strong pipeline of skilled trades workers, including electricians. Provincial priorities in labour force development continue to emphasize modernizing apprenticeship and certification pathways, strengthening employer participation, and improving system navigation for apprentices and sponsors [57,58]. At the same time, the province has invested in workforce solutions through the Skills Development Fund (SDF), which is intended to support partnership-driven projects that address challenges in hiring, training, and retaining workers, including apprentices, in key sectors of Ontario's economy [58].

The SDF5 project aligns directly with these priorities by generating sector-specific evidence on the conditions that support recruitment, retention, and sustainable employment in Ontario's electrical trades. In practical terms, the project is designed to inform employer-facing and worker-facing supports that are feasible for small and medium-sized businesses, where most electrical work is delivered and where formal resources (for example, dedicated HR capacity or structured wellness programming) are often limited. This focus is consistent with the SDF Training Stream's intent to support applied, partnership-based approaches that strengthen workforce capacity and resilience [58].

Beyond provincial policy alignment, SDF5 is also positioned within the United Nations 2030 Agenda and its Sustainable Development Goals (SDGs), which provide a global framework for strengthening health, equity, and sustainable economic participation [59]. Canada has likewise committed to advancing the SDGs through the implementation of Agenda 2030 [60]. Framing SDF5 within the SDGs helps situate workforce sustainability in the electrical trades as both an economic priority and a well-being priority.

Within this framework, SDF5 contributes to the following SDGs in ways that are directly relevant to Ontario's skilled trades context:

SDG 3 (Good Health and Well-being): By focusing on modifiable workplace and individual factors related to physical strain, fatigue, and psychosocial well-being that can affect injury risk, work functioning, and career longevity [59].

SDG 5 (Gender Equality) and SDG 10 (Reduced Inequalities): By examining barriers to participation and retention for underrepresented groups and informing practical approaches that support inclusive day-to-day workplace practices [59].

SDG 8 (Decent Work and Economic Growth): By strengthening the evidence base for working conditions that support retention, safe work, and sustained employment in small and medium-sized electrical businesses [59].

SDG 9 (Industry, Innovation, and Infrastructure): By supporting innovation in training, supervision, and prevention-focused practices that help the workforce adapt to evolving infrastructure demands and electrification goals [59].

SDG 11 (Sustainable Cities and Communities): By reinforcing workforce stability in a trade that is essential to housing delivery, safe infrastructure, and community resilience across Ontario [59].

Overall, this alignment reflects the Government of Ontario's emphasis on evidence-informed workforce development and the need for practical solutions that can be implemented across diverse electrical workplaces. It also supports a "whole-of-workforce" sustainability approach that links physical safety, mental health, and inclusion as interconnected drivers of retention and long-term sector capacity [57,58].

2.16 A Unified Sustainability Lens

Taken together, the provincial alignment and SDG framing provide a coherent sustainability lens for interpreting the purpose of SDF5. At the provincial level, Ontario's workforce and skilled trades priorities emphasize expanding apprenticeship pathways, strengthening employer participation, and supporting training models that improve retention and completion. At the global level, the SDGs emphasize that sustainable economic growth depends on decent work, reduced inequalities, and healthier workplaces. Positioning SDF5 within both frameworks reinforces the idea that workforce development in the electrical trades is not only about increasing the number of workers, but also about ensuring that workers remain healthy, supported, and productive throughout their careers.

Within the electrical sector, this integrated lens highlights the practical connections between worker health, inclusive workplaces, and SME capacity. Physical strain, fatigue, and psychosocial stressors can reduce work functioning and shorten careers, contributing to turnover and labour gaps. Similarly, barriers related to inclusion and culture can limit who enters the trade and who remains long enough to become experienced

journeypersons or supervisors. For SMEs, the ability to implement effective, low-burden support for health, supervision, and inclusion is therefore a core part of sector resilience and a key contributor to long-term workforce sustainability.

By bringing together evidence on health, well-being, and EDI within an implementation-focused approach, SDF5 supports Ontario's objective of building a future-ready skilled trades workforce. This sustainability framing ensures that output from SDF5 can be interpreted and used not only as research findings, but as a foundation for practical supports and policy-relevant strategies that strengthen retention, improve job quality, and support inclusive participation across Ontario's electrical sector.

2.17 Building on SDF1–SDF4: Why Continued Research Matters

Since 2021, the Ontario Electrical League (OEL) and the University of Toronto's ReSTORE Lab have collaborated on a multi-year research program focused on the health, well-being, and workforce experiences of electrical workers and small business employers across Ontario. Across SDF1–SDF4, this partnership generated a sector-specific evidence base that is difficult to achieve through single-year studies, including repeated measurement of musculoskeletal symptoms, sleep quality, psychological distress, burnout, job satisfaction, and workplace experiences that influence recruitment and retention. This multi-year foundation established that challenges in the electrical sector are not episodic; they show recurring patterns that warrant sustained attention and practical, sector-fit solutions.

Collectively, SDF1–SDF4 provided complementary layers of evidence. Early cycles established baseline patterns of physical and psychosocial strain and documented how these issues present across roles in the trade. Later cycles strengthened contextual understanding by drawing on qualitative evidence on workplace culture, supervisory realities, and EDI-related barriers that shape mental health and belonging. For example, one qualitative study based on 52 interviews identified three overarching themes: organizational culture challenges, barriers to promoting EDI, and practical strategies to promote EDI and support well-being in Ontario's construction skilled trades.

SDF5 builds directly on this cumulative foundation while shifting the program toward implementation readiness. In practical terms, SDF5 integrates new participant data with the existing multi-year dataset to strengthen analytic depth, improve statistical power, and enable more reliable comparisons by role (apprentice, journeyperson, employer) and by sex and gender where sample sizes permit. This approach supports a clearer understanding of which risks and protective factors are most modifiable and most relevant to workforce stability in Ontario's non-union electrical sector.

SDF5 also broadens the program's employer-focused lens, directly supporting feasibility. Building on the employer perspective introduced in earlier cycles, the SDF5 qualitative component includes a second qualitative study focused on SME owners (12 interviews), providing direct insight into operational constraints, coping strategies, and what

“implementable” supports realistically look like in smaller firms. Owners described work–life balance and flexibility as central coping strategies, including the ability to step away temporarily when pressures escalate and the tension between family responsibilities and peak workload periods.

Importantly, SDF5 advances the program from self-reported burden to planning for objective, on-site measurement. Consistent with the long-standing finding of widespread MSK strain in the sector, SDF5 introduces planning for a 2026 observation study to quantify physical demands and ergonomic risks during real tasks. During the SDF5 period, 11 journeypersons pre-registered to participate in this upcoming on-site assessment stream, reflecting strong engagement and helping address a key evidence gap: task-specific, field-based ergonomic exposure data to guide practical injury-prevention strategies for SMEs.

Across SDF1–SDF5, the program therefore reflects a deliberate trajectory:

- **SDF1–SDF2:** Established baseline workforce health and training-related challenges in the electrical sector.
- **SDF3:** Added deeper insights on EDI and worker experience and began expanding the employer perspective.
- **SDF4:** Strengthened mixed-method integration and contextual explanation of organizational culture, stressors, and health outcomes.
- **SDF5:** Integrates five years of evidence and advances toward scalable implementation-ready guidance and tools, with planning for objective observation in 2026 to strengthen ergonomic and MSK prevention recommendations.

Taken together, the multi-year OEL–ReSTORE Lab partnership demonstrates why continued research is essential for Ontario’s electrical workforce. Sustained, sector-specific evidence makes it possible to distinguish short-term fluctuations from persistent drivers of strain, to ground recommendations in worker and employer realities, and to develop supports that are not only evidence-based but also feasible for adoption across Ontario’s electrical SMEs.

3. Objectives

The SDF5 research program was designed to build on four consecutive years of sector evidence (SDF1–SDF4) and to move the program toward practical, implementation-ready supports for Ontario’s electrical small and medium-sized enterprises (SMEs). Consistent with the Skills Development Fund’s focus on workforce resilience, equitable participation, and labour market sustainability, SDF5 pursued four integrated objectives. Together, these objectives reflect the progression of the multi-year OEL–ReSTORE Lab partnership from documenting sector challenges to generating actionable guidance for employers, workers, and provincial stakeholders.

Objective 1: Extend and integrate multi-year evidence through combined SDF1–SDF5 analyses

SDF5 aimed to strengthen the multi-year evidence base by incorporating newly recruited participants and integrating their data with the existing datasets collected across SDF1–SDF4. This multi-year approach supports a more stable understanding of persistent issues and emerging trends, enabling the project to:

- consolidate survey and interview evidence to strengthen confidence in sector patterns
- examine whether key indicators of worker health and well-being remain consistent across cohorts
- support comparisons across roles and career stages (for example, apprentices, journeypersons, and employers/owners), where sample sizes allow
- provide a cumulative evidence platform that supports planning for OEL and informs broader provincial workforce discussions

This objective ensures that the SDF program functions as a continuous learning system, rather than a series of stand-alone annual snapshots.

Objective 2: Identify modifiable risk and protective factors affecting physical and mental health in electrical SMEs

The central objective of SDF5 was to identify modifiable factors that influence worker well-being and workforce sustainability in the electrical sector. Building on prior SDF work, SDF5 focused on factors that can realistically be targeted through employer practices, sector tools, and worker supports, including:

- work organization and scheduling realities that influence fatigue and recovery
- indicators of physical strain and musculoskeletal symptom burden
- psychosocial conditions that influence distress, burnout, and job satisfaction
- protective factors such as peer support, supervisory practices, and access to practical supports (e.g. employee assistance programs)

This objective was intended to ensure that SDF5 produces results usable for prevention and retention strategies, not only for descriptive reporting.

Objective 3: Map equity-related gaps and translate them into feasible strategies

SDF5 sought to advance the equity-focused work strengthened in later SDF cycles by identifying where inequities appear across the workforce and what can be done about

them in real workplaces. This objective focused on generating evidence that supports practical responses from employers and sector partners, including:

- examining differences by gender and career stage (including apprentices) where data permit
- assessing how workplace culture, leadership practices, and informal norms can shape opportunity, belonging, and retention
- documenting barriers experienced by underrepresented groups as reflected in qualitative evidence
- identifying organizational practices that are feasible in SME contexts, such as mentorship approaches, clear expectations for respectful conduct, equitable access to learning opportunities, and consistent response processes

This objective positions equity as a workforce-sustainability requirement, not merely a policy commitment.

Objective 4: Develop implementation-ready guidance and sector-specific tools for SMEs

SDF5 was designed to translate evidence into practical supports that electrical SMEs with limited time and administrative capacity can adopt. The focus was on developing guidance that is simple, scalable, and aligned with jobsite realities. This objective included:

- preparing practical content that supports musculoskeletal strain prevention and safer work practices
- developing fatigue and sleep health messaging suitable for toolbox talks, onboarding, and supervisor use
- producing EDI-informed supervisory guidance to support communication, respectful culture, and early issue resolution
- creating templates and checklists that SMEs can adopt without requiring formal HR infrastructure
- informing next-phase sector supports (including future SDF programming) by identifying what is ready to pilot, refine, and scale

This objective ensures that SDF5 outputs support action and implementation, not only analysis.

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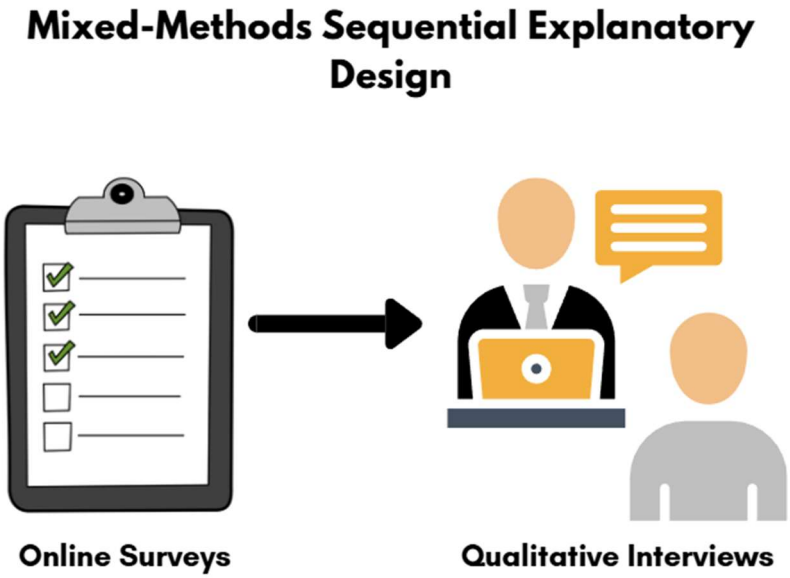
4. Methods

4.1 Design

This project used mixed-methods, sequential explanatory design to examine complex workforce issues in Ontario's electrical sector and to generate findings that are both statistically robust and grounded in workplace realities. In a sequential explanatory design, quantitative data are collected and analyzed first, and the results then guide a follow-up qualitative phase. Qualitative interviews are used to explain, clarify, and contextualize quantitative patterns, thereby strengthening interpretation and supporting practical, sector-relevant recommendations [61].



This design was selected because workforce sustainability in the electrical trades involves interconnected physical demands, psychosocial stressors, and organizational conditions that are difficult to capture with a single method. The quantitative phase provides sector-wide patterns and relationships, while the qualitative phase adds context on how these issues play out on job sites and in small- and medium-sized business operations. Together, the two phases support an applied, implementation-oriented evidence base suitable for OEL members and provincial stakeholders.

4.1.1 Phase 1: Quantitative component (survey first)

The first phase consisted of an online survey administered using REDCap (Research Electronic Data Capture), a secure, web-based platform widely used in health and occupational research for building and managing research surveys and databases [62]. The

survey was designed to capture a broad range of workforce characteristics and health indicators relevant to the electrical sector, including:

- **Socio-demographic and work context characteristics,** such as age, gender, work role (for example, apprentice, journeyperson, owner/employer), apprenticeship status, and years in the trade
- **Work organization and employment characteristics,** such as typical work schedules and weekly work hours, and other role-appropriate indicators of job demands
- **Musculoskeletal symptoms**, assessed using items from the Nordic Musculoskeletal Questionnaire (NMQ) to document region-specific symptoms across major body areas [63]
- **Sleep quality, assessed using the Pittsburgh Sleep Quality Index (PSQI)** [64]
- **Psychological distress,** assessed using the Kessler Psychological Distress Scale (K6) [65]
- **Burnout,** assessed using the Copenhagen Burnout Inventory (CBI) to measure personal and work-related burnout domains [66]
- **Job satisfaction**, measured using a brief, practical item appropriate for workforce surveys
- **Health-related quality of life (HRQoL)**, assessed using the SF-12, including physical and mental component summary indicators [67]

Quantitative analyses were used to describe the overall sample profile and to examine how work-related factors and health indicators relate to each other across the pooled multi-year dataset. The survey findings were also used to guide the qualitative inquiry by informing the interview guide and helping ensure that interview sampling and prompts reflected the most relevant patterns observed in the data.

4.1.2 Phase 2: Qualitative component (interviews to explain and contextualize)

The second phase consisted of semi-structured interviews with workers and SME owners. In keeping with the sequential explanatory approach, interviews were used to deepen understanding of the quantitative results by exploring:

- how workers and employers interpret and experience workplace demands and recovery opportunities
- how organizational culture, communication norms, and supervisory practices influence well-being and inclusion
- how health and workforce pressures are managed in SMEs with limited administrative capacity
- what supports are viewed as feasible, acceptable, and practical for adoption in real workplaces

This sequencing strengthens overall study quality by integrating measurable trends with lived experience and by ensuring that recommendations are both evidence-based and realistic for the electrical SME context [61].

4.1.3 Ethics and Oversight

All study procedures were reviewed and approved by the University of Toronto Research Ethics Board. Participation was voluntary, and informed consent was obtained from all participants prior to survey completion and/or interviews. To protect privacy, only de-identified and aggregated results are reported in this document. No identifiable participant information was shared with the Ontario Electrical League (OEL) or any external partners. Data were collected, stored, and analyzed by the University of Toronto research team in accordance with secure research data management procedures.

4.2 Recruitment and Data Sources

Recruitment for the SDF5 project was carried out through a coordinated partnership between the Ontario Electrical League (OEL) and the University of Toronto's ReSTORE Lab. Consistent with the approach used across earlier SDF cycles, recruitment prioritized accessibility and sector relevance, with the intent of engaging apprentices, journeypersons, and small to medium-sized enterprise (SME) owners operating in Ontario's electrical sector. Recruitment activities were designed to reflect real-world participation pathways in the trades, where workers and employers are more likely to engage through industry networks, association touchpoints, and trusted peer referral than through formal recruitment mechanisms.

4.2.1 Recruitment channels

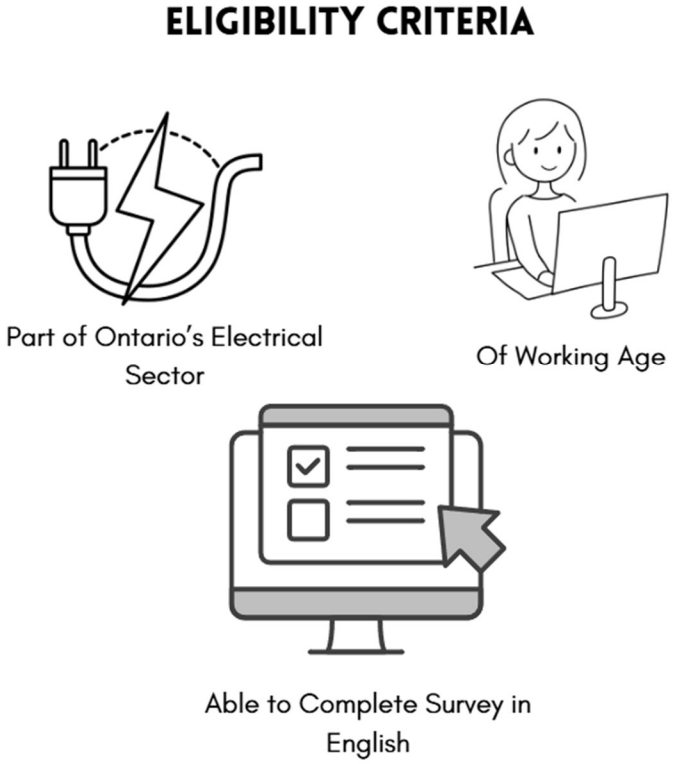
Participants were recruited using multiple OEL-supported channels, including:

- **OEL roadshow events,** where the study team engaged directly with workers and employers, provided a plain-language overview of the study, and supported enrolment.
- **Local OEL chapter meetings** are a key point of connection for contractors, SME owners, and workers across regions.
- **Contractor and employer meetings,** which supported targeted engagement of owners and supervisors with insight into staffing realities and workplace demands.
- **Targeted email outreach** distributed through OEL member communications, directing interested participants to the study team and the survey link.
- **Direct referrals**, where participants or employers shared study information within their networks, consistent with the relationship-based recruitment patterns observed in prior SDF projects.

Using multiple channels improved reach across roles and helped reduce barriers related to time, geography, and awareness, which are common limitations when recruiting within busy construction and trades contexts.

4.2.2 Eligibility and participation

Participation was open to individuals working in Ontario's electrical sector, including apprentices, journeypersons, and owners/employers of small- and medium-sized businesses. Interested individuals were provided with a plain-language description of the study and invited to participate if they met the project's inclusion criteria (for example, being of working age, currently working in the electrical sector in Ontario, and able to complete the survey in English).



Participation was voluntary, and individuals could choose to complete the survey only or, where eligible and interested, participate in a follow-up interview. Recruitment and participation procedures were designed to minimize burden and accommodate the time constraints of jobsite and business operations.

4.2.3 SDF5 participant cohort (2025–2026)

Through these recruitment activities, the SDF5 project enrolled 25 new participants during the reporting period. The cohort included:

- **Apprentices** at different stages of training,
- **Journeypersons, and**
- **SME owners and employers** operating within typical trade and contracting structures.

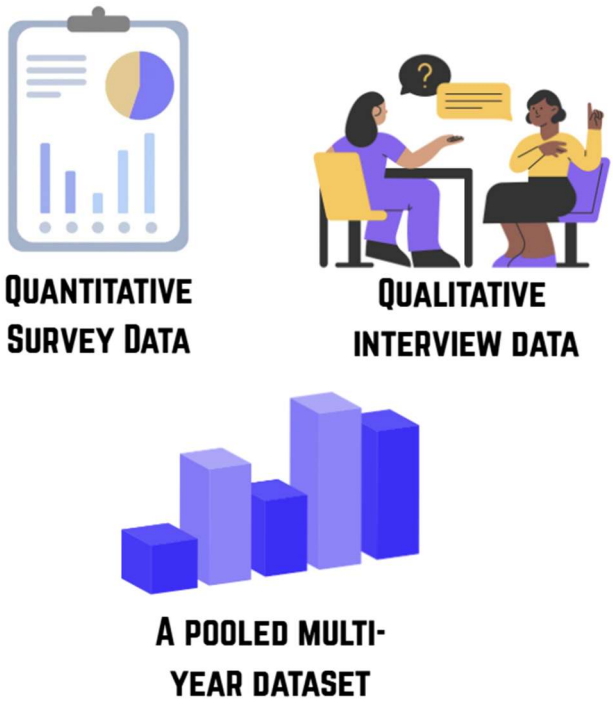
All enrolled participants were invited to complete the online survey. A subset also participated in semi-structured interviews to support the sequential explanatory design, allowing quantitative patterns to be interpreted alongside worker and employer perspectives.

4.2.4 Pre-registration for the 2026 observation study

In addition to the main SDF5 cohort, 11 journeypersons provided contact information to participate in a planned 2026 observational study focused on physical demands and musculoskeletal risk in real work settings. This next phase is intended to generate objective, task-informed evidence on ergonomic exposures and workload patterns that can complement the survey and interview findings and strengthen the practical basis for prevention-oriented guidance.

4.2.5 Data sources and integrated multi-year dataset

The SDF5 evidence base draws on multiple data sources:



1. **Quantitative survey data (REDCap)** collected from the SDF5 cohort during the project period.
2. **Qualitative interview data** with workers and SME owners to contextualize quantitative results and identify feasible strategies for SMEs.
3. **A pooled multi-year dataset,** integrating SDF5 data with prior SDF cohorts (SDF1–SDF4), to support stronger analyses across roles and to improve the stability of subgroup comparisons where single-year samples are limited.

Pooling across years strengthens analytical precision and supports a more reliable sector-level picture of recurring issues, such as musculoskeletal symptoms, sleep- and fatigue-

related concerns, psychological distress, burnout, and job satisfaction. It also improves the ability to examine patterns by role and career stage and, where feasible, to explore differences relevant to equity and inclusion objectives.

4.2.6 Integrated dataset handling and completeness

For the multi-year analyses, SDF5 survey data were combined with SDF1–SDF4 datasets using consistent variable definitions and harmonized coding, allowing indicators to be compared across project cycles. The research team applied standard data management procedures to ensure that records reflected unique participants within each cycle and that duplicate entries were not retained. Analyses were conducted using available data for each outcome, recognizing that some participants may have skipped individual survey questions. As a result, sample sizes may vary slightly across measures, and denominators are reported where needed to support transparency and accurate interpretation.

4.3 Measures (Quantitative)

The quantitative component of SDF5 used a set of standardized, widely used instruments in occupational health and workforce research. Measures were selected to (1) capture key dimensions of health and work experience that are directly relevant to electrical work, and (2) maintain continuity with earlier SDF cycles to support multi-year comparisons where appropriate. All measures were administered through a secure online REDCap survey [62].

4.3.1 Musculoskeletal health: Nordic Musculoskeletal Questionnaire (NMQ)

Musculoskeletal symptoms were assessed using region-specific items from the Nordic Musculoskeletal Questionnaire (NMQ), a widely used screening tool for documenting the presence and location of musculoskeletal symptoms [63]. Participants reported symptoms by body region (e.g., lower back, shoulders, neck, upper extremities, lower extremities) over a defined recall period, providing a clear description of symptom distribution across the electrical workforce.

4.3.2 Sleep quality: Pittsburgh Sleep Quality Index (PSQI)

Sleep quality was measured using the Pittsburgh Sleep Quality Index (PSQI), which assesses multiple components of sleep, such as sleep duration, sleep disturbances, sleep latency, and perceived sleep quality [64]. This measure supports a practical assessment of sleep- and fatigue-related risk, relevant to trades work schedules and recovery demands.

4.3.3 Psychological distress: Kessler K6

Psychological distress was measured using the Kessler Psychological Distress Scale (K6), a brief screening tool designed to capture non-specific distress symptoms that are commonly used in population and occupational health research [65]. The K6 provides a

concise indicator of distress that can be compared across worker groups and over time, without requiring clinical interpretation in the report.

4.3.4 Burnout: Copenhagen Burnout Inventory (CBI)

Burnout was assessed using the Copenhagen Burnout Inventory (CBI), which measures fatigue and exhaustion in domains relevant to work and daily functioning [66]. Consistent use of the CBI supports tracking of burnout-related burden and examining how burnout aligns with work conditions and recovery opportunities in electrical SMEs.

4.3.5 Job satisfaction: Single-item job satisfaction measure

Job satisfaction was captured using a single-item global measure, a common approach in workforce studies when a brief, low-burden indicator is needed [68]. This measure provides a practical summary of overall satisfaction that can be interpreted alongside burnout, distress, and health indicators.

4.3.6 Health-related quality of life: SF-12

Health-related quality of life was assessed using the 12-Item Short Form Health Survey (SF-12), which generates summary indicators reflecting physical and mental health functioning [67]. The SF-12 is widely used in population health research and provides a broad indicator of functional health that complements the more specific measures above.

4.3.7 Summary

Together, these measures provide a structured view of worker well-being across physical symptoms, sleep and recovery, psychological distress, burnout, overall job satisfaction, and functional health. This combination supports clear, policy-relevant interpretation and allows the report to describe both the burden of key issues and the workplace factors most closely linked to them.

4.4 Qualitative Procedures

The qualitative component of SDF5 was designed to contextualize and explain the quantitative findings by examining the lived experiences of workers and SME owners in Ontario's electrical sector. Semi-structured interviews were used to capture how day-to-day work conditions, workplace culture, and organizational constraints shape health, well-being, retention, and EDI experiences. This approach follows established qualitative standards that emphasize transparency, analytic rigor, and credibility in applied workforce research [69,70].

4.4.1 Data collection and interview approach

Semi-structured interviews were selected to balance consistency across participants with flexibility to explore issues that varied by role and workplace context. Interview guides were informed by earlier SDF cycles and refined to align with SDF5 priorities, including:

- work organization and task demands
- physical strain, fatigue, and recovery opportunities
- psychosocial stressors, burnout-related experiences, and help-seeking norms
- workplace culture and supervisory practices
- equity, inclusion, and accommodation experiences
- practical, feasible strategies that SMEs can implement within real constraints

Interviews were conducted by trained members of the research team using virtual or telephone formats, based on participant preference and scheduling feasibility. With consent, interviews were audio-recorded and transcribed verbatim to support accurate analysis and consistent interpretation.

4.4.2 Analytic framework: Reflexive thematic analysis

Interview data were analyzed using reflexive thematic analysis, a method suited to identifying patterns across complex social and organizational environments while remaining grounded in participant accounts [69,71]. Analysis proceeded through an iterative process that included:

1. Familiarization with transcripts through repeated reading and initial notetaking.
2. Systematic coding to capture meaningful segments related to work conditions, health, coping, culture, and EDI.
3. Theme development by clustering related codes into candidate themes and subthemes.
4. Theme refinement to ensure internal coherence within themes and clear distinctions between themes.
5. Interpretation and synthesis to ensure themes addressed the SDF5 research objectives and could be meaningfully integrated with quantitative results.

This approach supported both descriptive clarity and applied relevance, ensuring themes reflected workplace realities and were suitable for translation into recommendations.

4.4.3 Team-based analysis and interpretive rigor

Analysis was undertaken by a multi-disciplinary team with expertise in occupational health, workplace mental health, and EDI. Team-based review supported interpretive depth and helped ensure findings were not driven by a single disciplinary lens. Regular analytic meetings were used to review developing codes and themes, resolve interpretive

differences through discussion, and maintain consistency in how themes were defined and applied.

4.4.4 Trustworthiness and transparency

To enhance the credibility and transparency of findings, the research team used established strategies aligned with qualitative best practices [70,72], including:

- Audit trail: Documentation of coding decisions, theme revisions, analytic memos, and meeting notes.
- Reflexive practice: Ongoing reflection by analysts on assumptions, positionality, and interpretation during analysis [71].
- Peer debriefing: Review of emerging interpretations by senior team members to strengthen clarity and reduce blind spots.
- Mixed-method integration: Comparison of qualitative themes with quantitative patterns to confirm convergence, explain differences, and strengthen the overall interpretation of findings for applied use.

Together, these procedures ensured that qualitative findings were grounded in participant accounts, systematically analyzed, and presented in a way that supports policy and sector decision-making.

4.5 Integration with Quantitative Results

Although full mixed-methods integration is reported in Section 4.5, the qualitative phase was deliberately structured to explain and contextualize the quantitative findings. Interview guides and analytic interpretation were informed by quantitative patterns observed in the survey, including: (1) key correlates of burnout, psychological distress, and job satisfaction; (2) the distribution of musculoskeletal symptoms by body region; and (3) differences observed by gender, apprenticeship status, and workplace context within electrical SMEs. Qualitative themes were also used to clarify how workplace culture and practical constraints shape help-seeking and the feasibility of implementing supportive and inclusive practices. This design-level linkage strengthens the credibility of the qualitative findings by connecting participant accounts to the broader quantitative evidence rather than treating them as stand-alone anecdotes.

4.6 Mixed-Methods Integration

The SDF5 study combined quantitative (survey) and qualitative (interview) evidence to produce a complete, practical understanding of workforce health, workplace conditions, and equity-related barriers in Ontario's electrical sector. This integration was not an "add-on" at the end of the project. It was built into the research plan and carried through the full project cycle, from study design and recruitment to analysis, interpretation, and development of recommendations. This approach ensured that the findings are both (1)

grounded in measurable patterns across the workforce and (2) informed by the real-world context that shapes what is feasible for small- and medium-sized electrical businesses.

4.6.1 Integration in study design (survey first, then interviews to explain what we saw)

SDF5 used a "survey first, interviews second" structure. The survey was designed to capture core indicators used across earlier SDF cycles so results could be compared over time and interpreted as part of a multi-year evidence base. Once the survey patterns were identified, the qualitative phase was structured to explain and contextualize them rather than to explore unrelated topics.

This design supported integration in three practical ways:

1. **Focused interview content:** Topics explored in interviews were directly linked to the domains measured in the survey, including musculoskeletal symptoms, sleep and fatigue, psychological distress, burnout, job satisfaction, and health-related quality of life. Interviews also explored workplace conditions that influenced these outcomes, such as scheduling realities, recovery time, supervision and communication practices, and the availability of supports in SMEs.
2. **Purposeful inclusion of key perspectives:** Interview recruitment was guided by the need to include a range of roles and experiences relevant to the project objectives, including apprentices, journeypersons, and SME owners/employers. This ensured that the qualitative findings could explain patterns observed in the survey and highlight role-specific constraints that matter for implementation.
3. **Alignment with workforce priorities:** Both phases were designed to support the overall goal of turning evidence into feasible action. The integration plan, therefore, emphasized identifying modifiable factors, clarifying barriers to adoption, and documenting practical suggestions from participants that can inform tool development and sector planning.

4.6.2 Integration during analysis (cross-checking and connecting the two evidence sources)

Integration continued during analysis through a structured process of cross-checking survey patterns against interview themes. This helped ensure that interpretations were accurate, balanced, and policy-relevant.

The research team integrated findings through:

- **Cross-checking where findings aligned:** Survey results were compared against interview accounts to see whether participants described experiences consistent with the patterns observed in the quantitative data. Where alignment was clear, this strengthened confidence that the finding reflects a meaningful sector issue rather than a one-time or context-specific concern.

- **Using interviews to explain "why" behind survey patterns:** Where the survey identified relationships between factors (for example, sleep quality and well-being outcomes, or differences across career stage or gender), interviews helped explain the mechanisms and workplace realities that may contribute to these patterns. This is especially important in trades contexts where work organization, scheduling, and culture shape daily experience in ways that standard questionnaires cannot fully capture.
- **Identifying where findings differed or added nuance:** In some cases, interviews provided nuances that helped interpret the survey results more carefully. For example, participants may describe how support vary by contractor, job type, or season, or how barriers to help-seeking are influenced by workplace norms and concerns about credibility or job security. These insights were documented as context for interpretation and as priorities for future work.
- **Connecting findings to feasibility and implementation:** Interviews were used to assess what is realistic for SMEs to adopt. This included documenting constraints such as limited time, staffing shortages, and the lack of formal HR structures, as well as practical solutions that participants felt could work within these constraints.

4.6.3 Integration across years (using the multi-year evidence base appropriately)

A core strength of SDF5 is that findings were interpreted within a multi-year evidence base (SDF1–SDF5). This allowed the project to distinguish between:

- issues that appear consistently across years (suggesting stable sector challenges), and
- issues that may emerge or changing over time (suggesting areas requiring closer monitoring or targeted follow-up).

Multi-year integration was used to support stronger interpretation, to improve the stability of subgroup comparisons, and to inform which topics should be prioritized for recommendations and future phases of work.

4.6.4 Integration for recommendations and knowledge-to-action

Integration directly informed the development of recommendations for OEL members and the Government of Ontario. Survey findings helped identify the most common issues, the factors most strongly linked to well-being and job satisfaction, and the factors most strongly linked to well-being and job satisfaction. Interviews helped determine what actions are feasible for SMEs, what supports workers and owners perceive as most useful, and what would reduce barriers to adoption.

As a result, recommendations in Section 8 are based on:

- what the data show is most important (survey patterns), and

- what participants describe as workable and relevant (interview findings), with attention to differences by role and career stage.

This combined evidence base also supported planning for the next phase of work, including the 2026 observation study, which is intended to add objective, task-informed evidence on physical demands and musculoskeletal risk in real work settings.

4.6.5 Why this integrated approach matters for Ontario's skilled trades priorities

This integrated approach strengthens the usefulness of SDF5 for workforce planning. It ensures that the report does not rely on a single method and avoids producing recommendations that are either statistically informed but impractical or practical but not supported by broader evidence. By combining measurable patterns with real-world context, SDF5 produces findings that are directly applicable to improving retention, safety, and well-being in Ontario's electrical SMEs.

5. Results

5.1 Quantitative Results

5.*1.1 Overview of the Quantitative Dataset*

The quantitative component of SDF5 is grounded in a pooled, multi-year dataset spanning five consecutive Skills Development Fund cycles (SDF1–SDF5). This consolidated dataset provides one of the most comprehensive sources of evidence available on occupational health and well-being in Ontario's electrical sector and is particularly valuable for examining patterns that are difficult to detect within single-year cohorts, such as differences by apprenticeship status, gender, and other workforce characteristics.

Across SDF1–SDF5, the pooled analytical sample includes 188 electrical sector participants who completed the standardized survey measures used throughout the program of research. Consistent with earlier cycles, the survey was administered online and captured a structured set of socio-demographic and work-context characteristics alongside validated health and well-being measures, enabling year-to-year comparability and multi-year integration.

SDF5 cohort contribution (2025–2026)

During the SDF5 reporting period, 25 new participants were recruited and added to the multi-year dataset, strengthening both the currency of the evidence base and the stability of subgroup analyses.

What the quantitative survey measured

The SDF program survey is intentionally comprehensive and consistent across cycles (including SDF5). It includes socio-demographic and job characteristics (for example,

gender, age, education, work experience, and job characteristics) and core occupational health indicators measured using established tools. Specifically, the survey assesses musculoskeletal symptoms (Nordic Musculoskeletal Questionnaire), sleep quality (Pittsburgh Sleep Quality Index), psychological distress (K-6), and burnout (Copenhagen Burnout Inventory), alongside working hours and other work-burden indicators. These measures support both descriptive profiling of the workforce and statistical modelling of associations between work conditions, health outcomes, and sustainability-relevant indicators.

5.1.2 Participant Characteristics

The quantitative results presented in this report are based on a pooled dataset of 188 participants who completed the standardized survey measures across SDF1-SDF5, including 25 new participants recruited during the SDF5 project year (2025–2026). Pooling data across project cycles strengthens the stability of descriptive estimates and supports subgroup comparisons where single-year samples are limited. It also enables a more credible assessment of patterns across key workforce characteristics captured in the survey, including gender, apprenticeship status, years of experience, and other work-context indicators in the dataset.

This section summarizes the demographic and occupational profile of the pooled sample. It provides context for interpreting the subsequent results on musculoskeletal symptoms, sleep and fatigue, psychological distress, burnout, job satisfaction, and health-related quality of life. Where applicable, denominators are reported because sample sizes can vary slightly across variables if participants did not complete every survey item.

5.1.2.1 Demographic Profile

Age Distribution

Participants spanned early career through late career, with representation from workers in their early 20s to those over 60. This range captures the realities of the electrical workforce across the full career trajectory, from apprentices navigating training and early job instability to experienced journeypersons and SME owners managing cumulative physical demands and longer-term health risks. The overall age profile reflects a largely mid-career workforce, underscoring the importance of succession planning as retirement eligibility increases across the sector.

Gender

Consistent with the gender composition of Ontario's electrical trade, the pooled sample was predominantly male:

- **Men:** 88%
- **Women:** 8%
- **Non-binary / another gender identity:** 4%

Although women and gender-diverse participants represent a smaller proportion of the overall sample, their inclusion across multiple SDF cycles strengthens the ability to examine differences in workplace experience and well-being by gender. This is particularly relevant for interpreting equity-focused findings later in the report, including patterns related to psychological distress, workplace culture, support needs, and retention pressures in a historically male-dominated sector.

5.1.2.2 Occupational Characteristics

Role in the Trade

Participants represented multiple roles across Ontario's electrical sector, capturing perspectives across the training-to-journeyperson pipeline as well as other job functions within electrical work. In the pooled SDF1–SDF5 sample (n = 188), 58% identified as apprentices, 27% as licensed electricians, 8% as journeypersons, and 6.8% selected other roles (for example, roles that may include supervisory or business responsibilities, depending on how participants self-identified in the survey). This distribution supports interpretation of findings across career stages and work contexts, including early-career training environments and more experienced practice settings.

Years of experience

Participants reported a wide range of experience in the electrical field, spanning early career through long-term practice. In the pooled dataset, average experience was 9.60 years, reflecting a sample that includes both developing and established workers. Experience also emerged as an important indicator when interpreting well-being patterns across the sector. In regression analyses, greater years of experience were associated with lower psychological distress (K-6) and lower personal burnout (CBI personal burnout), suggesting that retention and career stability may be linked to improved coping capacity, role confidence, and adaptation to trade demands over time (while recognizing that these are cross-sectional associations).

Work hours

Across the pooled SDF1–SDF5 dataset, participants reported an average of 41.15 hours per week, reflecting full-time employment patterns typical of the sector. Importantly, in the regression models reported for the pooled sample, average weekly working hours were not a statistically significant predictor of psychological distress or personal burnout. This suggests that worker well-being in this dataset may be more strongly shaped by factors beyond total hours alone, such as sleep quality, recovery opportunities, job demands, job pacing, commute burden, and workplace culture, which are further explored elsewhere in the report.

5.1.2.3 Organizational Context

Firm and Organizational Context

Participants were employed across small and medium-sized electrical businesses, reflecting the structure of Ontario's electrical sector and the operating context of many

OEL member companies. Where reported, firm size was captured as a practical indicator of organizational capacity, including the availability of formal policies, supervision structures, and dedicated resources for health, safety, and workforce support.

In interpreting the results of this report, firm context matters because it can shape:

- the feasibility of implementing ergonomic and musculoskeletal prevention practices,
- access to benefits and external supports (for example, EAPs or formal HR functions),
- the consistency of apprenticeship supervision and mentoring,
- the degree of flexibility in scheduling, job planning, and task rotation, and
- the ability to implement and sustain equity, diversity, and inclusion practices.

As a result, recommendations in later sections are framed to be practical for SMEs and adaptable to different organizational realities, recognizing that many electrical businesses operate with lean staffing and limited administrative capacity.

Primary Work Settings

Participants reported working across a range of electrical environments, including residential, commercial, and industrial contexts, as well as mixed-service operations. This diversity supports interpretation of findings as sector-relevant across multiple job settings and project types, while still grounded in the realities of day-to-day electrical work.

5.1.2.4 Apprenticeship Representation

Apprentices comprised a meaningful proportion of the pooled SDF1–SDF5 sample, ensuring that the quantitative findings reflect not only established journeyperson experiences but also the realities of workers in the earliest and most transitional stage of their trade careers. Including apprentices is particularly important for workforce planning because this group sits at the point where recruitment success must translate into retention and progression toward certification.

In the electrical sector, apprentices commonly face a combination of factors that can shape their health and work experience, including learning new tasks under time pressure, adapting to physically demanding work, and navigating variable jobsite conditions. Apprentices also often manage competing expectations, such as balancing field work with in-class requirements and progressing through training milestones while establishing credibility on site. These dynamics can affect stability, confidence, and access to supportive supervision, especially in smaller businesses with limited capacity for formal mentorship structures.

Across the multi-year dataset, the apprenticeship group consistently signals areas for targeted attention in subsequent analyses, particularly regarding psychological distress

and other indicators of well-being. As such, apprentices are treated as a priority subgroup throughout this report, both to support improved completion outcomes and to strengthen long-term workforce sustainability in Ontario's electrical trade.

5.1.2.5 SME Owner and Employer Representation

Approximately 12% of the pooled SDF1–SDF5 sample identified as business owners, senior employers, or supervisors. Including this group strengthens the relevance of the findings for implementation because owners and supervisors are the primary decision-makers in electrical SMEs. They influence how work is organized daily, including task allocation, pacing, scheduling, onboarding practices, and the tone of workplace culture. They are also the group most directly responsible for whether new supports, training, or tools are adopted and sustained in real job settings.

Owner and supervisor representation is particularly important in the context of Ontario's SME-dominated electrical sector, where formal human resources structures are often limited, and workplace practices tend to be shaped through informal leadership and day-to-day decisions. As reflected in this project's mixed-methods evidence, SME owners also face distinct pressures, including staffing constraints, administrative workload, financial uncertainty, and the need to manage competing operational demands while supporting workforce well-being. Capturing these perspectives ensures that conclusions and recommendations are grounded in the realities of the firms expected to implement them and supports the development of practical, "right-sized" strategies for OEL member companies.

5.1.2.6 Importance of the Integrated Dataset

Pooling survey data across five consecutive years of SDF research (SDF1–SDF5) and 188 total participants strengthens both the analytical quality and the policy relevance of this report. From an analytical perspective, a larger, integrated dataset increases the ability to detect meaningful and consistent patterns in worker health and workplace experience, particularly when examining outcomes that vary by role, career stage, and demographic characteristics. This is especially important in the electrical trades context, where single-year samples can be affected by recruitment variability, regional differences, and shifting project conditions.

From a workforce planning perspective, the multi-year structure supports more stable interpretation. It helps distinguish persistent issues that recur across years from short-term fluctuations related to seasonal work cycles, economic conditions, or localized job-site factors. The pooled dataset also improves the reliability of subgroup comparisons (for example, apprentices versus journeypersons and men versus women) and reduces the likelihood that any one cohort overly influences conclusions.

Importantly, this approach aligns with the intent of Skills Development Fund programming by supporting evidence that is cumulative, sector-informed, and directly usable for

decision-making. The integrated dataset therefore provides a stronger foundation for identifying modifiable risk and protective factors, prioritizing intervention areas, and developing recommendations that are credible for both OEL member companies and provincial partners.

5.1.3 Musculoskeletal Health (MSK) Findings

Musculoskeletal (MSK) symptoms remain the most reported physical health concern among electrical workers across the multi-year SDF dataset. In the pooled SDF1–SDF5 sample (N = 188), 89.4% of participants reported MSK symptoms in at least one body region over the previous 12 months. The most frequently reported regions were the lower back (66.0%), shoulders (58.5%), and neck (55.9%), indicating a consistent concentration of discomfort in areas most relevant to physical trade work and sustained postural demands. These findings reinforce that MSK burden is widespread across the sector and remains a central workforce sustainability issue, given its implications for daily functioning, safety, and longer-term retention in the trade.

5.1.3.1 Most Commonly Affected Body Regions

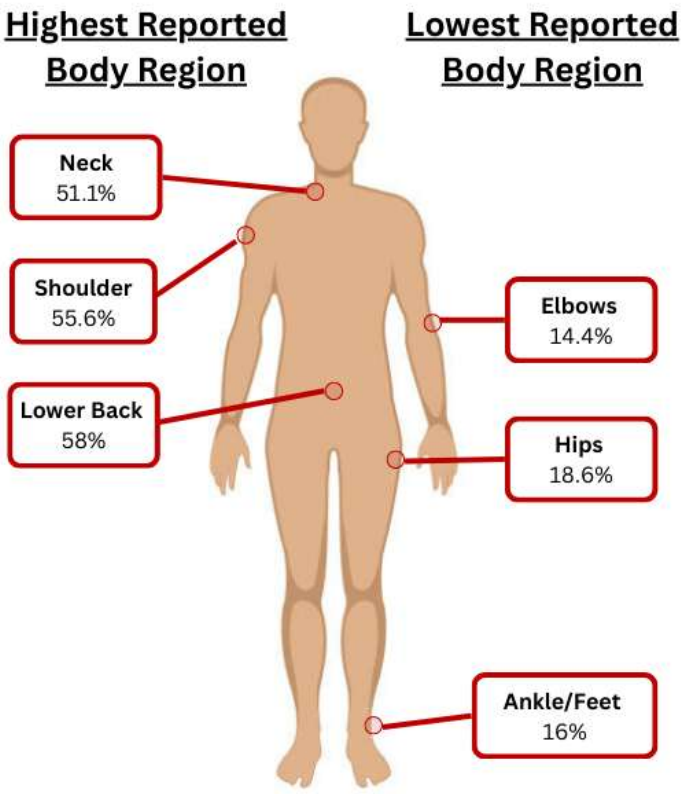
Across the pooled SDF1–SDF5 dataset (N = 188), musculoskeletal symptoms were reported across multiple anatomical regions, with the highest prevalence concentrated in the **lower back, shoulders, and neck**. Specifically, the most frequently reported regions over the past 12 months were:

- **Lower back:** 109 workers (58.0%)
- **Shoulders:** 104 workers (55.6%)
- **Neck:** 96 workers (51.1%)

Symptoms were also common in the upper extremities and lower body, including:

- **Wrists/hands:** 81 workers (43.3%)
- **Knees:** 70 workers (37.2%)
- **Upper back:** 58 workers (30.9%)

Less frequently reported regions included hips (18.6%), ankles/feet (16.0%), and elbows (14.4%). Overall, this distribution indicates that musculoskeletal burden is not limited to a single area but is widespread across body regions relevant to sustained physical work in the trade.



5.1.3.2 Severity and Frequency of Symptoms

The quantitative survey captured whether workers experienced musculoskeletal symptoms in specific body regions over the past 12 months. While the survey provides a strong indication of the extent and distribution of MSK symptoms across the workforce, it does not, by itself, quantify symptom intensity or clinical severity.

However, the very high proportion of workers reporting MSK symptoms across multiple regions suggests a meaningful burden that is likely to affect day-to-day functioning for at least a subset of workers. From a workforce and sector-planning perspective, widespread MSK symptoms can have operational implications, including reduced capacity to sustain physically demanding work, increased need for modified duties, and potential impacts on attendance and retention. These implications are explored further in later sections of this report, including the integrated interpretation of quantitative and qualitative findings.

5.1.3.3 Differences Across Worker Roles

Although the survey analyses in this report present musculoskeletal (MSK) symptoms primarily at the overall sample level, the very high prevalence of MSK symptoms across the pooled SDF1–SDF5 dataset (90.2%) indicates that MSK burden is a sector-wide issue rather than a concern isolated to any single role. The most commonly affected regions

(lower back and shoulder) further reflect the trade's consistent physical exposures across job types and career stages.

Importantly, the pooled dataset includes representation across multiple roles in the electrical workforce, including apprentices (58%), licensed electricians (27%), journeypersons (8%), and other roles such as supervisors/related positions (6.8%). This distribution supports the interpretation of MSK concerns as broadly relevant across the workforce ecosystem captured by the SDF research program.

Implications by role (interpretive, aligned with the dataset structure):

- **Apprentices and early-career workers:** Given their substantial representation in the pooled sample, the overall MSK burden strongly suggests that many MSK concerns are emerging during training and early work exposure, reinforcing the need for prevention supports that can be integrated early in apprenticeship.
- **Licensed electricians and journeypersons:** The persistence of high MSK prevalence at the sample level, paired with the most frequently affected regions (lower back and shoulder), supports the interpretation that MSK strain remains relevant beyond entry-level work and may reflect cumulative exposure over time.
- **Supervisors/other roles:** Even where workers shift into supervisory or mixed roles, the dataset still reflects high MSK burden overall, indicating that MSK prevention strategies should be framed as a workforce-wide standard rather than a worker-only issue.

5.1.3.4 Association with Other Health Indicators

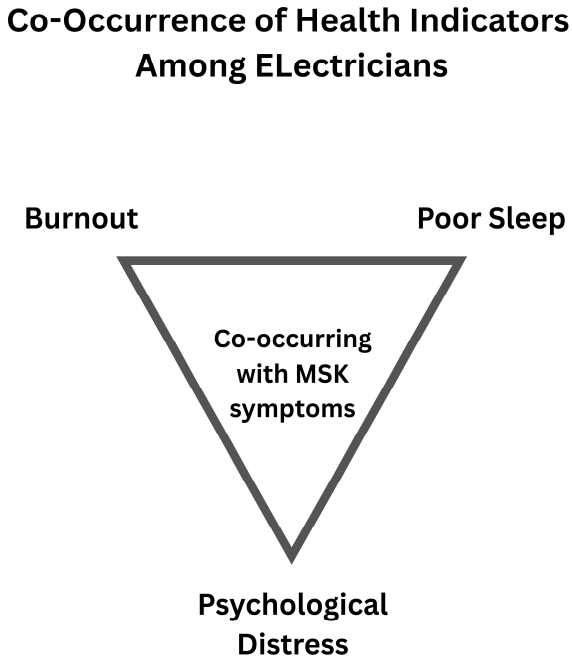
In the pooled SDF1–SDF5 dataset, musculoskeletal symptoms did not occur in isolation. Participants who reported MSK discomfort also commonly reported challenges in other areas of well-being captured in this study, including sleep quality, psychological distress, and burnout. While the quantitative analyses in SDF5 primarily examined sleep quality and years of experience as predictors of mental health outcomes, the overall pattern across measures indicates that physical discomfort and psychosocial strain often co-occur in Ontario's electrical workforce.

From a sector planning perspective, this reinforces the importance of addressing MSK prevention and recovery alongside fatigue and mental health supports, rather than treating these as separate issues.

Where relevant across the pooled dataset, MSK symptoms were discussed in relation to:

- **Sleep and recovery:** MSK discomfort and poor sleep were frequently reported within the same participant profiles, highlighting the role of recovery as a practical intervention target.

- **Psychological distress:** Workers experiencing physical strain also commonly reported elevated distress, consistent with the overall burden profile observed in the multi-year dataset.
- **Burnout:** Persistent physical discomfort was often present alongside higher personal exhaustion, reinforcing the need for integrated approaches that address both physical and psychosocial demands.



5.1.3.5 Multi-Year Consistency

Across five consecutive SDF cycles (SDF1–SDF5), musculoskeletal (MSK) symptoms have remained consistently widespread in Ontario's electrical workforce. The persistence of this pattern over time indicates that MSK burden is not a short-term fluctuation linked to a single project year or temporary market conditions. Instead, it reflects a recurring, sector-wide challenge in electrical work environments.

This multi-year stability suggests that current workplace conditions and typical prevention practices have not been sufficient to meaningfully reduce MSK strain at the workforce level. It also reinforces the importance of developing prevention approaches that are feasible for small and medium-sized contractors, where time, staffing, and administrative capacity can limit the uptake of more resource-intensive ergonomic programs.

These findings provide direct rationale for the planned 2026 observation study, which will complement self-reported survey data with objective, task-informed evidence on physical workload and ergonomic risk in real job settings. By quantifying field exposures, the

observation phase aims to strengthen the practical foundation for MSK prevention guidance that is realistic and implementable for Ontario's electrical SMEs.

5.1.3.6 Implications for Workforce Development and Policy

The persistence and scale of MSK symptoms across the multi-year SDF dataset highlight MSK prevention as a workforce-sustainability issue, not just an individual health concern. The findings point to several practical priorities for OEL members and provincial workforce planning:

- **Strengthen MSK prevention in everyday work practices across electrical SMEs.** Given the consistently high prevalence of MSK symptoms over time, prevention strategies need to be practical, job-relevant, and easy to apply within typical electrical work settings.
- **Prioritize early-career supports.** Apprentices have repeatedly emerged as a higher-burden group in the SDF program. This supports targeted prevention strategies early in the trade pathway, including onboarding approaches that reinforce safe work practices, pacing, and recovery.
- **Treat MSK health as part of an integrated well-being strategy.** SDF findings show that MSK symptoms co-occur with sleep disruption, psychological distress, and burnout. Addressing MSK strain alongside fatigue and mental health initiatives is likely to yield greater impact than treating these issues in isolation.
- **Support retention through sustainable work practices.** Multi-year patterns suggest that MSK symptoms persist across career stages. Retention strategies should therefore consider the cumulative nature of physical strain and the importance of promoting sustainable work practices that help workers remain healthy and employable over time.
- **Position MSK prevention as a workforce capacity issue as infrastructure demand increases.** As Ontario continues to expand housing and electrical infrastructure, reducing preventable MSK strain becomes increasingly important to minimize avoidable absence, support productivity, and strengthen long-term workforce stability.

Bridge to the 2026 observation study: These multi-year findings provide a clear rationale for the planned 2026 observation study, which will add objective, on-site information about physical workload and ergonomic exposures to better inform practical, task-relevant MSK prevention guidance that electrical SMEs can realistically adopt.

5.1.4 Sleep and Fatigue Findings

Sleep quality emerged as a high-priority well-being issue across the integrated SDF1–SDF5 quantitative dataset. Sleep was assessed using the Pittsburgh Sleep Quality Index (PSQI), which captures multiple dimensions of sleep, including duration, disturbances, and perceived restfulness. Across the pooled sample (N = 188), results indicate that many

electrical workers experience poor or disrupted sleep, with meaningful implications for both physical recovery and psychological well-being.

Across the multi-year dataset, poorer sleep quality was consistently associated with:

- higher psychological distress
- higher personal burnout
- higher work-related burnout
- lower job satisfaction

Importantly, these relationships remained evident even after accounting for key worker characteristics, including demographic and experience-related factors. Taken together, the findings identify sleep and fatigue as cross-cutting issues that warrant attention in workforce planning and workplace supports.

5.1.4.1 Overall Sleep Quality

Across the pooled SDF1–SDF5 dataset, sleep disruption was commonly reported by electrical workers. Many participants indicated difficulties falling asleep, waking during the night or too early, and feeling that sleep was not restorative. Taken together, these responses suggest that sleep quality is a recurring concern in this workforce rather than an isolated issue in a single project year.

From a workforce sustainability perspective, these patterns are important because disrupted sleep reduces recovery time between physically demanding workdays and can contribute to ongoing fatigue. Consistent with observations across earlier SDF cycles, the presence of persistent sleep disruption reinforces the need to consider fatigue and recovery as foundational components of worker well-being in Ontario's electrical SMEs.

5.1.4.2 Sleep as a Predictive Health Indicator

In the SDF1–SDF5 analyses, sleep quality consistently emerged as a central indicator linked to multiple outcomes, including psychological distress, burnout, and job satisfaction. Workers reporting poorer sleep were more likely to report:

- greater emotional exhaustion,
- reduced coping capacity,
- higher stress levels, and
- lower satisfaction with their work.

These findings reinforce the importance of considering fatigue and recovery as part of a broader strategy for supporting sustainable employment, particularly in a sector where retention and workforce stability are ongoing priorities.

5.1.4.3 Sleep and Physical Health

Across the pooled SDF1–SDF5 dataset, poorer sleep quality tended to co-occur with a higher musculoskeletal (MSK) symptom burden. Workers who reported disrupted or non-restorative sleep were also more likely to report MSK discomfort across one or more body regions. This pattern is important because it points to a potentially reinforcing cycle between pain and recovery: inadequate sleep can limit physical restoration between workdays, while persistent pain or discomfort can interfere with the ability to fall asleep or stay asleep.

Although the survey did not capture detailed fatigue drivers such as commuting distance, shift variability, job pacing, or task rotation, the consistent association between sleep and MSK symptoms across multiple SDF cycles strengthens confidence that these two domains are closely linked in Ontario's electrical workforce. This finding supports the value of integrated approaches that address both ergonomic strain and recovery practices, rather than treating sleep and MSK concerns as separate issues.

5.1.4.4 Variation Across Worker Roles

Apprentices
Across the integrated SDF1–SDF5 dataset, apprentices reported poorer sleep quality than journeypersons. This pattern aligns with the broader profile observed for apprentices in this research program, including higher psychological distress and higher burnout indicators. In practical terms, the findings suggest that sleep disruption may be one of the early-career vulnerabilities that contributes to reduced recovery and lower overall resilience during the apprenticeship period.

Journeypersons
Journeypersons generally reported moderate sleep quality, but poor sleep remained common within this group, particularly among those who also reported elevated MSK symptoms or higher psychosocial strain. The multi-year pattern indicates that sleep concerns are not limited to early-career workers and can persist across the career span, especially when physical demands and recovery challenges accumulate.

Employers and SME Owners
Owners and supervisors frequently describe fatigue linked to balancing fieldwork with administrative and staffing responsibilities. However, in the quantitative analyses, differences in sleep quality between owners and non-owners were not large enough to distinguish this group clearly as a separate statistical pattern. As a result, the most defensible interpretation for this report is that owner fatigue is strongly evident in qualitative accounts, while the survey data does not show a clear role-based separation in sleep outcomes for this subgroup.

5.1.4.5 Multi-Year Consistency

Sleep concerns have been a consistent finding across the entire SDF research program (SDF1–SDF5). In each cycle, a substantial proportion of participants reported poor sleep quality, and the overall pattern has remained stable year after year rather than fluctuating as a short-term issue.

Across the integrated analyses, poorer sleep quality has repeatedly shown strong links with key well-being outcomes, particularly higher psychological distress and higher burnout. This recurring relationship across multiple cohorts strengthens confidence that sleep and fatigue are not isolated to a single project year or subgroup, but reflect a persistent, sector-wide challenge within Ontario's electrical workforce.

Importantly, because sleep is a modifiable factor, the multi-year stability of these findings points to a clear opportunity for prevention-oriented action. Addressing fatigue and recovery is likely to produce benefits across multiple domains of workforce sustainability, including mental health, physical recovery, and job satisfaction.

5.1.5 Psychological Distress Findings

Psychological distress, measured using the Kessler K-6 scale, provides an indicator of non-specific emotional strain that can reflect symptoms such as anxiety, low mood, and reduced coping capacity. Across the pooled SDF1–SDF5 dataset (N = 188), distress levels were elevated for a meaningful proportion of participants. This pattern has appeared consistently across SDF cycles, reinforcing that mental well-being is a central workforce sustainability issue in Ontario's electrical sector.

Distress matters because it influences more than individual health. Elevated distress is associated with reduced concentration, lower perceived work ability, higher burnout risk, and greater likelihood of withdrawal from the job or trade. In the context of ongoing labour shortages, persistent distress therefore has implications for safety, productivity, retention, and long-term workforce capacity.

In SDF5, the multi-year dataset strengthens the reliability of these findings by demonstrating that distress is not limited to a single cohort or short-term labour market context. Instead, it appears alongside other recurring pressures documented throughout the program, including musculoskeletal symptoms, fatigue and sleep disruption, and work organization challenges, highlighting the interconnected nature of physical and psychological strain in the trade.

5.1.5.1 Overall Distress Levels

Across the pooled SDF1–SDF5 dataset, K-6 responses indicate that a sizeable share of workers experienced symptoms consistent with elevated emotional strain during the reference period. Participants commonly endorsed items reflecting feelings of

nervousness, restlessness, or the sense that “everything was an effort,” highlighting that distress is not confined to isolated cases but is present across the workforce.

At the same time, distress scores varied meaningfully across participants. This variability is important because it enables the analysis of subgroup patterns (for example, differences by apprenticeship status, gender, and experience level) and supports identification of modifiable factors linked to better or worse mental health outcomes.

5.1.5.2 Differences Across Worker Roles

Apprentices

Across the pooled SDF1–SDF5 dataset, apprentices reported the highest levels of psychological distress. This pattern has appeared consistently across multiple SDF cycles and remains evident in the current multi-year analysis, indicating that early-career workers face a distinct mental health burden during training and transition into the trade.

Journeypersons

Journeypersons reported lower distress on average than apprentices. However, distress was not absent in this group. A meaningful subset of journeypersons continued to report elevated symptoms, indicating that emotional strain persists beyond apprenticeship and can remain a workforce-wide issue rather than only an early-career challenge.

Employers and SME owners

Employers and SME owners reported distress levels comparable to those of employees in the pooled analysis. This reinforces that psychological strain is experienced across the full workforce ecosystem, including individuals responsible for supervision, scheduling, and business operations, not only those performing frontline tasks.

5.1.5.3 Gender Differences

Although women represented a small proportion of the pooled SDF1–SDF5 sample, the quantitative findings indicate a consistent pattern: women reported higher psychological distress than men. This difference has also appeared in earlier SDF cycles. It remains visible when the data are examined across years, suggesting that gender-related strain is not isolated to a single project period.

Because the number of women participants is relatively small, these results should be interpreted with appropriate caution. At the same time, the pattern aligns with qualitative evidence from the SDF program indicating that women in the trades may face additional pressures related to workplace culture, credibility expectations, and inclusion, which can contribute to heightened stress and reduced psychological safety.

5.1.5.4 Association with Other Health Measures

Psychological distress did not occur in isolation. Across the pooled SDF1–SDF5 dataset, distress scores moved in parallel with several other indicators of worker well-being,

reinforcing the interconnectedness of mental health, physical strain, and recovery in the electrical trade.

- **Sleep quality:** Workers reporting poorer sleep also tended to report higher distress. This pattern supports the broader finding across the SDF program that disrupted sleep and fatigue are closely tied to emotional strain.
- **Burnout:** Distress showed a strong relationship with both personal and work-related burnout, indicating that workers experiencing higher distress are also more likely to report emotional exhaustion and reduced coping capacity at work.
- **Musculoskeletal symptoms:** Workers who reported MSK discomfort were also more likely to report higher distress, suggesting an overlapping burden where physical pain and psychological strain may reinforce one another over time.
- **Job satisfaction:** Higher distress was associated with lower job satisfaction, highlighting the workforce relevance of mental health. Emotional strain is not only a clinical concern, but also a contributor to motivation, engagement, and retention.

Taken together, these associations were consistent across SDF cycles and strengthen the interpretation that improving workforce sustainability requires integrated approaches that address recovery and fatigue, physical strain, and psychosocial supports in tandem.

5.1.5.5 Multi-Year Stability

Psychological distress patterns observed in SDF5 were consistent with earlier SDF cycles, indicating that emotional strain is a persistent, sector-wide concern rather than a year-specific finding. Across SDF1–SDF5, distress has remained:

- **consistently higher among apprentices**, reinforcing that early-career workers face a distinct and ongoing mental health burden;
- **higher among women than men**, even when women represent a smaller portion of the sample; and
- **closely linked with other well-being indicators**, particularly poor sleep quality, elevated burnout, and greater musculoskeletal symptom burden.

This sustained pattern across five years strengthens confidence in the findings and signals a stable workforce challenge that warrants continued attention in both sector planning and policy.

5.1.6 Burnout Findings

Burnout was measured using the Copenhagen Burnout Inventory (CBI), which captures two related but distinct forms of exhaustion:

- **Personal burnout**, reflecting general physical and emotional fatigue regardless of source; and

- **Work-related burnout**, reflecting exhaustion that participants attribute specifically to their job.

Across the pooled SDF1–SDF5 dataset (N = 188), CBI results indicate that burnout remains a persistent and meaningful concern within Ontario's electrical workforce. A substantial portion of participants reported fatigue and exhaustion levels relevant to day-to-day functioning, recovery between workdays, and the longer-term ability to remain in the trade. Importantly, the multi-year dataset shows that burnout has not been isolated to a single project year, and instead reflects a recurring pattern observed across earlier SDF cycles.

In this report, burnout is interpreted as a workforce sustainability indicator. Higher burnout levels are relevant not only to individual health but also to sector outcomes such as safety performance, absenteeism, reduced job satisfaction, and retention risk. As shown in the integrated analyses, burnout also aligns closely with other indicators tracked in the SDF program, particularly sleep quality, psychological distress, and musculoskeletal symptom burden, underscoring that burnout is part of a broader, interconnected well-being profile rather than a stand-alone issue.

5.1.6.1 Overall Burnout Levels

Across the pooled SDF1–SDF5 dataset, personal burnout scores indicate that many participants experience ongoing physical and emotional fatigue, extending beyond short-term tiredness and reflecting reduced recovery capacity over time. Work-related burnout scores also indicate meaningful levels of exhaustion attributed to job demands, reinforcing that fatigue in the electrical sector is not only a general health issue but also linked to working conditions and the organization of work.

Burnout scores varied across participants rather than clustering at a single level, which supports subgroup comparisons in later sections of the report. This variability allows the project to examine how burnout differs across career stage (apprentices versus journeypersons), gender, and workplace context, and to identify patterns to sector planning and targeted supports.

5.1.6.2 Differences Across Worker Roles

Apprentices

Across the pooled SDF1–SDF5 dataset, apprentices reported higher personal burnout than journeypersons. This recurring pattern suggests that early-career workers experience a heavier recovery burden, likely reflecting the combined demands of adapting to physically intensive work, meeting on-site learning expectations, and navigating training requirements alongside employment.

Journeypersons

Journeypersons reported moderate levels of personal and work-related burnout. Although average scores were lower than those reported by apprentices, a substantial subset of

journeypersons still reported elevated burnout, indicating that exhaustion is not limited to the early career and can persist throughout the career span.

Employers and SME owners
Employers and SME owners reported burnout levels comparable to those of employees, reinforcing that exhaustion is experienced across the entire trade ecosystem. This pattern is consistent with qualitative evidence showing that many owners continue to carry operational and staffing responsibilities alongside direct work demands, which can contribute to sustained fatigue and reduced recovery time.

5.1.6.3 Gender Differences

In the pooled SDF1–SDF5 dataset, women reported higher personal burnout scores than men. While women represent a smaller proportion of the overall sample, this pattern is consistent with the direction of findings observed in the SDF3 and SDF4 cycles. It supports continued attention to gender-responsive workplace supports within Ontario's electrical sector.

5.1.6.4 Associations with Other Health Indicators

Across the pooled SDF1–SDF5 dataset, burnout did not occur in isolation. Instead, it consistently clustered with other indicators of strain and reduced well-being, reinforcing that interconnected physical and psychosocial pressures shape workforce sustainability.

- **Sleep quality:** Participants reporting poorer sleep quality also tended to report higher levels of personal and work-related burnout, suggesting that limited recovery is closely tied to emotional and physical exhaustion.
- **Psychological distress:** Burnout scores showed a strong relationship with psychological distress, indicating overlap between exhaustion, reduced coping capacity, and broader emotional strain.
- **Musculoskeletal symptoms:** Workers reporting MSK discomfort were more likely to report **elevated burnout**, consistent with the cumulative effect of ongoing pain, physical fatigue, and reduced recovery between workdays.
- **Job satisfaction:** Higher burnout was associated with lower job satisfaction, reinforcing the link between sustained exhaustion and reduced engagement or fulfillment at work.

Taken together, these associations, observed consistently across the five SDF cycles, highlight burnout as a multi-factor outcome influenced by both physical demands and psychosocial conditions, rather than a stand-alone mental health issue.

5.1.6.5 Multi-Year Stability

Across the full SDF1–SDF5 evidence base, burnout has remained consistently elevated, with only modest year-to-year variation. The pooled analyses demonstrate a stable and recurring pattern in which:

- Apprentices continue to report higher burnout than journeypersons, indicating that early-career stages remain a period of heightened vulnerability.
- Women report higher personal burnout than men, a pattern that has appeared across multiple SDF cycles despite smaller sample sizes.
- Burnout remains strongly linked to other core indicators of workforce strain, including poor sleep quality, higher psychological distress, MSK symptoms, and lower job satisfaction.

Overall, these multi-year findings indicate that burnout is a persistent workforce sustainability issue in Ontario's electrical sector and reinforces the need for practical supports that address recovery, fatigue, and psychosocial strain alongside physical job demands.

5.*1.7 Job Satisfaction Findings*

Job satisfaction was assessed using a single-item measure in which participants rated their overall job satisfaction. In the pooled SDF1–SDF5 dataset (N = 188), job satisfaction showed meaningful variation across workers and roles. While many participants indicated that they were satisfied with their work, a notable proportion reported lower satisfaction, suggesting that workforce experience is not uniform across Ontario's electrical sector. This pattern has been observed across multiple SDF cycles and remains relevant as job satisfaction is closely linked to retention, performance, and long-term workforce stability.

5.1.7.1 Overall Job Satisfaction Levels

Survey responses reflected a wide range of satisfaction levels, from "highly satisfied" to "dissatisfied." The distribution indicates that, alongside a sizeable group reporting positive work experiences, there is also a substantial group whose satisfaction is reduced. This variability reinforces the idea that workforce sustainability cannot be addressed through recruitment alone; it must also consider working conditions and modifiable factors that shape day-to-day experience in the trade.

5.1.7.2 Differences Across Worker Roles

Apprentices

Apprentices reported lower job satisfaction than journeypersons in the pooled dataset. This role-related difference has appeared consistently in earlier SDF cycles and aligns with broader evidence from this research program showing that apprentices often experience higher strain, greater uncertainty, and fewer stabilizing resources early in their careers.

Journeypersons
Journeypersons reported moderate to high satisfaction overall, although there was still notable variability among individuals. This suggests that experience may be protective for some workers, but job satisfaction remains sensitive to other workplace conditions.

Employers/SME Owners
Job satisfaction among owners and senior employers varied substantially. Some reported strong satisfaction, often reflecting pride in their work and business, while others reported lower satisfaction, likely reflecting the operational realities and cumulative pressures of running and staffing a small business in a high-demand sector. Importantly, these results indicate that satisfaction challenges are not limited to employees.

5.1.7.3 Gender Differences

Although women represent a smaller proportion of the pooled sample, women reported slightly lower job satisfaction than men. This pattern aligns with trends observed across previous SDF cycles and is consistent with qualitative findings from this research program describing gendered workplace pressures and challenges related to inclusion, recognition, and support.

5.1.7.4 Associations with Other Health Measures

Job satisfaction was closely connected to multiple indicators of worker health and well-being in the pooled dataset:

- **Sleep quality:** Poorer sleep was associated with lower job satisfaction.
- **Burnout:** Higher burnout scores corresponded with reduced satisfaction.
- **Psychological distress:** Higher distress scores were linked to lower satisfaction.
- **MSK symptoms:** Workers reporting MSK discomfort were more likely to report lower satisfaction.

These associations reinforce the idea that job satisfaction serves as an integrated indicator of workforce experience, reflecting the combined influence of physical strain, fatigue, and psychosocial stress.

5.1.7.5 Multi-Year Stability

Across SDF1–SDF5, job satisfaction has remained relatively stable at the sector level, with persistent patterns showing:

- Lower satisfaction among apprentices compared to journeypersons,
- Slightly lower satisfaction among women, and
- Consistent links between reduced job satisfaction and poor sleep, higher burnout, higher distress, and MSK symptoms.

Overall, the multi-year evidence suggests that job satisfaction is shaped by recurring structural and health-related pressures in the trade. These findings strengthen the rationale for interventions that address fatigue and recovery, reduce preventable MSK burden, and strengthen supportive workplace practices, particularly for apprentices and other groups facing higher strain.

5.1.8 Health-Related Quality of Life (HRQoL) Findings

Health-related quality of life (HRQoL) provides a broad indicator of how workers are functioning physically and mentally in day-to-day life. In SDF5, HRQoL was assessed using the SF-12, which produces two standardized summary scores:

- **Physical Component Summary (PCS)**, reflecting physical functioning and physical health limitations
- **Mental Component Summary (MCS)**, reflecting emotional well-being and psychological functioning

Across the pooled SDF1–SDF5 dataset (N = 188), HRQoL scores varied across participants, indicating that while many workers are functioning well, a substantial portion of the workforce is experiencing reduced functioning tied to physical strain, fatigue, and psychosocial stress. Taken together with the MSK, sleep, distress, and burnout findings, the HRQoL results reinforce that worker well-being in the electrical sector is multi-dimensional and interconnected.

5.1.8.1 Physical HRQoL (PCS)

Overall, PCS scores reflected moderate physical functioning across the workforce, with clear variation between workers who reported musculoskeletal symptoms and those who did not. Consistent with the MSK findings in Section 5.1.3, workers reporting MSK discomfort tended to report lower PCS scores, reflecting how pain and discomfort translate into reduced physical functioning, slower recovery, and potential limitations in completing physically demanding work.

Across roles, PCS patterns were broadly similar, with modest differences:

- **Apprentices** tended to report slightly lower PCS scores, consistent with their higher MSK symptom burden and the physical intensity of early-career work.
- **Journeypersons** reported moderate PCS scores, indicating generally stable physical functioning but with meaningful variability across individuals.
- **Employers/SME owners** reported PCS scores comparable to employees, suggesting that many continue to experience physical strain, particularly when they remain engaged in fieldwork alongside supervisory and administrative responsibilities.

These results align with earlier SDF cycles, where physical functioning has remained closely linked to MSK burden across the career trajectory.

5.1.8.2 Mental HRQoL (MCS)

MCS scores also showed substantial variability, indicating that workers' mental functioning and emotional well-being differ considerably across the sector. Patterns in the pooled dataset were consistent with findings from distress, burnout, and sleep measures:

Participants reporting poorer sleep quality, higher burnout, or higher psychological distress also tended to report lower MCS scores, reflecting reduced emotional well-being and coping capacity. In practice, this means that fatigue and psychosocial strain are not only associated with "clinical" indicators like distress or burnout, but also with broader impacts on daily mental functioning.

Women reported slightly lower MCS scores than men, though interpretation should remain cautious given the smaller number of women in the pooled sample. Nonetheless, this direction is consistent with multi-year patterns showing higher distress among women and qualitative findings describing additional pressures linked to workplace culture and inclusion.

5.1.8.3 Associations With Other Health Indicators

HRQoL scores were closely connected to the other indicators measured in the SDF program, reinforcing that physical and mental functioning are shaped by overlapping workplace and health factors. Across the pooled dataset:

- **Sleep quality** was associated with both PCS and MCS, indicating that poor sleep affects not only mental resilience but also physical recovery and day-to-day functioning.
- **Burnout** corresponded with lower HRQoL, particularly reduced MCS, reflecting the broader functional impact of sustained exhaustion.
- **Psychological distress** was strongly associated with lower MCS, consistent with the role of emotional strain in overall quality of life.
- **MSK symptoms** were associated with lower PCS, confirming that persistent pain and discomfort reduce physical functioning and may undermine long-term sustainability in physically demanding work.

These patterns reflect the same "linked system" observed across other sections: MSK strain, sleep disruption, distress, and burnout move together and shape overall functioning.

5.1.8.4 Multi-Year Consistency

HRQoL patterns have remained stable across the SDF research program, including SDF5:

- **Physical functioning (PCS)** consistently reflects the physical burden of electrical work and its link to MSK symptoms.
- **Mental functioning (MCS)** consistently reflects elevated psychosocial strain and its relationship to distress, burnout, and fatigue.
- **Sleep quality** has repeatedly emerged as a cross-cutting factor associated with both physical and mental functioning across years.

The stability of these HRQoL patterns strengthens the policy relevance of the findings: improving workforce sustainability requires interventions that support both physical recovery (for example, MSK prevention and ergonomic supports) and psychosocial functioning (for example, fatigue management, mental health literacy, and supportive workplace practices).

5.1.9 Predictors of Worker Well-Being

In addition to describing prevalence patterns, the SDF5 quantitative analysis examined which factors were most strongly associated with worker well-being across the pooled SDF1–SDF5 dataset (N = 188). The purpose of these analyses was practical: to identify modifiable levers and priority groups that can inform sector supports, employer resources, and provincial workforce strategies.

To do this, the research team examined statistical relationships between key outcomes and potential predictors using multivariable models. Outcomes included:

- **Psychological distress** (K-6)
- **Personal burnout** and **work-related burnout** (CBI)
- **Job dissatisfaction** (single-item job satisfaction measure, analyzed as satisfaction versus dissatisfaction)

Predictors included sleep quality, years of experience, apprenticeship status, gender, MSK symptoms, and work-related factors. For transparency, these models used available data **f**or each outcome, meaning that sample sizes could vary slightly across models because some participants skipped individual survey questions. The sections below summarize the consistent and statistically significant patterns that emerged.

5.1.9.1 Sleep Quality (Consistent, Cross-Cutting Predictor)

Across all models, sleep quality was the most consistent predictor of worker well-being. Poorer sleep quality was associated with:

- **Higher psychological distress**
- **Higher personal burnout**
- **Higher work-related burnout**
- **Higher likelihood of job dissatisfaction**

This pattern was stable across the pooled dataset and aligns with the multi-year descriptive findings showing that fatigue and sleep disruption are closely tied to both mental health and workplace experience.

5.1.9.2 Years of Experience (Protective Association)

Years of experience in the electrical trade showed a protective association in the pooled analyses:

- Workers with more years in the trade tended to report lower psychological distress
- Workers with more years in the trade also tended to report lower personal burnout

Experience was not a consistent predictor of job dissatisfaction once other variables were considered. Overall, the results suggest that early-career periods may be particularly vulnerable, reinforcing the importance of retention and structured supports during apprenticeship and early journeyperson years.

5.1.9.3 Apprenticeship Status (Distress Vulnerability Signal)

Apprenticeship status was a significant predictor of psychological distress:

- Apprentices reported higher distress scores than non-apprentices in the pooled analysis.

Once sleep quality and other factors were included, apprenticeship status was not a consistent predictor of burnout or job satisfaction. This suggests that apprentice vulnerability may be most evident in emotional strain, and that distress may be shaped by intersecting factors such as fatigue, uncertainty, and workplace context.

5.1.9.4 Gender (Distress Differences in the Pooled Analysis)

Gender was also a significant predictor of **p**sychological distress in the pooled models:

- Women reported higher distress scores than men.

Gender was not consistently retained as a statistically significant predictor in models of burnout or job dissatisfaction, although descriptive trends suggested differences. Given the smaller number of women in the multi-year sample, the gender-related findings should be interpreted carefully, but they remain important as an equity signal for workforce planning and targeted supports.

5.1.9.5 Musculoskeletal Symptoms (Important Context, Less Stable as an Independent Predictor)

MSK symptoms were strongly associated with distress and burnout in descriptive and bivariate analyses. However, in multivariable models that included sleep and distress, MSK symptoms were not always retained as an independent predictor.

This does not mean MSK symptoms are unimportant. Rather, the results suggest that MSK strain may operate through connected pathways, including sleep disruption and emotional exhaustion. As shown in Sections 5.1.3–5.1.8, MSK burden remains highly prevalent and closely linked to other well-being indicators in the pooled dataset.

5.1.9.6 Work Hours (Not a Consistent Predictor)

Weekly work hours did not emerge as a statistically significant predictor of distress, burnout, or job dissatisfaction in the multivariable analyses. This finding is consistent with the broader interpretation that how work is structured and experienced (for example, recovery time, commuting, job pacing, and fatigue) may matter more than the number of hours alone.

5.1.9.7 Summary of Key Predictors (What Matters Most in the Multi-Year Data)

Across the pooled SDF1–SDF5 dataset, the most consistent predictors of worker well-being were:

- **Sleep quality**, the strongest and most consistent predictor across distress, burnout, and job dissatisfaction
- **Years of experience**, associated with lower distress and lower personal burnout
- **Apprenticeship status**, associated with higher distress
- **Gender**, associated with higher distress among women in the pooled analysis

Other variables such as MSK symptoms and work hours remained important descriptively, but were not consistently retained as independent predictors once the strongest drivers were considered.

Overall, these findings identify sleep and fatigue as a high-impact and potentially modifiable intervention point and reinforce the importance of targeted supports for early-career workers, particularly apprentices, alongside sector-wide strategies that strengthen recovery, coping capacity, and sustainable work practices.

5.2 Qualitative Findings

The qualitative component of the SDF research program provides essential context for interpreting the quantitative results by examining how electrical workers and employers experience health, mental well-being, and equity-related issues in real workplaces. While

the survey data quantify patterns across the sector, the interviews clarify the day-to-day conditions and workplace dynamics that sit behind those patterns, including how work is organized, how teams communicate, and what supports are realistically available in small- and medium-sized electrical businesses.

Across the multi-year SDF program, qualitative evidence used in this report draws on two complementary interview datasets. The first includes 52 interviews with workers (primarily electricians and apprentices in Ontario's construction trades), focused on organizational culture, equity, diversity, and inclusion (EDI), and the practical barriers and opportunities affecting participation and retention. The second includes 12 interviews with owners of non-unionized electrical SMEs, focused on business realities, mental health and coping, work–life balance, and the constraints that shape what employers can implement in practice.

Together, these qualitative findings produce two interlocking sets of insights: (1) how workplace culture and day-to-day practices shape inclusion, psychological safety, and help-seeking; and (2) how SME owners navigate competing operational pressures that influence both their own well-being and the supports available to workers. These themes align closely with the quantitative results on musculoskeletal burden, sleep and fatigue, distress, burnout, and job satisfaction, and they help explain why certain groups, including apprentices and women, may report greater strain and fewer supports in the field.

5.2.1 Challenges in Organizational Culture

Interviews with workers and employers emphasized that organizational culture remains a key factor shaping both psychological well-being and equity, diversity, and inclusion (EDI) in Ontario's skilled trades. Participants described culture as expressed through everyday behaviours on sites and in shops, including how people speak to one another, how work is assigned, and how concerns are addressed. Three recurring cultural challenges were especially prominent: sexism and gendered expectations, biased assumptions about competence and "fit," and limited leadership capacity to respond consistently and constructively when issues arise.

Sexism and gendered expectations
Women described encountering explicit sexist comments and assumptions that questioned their legitimacy in the trade. In one interview account, a woman electrician described the type of language she faced during job interviews:

"I think you'd be a distraction to my men. Are you going to get pregnant and then take off for a year? Are you here to find a husband? … I already have someone to bring me a beer so what could you possibly be good for?"

These experiences provide important context for the quantitative pattern in this report showing higher psychological distress among women in the pooled dataset. While the survey results quantify the difference, the interview narratives illustrate how persistent gendered messaging and exclusionary interactions can contribute to ongoing stress and reduced sense of belonging at work.

Biased beliefs about competence and "fitting the mould"
Participants also described biased assumptions about workers who do not match traditional expectations of who "belongs" in the trade, including newcomers, workers whose first language is not English, and individuals with disabilities. In interviews, these biases were described as shaping how workers are judged, trusted with tasks, or included in teams, sometimes regardless of actual skill. These accounts help interpret the quantitative results, which show uneven patterns in distress and job satisfaction across worker groups and career stages, and reinforce the idea that workplace experience is influenced by more than technical ability alone.

Leadership gaps and limited support when issues arise
A consistent theme was that when problems occur, including harassment, unfair treatment, or mental health strain, workers often feel they must manage the situation independently or rely on supports outside of the workplace. One woman described how she navigated her early years in the industry:

"As a female in the industry, it was difficult for me the first eight years in business… To the point where I'm a 'but why' thinker… it doesn't faze me anymore because I like to push boundaries. So that has been my guiding force through this industry."

These narratives align with the quantitative findings of elevated distress and burnout in the sector. They highlight a practical challenge for SMEs in particular: when formal policies, HR support, or supervisory training are limited, responses to interpersonal issues can be inconsistent, and workers may perceive that support depends on individual personalities rather than clear expectations and systems.

5.2.2 Barriers to Promoting Equity, Diversity, and Inclusion (EDI)

Across interviews, both workers and employers described structural and practical barriers that continue to limit the participation, inclusion, and retention of under-represented groups in the skilled trades. While many participants expressed support for fairness and respectful treatment, they also described day-to-day constraints in hiring, accommodation, and workplace decision-making that can unintentionally reproduce inequity. Three barriers were especially prominent: a narrowly interpreted "merit-based" approach, limited accommodation capacity and uncertainty about responsibilities, and gaps in awareness and practical EDI knowledge.

Merit-based hiring interpreted narrowly

Many employers emphasized that they "hire based on merit" and want "the best person for the job." Participants recognized this as a reasonable intent in a safety-critical occupation. At the same time, they described how a narrow definition of merit can overlook uneven access to training opportunities, mentorship, and informal networks that help people demonstrate competence. In practice, this can mean that workers from under-represented groups may be expected to provide stronger proof of competence than others before being trusted with opportunities or advancement.

One employer illustrated this dynamic when describing why he hired a woman apprentice, noting her exceptional academic performance and recognition:

"I hired her because she was scholastically the smartest kid in high school… she actually won a province-wide academic award."

This example highlights an important barrier raised by participants: the threshold for being seen as "qualified" may be higher for women and other under-represented groups, even when the stated hiring philosophy is merit-based.

Limited accommodations and uncertainty about how to support diverse needs

Participants repeatedly noted that many SMEs lack clear, practical guidance on accommodations, particularly when needs involve safety-sensitive tasks and variable jobsite conditions. Employers described uncertainty about how to support pregnant workers onsite, how to plan modified duties, and how to manage leave or temporary restrictions in lean staffing environments. The barrier was often framed less as unwillingness and more as a lack of tools, role clarity, and feasible options, especially for smaller firms that cannot easily absorb staffing disruptions.

Limited awareness of EDI issues in everyday practice

Another barrier raised in the interviews was uneven awareness of what EDI challenges look like in real workplaces. Some employers described "diversity" or "disability" in broad terms without recognizing the range of needs and capabilities within these categories. Participants noted that when EDI issues are understood only at a general level, responses can default to avoidance or oversimplification, which can prevent accommodations, reduce psychological safety, and leave inequities unaddressed.

Link to the quantitative findings

Taken together, these reported barriers provide context for the quantitative patterns observed in this report, including differences in psychological distress by gender and apprenticeship status. Interview participants described how hiring decisions, access to opportunities, and the availability of accommodations can vary across worksites and firms, particularly in smaller businesses with limited capacity.

5.2.3 Worker-Identified Strategies to Promote EDI and Well-Being

In addition to describing barriers, interview participants proposed practical strategies that they viewed as feasible within small and medium-sized electrical businesses. These strategies focused on improving early access to meaningful work opportunities, strengthening day-to-day support, and increasing access to clear information and resources.

Early-career opportunities and meaningful exposure to tasks

Participants emphasized that early, structured opportunities for apprentices, including those from under-represented groups, are important for skill development and retention. Employers and workers described the value of ensuring apprentices are exposed to a range of tasks and work areas so that competence can be demonstrated through performance rather than assumptions or first impressions. One employer highlighted the importance of varied exposure across electrical work areas:

“It’s not like we hire a female and then she’s going to do troubleshooting because I don’t know if she’s good at it. Maybe she’s really good at piping. We won’t be able to find out until you are exposing to those multiple areas and the electrical field.” (Participant 1)

Creating tailored and accessible resources

Participants identified a need for practical, easy-to-use resources that support both workers and employers. In particular, they described the value of:

- clear information for under-represented workers and newcomers on pathways into the trade and workplace expectations, and
- guidance for employers on inclusive supervision and accommodations, including situations such as pregnancy, modified duties, and disability-related needs.

These suggestions were often framed as support that would reduce uncertainty and improve consistency in how workers are integrated and supported, especially in smaller firms.

Peer support, mentorship, and reducing isolation

Participants frequently described peer connection and mentorship as important for belonging and well-being, particularly for workers from under-represented groups. One participant described the challenge of being isolated within a crew environment:

“I’m a woman. I come to work and everybody [else]’s a man. They’re talking about manly topics and stuff. How do you find a way to integrate people like that?” (Participant 1)

Participants suggested approaches such as pairing new workers with supportive mentors or “buddy” supports and, where feasible, avoiding situations where workers from under-

represented groups are consistently placed in environments where they are the only person with that background.

Connection to quantitative patterns

These qualitative strategies help contextualize quantitative findings in this report that show differences in distress by gender and apprenticeship status, and broader patterns linking well-being to workplace experience.

5.2.4 SME Owners' Mental Health, Work–Life Balance, and Resource Constraints

The second qualitative study, based on interviews with 12 owners of non-unionized electrical SMEs, provides an employer-focused perspective on well-being and operational realities. These findings add context to the quantitative results by explaining how business demands, recovery opportunities, and workplace norms can shape fatigue, stress, and the practical feasibility of implementing supports in smaller electrical workplaces.

5.2.4.1 Work–life balance and recovery time as key coping strategies

Owners frequently described work–life balance and the ability to step away temporarily as essential for managing stress and sustaining their capacity to lead the business. Flexible scheduling was often framed as one of the few realistic ways to reduce strain in the context of unpredictable project demands:

"My flexibility in my schedule allows me to remove myself from… whether it's the spotlight or whether it's the… to get out of the environment."

Owners also described the tension between personal responsibilities and busy periods, particularly when family needs arise during high-demand seasons:

"I have a nine-month-old daughter. I was able to take time off to spend with my daughter and to spend time with my wife [for 2 weeks] … however, it was also frustrating [as] my daughter was born right in the middle of busy season."

These experiences align with the multi-year quantitative pattern that fatigue-related factors, especially sleep and recovery, are strongly linked to worker well-being outcomes, and reinforce that recovery constraints affect both employees and owner-operators.

5.2.4.2 Company size and capacity to offer supports

Owners described how company size and staffing flexibility influence what supports are realistically possible. In very small operations, time away from work was often difficult to accommodate without disrupting schedules, delaying projects, or increasing financial pressure. Owners of larger SMEs reported greater ability to redistribute work, provide flexibility, and connect workers to formal supports (when available).

Across interviews, owners emphasized that even when they value worker well-being, limited time and administrative capacity can make it difficult to implement structured programs, especially without practical, ready-to-use tools that fit SME realities. This directly supports the report's emphasis on "right-sized" approaches for SMEs.

5.2.4.3 Instrumental support and coping strategies

Owners commonly relied on instrumental support (for example, help from family, trusted peers, or community networks) and practical day-to-day strategies (such as brief breaks, schedule adjustments, or temporarily stepping back from high-pressure situations). At the same time, owners described how ongoing strain and limited recovery can contribute to less sustainable coping patterns (for example, avoidance or withdrawal), particularly during periods of high workload and staffing pressure.

Overall, these qualitative findings reinforce a key implication for sector planning: supporting SME owner well-being is part of supporting workforce well-being, because owners are often the primary source of supervision, task allocation, and workplace norms in small electrical businesses.

5.2.5 Integrated Qualitative–Quantitative Insights

Considered together, the qualitative and quantitative findings provide a consistent and mutually reinforcing picture of the factors shaping health, well-being, and retention in Ontario's electrical sector.

First, the quantitative results show a persistent burden of musculoskeletal symptoms and a strong, consistent relationship between poorer sleep quality and worse psychosocial outcomes (higher distress and burnout and lower job satisfaction). The qualitative interviews help interpret why recovery can be difficult to achieve in practice. Workers described a workplace culture where stress and discomfort are often minimized or managed privately, and SME owners described how operational demands and "busy season" pressures can constrain the ability to step away, even when time off is clearly needed for recovery.

Second, the quantitative analyses identify higher psychological distress among apprentices and women. The worker interviews provide clear contextual explanations for these patterns, including accounts of sexism and gendered assumptions, biased beliefs about competence and "fit," and uneven access to mentorship, guidance, and psychologically safe support. In combination, these findings suggest that differences in distress are not only individual-level experiences, but are also shaped by workplace culture and how opportunities, respect, and support are distributed.

Third, the qualitative owner interviews clarify how business context influences the feasibility of supports. Owners described reliance on informal coping and practical workarounds, alongside limited capacity to accommodate extended absences in very

small operations. This perspective aligns with the broader pattern across the program that supportive structures are harder to sustain when administrative capacity and staffing flexibility are limited, reinforcing the importance of "right-sized" interventions that can be implemented in smaller firms.

Finally, both datasets point to the central importance of inclusive culture and psychologically safe day-to-day practices. The qualitative data emphasize that respectful communication, fair treatment, and access to support are operational realities that influence whether people stay and thrive. The quantitative findings show how these conditions connect to measurable outcomes in well-being, burnout, and satisfaction.

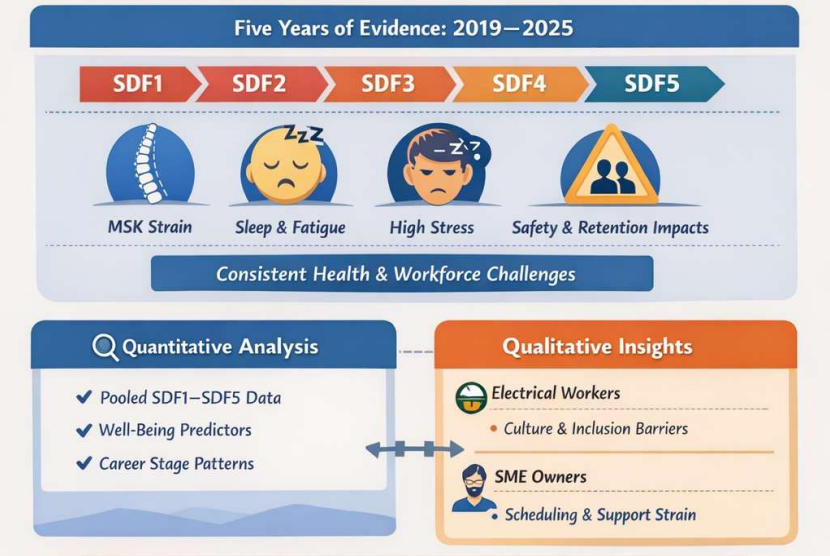
The integrated evidence supports multi-component strategies that address physical strain and recovery, sleep and fatigue, mental health literacy, and inclusive supervisory practices together, while tailoring delivery to the realities of smaller electrical businesses. These integrated insights inform the recommendations and implementation-ready tools presented in the following sections.

6. Discussion

6.1 Overview: Why These Findings Matter for Ontario's Electrical Workforce

The SDF5 findings, interpreted alongside four prior years of Skills Development Fund research (SDF1–SDF4), present a consistent picture of the workforce sustainability challenges facing Ontario's electrical sector. Across five years of data, workers and employers report persistent musculoskeletal (MSK) burden, sleep and fatigue concerns, and elevated psychosocial strain that can affect safety, performance, and retention [19,73]. These challenges emerge in a broader context where Ontario continues to prioritize skilled trades recruitment, training capacity, and workforce participation through initiatives such as the Skills Development Fund and related skilled trades investments [14,74–76].

What distinguishes SDF5 is the strength of the integrated evidence base. Quantitative analyses drawing on the pooled SDF1–SDF5 dataset identify stable patterns and key predictors of well-being across roles and career stages [73]. The qualitative program adds explanatory depth from two complementary interview streams: (1) worker interviews examining organizational culture and barriers to equity and inclusion in the skilled trades and (2) SME owner interviews describing the operational and emotional pressures that shape day-to-day decisions about scheduling, time off, and supports [13,19]. Together, these methods move beyond mere documentation of risk. They clarify why risk persists, where it concentrates, and what "feasible change" can look like inside small and medium-sized electrical businesses.



Three cross-cutting messages are especially important for policy and sector partners.

First, the sector's health challenges are longstanding and interconnected. Across SDF cycles, MSK pain, sleep disruption, fatigue, psychological distress, and burnout recur and reinforce one another [19,73]. The quantitative results repeatedly highlight sleep quality as a central, modifiable predictor associated with distress, burnout, and job satisfaction [73]. Qualitative accounts help explain how recovery can be constrained by job demands, seasonal workload surges, and limited flexibility, particularly in smaller businesses [19].

Second, risk is not evenly distributed across the workforce. Multi-year findings show disproportionate vulnerability among apprentices and among women, with consistent differences in psychosocial outcomes that align with workplace realities described in interviews [13,73]. Worker interviews document how sexism, biased assumptions about competence, and uneven access to mentorship and task opportunities can compound

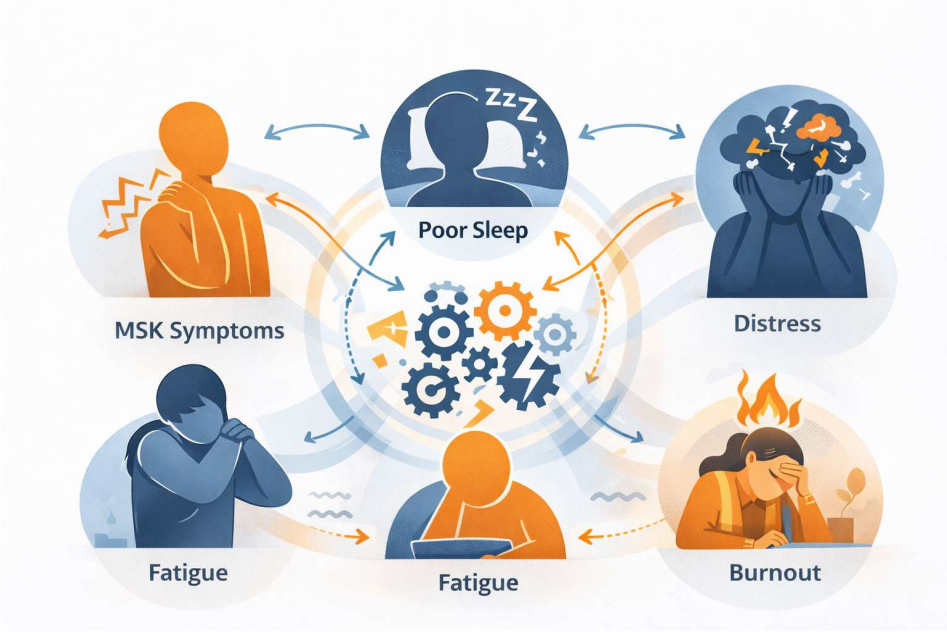
stress and undermine belonging for equity-deserving groups [13]. These conditions are directly relevant to retention and to Ontario's efforts to broaden participation in the skilled trades [74].

Third, SME capacity constraints shape what supports are realistically adoptable. Owner interviews describe the operational pressures that can limit time off, staffing redundancy, and the ability to implement formalized mental health or EDI supports, especially in very small firms [19]. This helps contextualize why "one-size" approaches often fail in the SME environment and why implementation supports must be right-sized, practical, and low-burden [19]. These insights align directly with the Skills Development Fund's intent to support training and workforce solutions that can be implemented across diverse employer contexts [76].

Taken together, SDF5 strengthens the evidence that improving workforce sustainability in Ontario's electrical sector requires integrated, practical approaches that address physical demands, fatigue and sleep, psychosocial strain, and inclusive workplace culture in combination rather than as separate initiatives [13,19,73]. The value of this program is its direct applicability: it identifies intervention targets that are both evidence-based and feasible within the operational realities of Ontario electrical SMEs. The sections that follow build from this integrated foundation, linking the core findings to training, health, and retention priorities and translating evidence into actionable recommendations for OEL and provincial partners.

6.2 Interconnected Physical and Psychosocial Risks

Across five consecutive years of SDF research (SDF1–SDF5), the evidence consistently shows that physical and psychosocial health challenges in Ontario's electrical sector are closely linked and mutually reinforcing. Musculoskeletal (MSK) symptoms, disrupted sleep, fatigue, psychological distress, and burnout do not occur as separate problems for separate workers. Instead, they tend to cluster together and interact in ways that affect daily functioning on site, recovery between shifts, safety performance, and longer-term satisfaction and retention in the trade.



SDF5 strengthens this understanding by combining multi-year survey results with qualitative accounts from workers and SME owners. The quantitative data indicate that poorer sleep and higher symptom burden are associated with worse mental health outcomes and lower job satisfaction. At the same time, the qualitative findings help explain how these patterns develop in real work settings. Workers described the practical challenges of demanding physical work, limited recovery time, and the expectation to keep working through discomfort. Owners described how staffing constraints, deadlines, and administrative load can limit flexibility and reduce the capacity to implement structured supports. Taken together, the findings point to a connected risk system that is especially important for SMEs, where limited time and resources make it harder to address one issue without addressing the others.

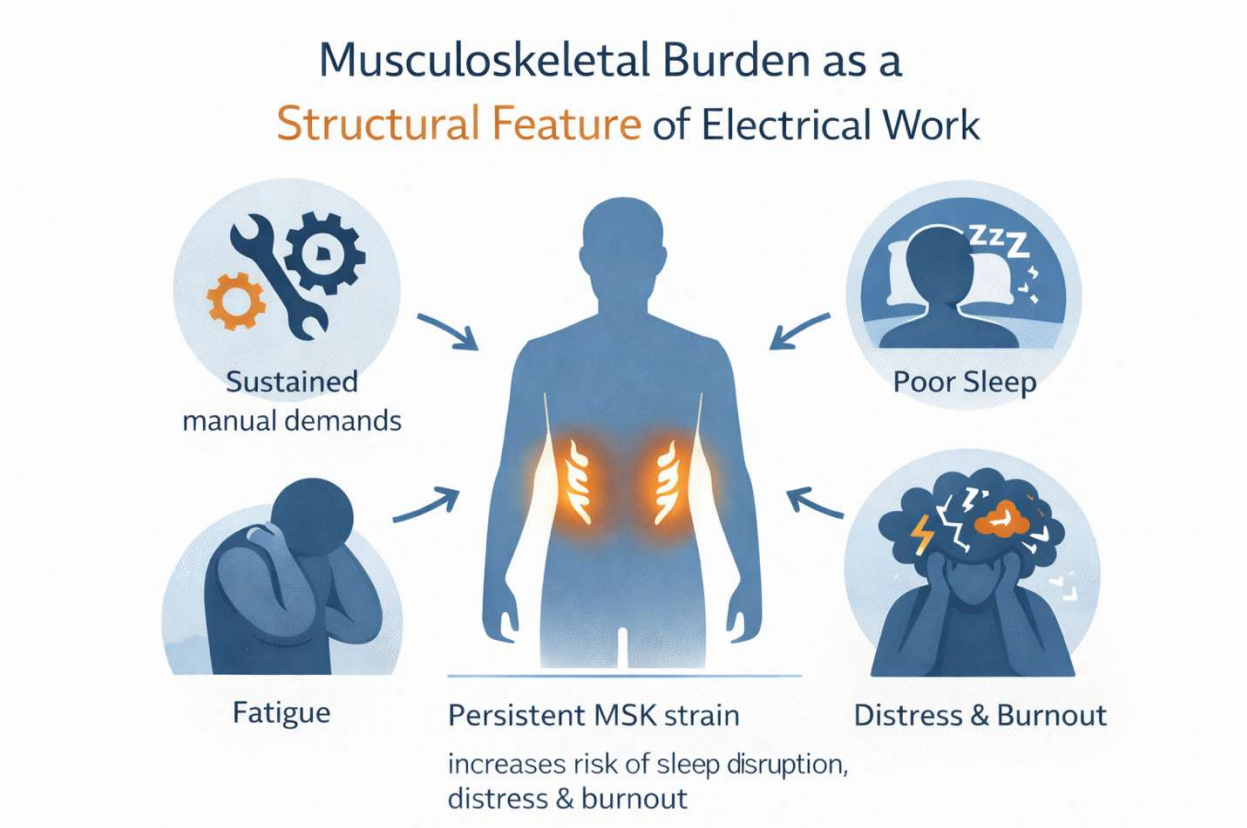
6.2.1 Musculoskeletal Burden as a Structural Feature of Electrical Work

High levels of musculoskeletal (MSK) discomfort remain one of the most consistent health findings across the SDF research program. In the pooled SDF1–SDF5 survey dataset, the large majority of respondents reported at least one MSK symptom over the previous 12 months, indicating that MSK strain is a sector-wide issue rather than a concern isolated to a single role, region, or project year [35,73]. The most frequently reported areas of discomfort in the SDF datasets have consistently included the lower back and shoulders, reflecting the physical demands of electrical work and the cumulative strain associated with sustained manual tasks.

From a workforce sustainability perspective, the key implication is not only that MSK symptoms are common, but that they appear to be persistent over time. The limited year-to-year variation observed across the SDF cycles suggests that existing controls and

informal “work-as-usual” practices are not sufficiently reducing risk at the sector level, particularly in SME contexts where formal ergonomic capacity and structured job redesign may be limited [8,35,73].

Importantly, the SDF findings also indicate that MSK symptoms do not sit in isolation from psychosocial outcomes. In the pooled analyses, greater MSK symptom burden was associated with poorer sleep quality and higher levels of psychological distress and burnout at the descriptive and bivariate level. These relationships reinforce the broader program conclusion that physical strain and recovery challenges can contribute to a wider pattern of fatigue and diminished well-being, with downstream implications for job satisfaction and retention [35,73].



6.2.2 Sleep and Fatigue as Central Predictors of Worker Well-Being

Across the SDF1–SDF5 quantitative analyses, sleep quality emerged as one of the most consistently important indicators of worker well-being. In the pooled dataset, poorer sleep quality was strongly associated with higher psychological distress, higher personal and work-related burnout, and a greater likelihood of job dissatisfaction. In the multivariable models reported in the project’s quantitative paper(s), sleep quality remained a key predictor even when other worker and job characteristics were considered, reinforcing sleep and fatigue as high-leverage intervention targets for the electrical sector [35,73,77].

The qualitative findings add practical context for why sleep and fatigue are so closely tied to day-to-day functioning in electrical work. Workers described conditions that can make recovery difficult, including early start times, extended or irregular workdays, physically demanding shifts, commuting burden, and difficulty mentally disengaging from work stress after hours [18,35,77]. SME owners echoed these pressures from an operational standpoint. In Paper 2, owners described using flexibility and short periods away from work as a coping strategy, while also noting that busy periods can limit the feasibility of time off, even when family or recovery needs are present [19].

Taken together, the integrated evidence indicates that fatigue is not a peripheral concern. It functions as a cross-cutting risk that influences physical recovery, emotional regulation, and overall capacity to cope with job demands. As a result, sleep and fatigue are directly relevant to workforce sustainability goals, including safety performance, productivity, job satisfaction, and retention within Ontario's electrical SMEs [19,35,73].

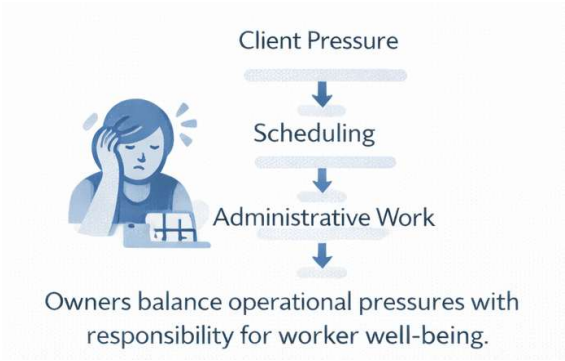
6.2.3 Psychological Distress, Burnout, and Emotional Strain

Indicators of psychological distress and burnout point to a meaningful level of emotional strain within Ontario's electrical workforce. In the pooled quantitative dataset, higher distress and burnout scores consistently clustered with poorer sleep quality and lower job satisfaction, reinforcing the idea that mental well-being in the sector is closely tied to recovery, workload conditions, and the overall sustainability of daily work.

The SDF5 quantitative patterns also show that emotional strain is not evenly distributed. Apprentices continue to report higher psychological distress compared with journeypersons, and women report higher distress compared with men. These differences are important for workforce planning because they point to specific career stages and groups where additional supports may have the greatest impact on retention and long-term participation.

The qualitative findings add critical context to these patterns by clarifying how distress and burnout build over time in real work settings. Workers described stress arising from high performance expectations under tight timelines, limited recovery between demanding workdays, and inconsistent supervisory support. In the EDI-focused interviews, women and other underrepresented workers described added strain linked to exclusionary workplace culture, biased assumptions about competence, and the emotional effort required to continually prove themselves or manage disrespectful interactions. These experiences help explain why distress is higher among some groups, even when they work in the same sector and face similar physical demands.

Owners' interviews further show that emotional strain is also present at the leadership level. SME owners described balancing operational demands (staffing, scheduling, client pressures, and administrative work) alongside ongoing responsibility for jobsite delivery and worker well-being. This matters because owner stress can shape workplace climate, communication, and the consistency of support available to workers, particularly in smaller firms where there is little buffer capacity.



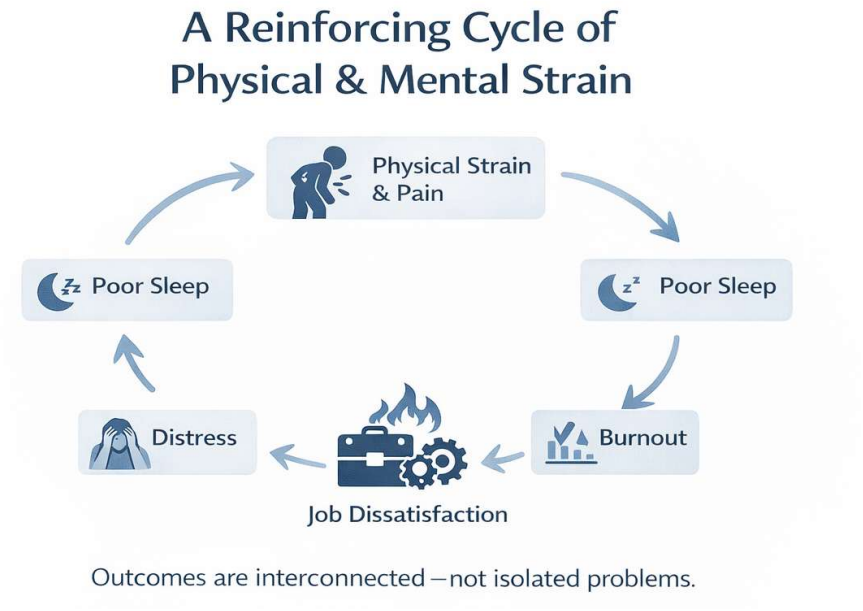
Taken together, the quantitative and qualitative evidence indicate that distress and burnout in the electrical sector are best understood as part of a connected system: physical strain and pain can erode recovery, poor sleep can reduce coping capacity, and ongoing stress can contribute to dissatisfaction and reduced sustainability at work. This reinforces the importance of integrated strategies that strengthen recovery and fatigue management, improve supervisory capability, and reduce avoidable cultural stressors that disproportionately affect apprentices and underrepresented workers.

6.2.4 A Reinforcing Cycle of Physical and Mental Strain

Across SDF1–SDF5, the quantitative and qualitative findings together point to a reinforcing cycle in which physical strain and psychosocial strain intensify one another over time. This cycle helps explain why challenges such as MSK symptoms, poor sleep, distress, burnout, and job dissatisfaction appear persistently across project years and why single-issue interventions are unlikely to be sufficient on their own.

The evidence supports the following pattern of interconnection:

- Musculoskeletal strain and discomfort can interfere with rest and recovery, making it harder for workers to achieve restorative sleep.
- Poor sleep quality is consistently linked in the pooled analyses to higher distress and higher burnout, and to increased likelihood of job dissatisfaction.
- Fatigue can reduce coping capacity and emotional resilience, increasing the likelihood that daily stressors at work escalate into sustained psychological distress.
- Sustained distress is closely associated with burnout, reflecting emotional and physical exhaustion that affects motivation, communication, and overall functioning at work.
- Burnout and distress correspond with lower job satisfaction, which in turn increases the risk of withdrawal from the workplace, reduced engagement, and eventual turnover intentions.



Qualitative findings reinforce this pattern by illustrating how workers and owners experience these links in practice. Workers described cumulative wear and tear, limited opportunities for recovery, and the challenge of maintaining emotional balance when physically depleted. Owners similarly emphasized that fatigue and stress can influence mood, patience, and decision-making, particularly under the pressures of staffing shortages and operational demands.

Overall, the multi-year SDF evidence indicates that these outcomes are not isolated problems but part of an interconnected system. As a result, interventions that address only one component (for example, ergonomics alone or mental health awareness alone) are unlikely to shift outcomes on a scale. Instead, the findings support the need for integrated approaches that address physical demands, recovery and fatigue, supervisory practices, and workplace culture together in ways that are feasible for electrical SMEs.

6.2.5 Implications for Sector Sustainability

Because these risks are interconnected, addressing them in isolation (for example, focusing only on ergonomics or only on mental health awareness) is unlikely to produce sustained sector-wide improvement. The SDF1–SDF5 evidence indicates that workforce sustainability efforts will be most effective when they are integrated, practical, and designed for SME realities, including limited time, staffing, and administrative capacity.

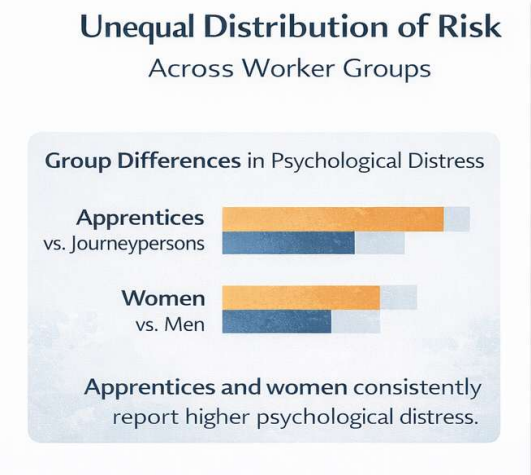
Implications for sector planning and supports include:

- **Fatigue and sleep supports as core prevention strategies:** Embed simple sleep and fatigue practices into routine operations (for example, onboarding, daily planning, and brief safety or well-being check-ins), given their strong links to multiple outcomes.
- **Ergonomics and recovery are built into daily work:** Promote feasible, job-compatible approaches such as task variation where possible, micro-breaks, and practical body mechanics guidance that can be applied without specialized equipment.
- **Stronger supervision and mentorship for early-career workers:** Prioritize structured check-ins, clear expectations, and consistent coaching for apprentices, who show the highest vulnerability across multiple outcomes.
- **Psychological safety and inclusion as operational necessities:** Support supervisors and owners with practical skills to address interpersonal issues early, set clear expectations for respectful conduct, and reduce barriers to speaking up and help-seeking.
- **Low-burden tools tailored to SMEs:** Provide ready-to-use templates and short guides that reduce administrative load (for example, quick-start bundles, checklists, and brief conversation scripts), so adoption is realistic in small firms.

These implications inform the recommendations that follow and reinforce the need for solutions that improve physical health, psychosocial well-being, and workplace culture together, rather than as separate initiatives.

6.3 Unequal Distribution of Risk Across Worker Groups

Although the physical and psychosocial challenges identified in SDF5 affect the electrical workforce broadly, the findings show that these risks are not experienced uniformly. Across the multi-year dataset, apprentices and women workers consistently report higher psychological distress and greater strain than their comparison groups. Qualitative findings help explain these disparities by describing the added pressures faced by early-career workers (including inconsistent supervision, fluctuating work conditions, and the need competence) and the additional stressors experienced by women in predominantly male work environments (including exclusionary workplace culture and gendered expectations).



Differences also emerge in the SME context. In the qualitative evidence, owners describe how limited staffing, time, and resources shape the supports that can realistically be offered, which helps contextualize why workers in smaller, more resource-constrained firms may experience greater strain and fewer formal supports. Together, these patterns underscore the need for workforce strategies that are both targeted and practical, strengthening early-career support, improving inclusion and psychological safety, and offering low-burden tools that fit day-to-day SME operations.

6.3.1 Apprentices: The Most Vulnerable Stage of the Career Pathway

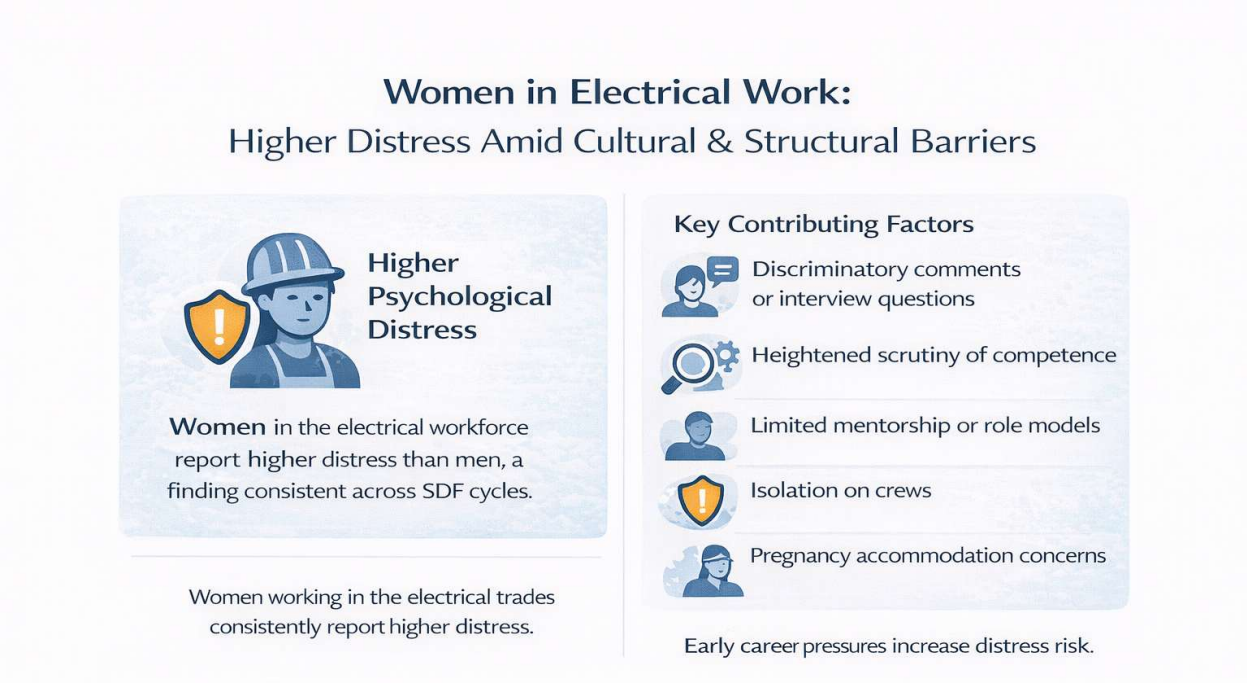
Across the pooled SDF1–SDF5 dataset, apprenticeship status consistently emerged as a marker of heightened vulnerability. In the SDF1–SDF5 quantitative analyses (N = 188), apprentices reported significantly higher psychological distress than non-apprentices, and this pattern remained evident even when key covariates were considered in regression modelling [18,35]. This finding matters for workforce sustainability because distress during early career stages can undermine learning, safety confidence, and long-term commitment to the trade, especially in a context where Ontario is relying on apprenticeships to address labour shortages.

The qualitative evidence provides important context for *how* early-career strain can develop in practice. Through interviews, participants described early trade experiences that can be psychologically demanding, including pressure to perform under time constraints, limited control over work pacing, and uneven access to mentorship or supportive supervision. These dynamics are consistent with external evidence showing that apprentices can face compounding stressors such as job insecurity, low perceived control, and limited support, which are associated with poorer mental health outcomes [78–80].

Taken together, the mixed evidence supports a clear implication for sector planning: improving apprenticeship retention and completion requires more than technical training capacity. It also requires structured, consistent supports that reduce avoidable strain in

the early years, including predictable check-ins, clear expectations, reliable supervision, and psychologically safe learning environments. These supports are especially important for SMEs, where formal training infrastructure may be limited and where day-to-day supervisory practices can strongly shape the apprentice experience.

6.3.2 Women in Electrical Work: Higher Distress Amid Cultural and Structural Barriers



Women remain underrepresented in the electrical trades, and the SDF1–SDF5 evidence indicates that those who enter the sector can face distinct psychosocial stressors that shape well-being and retention. In the pooled quantitative analysis, women reported higher psychological distress than men, a pattern that has remained consistent across SDF cycles.

The qualitative findings clarify why this disparity persists. Women described workplace experiences that included sexist comments and discriminatory interview questions, heightened scrutiny of competence, limited access to mentors and role models, and isolation as the only woman on a crew or within a small firm. Concerns about the availability and consistency of pregnancy/maternal health accommodations further reinforced uncertainty about long-term fit in the trade.

One woman electrician described being asked explicitly gendered questions during hiring, including concerns about pregnancy and being “a distraction,” illustrating how exclusion

can be normalized early in the employment pathway. Another woman described the cumulative emotional effort required to remain and progress in the industry over time.

These experiences likely compound baseline fatigue and physical demands in electrical work, helping to explain why women show higher distress despite representing a smaller portion of the sample. These findings reinforce the need for gender-responsive retention supports, including clear anti-harassment expectations, supervisor training in inclusive people management, and practical guidance for SMEs on accommodations and a respectful jobsite culture.

6.3.3 Workers in Very Small Electrical Businesses: Capacity Constraints Increase Exposure to Strain

A consistent message from the SME owner interviews is that business size shapes what supports are realistically available in day-to-day operations. Owners described how very small operations often have limited staffing flexibility, making it difficult to accommodate time off, modified duties, or schedule adjustments without disrupting job timelines and increasing workload for others. One owner captured this tension when describing family responsibilities alongside peak workload periods:

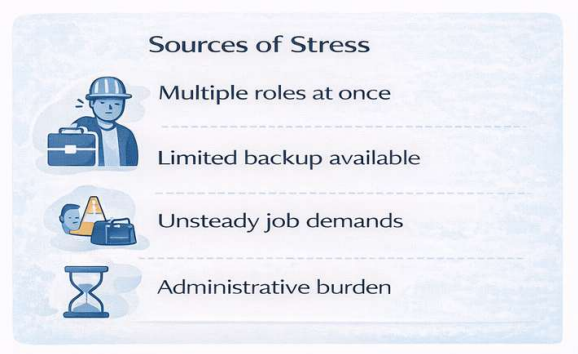
“I have a nine-month-old daughter. I was able to take time off to spend with my daughter and to spend time with my wife [for 2 weeks] … however, it was also frustrating [as] my daughter was born right in the middle of busy season.” (SME owner interview)

These capacity constraints help explain why, even when owners value worker well-being, they may struggle to implement consistent fatigue supports, structured mentoring, or formalized EDI and conflict-resolution practices. In practice, the burden often shifts to informal coping and “making it work” under pressure, which can heighten fatigue and strain for both owners and workers.

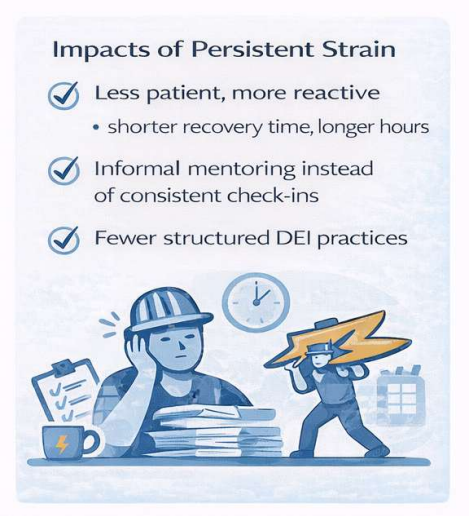
Interpreting SDF findings through this SME-capacity lens is important for workforce planning: solutions are most likely to be adopted when they are low-burden, practical, and designed around the operational realities of smaller electrical businesses, rather than assuming access to dedicated HR or formal wellness infrastructure.

6.3.4 SME Owners: A Hidden High-Risk Group

The SDF5 qualitative interviews with SME owners indicate that owners and lead operators experience substantial strain alongside their operational responsibilities. Owners described carrying multiple roles at once (for example, supervising jobs, managing client expectations, completing administrative work, and addressing staffing issues), often with limited backup. In this context, stress was described not as an occasional spike, but as something that can accumulate during busy periods and affect daily decision-making, patience, and emotional regulation.



Owners also described the importance of having some flexibility to step away briefly when demands become overwhelming. As one owner explained: “My flexibility in my schedule allows me to remove myself from… whether it’s the spotlight or… to get out of the environment.” This short recovery window was presented as one of the few practical coping options available in the realities of running a small business.



These findings matter for workforce sustainability because owners are also the primary gatekeepers of workplace conditions in SMEs: they set expectations, shape how issues are addressed day to day, and determine what supports are feasible to implement. The SDF5 evidence suggests that supporting owner well-being is not separate from supporting worker well-being; it is an enabling condition for consistent supervision, psychological safety, and the adoption of practical health and inclusion supports across electrical SMEs.

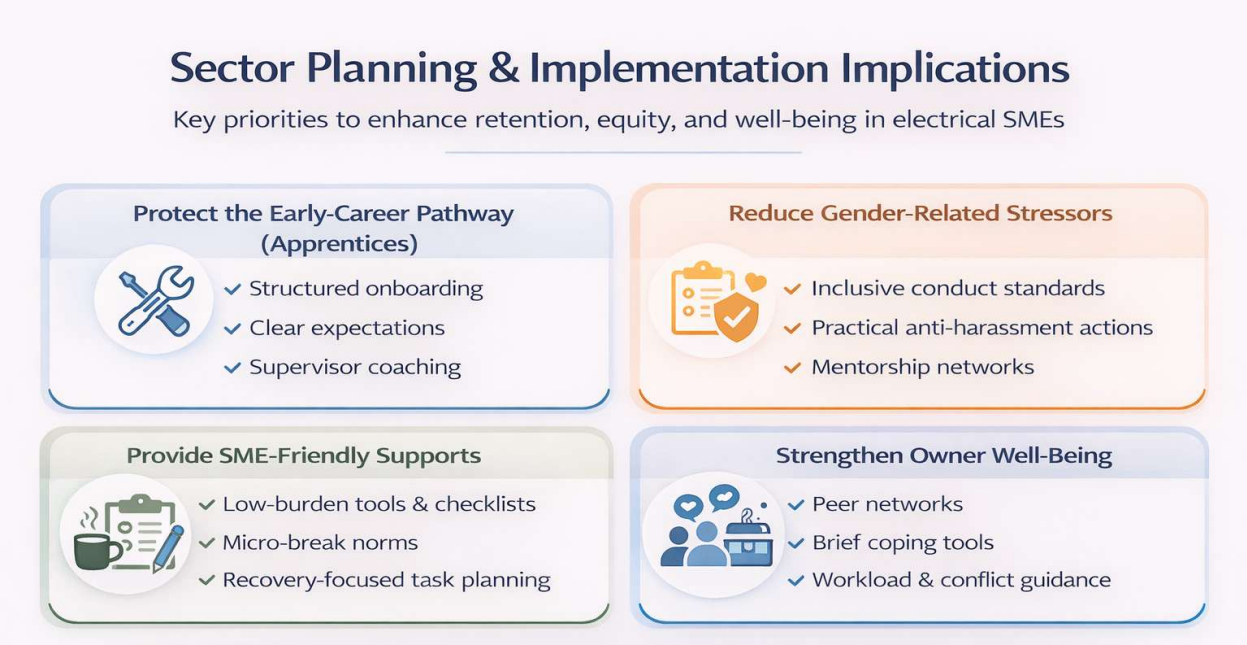
6.3.5 Implications of Unequal Risk Distribution

The consistent concentration of strain among apprentices, women, and workers in very small firms has direct implications for retention, training return-on-investment, and Ontario's broader skilled trades capacity. Across SDF1–SDF5, these subgroup patterns indicate that "one-size-fits-all" solutions are unlikely to shift sector-wide outcomes. Instead, supports need to be targeted, practical, and designed to match the operational realities of electrical SMEs—especially those with limited staffing flexibility and administrative capacity.

Implications for sector planning and implementation include:

- **Protect the early-career pathway (apprentices):** Prioritize structured onboarding, predictable expectations, and supervisor capability-building (e.g., consistent coaching and check-ins). Given apprentices' recurring elevation in distress and sleep-related strain, strengthening the first years of employment is a high-leverage retention strategy.
- **Reduce gendered and exclusionary stressors (women and equity-deserving workers):** Pair recruitment goals with day-to-day conditions that support retention, clear standards for respectful conduct, practical anti-harassment responses, and inclusive supervision practices. Worker accounts show that biased treatment and isolation can add an avoidable psychological load on top of demanding work conditions.

- **Right-size supports for very small firms:** Very small and small operations often cannot absorb extended absences or add stand-alone programs. The evidence supports low-burden tools that fit existing workflows (brief scripts, checklists, and quick-start bundles) and focus on feasible changes (task planning for recovery, micro-break norms, and early identification of strain).
- **Treat owner well-being as an upstream lever:** SME owners' stress and fatigue affect decisions, communication, and workplace tone, conditions that shape psychological safety and help-seeking for everyone. Practical owner support (peer networks, brief coping tools, and guidance on managing workload and conflict) can strengthen the environment in which health and retention initiatives are implemented.



These implications lead directly into Section 6.4, which examines how SME capacity constraints shape what is realistically implementable, and how to design supports that are both evidence-informed and adoptable at scale.

6.4 SME Capacity Constraints and Owner Well-Being

Small and medium-sized electrical businesses make up the workplaces represented across the SDF program. Across SDF1 to SDF5, the evidence shows that limited staffing, time, and administrative capacity in these businesses shapes everyday working conditions and constrains what health, safety, and inclusion supports can realistically be put in place. The qualitative findings from owners highlight that when teams are small, even routine disruptions (for example, illness, family responsibilities, or a short-term absence) can quickly translate into scheduling pressure, heavier workloads for remaining staff, and

reduced opportunity for recovery. These realities help interpret the quantitative patterns observed across the SDF program, where well-being outcomes such as fatigue-related concerns, burnout, and job satisfaction vary alongside differences in available supports and flexibility in work organization.

6.4.1 The Multi-Role Demands on SME Owners

Across the SDF, qualitative interviews with owners reveal a consistent picture of businesses operating with lean structures, where the owner must carry out several roles at once. Owners described being responsible for supervising crews, managing clients, completing hands-on electrical work when needed, estimating and scheduling, handling payroll and administrative requirements, and responding to day-to-day people issues. In combination, these overlapping responsibilities create sustained cognitive and emotional load and reduce opportunities for recovery.

These qualitative accounts align with the quantitative evidence across the SDF program, showing that elevated strain is not limited to employees. Owners and supervisors also report notable levels of distress and burnout, reflecting the reality that leadership roles in small electrical businesses can involve continuous pressure with limited downtime.

Owners also described a pattern of prioritizing business continuity and worker needs ahead of their own well-being. Several accounts reflected “pushing through” busy periods, delaying rest, and absorbing additional responsibilities when staffing is tight. This helps explain why owner well-being emerges as an important part of the broader workforce

sustainability picture, since the same conditions that affect workers' fatigue and stress can also affect owners who are simultaneously managing operational demands and team functioning.

6.4.2 Emotional Contagion and Workplace Climate

Findings from the owner interviews show that owners play a central role in shaping day-to-day workplace climate through how they communicate, respond to problems, and set expectations for how people treat one another. Several owners described feeling pressure to remain composed and keep work moving, even when they were experiencing significant stress. In the interviews, owners described stepping back from situations or removing themselves from stressful environments as a way to manage emotions and avoid reacting in ways that could escalate tension.

This coping pattern helps explain how owner well-being can influence the broader work environment. When owners are fatigued or under high strain, they may have less capacity for calm communication, proactive check-ins, or early conflict resolution. The qualitative data indicate that owner stress can shape crew morale and the "emotional tone" of the job site, including whether workers feel comfortable raising concerns related to safety, workload, or interpersonal issues.

These qualitative insights are consistent with the broader SDF evidence that worker well-being is influenced by organizational context and day-to-day management practices. In small electrical businesses in particular, where formal structures are limited and a small number of leaders strongly shapes culture, owner strain can have meaningful ripple effects on communication quality, psychological safety, and the team's ability to address issues before they become larger problems.

6.4.3 Structural Constraints of Small Electrical Businesses

Findings from the SME owner interviews highlight that the smallest electrical businesses often operate with very limited staffing and administrative capacity. Owners described how day-to-day operations can become strained when even one worker is absent, delayed, or injured, because there are few "extra hands" to absorb the workload or maintain schedules. In this context, owners reported facing practical limits in their ability to implement supports that require time, backfill staffing, **or** formal planning.

Owners described several operational constraints that shape both worker and employer well-being, including limited capacity to rotate tasks to reduce physical strain, difficulty accommodating extended time off during high-demand periods, and the challenge of balancing fluctuating workload across busy and slower seasons. They also described limited time and administrative bandwidth to develop formal policies, structured programs, or consistent supervisory practices beyond what is required to keep projects on track.

These qualitative findings provide important context for the quantitative patterns observed across the SDF datasets, in which workers in smaller businesses reported poorer sleep, greater distress, and lower job satisfaction than those in larger SMEs. Taken together, the evidence suggests that differences in well-being are not only about individual resilience or motivation, but also reflect structural conditions in smaller firms that shape recovery time, workload flexibility, and access to supports.

The combined findings also reinforce an implementation implication for the sector: supports for health, supervision, inclusion, and safety must be designed to be feasible in small business settings. Approaches that require substantial training time, complex administrative processes, or significant financial investment are less likely to be adopted without external support or adaptation into shorter, practical tools that fit within daily operations.

6.4.4 Reliance on Informal Coping and Support Systems

The SME owner interviews indicate that owners often manage stress through informal coping strategies and support systems rather than through formal mental health services. Owners described drawing on personal networks, particularly family members and partners, and relying on trusted peers within the trades for advice, perspective, or emotional support. Several also described self-management strategies such as stepping away from stressful situations to regain composure or intentionally shifting attention to non-work activities when circumstances allowed. For example, one owner emphasized the importance of stepping out of a stressful environment when needed.

These accounts illustrate practical, experience-based coping approaches that reflect adaptability within small business contexts. At the same time, the qualitative findings suggest that these strategies are often reactive, used to manage stress once it has intensified, rather than preventing fatigue and emotional strain from accumulating. This aligns with the quantitative pattern showing elevated distress and burnout indicators across the sector, including among owners, and reinforces the importance of owner well-

being to workforce sustainability.

6.4.5 Implications for Workforce Sustainability

The qualitative and quantitative findings together indicate that SME owner well-being is a strategic factor in workforce sustainability in Ontario's electrical sector. Owners influence several core functions that shape recruitment, training, and retention, including hiring and onboarding, day-to-day supervision, task planning, and how concerns are handled on jobsites. They also play a central role in setting expectations for respectful conduct and responding to issues related to health, safety, and inclusion.

The owner interviews suggest that when owners are operating under sustained pressure, limited time, and tight staffing, it becomes harder to provide the conditions that protect worker well-being consistently. This includes the ability to support recovery time, respond early to signs of strain, and address interpersonal issues before they escalate. In this context, stress experienced at the leadership level can influence the broader work environment, affecting communication, morale, and workers' comfort in speaking up. This is consistent with the study's broader findings that well-being is shaped not only by individual factors, but also by day-to-day organizational conditions.

Overall, the multi-year SDF evidence reinforces a practical implication for sector planning: improvements in worker health, retention, and inclusive workplace practice are unlikely to be sustained unless they are feasible for SME operations. The findings point to the value of

practical, low-burden supports that fit the realities of smaller electrical businesses, including limited administrative capacity and staffing flexibility.

6.5 The Role of Organizational Culture and EDI in Workforce Stability

Organizational culture and equity, diversity, and inclusion (EDI) are consistently reflected in the SDF program evidence as core determinants of workforce stability in Ontario's electrical sector. Across SDF1–SDF5, the quantitative findings show persistent differences in well-being outcomes by worker group (including higher psychological distress among women and apprentices), while the qualitative findings clarify how workplace norms, day-to-day interactions, and leadership practices shape workers' sense of belonging, psychological safety, and access to learning opportunities. Taken together, these results indicate that EDI is not separate from workforce sustainability; it is directly connected to retention, job satisfaction, and the conditions that support apprenticeship progression and long-term participation in the trade [13,19,35,73].

The qualitative interviews further demonstrate that culture-related challenges can manifest through overt and subtle forms of exclusion, including sexist language, biased assumptions about competence, and inconsistent responses to conflict or accommodation needs. Workers described situations in which raising concerns could be socially risky, and in which navigating issues related to respect, fairness, or inclusion often depended on informal practices rather than clear expectations and consistent supervisory follow-through. These qualitative themes align with the program's quantitative pattern of elevated distress and burnout in groups more likely to experience additional social strain in the workplace, reinforcing that improving workforce stability requires addressing both the physical demands of the job and the cultural conditions in which that work occurs [13,35].

6.5.1 Organizational Culture as a Determinant of Mental Health and Job Satisfaction

Both quantitative and qualitative findings indicate that organizational culture is closely linked to worker well-being and job satisfaction. The pooled quantitative analyses show consistent relationships between poorer mental health indicators (higher psychological distress and burnout) and lower job satisfaction. At the same time, the qualitative findings help explain how day-to-day workplace norms and supervisory practices contribute to these outcomes. In particular, interviews highlight how communication patterns, expectations around “pushing through,” and the availability of practical support shape whether workers feel respected, safe, and able to cope with job demands [13,35].

Qualitative interviews describe workplace environments where speaking openly about stress or mental health can be discouraged, and where workers may feel pressure to continue working through pain, fatigue, or emotional strain. Participants also noted hierarchical communication dynamics and uncertainty about how to raise concerns related to workload, fairness, or safety without negative consequences. These themes align with the quantitative pattern that workers reporting poorer well-being (including

higher distress and burnout) are also more likely to report lower job satisfaction, reinforcing that culture influences not only how work feels on a daily basis, but also workers' willingness to remain in the job and in the trade over time [35].

In this context, organizational culture should be understood as an operational factor that affects retention and performance, rather than merely an interpersonal issue. When workers perceive limited support, unclear expectations, or low psychological safety, the combined evidence indicates increased emotional strain and a higher likelihood of disengagement, particularly for early-career workers and those who already face additional pressures related to underrepresentation [13,35].

6.5.2 Gendered Experiences and Barriers for Women in the Trade

Across the pooled SDF1–SDF5 quantitative dataset, women reported higher psychological distress than men, a pattern that has remained consistent across project cycles. The qualitative findings provide clear context for this disparity by documenting the day-to-day workplace experiences that can undermine psychological safety, belonging, and long-term retention for women in the trade [13].

In interviews, women described discriminatory and gendered assumptions that begin as early as recruitment and hiring and on jobsites through daily interactions. One participant recounted being asked during interviews whether she would be "a distraction," whether she would "get pregnant," and being told, "I already have someone to bring me a beer, so what could you possibly be good for?" [13]. These types of experiences illustrate how credibility can be questioned regardless of competence, adding emotional load on top of the physical and time demands already typical in electrical work.

Women also described the continually having to prove themselves, often in environments with few peers or mentors who share similar experiences. As one participant reflected, "As a female in the industry, it was really difficult for me the first eight years… I like to push boundaries. So that has been my guiding force through this industry" [13]. When combined with limited accommodation clarity (for example, around pregnancy or modified duties), inconsistent supervisory response to disrespectful behaviour, and exclusion from informal networks where learning opportunities circulate, these conditions can contribute to sustained distress and lower job satisfaction over time.

Taken together, the mixed evidence indicates that improving women's retention in the electrical sector requires more than recruitment efforts alone. It depends on consistent, day-to-day practices that reduce preventable stressors, including clear expectations for respectful conduct, supervisors' ability to address issues early, equitable access to training and task opportunities, and practical accommodation guidance that is feasible for small- and mid-sized employers [13].

6.5.3 Barriers for Newcomers, Racialized Workers, and Persons with Disabilities

Participants described additional barriers for workers who are newcomers, racialized, or living with disabilities, particularly in smaller electrical businesses where support and policies are often informal. These barriers were not always overt; more commonly, participants described subtle patterns that affected day-to-day work, including assumptions about communication ability or "fit," uneven access to skill-building opportunities, and uncertainty about how to request or provide accommodations.

A recurring theme was the burden of repeatedly having to "prove" competence. Participants described how workers who did not fit the traditional image of an electrician could be scrutinized more closely or judged more quickly, even when their technical skills were strong. Others noted that informal crew dynamics and reliance on personal networks can unintentionally exclude newcomers or racialized workers from relationships where opportunities, learning moments, and better task assignments often circulate.

Participants also highlighted gaps related to accommodations and support. Employers and workers described uncertainty about what accommodations should look like on a job site, how modified duties can be arranged in practice, and how to balance safety, productivity, and fairness. Where accommodation processes are unclear, workers may be less likely to disclose needs or request support, which can increase strain, limit retention, and contribute to poorer well-being over time. These qualitative insights help interpret the broader SDF pattern that distress and burnout are closely tied to workplace conditions, support, and the ability to recover, resilience to individual resilience, rather than to individual resilience alone.

6.5.4 Apprenticeship Culture and Its Influence on Retention

Across SDF1–SDF5, apprentices consistently emerge as a group with elevated psychological distress and lower job satisfaction than more experienced workers. The quantitative findings in SDF5 reaffirm this pattern, and the qualitative interviews help explain how apprenticeship culture and day-to-day supervisory practices shape early-career experience and retention.

In interviews, apprentices and other participants described early-career work as highly dependent on the quality and consistency of supervision. Where expectations were unclear or guidance was inconsistent, apprentices reported greater stress and uncertainty, particularly when they were expected to perform at a high level without adequate instruction or feedback. Participants also described situations in which apprentices had limited opportunities to demonstrate or broaden their skills, including being repeatedly assigned the same physically demanding or lower-skilled tasks, which can restrict development and contribute to frustration and disengagement over time.

Workplace culture was described as a powerful mediator of these experiences. When apprenticeship environments normalize “learning by being thrown in,” discourage asking questions, or treat help-seeking as weakness, apprentices may cope by staying silent, pushing through fatigue or discomfort, and relying on trial-and-error. This dynamic aligns with the multi-year pattern among fatigue, distress, burnout, and job dissatisfaction. It also increases the risk that early-career workers interpret their strain as personal failure rather than a predictable outcome of weak structure and support.

Taken together, the SDF findings suggest that improving apprenticeship completion and retention is not only a training pipeline issue, but also a workplace culture issue. Apprenticeship-specific mentorship, clearer onboarding expectations, and practical supervisory skills (consistent check-ins, task coaching, fair task allocation, and early conflict resolution) are likely to have an outsized impact because the earliest years of the trade represent a period of heightened vulnerability and a key decision point for whether workers remain in the sector.

6.5.5 Inclusion as a Workforce Retention Strategy

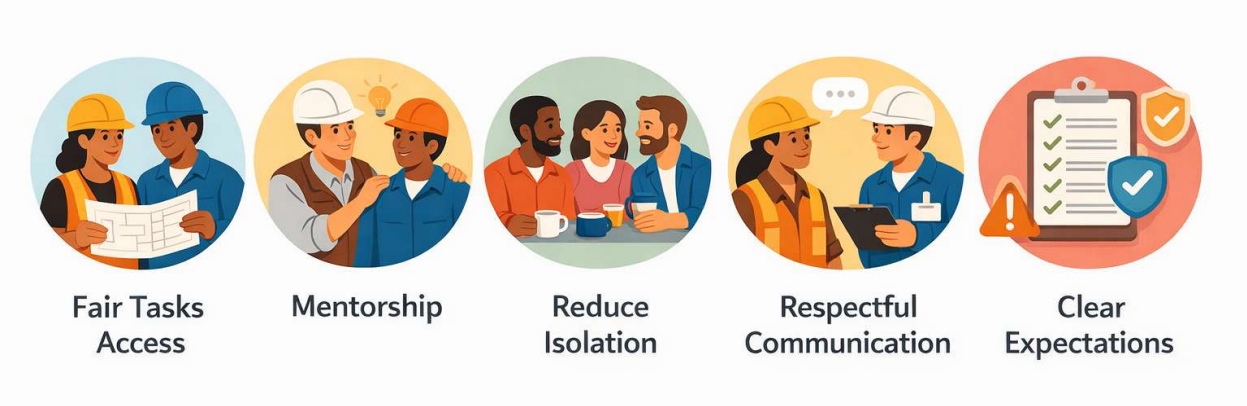
The evidence consistently indicates that inclusion is not an “add-on” to workforce development. It is a practical retention strategy. The quantitative results show that groups facing higher psychosocial strain also report lower job satisfaction and higher risk indicators for disengagement. The qualitative findings help explain the pathway: when workers experience exclusion, stereotyping, or unequal access to opportunities, the day-to-day burden of “proving yourself” increases stress, reduces psychological safety, and makes it harder to stay engaged in the trade over time. In contrast, workplaces that

communicate respectfully, allocate opportunities fairly, and address problems early create conditions that support both well-being and long-term participation.

The qualitative data also reinforce that meaningful improvements do not necessarily require complex programs. Participants emphasized simple, feasible practices that fit SME operations and can be implemented with minimal administrative burden, including:

- More equitable task assignment and training exposure, so apprentices and underrepresented workers are not repeatedly channeled into the least desirable or most physically demanding tasks.
- Intentional mentorship or buddy approaches, especially during onboarding and early months of employment, to strengthen skills, confidence, and belonging.
- Reducing isolation, including hiring or onboarding in ways that avoid having a worker be "the only one" from an underrepresented group on a crew where feasible.
- Regular, respectful supervisor–crew communication, including brief check-ins that surface issues early (workload, fatigue, interpersonal tension, training needs).
- Clear expectations for conduct and accountability, including straightforward anti-harassment expectations and consistent responses when boundaries are crossed.

Inclusion & Workforce Retention



These findings support a clear conclusion for sector planning: inclusive practices function as operational safeguards that reduce avoidable strain, strengthen psychological safety, and improve retention. This is particularly important in a tight labour market were keeping trained workers and supporting apprentices to completion are strategic necessities for Ontario's electrical workforce.

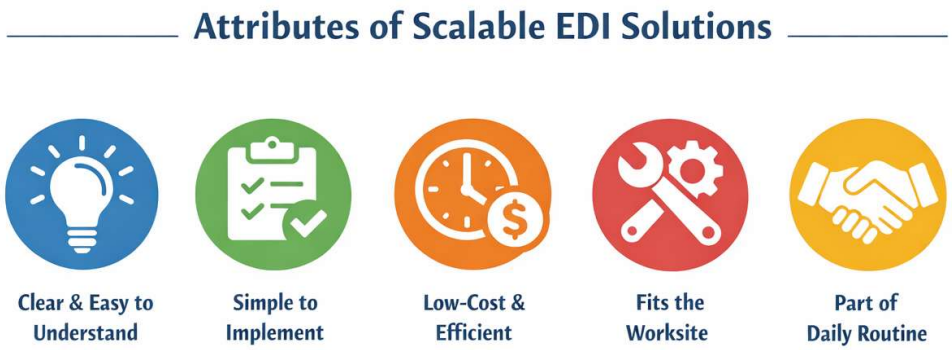
6.5.6 SME Limitations and the Need for Scalable EDI Solutions

Across the SDF5 qualitative findings, owners and supervisors described structural and operational constraints that limit the implementation of formal equity, diversity, and

inclusion (EDI) initiatives. Commonly identified barriers included limited administrative capacity, the absence of dedicated human resources support, and significant time pressures related to day-to-day operations. These constraints do not lessen the importance of inclusion. Rather, they demonstrate that effective EDI approaches in SME contexts must be scalable, practical, and aligned with operational realities.

Consistent with worker and employer perspectives, SMEs are most likely to adopt EDI practices when they are feasible to implement and sustain within existing workflows. In practice, this includes EDI actions that are:

- clear and easy to understand
- straightforward to implement with minimal training
- low-cost and time-efficient
- aligned with operational requirements and jobsite expectations
- integrated into routine processes such as hiring, onboarding, supervision, and jobsite communication



These findings highlight that scalable EDI supports for SMEs should prioritize practical implementation and routine use rather than reliance on resource-intensive programs. This evidence informed the SDF5 emphasis on developing implementation-ready tools that can be adopted across firms with limited capacity and can support sustained improvements in inclusion and workplace culture.

6.6 Alignment with Provincial Workforce Priorities and SDF Objectives

The SDF5 findings align with Ontario's workforce development priorities by identifying practical, evidence-informed factors that influence skilled trades retention and sustainability. Across SDF1 to SDF5, the program generated converging quantitative and qualitative evidence showing that worker well-being, fatigue and sleep, musculoskeletal burden, psychosocial stressors, and workplace culture and inclusion are directly relevant to recruitment, retention, and day-to-day productivity in the electrical sector. In the

context of ongoing labour market demand for skilled trades, these findings provide actionable insights into barriers affecting workforce stability and inform scalable approaches that employers, including small and medium-sized firms, can implement to strengthen retention and support a resilient workforce.

6.6.1 Addressing Labour Shortages Through Improved Retention and Well-Being

Ontario continues to prioritize skilled trades recruitment and apprenticeship progression through a range of provincial strategies and investments, including initiatives to expand training capacity, support employers, and strengthen apprenticeship pathways. Within this context, retention has become a critical complement to recruitment. Retaining trained workers and supporting apprentices through completion are essential to maintaining a stable electrical workforce and protecting the return on workforce development investments.

The SDF5 findings directly inform these priorities by identifying workplace factors associated with reduced job satisfaction and increased risk of disengagement. Across SDF1 to SDF5, the evidence consistently points to the role of fatigue and sleep-related challenges, musculoskeletal strain, high job demands, gaps in supervision and mentoring, and exclusionary workplace experiences in shaping worker well-being and burnout risk. Qualitative findings further indicate that these factors are especially consequential during early career stages, when apprentices and newer workers are still building confidence, adapting to jobsite expectations, and relying heavily on the quality of supervision and workplace culture.

6.6.2 Advancing Equity, Diversity, and Inclusion (EDI) Across the Skilled Trades

Increasing participation of underrepresented groups in the skilled trades, including women, Indigenous peoples, newcomers, and persons with disabilities, is an important objective of Ontario's workforce development agenda. The SDF5 findings reinforce that recruitment efforts alone are not sufficient if workplace conditions continue to create barriers to entry, progression, and retention. Across the SDF1 to SDF5 evidence base, qualitative accounts describe persistent challenges that affect underrepresented workers, including biased hiring and interview experiences, unequal task assignment, limited access to informal learning and mentorship, and inconsistent accommodation practices. These workplace dynamics contribute to reduced psychological safety, increased distress, and a lower likelihood of remaining in the trade.

By examining both worker and employer perspectives, the SDF5 project identifies practical and evidence-informed pathways to strengthen inclusion in the electrical sector. Findings indicate that the most feasible improvements are those that can be integrated into routine jobsite practices and supervisory responsibilities. Priority actions supported by the SDF evidence include:

- strengthening inclusive supervision practices through short, practical training and clear expectations
- promoting equitable task distribution and access to skill-building opportunities
- implementing clear and consistently applied anti-harassment and respectful workplace procedures
- establishing mentorship and peer support mechanisms, particularly for apprentices and early-career workers
- supporting early and sustained exposure to the trade for underrepresented workers through structured onboarding and integration supports

These findings align with Ontario's EDI objectives by demonstrating that inclusive workplace culture is not only an equity priority but also a workforce sustainability strategy. Scalable, SME-ready actions that reduce barriers and improve day-to-day inclusion can support retention, progression, and long-term participation across the skilled trades.

6.6.3 Supporting SME Competitiveness and Economic Growth

Most electrical employers in Ontario operate as small and medium-sized enterprises (SMEs). Strengthening the capacity and resilience of these firms aligns with provincial workforce and economic development priorities, particularly in sectors where productivity and project delivery depend on skilled labour. The SDF5 findings indicate that SMEs experience practical constraints that can limit the adoption of workplace health and inclusion supports, including limited administrative capacity, workforce fluctuations, and financial pressures that restrict the feasibility of resource-intensive initiatives.

In response, the SDF5 project emphasizes implementation-ready supports that can be integrated into routine operations. Drawing on evidence generated across SDF1 to SDF5, the project identifies right-sized tools and approaches that are feasible and cost-effective for SMEs, including micro-break guidance, fatigue management prompts, inclusive supervision practices, and practical EDI templates and checklists that can be applied without dedicated HR infrastructure.

These findings support the SDF objective of enabling scalable innovation in training, workplace health, and productivity. By prioritizing tools that fit operational realities, the project advances improvements that strengthen worker well-being, workplace culture, and retention while minimizing additional administrative burden for employers.

6.6.4 Advancing the United Nations Sustainable Development Goals (SDGs)

Consistent with the approach used in SDF4, the SDF5 findings can be mapped to several United Nations Sustainable Development Goals (SDGs) that are relevant to workforce development, workplace health, and equitable participation in the skilled trades. This alignment is not presented as a separate outcome. Rather, it reflects how the SDF5 evidence base links jobsite conditions, worker well-being, and inclusive practices to workforce sustainability in the electrical sector.

Based on the SDF1 to SDF5 findings, the most direct SDG connections include:

- **SDG 3 (Good Health and Well-being):** The program documents high musculoskeletal (MSK) burden and the role of fatigue, sleep challenges, distress, and burnout in shaping worker functioning, safety, and retention risk.
- **SDG 5 (Gender Equality):** Findings highlight barriers experienced by women in the trade, including exclusionary workplace dynamics and unequal access to learning opportunities and supportive supervision.
- **SDG 8 (Decent Work and Economic Growth):** The evidence links job quality factors, including workload, supervision, psychological safety, and workplace culture, to job satisfaction, well-being, and intentions to remain in the occupation.

- **SDG 9 (Industry, Innovation, and Infrastructure):** The project contributes applied tools and training approaches intended to strengthen jobsite practices, including fatigue-related supports, supervision resources, and practical workplace guidance that can be adopted across firms.
- **SDG 10 (Reduced Inequalities):** Findings identify inequities in day-to-day experiences for underrepresented groups and support practical actions to reduce barriers to participation and progression.
- **SDG 11 (Sustainable Communities):** By emphasizing retention and completion of training pathways, the project supports stable skilled trades participation that strengthens local labour supply and community infrastructure capacity.

Figure 2: SDG's connections throughout various SDF projects

Overall, this SDG alignment reinforces the broader value of SDF5 to provincial workforce priorities by demonstrating that workplace health, inclusion, and retention are interconnected and mutually reinforcing outcomes within the skilled trades.

6.6.5 Delivering Evidence for Policy, Program Design, and Sector Planning

The SDF5 findings provide an evidence base to inform policy, program design, and sector planning across government, sector associations, and employers. Taken together, the integrated qualitative and quantitative results across SDF1-SDF5 identify practical, modifiable workplace and training-related factors that influence job satisfaction, burnout risk, and retention in the electrical sector. These findings point to specific, actionable levers for improvement that are feasible to implement at scale, including fatigue and sleep-related supports, ergonomic and task design practices to reduce musculoskeletal strain, strengthened supervision and mentoring, early-career and apprenticeship supports, and scalable resources to promote respectful and inclusive workplaces.

This evidence directly supports the Ministry's workforce development objectives by informing strategies to:

- increase apprenticeship recruitment and participation
- strengthen progression and completion pathways
- enhance safety, productivity, and day-to-day jobsite performance
- support employer capacity, particularly among SMEs
- strengthen Ontario's skilled trades talent pipeline over the long term

By building on five years of Skills Development Fund-supported research, SDF5 establishes a strong foundation for future programming and sector capacity-building. The findings provide direction for SDF6 planning and for continued partnerships focused on sustaining and strengthening Ontario's electrical workforce through evidence-informed, implementation-ready approaches.

6.7 Implications for Workforce Development and Policy in Ontario

The SDF5 findings have clear implications for workforce development, labour market planning, and sector capacity-building across Ontario's electrical sector and other skilled

trades. As Ontario continues to expand infrastructure and strengthen skilled trades capacity, sustaining a stable workforce requires attention not only to the supply of recruitment and training, but also to the conditions that influence retention, performance, and progression. The multi-year evidence generated through SDF1 to SDF5 indicates that worker well-being, including fatigue and sleep challenges, musculoskeletal burden, psychosocial stressors, and workplace culture and inclusion, is directly connected to job satisfaction, burnout risk, and intentions to remain in the occupation. Taken together, these findings demonstrate that improving worker well-being is a core workforce strategy that supports long-term sector sustainability and the effective delivery of provincial priorities.

6.7.1 Worker Health as a Determinant of Labour Supply and Retention

The SDF1 to SDF5 evidence base demonstrates that worker health is a measurable determinant of retention, job satisfaction, and day-to-day functioning in the electrical sector. Across the quantitative findings and supporting qualitative accounts, physically demanding work, musculoskeletal (MSK) strain, sleep disruption and fatigue, and psychosocial distress were consistently linked to lower job satisfaction and elevated burnout risk. In a context where labour shortages already challenge sector capacity, these health-related factors represent a direct risk to labour supply and workforce stability.

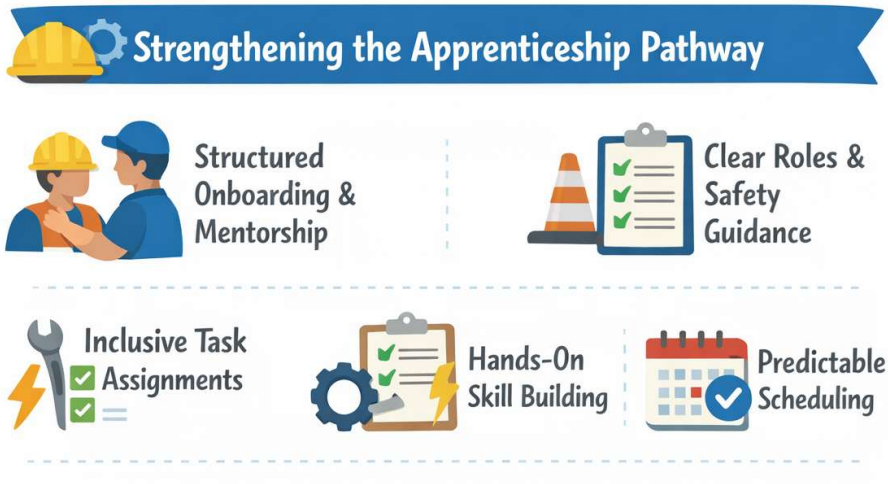
The findings indicate that fatigue, burnout, and MSK pain can reduce workers' capacity to perform safely and consistently, contribute to disengagement, and increase the likelihood of turnover. They also limit the availability of experienced workers who play essential roles in supervision, mentoring, and maintaining jobsite productivity. As a result, interventions that support rest and recovery, reduce preventable physical strain, and strengthen supervisory and jobsite supports should be considered workforce retention measures. These approaches address modifiable drivers of attrition and can help stabilize the electrical workforce while supporting safety and performance.

6.7.2 Strengthening the Apprenticeship Pathway

Across the SDF1 to SDF5 evidence base, apprentices consistently emerge as a higher-risk group for distress, sleep-related challenges, and lower job satisfaction. Qualitative findings further indicate that early-career experiences on the job site are highly influential. Inconsistent supervision, unclear expectations, high physical and cognitive demands, and experiences of exclusion or reduced psychological safety can contribute to early disengagement and increase the likelihood of leaving the trade. These patterns have direct implications for apprenticeship completion and for the stability of the future skilled trades workforce.

Strengthening apprenticeship retention, therefore, requires targeted and practical strategies that address early-career conditions and improve day-to-day support. Based on the SDF findings, priority approaches include:

- structured onboarding and mentorship to support skill development and integration into the crew
- clear role expectations and consistent safety communication, including learning opportunities and feedback
- equitable and inclusive task assignment, with attention to access to training-relevant work
- early exposure to a range of work activities that build competence and confidence
- predictable scheduling where feasible, to support sleep, recovery, and overall functioning



Collectively, these interventions support Ontario's apprenticeship and skilled trades priorities by addressing modifiable barriers that disproportionately affect new entrants. Improving the quality and consistency of early-career experiences can strengthen completion pathways and contribute to a more stable, sustainable talent pipeline.

6.7.3 Supporting Women and Equity-Deserving Groups

The SDF1 to SDF5 findings indicate that women and other equity-deserving groups continue to face barriers that affect both participation and retention in the electrical sector. Qualitative evidence describes workplace experiences that include discriminatory behaviour, biased assumptions about competence or "fit," unequal access to learning and advancement opportunities, and social isolation on jobsites. Quantitative patterns of higher distress among women are consistent with these accounts and reinforce that workplace culture and inclusion are material determinants of well-being and retention, not secondary considerations.

Addressing these barriers supports provincial equity and workforce diversification priorities while also strengthening labour supply. The SDF5 evidence points to practical strategies that can be implemented at the employer and jobsite level, including:

- inclusive supervision practices with clear expectations for respectful communication and fair treatment
- consistent anti-harassment and complaint-response protocols that are understood and applied in practice
- equitable allocation of work tasks and access to training-relevant experiences
- peer support and mentorship opportunities, particularly for apprentices and early-career workers
- recruitment and selection practices that recognize diverse strengths and reduce bias in hiring decisions

Together, these approaches can improve day-to-day inclusion, strengthen psychological safety, and support retention among equity-deserving workers. Over time, this contributes to a more diverse and stable workforce and supports broader labour market participation across Ontario's skilled trades.

6.7.4 SME-Tailored Interventions Are Essential for System Impact

Most electrical employers in Ontario operate as small and medium-sized enterprises (SMEs), yet many workplace health, inclusion, and training resources are developed with larger organizations in mind. The SDF5 qualitative findings indicate that SME owners and supervisors face practical constraints that can limit the adoption of complex initiatives, including limited administrative capacity, financial pressures, and competing day-to-day operational demands. These realities shape what can be implemented consistently and sustained over time.

For provincial workforce strategies to achieve system-level impact, supports must be feasible for SMEs and designed for implementation in real-world settings. The SDF evidence suggests that SME-ready interventions are most effective when they are short, practical, and integrated into routine operations. Priority examples include:

- short training units that can be delivered in brief intervals and reinforced over time

- practical fatigue and sleep-related prompts that can be used in daily planning and supervision
- concise EDI guidance that supports respectful communication, fair task assignment, and early response to concerns
- ergonomic break and recovery strategies that can be applied during physically demanding work
- ready-to-use templates to support consistent policies, onboarding, and supervisor communication

Embedding these tools into existing workflows is essential for sustainability. When interventions are designed to match SME capacity, they are more likely to be adopted, used consistently, and scaled across firms, strengthening retention and workforce stability across the sector.

6.7.5 Integrating EDI, Health, and Safety into Workforce Planning

The multi-year findings from SDF1 to SDF5 indicate that inclusion, physical health, and psychosocial well-being should not be treated as separate issues. In the electrical sector, these factors interact to shape jobsite culture, psychological safety, learning opportunities, and workers' capacity to perform safely and consistently. Together, they influence job satisfaction, burnout risk, and retention, ultimately affecting safety performance and the stability of the skilled trades workforce.

These findings support the value of an integrated workforce planning approach that aligns health, safety, inclusion, and training policies. Practical integration includes ensuring that fatigue and recovery practices are embedded within safety management, that supervision and mentoring expectations support both skill development and respectful workplace culture, and that training pathways address inclusion and psychological safety as conditions for effective learning. Strengthening this alignment can support a more resilient and diverse skilled trades workforce and improve Ontario's capacity to meet future labour market demand.

6.7.6 Sector-Wide Knowledge Mobilization and Partnership

The OEL and University of Toronto partnership demonstrates the value of coordinated evidence-informed sector leadership in strengthening workforce capacity. Across the SDF program, knowledge mobilization activities have supported ongoing communication between employers, workers, sector representatives, and research partners. Through chapter meetings, Roadshow engagements, employer briefings, and targeted dissemination, the project has created practical channels for sharing findings and translating evidence into tools that are feasible for day-to-day use in the electrical sector.

Continued collaboration is expected to support sector-wide implementation and scaling by enabling:

- broader adoption of fatigue, sleep, and mental health supports that are aligned with jobsite realities
- integration of EDI guidance and inclusive supervision practices into routine employer and supervisory processes
- readiness for SDF6 planning and expansion of pilot interventions and implementation supports
- improved alignment between employer needs, sector priorities, and government programming through ongoing feedback and engagement

Taken together, these activities strengthen the conditions for sustained uptake, support consistent messaging across the sector, and reinforce the role of partnership-based delivery in achieving system-level workforce outcomes.

6.8 An Integrated Pathway Linking Physical Demands, Sleep, Distress, Burnout, and Retention

A key insight from the multi-year SDF research program is that worker well-being in the electrical sector is shaped by interconnected physical, psychosocial, and workplace factors. Across SDF1 to SDF5, the evidence indicates that musculoskeletal (MSK) symptoms, sleep quality and fatigue, psychological distress, and burnout are not isolated concerns. Rather, they tend to co-occur and reinforce one another, affecting job satisfaction, safety-related functioning, and workers' intentions to remain in the trade. This

integrated evidence base supports the need for coordinated approaches that address physical demands, recovery and sleep, and jobsite conditions together to strengthen retention and overall workforce sustainability.

6.8.1 Musculoskeletal Pain as the Entry Point of Strain

Across SDF1 to SDF5, musculoskeletal (MSK) pain consistently emerges as an early and prevalent indicator of strain in the electrical workforce. In each SDF cycle, more than 90 percent of participants reported at least one MSK symptom, with lower back and shoulder pain most frequently identified. These symptoms have direct implications for day-to-day functioning and recovery. Workers described how persistent discomfort can limit sleep quality, reduce restorative rest, and prolong physical fatigue. As a result, MSK pain often functions as an upstream stressor that contributes to a broader pattern of strain, increasing vulnerability to sleep disruption, psychological distress, and burnout, and ultimately shaping job satisfaction and retention.

6.8.2 Sleep Disruption as the Central Mechanism

Across the SDF5 findings, sleep quality emerged as a central mechanism linking physical strain and psychosocial outcomes. Quantitative results indicate that poorer sleep was among the strongest predictors of burnout, higher psychological distress, and lower job satisfaction. This pattern remained evident even when considering other relevant factors measured in the program, including years in the industry and musculoskeletal symptom burden.

Qualitative interviews help explain how sleep becomes disrupted in this workforce context. Workers and employers described several consistent pathways:

- musculoskeletal pain that interferes with falling asleep or staying asleep
- long workdays, irregular hours, and commuting time that reduce sleep opportunity
- cognitive strain and rumination that carry into the evening and make it difficult to “switch off”
- limited recovery time between shifts due to workload and competing personal responsibilities

The findings position sleep as a practical leverage point for intervention. Improvements in sleep and recovery are likely to produce cascading benefits for distress, burnout risk, safety-related functioning, and overall job satisfaction, with implications for retention and workforce stability.

6.8.3 Distress as a Response to Accumulated Demands

As physical strain and fatigue accumulate, the SDF findings indicate a corresponding increase in psychological distress. This pattern is reflected in the SDF5 quantitative results and is reinforced by qualitative accounts from both workers and employers. Participants

described distress as a practical, day-to-day response to sustained demands, often expressed through:

- irritability and reduced patience
- difficulty concentrating and reduced attention
- feeling overwhelmed and mentally “behind”
- emotional exhaustion and reduced motivation

The SDF evidence further indicates that distress is not evenly distributed across the workforce. Apprentices and women reported higher levels of distress, consistent with qualitative accounts describing the combined impact of demanding work conditions, inconsistent supervision, and experiences of exclusion or reduced psychological safety. These findings suggest that distress is both an outcome of accumulated demands and a key indicator of elevated risk for burnout and withdrawal from the skilled trade.

6.8.4 Burnout as an Endpoint of Prolonged Strain

Across the SDF evidence base, burnout appears most clearly when sustained physical and psychosocial demands are combined with limited opportunities for recovery and insufficient workplace supports. The SDF5 quantitative findings indicate that burnout levels are higher among apprentices than among journeypersons, and that burnout is strongly associated with poorer sleep and greater psychological distress. The results also show that higher burnout is associated with poorer job satisfaction and reduced work engagement, with direct implications for retention and workforce stability.

Qualitative findings provide complementary insight into how burnout is experienced and described in this sector. Workers and employers used phrases such as “running on empty,” “pushing through,” and “hitting a wall” to describe a state of persistent exhaustion, reduced resilience, and diminished capacity to cope with daily demands. These accounts are consistent with burnout as an endpoint of prolonged strain, particularly when recovery time, supportive supervision, and practical workplace resources are not sufficient to offset ongoing pressures.

6.8.5 Job Satisfaction and Retention as System Outcomes

Job satisfaction functions as a key pathway linking worker well-being to retention. The SDF5 results indicate that poorer sleep, higher psychological distress, higher burnout, and musculoskeletal (MSK) pain are each associated with lower job satisfaction and greater intention to leave. These patterns are consistent with the broader multi-year evidence base showing that physical strain, inadequate recovery, and psychosocial pressures contribute to reduced engagement and lower willingness to remain in the occupation over time.

In the context of ongoing skilled trades shortages, these findings underscore that retention cannot be addressed solely through recruitment. Improving workforce stability requires upstream interventions that reduce preventable physical strain, strengthen sleep and

recovery support, and improve jobsite conditions that influence distress and burnout. Approaches that address these drivers together are more likely to increase job satisfaction and support sustained participation in the electrical workforce.

6.8.6 Implications of the Interconnected System

The SDF1 to SDF5 findings indicate that the pathway linking physical strain, sleep disruption, distress, burnout, and retention have clear implications for Ontario's skilled trades workforce strategy.

1. **Single-issue interventions are unlikely to be sufficient.**
   Addressing musculoskeletal pain without strengthening rest and recovery conditions or providing mental health resources without addressing workload and jobsite conditions, is unlikely to disrupt the broader cycle of strain. The evidence suggests that risks accumulate across domains and therefore require coordinated responses.
2. **Integrated, multi-component approaches are required for meaningful impact.**
   Improvements in fatigue and sleep support, ergonomic and task design practices, supervision and mentoring, and inclusion and respectful workplace practices are most effective when implemented as a connected set of actions. This reflects the reality that well-being and retention are influenced by interacting physical, psychosocial, and organizational factors.
3. **SME-ready solutions are essential for system-level change.**
   Because many employers operate with limited administrative capacity, interventions must be practical, low burden, and feasible to embed into existing workflows. If support is not designed for SMEs, implementation will remain uneven across the sector, and overall impact will be limited.

Recognizing these interconnected dynamics provides a stronger basis for designing future SDF programming and implementation supports. It also supports the rationale for planned next-step work, including the 2026 observation study, to collect objective ergonomic and workload data that can inform more precise and scalable interventions.

6.9 Strengths and Limitations

The SDF5 study builds on five consecutive years of collaboration between the OEL and the University of Toronto and represents sustained mixed-methods evidence base focused on worker health, inclusion, and workforce sustainability in Ontario's electrical sector. The program integrates multi-year survey data with qualitative input from workers and employers, strengthening the ability to interpret patterns over time and identify practical, implementation-relevant priorities. As with all applied sector research, the SDF5 project also has limitations that should be acknowledged to support appropriate interpretation and use of the findings.

6.9.1 Strengths

Multi-Year Evidence Base Across SDF1 to SDF5
The integration of quantitative data across five SDF cycles provides a strong evidence base to examine patterns in worker health, well-being, and workplace conditions in Ontario's electrical sector over time. This multi-year dataset strengthens the stability of findings, supports more robust analyses, and enables comparison across subgroups such as gender, role (apprentice and journeyperson), and other work-related characteristics captured in the study.

Mixed-Methods Sequential Explanatory Design
The use of a sequential explanatory approach, combining validated survey measures with qualitative interviews, strengthens interpretation and practical relevance. Quantitative results identify key patterns and associations, while qualitative findings from workers and employers provide context for how these issues are experienced and why they occur within day-to-day jobsite realities.

Inclusion of Employer and SME Perspectives
By incorporating interviews with SME owners and supervisors, the SDF5 cycle expanded the evidence base to include perspectives that are often underrepresented in occupational health and workforce research. These findings provide important insight into implementation feasibility, including operational constraints, supervision practices, and factors shaping workplace culture and support in smaller firms.

Use of Validated Measurement Tools
The quantitative component used established instruments, including the Nordic Musculoskeletal Questionnaire (NMQ), the Pittsburgh Sleep Quality Index (PSQI), the Kessler Psychological Distress Scale (K6), the Copenhagen Burnout Inventory (CBI), and the SF-12 Health-Related Quality of Life Survey. The use of validated measures supports reliability, strengthens comparability with other research, and increases confidence in the interpretation of observed patterns.

Strong Sector Partnership and Embedded Knowledge Mobilization
The long-standing collaboration with the Ontario Electrical League supported recruitment through sector channels, including Roadshows, chapter meetings, and employer networks. This partnership also enabled ongoing engagement with employers and stakeholders, improving the relevance and feasibility of the tools and recommendations developed through the project and supporting sector-ready dissemination.

6.9.2 Limitations

Convenience Sampling and Generalizability
Participants were recruited through OEL events, employer networks, email outreach, and voluntary participation. While this approach is appropriate for applied, sector-based research and supports timely engagement with industry stakeholders, the sample may not

fully represent all electrical workers in Ontario, particularly those who do not participate in association-based activities. Findings should therefore be interpreted as representative of the participating population and sector networks engaged through the project.

Underrepresentation of Some Worker Groups
Despite efforts to broaden participation, some groups remain underrepresented, including women, newcomers, Indigenous workers, and persons with disabilities. This reflects the current demographic composition of the sector and recruitment constraints in applied settings. As a result, subgroup findings should be interpreted with caution due to smaller sample sizes and reduced statistical precision.

Reliance on Self-Reported Health and Work Measures
Musculoskeletal symptoms, sleep quality, psychological distress, and burnout were measured using validated self-report instruments. While these measures are appropriate and widely used, self-reported data can be influenced by recall bias and individual interpretation. Planned next-step work, including the 2026 observation study, will support triangulation through objective assessment of physical workload and ergonomic exposures.

Cross-Sectional Nature of SDF5 Survey Data
The SDF5 survey captures outcomes and exposures at a single point in time. Although the overall SDF1 to SDF5 program provides multi-year evidence and consistency of key patterns, causal relationships at the individual level cannot be confirmed through cross-sectional analyses alone.

Workplace Diversity and Unmeasured Contextual Factors
The electrical sector includes diverse job types and work contexts. Variation in firm size, work setting (for example, residential, commercial, or industrial), union status, and project characteristics may influence worker experiences in ways that are not fully captured in the dataset. These contextual factors may contribute to heterogeneity in outcomes and should be considered when interpreting results and planning interventions.

6.9.3 Interpretation Considerations

Despite these limitations, the overall interpretation is strengthened by the consistency of key patterns observed across five SDF cycles. The convergence of quantitative results with qualitative accounts from workers and employers supports confidence in the relevance of the findings to sector conditions and priorities. Taken together, the SDF1 to SDF5 evidence base provides a strong foundation for identifying practical, feasible intervention areas and for informing scalable approaches under future SDF programming.

6.10 Conclusion

The SDF5 findings, when considered alongside the four previous years of Skills Development Fund research, provide a clear, evidence-informed understanding of the

physical, psychosocial, and workplace factors that shape health, performance, and long-term sustainability in Ontario's electrical workforce. Across SDF1 to SDF5, musculoskeletal strain, sleep disruption and fatigue, psychological distress, and burnout remained persistent challenges. The evidence indicates that these issues rarely occur in isolation. They interact in reinforcing ways that influence safety-related functioning, job satisfaction, productivity, and retention.

The findings also indicate that risk is not evenly distributed across the workforce. Apprentices and women consistently reported higher distress and greater barriers to support, and qualitative accounts further describe how exclusionary workplace experiences, inconsistent supervision, and limited access to mentorship and learning opportunities can contribute to early disengagement. These patterns have direct implications for apprenticeship progression, workforce diversification, and labour market stability, particularly in a sector where sustained demand requires both recruitment and retention.

At the same time, the SDF5 qualitative evidence provides practical, worker- and employer-informed pathways for improvement. The project identifies feasible, implementation-ready actions that align with the operational realities of small and medium-sized electrical employers, including fatigue and sleep-related supports, ergonomic and task design strategies such as micro-break practices, strengthened supervision and mentoring, and accessible, practical EDI guidance. These approaches emphasize scalable changes that can be embedded into routine jobsite processes rather than relying on resource-intensive programs.

The SDF5 findings also highlight the job site conditions. In smaller firms, the capacity and well-being of owners and supervisors influence the emotional climate of the crew, the consistency of supervision, and the availability of support for apprentices and other workers. Strengthening employer capacity is therefore an important component of improving worker outcomes and increasing the feasibility of sustained implementation.

Overall, the SDF5 research reinforces that worker well-being is integral to Ontario's workforce development and skilled trades priorities. Actions that reduce fatigue, prevent musculoskeletal strain, strengthen supervision, and improve inclusion are also retention strategies that support productivity, safety, and long-term sector sustainability. The following section translates these findings into concrete, implementation-ready recommendations for the Ontario Electrical League, the Government of Ontario, and sector partners.

7. Recommendations for OEL and the Government of Ontario

The multi-year SDF research program indicates that sustaining Ontario's electrical workforce requires coordinated, practical, and scalable actions that address the physical, psychosocial, and workplace culture factors influencing worker well-being and retention.

The recommendations below translate the SDF5 evidence, informed by findings across SDF1 to SDF5, into implementation-ready actions for the Ontario Electrical League (OEL), member employers, training and apprenticeship stakeholders, and the Government of Ontario. For clarity and usability, recommendations are organized into five domains: (1) fatigue and sleep, (2) musculoskeletal health and physical demands, (3) mental health and burnout, (4) equity, diversity, and inclusion (EDI), and (5) employer capacity and system-level supports.

7.1 Fatigue and Sleep Health: High-Leverage Interventions for Safety, Productivity, and Retention

Across the SDF evidence base, sleep quality and fatigue emerged as central drivers of worker well-being and retention. In SDF5, poorer sleep was strongly associated with higher burnout and distress and with lower job satisfaction. Because opportunities, practical fatigue prevention strategies represent a high-leverage intervention area that can be implemented by employers, including SMEs, with limited administrative capacity.

Recommendations

- **Integrate fatigue awareness into routine safety processes.**
  Include brief fatigue check-ins and reminders in toolbox talks and safety briefings, supported by short supervisor scripts.
- **Develop and distribute an SME-ready Sleep and Fatigue Toolkit for the electrical sector, including:**
  - practical sleep hygiene guidance relevant to trades schedules
  - shift and commute planning considerations where feasible
  - early warning signs of fatigue and reduced alertness
  - simple fatigue-response steps for supervisors and workers
  - prompts for recovery and pacing during physically demanding work
- **Promote micro-break practices on jobsites to support recovery.**
  Encourage brief, repeatable pauses between tasks (for example, 1 to 2 minutes) as part of normal workflow to support physical recovery and reduce cumulative fatigue.
- **Embed fatigue considerations into job planning during higher-risk periods.**
  Apply additional fatigue management during peak workload periods, overtime, extended shifts, and long commutes.
- **Integrate sleep and fatigue content into apprenticeship-related training and supervision.**
  Prioritize early-career workers and apprentices, given the higher distress and burnout vulnerability observed across the SDF findings, and reinforce practical strategies through onboarding and regular check-ins.

7.2 MSK Prevention and Physical Demands: Practical Ergonomic Supports for SMEs

Musculoskeletal (MSK) symptoms were consistently widespread, with more than 90 percent of participants reporting at least one symptom each year. Lower back and shoulder pain were most frequently reported, reflecting common electrical tasks that involve lifting, overhead work, awkward postures, kneeling, and sustained force. Many SMEs do not have access to dedicated ergonomic expertise or formal prevention programs. The SDF evidence therefore supports the need for practical, sector-specific ergonomic supports that can be implemented with minimal cost and limited administrative burden.

Recommendations

- **Develop a "Right-Sized Ergonomics" guide for electrical SMEs focused on high-risk tasks and practical prevention strategies, including**:
    - overhead work and sustained shoulder loading
    - lifting, carrying, and material handling approaches
    - kneeling, crouching, and floor-level work strategies
    - tool selection and tool weight management
    - ladder use, positioning, and work height adjustments
- **Support implementation of the 2026 observation study to strengthen task-level prevention guidance**.
  Use observation-based findings to identify high-exposure tasks and to refine sector-specific MSK prevention supports, including ergonomic priorities that are feasible for SMEs.
- **Promote task rotation and workload distribution practices where feasible**.
  Encourage supervisors to reduce sustained exposure to repetitive or high-demand tasks by distributing physically demanding work across the crew and over the shift.
- **Provide visual cue cards or quick-reference resources for common electrical tasks.**
  Include recommended body positioning, pacing guidance, and brief recovery prompts for use on jobsites and in toolbox talks.
- **Encourage early reporting and response to discomfort.**
  Promote simple, non-punitive reporting practices that allow workers to flag emerging strain early, enabling timely adjustments before symptoms progress to injury or lost time.

7.3 Mental Health, Distress, and Burnout Reduction

Across the SDF evidence base, psychological distress and burnout were consistently linked to poorer sleep, high physical demands, and challenging jobsite conditions. The findings also indicate that some groups experience elevated risk, including apprentices and women, and qualitative accounts highlight the added pressures faced by SME owners

and supervisors who manage operational demands while supporting crews. These patterns reinforce that mental health supports in the electrical sector must be practical, role-specific, and feasible for SMEs to implement within routine supervision and jobsite communication.

Recommendations

- **Develop an electrical sector specific Mental Health First Aid (MHFA) training module designed for SME delivery.**
  Focus content on practical skills aligned with the SDF findings, including recognizing early signs of distress, responding early, communicating effectively within crews, and clarifying supervisor responsibilities and referral pathways.
- **Create brief self-check tools for stress and burnout for both workers and employers.**
  Integrate these tools into existing OEL resources and dissemination channels to support early identification and encourage timely support seeking.
- **Promote regular check-ins as a routine supervision practice.**
  Encourage brief, structured check-ins that can be integrated into existing workflows to reduce isolation, improve morale, and identify concerns early, particularly for apprentices and workers who may be less likely to raise issues proactively.
- **Develop a concise Supervisor Pocket Guide for mental health conversations.**
  Provide script-based guidance that supports SME supervisors in initiating supportive conversations, responding appropriately, maintaining confidentiality, and connecting workers to relevant resources.
- **Strengthen targeted supports for apprentices and early-career workers.**
  Prioritize mentorship pairings, early-career orientation to jobsite expectations and available supports, and clear information on how to access mental health resources, recognizing the higher early-career vulnerability reflected in the SDF findings.

7.4 Equity, Diversity, and Inclusion (EDI): Creating Inclusive, Productive Workplaces

In the qualitative findings, workers described persistent barriers affecting women, newcomers, Indigenous workers, and persons with disabilities. These barriers included exclusionary jobsite dynamics, unequal access to learning opportunities, and inconsistent responses to harassment or accommodation needs. The evidence indicates that improving inclusion is essential for workforce diversification and retention, and that practical, SME-ready EDI supports are most likely to be adopted when they are simple, low-burden, and embedded in routine supervision and workplace processes.

Recommendations

- **Develop an SME-ready EDI Quick-Start Bundle for the electrical sector, including:**
    - clear anti-harassment and respectful workplace templates
    - concise, inclusive supervision guidance, including expectations and accountability steps
    - practical examples of equitable task assignment and access to skill-building work
    - hiring and interview guidance to reduce bias and support fair selection practices
- **Support mentorship and buddy programs, with priority for apprentices and underrepresented workers.**
  Encourage structured pairing to reduce isolation, support skill acquisition, and strengthen early-career integration.
- **Provide short EDI micro-learning modules for supervisors.**
  Design content in brief segments (e.g., 10-15 minutes) focused on practical scenarios and jobsite-level actions that can be completed without extensive training time.
- **Promote peer support strategies that strengthen day-to-day inclusion.**
  Encourage approaches such as balanced crew composition, deliberate integration of new workers into informal learning networks, and structured check-ins to support psychological safety and belonging.
- **Encourage OEL chapters to model inclusive practices through meetings and events.**
  Use consistent messaging, inclusive participation practices, and visible leadership to reinforce sector-wide expectations and support culture change across member networks.

7.5 Strengthening SME Capacity and Sector Resilience

Small and medium-sized employers play a central role in Ontario's electrical sector and are essential to workforce growth and project delivery. The SDF findings also indicate that many SMEs operate with limited administrative capacity and limited access to formal HR or occupational health resources. For sector-wide improvement to be feasible and scalable, tools and supports must be designed for practical use in small business settings and integrated into routine operations.

Recommendations

- **Prioritize low-burden tools that are feasible for SMEs to implement and sustain.**
  Develop supports that do not depend on dedicated HR functions or extensive training, and that can be embedded into existing supervision and jobsite communication practices.
- **Create implementation-ready templates to strengthen consistency in core people and safety processes, including:**

    - onboarding and orientation checklists
    - task rotation and workload planning tools
    - simple incident and concern reporting templates
    - practical performance feedback and coaching prompts for supervisors
- **Pilot a Small Business Support Package for the electrical sector.**
  Provide a curated bundle of practical materials across fatigue and sleep, ergonomics and MSK prevention, mental health and burnout, and EDI, designed for rapid uptake and routine use.
- **Sustain sector-wide knowledge mobilization through the OEL and University of Toronto partnership.**
  Continue dissemination through Roadshows, webinars, chapter networks, and targeted employer briefings to support adoption and reinforce consistent sector messaging.
- **Use future SDF programming to test implementation and refine tools in real-world settings.**
  Work with a small group of volunteer SMEs to implement selected supports, collect employer and worker feedback, and refine tools to improve feasibility, uptake, and impact before broader scaling.

7.6 Sector-Wide Policy and Planning Implications

The SDF1 to SDF5 findings identify several practical opportunities for the Government of Ontario to strengthen skilled trades capacity by supporting retention, well-being, and inclusive workplace conditions. The following policy and planning considerations reflect the evidence generated through this program and focus on scalable approaches with potential sector-wide impact.

Opportunities for provincial action

- **Integrate fatigue and sleep considerations into provincial occupational health and safety guidance.**
  Encourage the inclusion of fatigue awareness, fatigue risk indicators, and recovery practices within existing occupational health and safety frameworks and related guidance materials.
- **Strengthen apprenticeship retention through early-career well-being and mentorship supports.**
  Support structured onboarding, mentorship, and early-career supervision practices through targeted funding, guidance, or program requirements that improve progression and completion.
- **Advance adoption of inclusive hiring and supervision practices through incentives and recognition.**
  Promote EDI-informed recruitment, respectful workplace practices, and inclusive supervision through targeted incentives, recognition programs, or implementation supports that are feasible for SMEs.

- **Support ongoing sector monitoring to inform workforce planning.**
  Enable continued data collection and periodic reporting to track changes in worker well-being, job demands, and retention risk, supporting evidence-informed adjustments to programming.
- **Promote cross-trade collaboration to align well-being and ergonomics approaches.**
  Encourage collaboration across construction-related trades to harmonize practical approaches to mental health supports, fatigue prevention, and ergonomic risk reduction, improving consistency and scalability across sectors.

8. Key Performance Indicators (KPIs)

The SDF5 project emphasizes measurable progress that supports workforce development, retention, and sector capacity in Ontario's electrical industry. The KPIs presented below summarize achievements from the 2025 to 2026 project period and reflect key outputs across recruitment and participation, research and analysis, stakeholder engagement, knowledge mobilization, and implementation readiness. Collectively, these indicators demonstrate alignment with the Ministry's objectives for evidence-informed programming and practical, sector-relevant improvement.

8.1 Participation and Recruitment Indicators

New Enrolments During the SDF5 Period (2025)
A total of 25 new participants were recruited in 2025, including apprentices, journeypersons, and SME owners. Recruitment was conducted through established OEL channels and sector outreach, including Roadshows, chapter meetings, contractor outreach, email campaigns, and peer referrals.

Engagement for the 2026 Observation Study
In preparation for the 2026 on-site observation study focused on musculoskeletal (MSK) risk and physical workload assessment, 11 journeypersons pre-registered to participate.

Cumulative Multi-Year Dataset (SDF1 to SDF5)
With the integration of SDF5 enrolments, the combined SDF1 to SDF5 dataset now includes more than 180 participants, representing a substantial and sustained evidence base on workforce health and retention-related factors in Ontario's electrical sector.

8.2 Research and Knowledge Generation

Manuscripts and Scholarly Outputs
During the SDF5 period, multiple scholarly outputs were developed or advanced to support peer-reviewed dissemination of the SDF evidence base. This included four manuscripts derived from the integrated SDF1 to SDF5 dataset, comprising:

- Two qualitative manuscripts focused on organizational culture, equity, diversity, and inclusion, and SME owner perspectives and well-being
- Two quantitative manuscripts examining sector patterns related to musculoskeletal burden, sleep and fatigue, psychological distress, burnout, job satisfaction, and retention-related indicators

Additional manuscripts are anticipated following the 2026 observation phase as objective task-level ergonomic and workload data become available for integration with the existing evidence base.

Sector Analyses Conducted

- Expanded multi-year quantitative analyses were completed to examine patterns in musculoskeletal symptoms, sleep quality, burnout, psychological distress, job satisfaction, health-related quality of life, and retention-related indicators across the SDF program.
- **I**n-depth qualitative analyses were conducted using more than 60 interviews with workers and SME owners, strengthening interpretation of quantitative patterns and supporting practical, implementation-ready insights for the sector.

8.3 Knowledge Mobilization and Sector Communication

Engagement Activities
Knowledge mobilization during the SDF5 period was integrated into existing OEL sector channels to support efficient outreach and practical feedback. Key engagement activities included:

- participation in OEL Roadshow events to engage contractors, business owners, apprentices, and other industry stakeholders
- presentations and briefings delivered through OEL chapter meetings across Ontario
- ongoing employer outreach to share emerging findings, validate priorities, and gather feedback on feasibility and implementation needs

Dissemination Outputs
To support timely use of findings and practical sector uptake, dissemination outputs included:

- executive summaries, infographics, and technical briefs shared with OEL leadership and partners
- preliminary implementation materials piloted with select SMEs to test usability and inform refinement of sector-ready tools

8.4 Equity, Diversity, and Inclusion Tracking

The SDF5 project incorporated equity, diversity, and inclusion (EDI) considerations across quantitative and qualitative analyses to support evidence-informed workforce diversification and retention planning. Key EDI-related indicators examined across the SDF evidence base included:

- gender-related patterns in psychological distress, burnout, and related well-being measures
- differences by apprenticeship status across health indicators and job satisfaction
- assessment of representation gaps for women, racialized workers, newcomers, and persons with disabilities within the participating sample, consistent with known sector-wide participation challenges
- integration of EDI findings into recommendations to inform policy, training approaches, and supervisory and workplace practices that support inclusion and retention

8.5 Implementation Readiness and Capacity Building

Evidence generated during the SDF5 period strengthened implementation readiness by ensuring that proposed interventions are feasible and aligned with electrical sector operations, particularly within SME contexts. Key implementation readiness and capacity-building outcomes included:

- Integration of employer and worker feedback into early intervention materials and prototypes, including fatigue and sleep supports, practical EDI guidance, and ergonomic resources, to improve usability and fit with jobsite realities.
- Identification of SMEs interested in participating in pilot implementation and refinement, establishing a foundation for structured testing, adjustment, and scaling of selected tools under future SDF programming, including SDF6.

8.6 Alignment with SDF Objectives

SDF5 activities contributed to the Ministry's Skills Development Fund objectives by generating actionable evidence and implementation-ready outputs that support workforce development and sector sustainability. Specifically, the project:

- advanced evidence relevant to labour supply pressures by identifying factors associated with retention risk, job satisfaction, and barriers to apprenticeship progression and completion
- supported the development and uptake of practical innovations that strengthen worker well-being and workplace culture, informed directly by sector data and stakeholder input

- prioritized SME-ready interventions designed to be feasible, low-cost, and scalable across employers with limited administrative capacity
- strengthened sector resilience by advancing supports that improve mental health literacy and early response to distress, promote inclusion and respectful workplaces, and reduce ergonomic risk and musculoskeletal strain

9. Risks, Challenges, and Mitigation Strategies

The SDF5 project was implemented in a context of sustained demand for skilled trades, ongoing labour shortages, and practical capacity constraints among employers across Ontario's electrical sector. Findings across SDF1 to SDF5, together with direct engagement with workers and SME owners, identified several systemic and project-level risks that can affect worker well-being, apprenticeship progression, recruitment, and retention. This section summarizes the key risks and challenges identified through the program and outlines mitigation strategies applied during SDF5, as well as practical strategies recommended for future implementation and scaling.

9.1 SME Time and Resource Constraints

Challenge

Many small and medium-sized electrical employers operate with limited staffing and administrative capacity, and supervisors often balance production demands with training and people-management responsibilities. These constraints can reduce SMEs' ability to participate in research activities, allocate time for training, or adopt workplace initiatives that require extensive documentation, formal programming, or time away from job tasks. As reflected across SDF cycles, this also affects the feasibility of sustained implementation, even when employers recognize the value of new supports.

Mitigation Strategies Implemented During SDF5

- **Used flexible, low-burden recruitment and engagement methods.** Participation was supported through existing OEL channels, such as Roadshows and chapter meetings, and through outreach methods that reduced scheduling and administrative burden.
- **Leveraged trusted sector networks to support participation.** Engagement through OEL networks helped reduce barriers for SMEs by using familiar communication pathways and reducing the need for additional coordination.
- **Maintained an applied, feasibility-oriented approach to knowledge mobilization**. Findings were communicated in practical formats intended to support sector use and reduce the burden of translating research into action.

Mitigation Strategies Recommended for Future Scaling

- **Develop SME-ready tools that are brief and practical.** Prioritize resources that can be used without dedicated HR support and that fit within routine supervision and jobsite communication.
- **Provide implementation-ready templates that employers can apply immediately.** For example, onboarding checklists, short communication guides, and simple reporting formats.
- **Emphasize small, repeatable practices that can be embedded into existing workflows.** Focus on actions that require minimal time and no formal programming, supported by concise guidance and reinforcement through sector channels.

9.2 Stigma and Cultural Barriers in the Skilled Trades

Across the qualitative findings, persistent cultural norms in the skilled trades, including expectations of toughness, self-reliance, and "pushing through," continue to limit open discussion of mental health and reduce early help-seeking. These norms can also discourage workers and employers from raising concerns about fatigue, musculoskeletal pain, or psychological strain, even when these issues are affecting safety, performance, and well-being. As a result, problems may escalate before support is accessed or workplace adjustments are made.

Mitigation Strategies Implemented During SDF5

- **Used worker and employer perspectives to inform messaging and interpretation**. Qualitative accounts were integrated into reporting and sector communication to provide credible, job-relevant language for discussing stress, fatigue, and strain in everyday work.
- **Maintained an applied, practical framing.** Findings and implications were communicated in operational terms that align with jobsite realities, focusing on early recognition, supportive supervision, and practical next steps rather than clinical terminology.

Mitigation Strategies Recommended for Future Scaling

- **Develop sector-specific Mental Health First Aid (MHFA) and supervisor guidance that is practical and script-based.** Prioritize simple language, early recognition of distress, and clear steps for supportive conversations and referral pathways.
- **Promote mentorship and buddy approaches to reduce isolation.** Encourage structured pairing for apprentices and workers who may have limited informal support on site.

- **Strengthen low-barrier pathways for raising concerns.** Use confidential and low-pressure options for reporting fatigue, discomfort, or psychosocial strain, supported by clear supervisor response steps and non-punitive expectations.
- **Embed normalization into routine communication.** Reinforce consistent messaging through onboarding, toolbox talks, and supervisor check-ins to support earlier disclosure and earlier intervention.

9.3 Persistent EDI Gaps and Resistance to Change

Challenge

Across the SDF qualitative findings, women, newcomers, Indigenous workers, and persons with disabilities remain underrepresented and reported barriers that affect inclusion, learning opportunities, and progression. Participants described differential treatment, exclusionary jobsite dynamics, and inconsistent responses to harassment or accommodation needs. Employer interviews also suggest that some leaders experience uncertainty about how to implement EDI practices in a small business context, including questions about policies, accommodations, and what is feasible within operational constraints. In this context, resistance is often linked to limited clarity, limited capacity, or perceived administrative burden, rather than opposition in principle.

Mitigation Strategies Implemented During SDF5

- **Used qualitative evidence to document barriers and define practical priorities.** Worker and employer accounts were incorporated to identify where exclusion occurs in day-to-day practice and what changes are viewed as feasible on jobsites.
- **Emphasized operationally grounded EDI actions in analysis and reporting.** Findings were framed around practical jobsite levers, including supervision practices, respectful communication, and equitable access to training-related work.
- **Leveraged the SDF4 EDI toolkit and used SDF5 findings to identify priority SME-ready components for refinement and future scaling,** including concise templates and supervisor guidance on respectful workplace practices, equitable task assignment, and bias-aware hiring.
- **Communicated the workforce value of inclusion.** Reporting connected inclusive workplace conditions to retention, job satisfaction, and workforce stability, supporting employer relevance and uptake.

Mitigation Strategies Recommended for Future Scaling

- **Support supervisors with practical tools and examples.** Prioritize short guidance on equitable task assignment, early response to concerns, and reinforcement of respectful norms during routine supervision.

- **Use sector examples to reinforce feasibility and benefits**. Share worker-informed solutions and positive jobsite examples through OEL channels to normalize practice change and strengthen employer confidence in implementation.

9.4 Sleep and Fatigue: Sector-Wide but Under-Addressed

Challenge
Across the SDF findings, sleep quality and fatigue are consistently associated with psychological distress, burnout, and lower job satisfaction. Despite this evidence, sleep and fatigue are often not addressed explicitly at the workplace level. Employer and worker accounts suggest that fatigue is frequently treated as an individual issue rather than a shared risk that scheduling, workload, commuting demands, and recovery opportunities can shape. This gap limits early identification and prevention, particularly during peak workload periods and overtime.

Mitigation Strategies Implemented During SDF5

- **Strengthened the evidence base and sector messaging on fatigue and sleep.** SDF5 analyses and qualitative accounts were used to reinforce the relevance of sleep and fatigue to safety, performance, and retention, supporting a clearer case for workplace-level attention.
- **Integrated fatigue and sleep as a priority theme within implementation planning.** Findings were used to inform the content areas and practical focus for sector tools and training priorities.

Mitigation Strategies Recommended for Future Scaling

- **Develop fatigue awareness materials suitable for toolbox talks and routine safety communication.** Provide short prompts that support early recognition and reinforce practical expectations on jobsites.
- **Provide SME-ready guidance for workload and recovery planning.** Include considerations related to shift scheduling where feasible, commuting demands, and early warning signs of fatigue and reduced alertness.
- **Integrate recovery strategies into related ergonomic and well-being resources.** Ensure practical pacing and recovery prompts are aligned across fatigue, ergonomic, and mental health materials.
- **Embed sleep and fatigue as a core component of sector mental health supports.** Integrate these topics into electrical sector MHFA-related resources and supervisor guidance, reflecting the central role of sleep in the SDF evidence base.

9.5 Recruitment Challenges Among Underrepresented Workers

Challenge
Across the SDF qualitative findings, underrepresented workers, including women and

newcomers, described barriers that affect entry and early progression in the trade. These barriers included biased assumptions during hiring and placement, limited access to informal mentorship and learning networks, unclear expectations for advancement, and fewer opportunities for early exposure to a range of tasks that build competence and confidence. These experiences can reduce psychological safety and contribute to early disengagement, with implications for both recruitment and retention.

Mitigation Strategies Implemented During SDF5

- **Documented barriers and practical solutions through qualitative evidence.** Worker accounts were used to clarify where barriers occur across hiring, onboarding, and early jobsite experiences and to identify feasibility considerations for employers.
- **Used evidence-informed messaging to support sector awareness.** Findings were incorporated into reporting and dissemination to reinforce the relevance of inclusive entry and early-career experiences to retention and workforce stability.

Mitigation Strategies Recommended for Future Scaling

- **Implement mentorship and buddy approaches to support early-career integration.** Prioritize pairing for apprentices and underrepresented workers to reduce isolation and strengthen access to informal learning.
- **Provide concise supports for inclusive hiring practices.** Develop practical templates for structured interviews and bias-aware hiring decisions that are feasible for SMEs.
- **Strengthen early exposure and learning opportunities.** Encourage supervisors to provide apprentices with planned exposure to diverse tasks and consistent feedback to support progression.
- **Use sector examples to reinforce role modelling and feasibility.** Share worker-informed examples and anonymized qualitative quotes through OEL channels to support culture change and normalize inclusion.

Challenge

SDF5 qualitative findings indicate that SME owners and supervisors often carry substantial operational and emotional demands. Many participants described juggling multiple roles, including supervision, hands-on electrical work, estimating, scheduling, and administrative tasks. This cumulative workload can contribute to fatigue and stress and may reduce the time and capacity available for consistent supervision, mentorship, and proactive support for workers. Because owners and supervisors shape daily jobsite communication and expectations, their capacity and well-being can influence workplace culture, safety practices, and retention.

Mitigation Strategies Implemented During SDF5

- **Included SME owner perspectives through targeted qualitative interviews.** This approach improved the relevance of the findings by identifying operational constraints, feasibility considerations, and employer-identified support priorities.
- **Applied a feasibility lens in interpretation and recommendations.** The SDF5 reporting emphasized practical, SME-appropriate actions informed by employer realities and jobsite conditions.

Mitigation Strategies Recommended for Future Scaling

- **Develop brief, practical supervisory supports.** Provide concise, implementation-ready guidance for supportive conversations, early identification of concerns, and consistent communication practices, designed for use without dedicated HR infrastructure.
- **Prioritize small, manageable changes over resource-intensive programs.** Emphasize actions that can be embedded into routine operations and sustained during periods of high workload.
- **Explicitly recognize owner well-being as a sector sustainability factor.** Reinforce that supporting employers and supervisors is an upstream strategy that strengthens worker support, workplace culture, and retention outcomes.

9.7 Data Limitations and Participation Fluctuations

Challenge

Participation in surveys and interviews varied across SDF cycles, influenced by seasonal workload, scheduling constraints, and changing recruitment opportunities within the sector. Representation of women and other equity-deserving groups also remained limited, reflecting current sector demographics and the practical challenges of recruiting smaller subgroups in applied workplace research. These factors affect statistical precision for some subgroup analyses and require careful interpretation of results.

Mitigation Strategies Implemented During SDF5

- **Integrated multi-year data to strengthen the stability of findings.** Where appropriate, evidence was examined across SDF1-SDF5 to assess the consistency of patterns and improve confidence in sector-relevant conclusions.
- **Used multiple recruitment and engagement channels.** Recruitment leveraged OEL sector activities and outreach approaches to increase accessibility and broaden potential reach.
- **Applied appropriate interpretation caution while emphasizing consistency.** Findings were framed with acknowledgement of sample limitations, with emphasis placed on patterns that were consistent across cycles.
- *Triangulated quantitative patterns with qualitative accounts.* Qualitative findings were used to contextualize observed subgroup differences and to strengthen interpretation where quantitative subgroup sizes were smaller.

9.8 Implementation Barriers for New Tools and Resources

Challenge
Even when resources are relevant, SMEs may experience barriers to adoption, including limited time, uncertainty about how to apply tools in day-to-day operations, and reluctance to change established practices. These barriers can reduce uptake and limit sustained use, particularly when materials require additional planning, documentation, or training that does not fit current workflows.

Mitigation Strategies Implemented During SDF5

- **Maintained close sector engagement through OEL channels.** Ongoing communication through chapter meetings, Roadshows, and employer outreach supported relevance, provided informal feedback, and strengthened the fit between findings and sector needs.
- **Applied a feasibility lens to tool priorities.** Recommendations and proposed tools were framed to support practical use in SME contexts, emphasizing low-burden and operationally compatible approaches.

Mitigation Strategies Recommended for Future Scaling

- **Co-develop and refine materials with SMEs and OEL to strengthen usability.** Use structured feedback from employers and workers to ensure tools job-site realities and supervision practices.
- **Use short, modular formats that support incremental adoption.** Design resources so employers can implement components gradually without requiring full program rollout.
- **Pilot implementation under future SDF programming, including SDF6.** Test selected tools in volunteer SMEs, gather implementation feedback, and refine formats before broader dissemination.
- **Establish ongoing feedback loops through OEL networks.** Use OEL chapter meetings and contractor networks to collect real-world input and support continuous improvement and sustained uptake.

10. Next Steps and Implementation Plan

The SDF5 project generated a sustained evidence base on worker health, inclusion, and workplace conditions within Ontario's electrical sector, informed by five years of SDF research and direct engagement with workers and employers. Building on these findings, the next phase of work will focus on knowledge mobilization, sector capacity-building, and preparation for implementation testing of priority tools. The activities planned for 2026 are intended to support practical uptake across employers, including SMEs, and to strengthen readiness for future SDF programming. The next steps below outline priority actions for the Ontario Electrical League, member employers, and the research team.

10.1 Launch of the 2026 Observation Study

A priority next step is the implementation of the 2026 field-based observation study, planned for early 2026. This study will collect objective, task-level information on physical job demands to strengthen the SDF evidence base and support development of more precise and practical prevention guidance for the electrical sector. Data collection will focus on:

- physical workload and task demands
- task-level musculoskeletal disorder (MSD) risk exposures
- movement patterns and work sequencing
- force demands associated with common tasks
- postures, repetition, and sustained positions

Purpose and benefits

The observation study will support multiple workforce and prevention objectives by:

- validating and extending the self-reported MSK findings observed across SDF1 to SDF5
- identifying high-risk tasks and ergonomic “pinch points” that contribute to lower back and shoulder strain
- generating actionable guidance suitable for SMEs, including task rotation approaches, practical tools or work method modifications, and recovery and pacing strategies
- strengthening evidence to inform future provincial training, workplace prevention guidance, and sector planning related to safety and workforce sustainability

Participants and recruitment

- Eleven journeypersons have pre-registered to participate.
- Recruitment will continue through OEL Roadshows and chapter meetings during Q1 2026 to support participation and ensure coverage of a range of job contexts where feasible.

Planned outputs

- a technical report summarizing task-level ergonomic exposures and priority risk areas
- visual guidance products (for example, infographics and quick-reference materials) designed for SME use
- integration of observation study insights into sector tools, including MSK and fatigue-related resources

10.2 Knowledge Mobilization with OEL Members

Knowledge mobilization with OEL members will continue in 2026 to support practical uptake of SDF5 findings and to strengthen readiness for implementation and scaling. Activities will use established OEL communication channels to ensure sector relevance and to reduce participation burden for employers and apprentices.

Planned activities

- present SDF5 findings through OEL chapter meetings and member engagement events
- develop short, practical learning products for employers and apprentices, including infographics, one-page summaries, and brief video content
- deliver implementation-focused webinars with OEL to introduce priority tools, provide guidance on use, and gather feedback to refine formats for SME application

Objectives

- strengthen employer and worker awareness of evidence-informed risks and priorities, including MSK strain, sleep and fatigue, inclusion and respectful workplace practices, and mental health and burnout
- support adoption of practical tools by providing clear implementation guidance and reinforcing consistent sector messaging
- encourage SME participation in future pilot and testing activities under subsequent SDF programming, including SDF6

10.3 Refinement of Implementation-Ready Tools

Building on SDF5 findings and feedback gathered through employer engagement, the project team will refine and package a set of implementation-ready resources for release in early 2026. These tools are intended to be practical for SMEs and designed for use within routine supervision, onboarding, and jobsite communication.

Priority tools for refinement and release (early 2026)

- **Fatigue and Sleep Toolkit**
  Practical prompts and checklists to support fatigue awareness, recovery planning, and day-to-day use on jobsites.
- **Right-Sized Ergonomics Guide for Common Electrical Tasks**
  Task-specific guidance focused on reducing MSK strain through practical work methods, positioning, and pacing strategies.
- **EDI Quick-Start Bundle**
  Building on the EDI toolkit developed in SDF4, this bundle will be refined into concise, SME-ready materials supporting inclusive supervision and respectful workplace practice, including harassment prevention and response guidance.

- **Apprentice Onboarding and Support Tools**
  Practical resources to strengthen early-career integration, clarify expectations, and support mentorship and check-ins.
- **Supervisor Pocket Guide for Mental Health Conversations**
  A short, practical guide to support early recognition of distress and appropriate supportive conversations, including clear next steps and referral guidance.

Planned enhancements

- Sector-specific examples relevant to residential, commercial, and industrial contexts, where feasible
- Visual aids and quick-reference formats to support easy jobsite use and adoption
- Multilingual options to support clear communication and accessibility for diverse workplaces

10.4 Preparation for SDF6: Pilot Implementation and Evaluation

Building on the five-year SDF evidence base, the next step is to move from evidence generation to structured implementation testing. A focused pilot with a small number of volunteer SMEs would enable selected tools to be tested in real-world jobsite conditions, refined based on employer and worker feedback, and evaluated feasibility and early indicators of impact. This approach supports readiness for scaling and strengthens accountability for practical outcomes.

Potential pilot focus areas

- fatigue and sleep-related supports, including practical recovery prompts and jobsite fatigue awareness practices
- inclusive supervision supports, including short training units and job-embedded supervisor guidance
- ergonomic and workload practices, including task rotation and practical pacing and recovery strategies for physically demanding work
- implementation of respectful workplace and EDI supports, including practical policy and communication tools and peer support approaches

Proposed evaluation measures

- worker-reported outcomes, such as fatigue, sleep quality, stress, musculoskeletal symptoms, and job satisfaction
- employer and supervisor uptake, including perceived feasibility, usability, and consistency of use
- implementation process indicators, including barriers, facilitators, and resource requirements for SMEs

- early retention-related indicators, such as intention to remain, engagement, and perceived workplace support

Sector impact
Pilot testing would provide the Government of Ontario and sector partners with implementation evidence to support decision-making about scaling. This would strengthen confidence that recommended actions are feasible for SMEs and translate into meaningful improvements in workplace health, safety-related functioning, and workforce stability.

10.5 Continued Engagement With SME Owners and Contractors

Given the influence of SME owners and supervisors on day-to-day workplace culture, supervision quality, and retention, continued engagement will remain a priority in the next phase of work. Planned activities will focus on practical supports that strengthens owner capacity and the feasibility of implementation in small business contexts.

Planned engagement activities

- targeted sessions for SME owners and supervisors focused on fatigue and sleep, mental health, and confidence in supportive supervision
- leadership-focused learning opportunities that emphasize fair task assignment, respectful communication, and early response to signs of distress or disengagement
- structured roundtables with owners and contractors to refine tools, validate priorities, and ensure materials are practical and feasible for routine use

These activities are intended to strengthen SME resilience by increasing supervisory capacity, reducing avoidable burden through practical supports, and improving the conditions needed for sustained adoption of retention-focused practices.

10.6 Integration with Provincial Initiatives and Workforce Strategies

The SDF5 findings provide actionable evidence that aligns with Ontario's workforce development and skilled trades priorities. Over the next year, the project team will strengthen policy and program alignment by:

- sharing technical findings and targeted policy briefs with the Ministry to support evidence-informed planning and future programming decisions
- working with the Ontario Electrical League to align tools and dissemination with relevant provincial initiatives, including Ontario's Skilled Trades Strategy and workplace health and safety priorities, to support consistency, usability, and sector-wide uptake

10.7 Ongoing Data Monitoring and Reporting

To support continuous improvement and evidence-informed sector planning, the research team will maintain a structured process for ongoing monitoring and reporting. This will enable timely identification of emerging priorities and provide feedback to refine tools and implementation approaches. Monitoring will include:

- trends in worker health and well-being indicators observed through the SDF program
- employer and SME feedback on feasibility, usability, and barriers to implementation of tools
- early indicators associated with implementation activities, including uptake and consistency of use
- evolving EDI-related challenges and workplace inclusion priorities identified through sector engagement
- new task-level insights generated through the 2026 observation study

These data will support ongoing sector planning and will inform future reporting, implementation refinement, and recommendations to OEL, employers, and government partners.

11. Key Messages and Priority Recommendations

This section provides a concise summary of the most decision-relevant findings across SDF1-SDF5 and highlights priority actions for implementation. Detailed rationale and supporting evidence are provided in Sections 6 and 7, and planned next steps are outlined in Section 10.

11.1 Key Messages

- Worker well-being and retention in the electrical sector are shaped by an interconnected set of factors, including physical demands, recovery and sleep, psychosocial strain, supervision quality, and workplace culture.
- Sleep disruption and fatigue are consistently linked with distress, burnout, and lower job satisfaction, indicating a high-leverage area for practical intervention.
- Musculoskeletal symptoms remain widespread and persistent and are closely tied to recovery challenges and work functioning.
- Apprentices and women experience elevated risk and greater barriers to support, with qualitative findings highlighting the importance of consistent supervision, learning access, and inclusive jobsite culture.
- SME capacity constraints influence feasibility. Tools and supports are most likely to be adopted when they are practical, low burden, and integrated into routine workflows.

11.2 Priority Recommendations

- Prioritize SME-ready fatigue and sleep supports that can be embedded into routine safety communication and supervision.
- Strengthen practical ergonomic and MSK prevention guidance for common electrical tasks and promote feasible workload distribution strategies.
- Improve apprenticeship retention through structured onboarding, mentorship, and consistent supervision expectations.
- Expand sector-appropriate mental health supports by equipping supervisors with practical guidance for early recognition and supportive conversations.
- Advance inclusion through concise, implementation-ready EDI resources that support respectful workplaces, equitable task assignment, and bias-aware hiring and supervision.
- Use future SDF programming to pilot selected tools in volunteer SMEs and evaluate feasibility and early indicators of impact before scaling.

11.3 Next Steps

SDF5 provides a strong basis for moving from evidence generation to implementation testing. The planned 2026 observation study will strengthen task-level ergonomic evidence and support more precise, sector-specific prevention guidance. In parallel, continued knowledge mobilization through OEL networks and structured pilots under future SDF programming will enable the refinement of tools, feasibility assessments, and scalable adoption across the sector.

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