WIRED FOR WELLNESS: INVESTIGATING PHYSICAL AND MENTAL HEALTH, AND LIVED EXPERIENCES OF EQUITY-DESERVING APPRENTICES AND WORKERS

2025 Annual Report

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ACKNOWLEDGMENTS

We want to recognize and thank the Ontario Electrical League (OEL) leadership team, staff, and other industry stakeholders who have supported this ongoing research program and the completion of this report. We also appreciate the contributions of all the research participants (e.g. apprentices, journeypersons, contractors) who have voiced their opinions concerning their lived and living experiences working in the skilled trades. The willingness and openness to participate in our surveys and interviews have allowed us to understand mental and physical health service gaps, industry-related, job-related, and organizational barriers to personal well-being, and identify opportunities for growth and improvement within the skilled trades sector. Their participation has remarkably contributed to our shared goal of improving job satisfaction, workplace culture, and worker health for Ontario's small to medium businesses operating in the skilled trades.

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.

EXECUTIVE SUMMARY

In collaboration with the OEL, this report examines the health and social challenges faced by individuals working in and operating small- to medium-sized businesses in Ontario's electrical trades. A key objective is to explore the lived and living experiences of equity-deserving apprentices and workers to identify Diversity, Equity, and Inclusion (DEI) related issues within the skilled trades, with an emphasis on understanding the experiences of underrepresented individuals, including women, ethnic workers, and persons with disabilities. Based on our research findings, we will propose evidence-based recommendations to advocate for DEI practices and policies in the small business workplace and to address ongoing labour shortages and retention rates in Ontario. Our goal is to promote sustainability in the sector through designing and evaluating interventions to achieve the United Nations' Sustainable Development Goals (SDGs).

This research builds on our ongoing partnership with the OEL (2021 to present) and leveraging existing data for a comprehensive analysis. Formal agreements, including the study protocol, were established between OEL and UofT. The ReSTORE Lab at UofT conducted the data analysis and prepared this report. A mixed-methods sequential explanatory design guided the research, consisting of two phases: 1) **Quantitative phase:** A total of 163 participants working with small-to-medium electrical businesses completed an online survey covering demographics and physical and mental health using validated questionnaires. Data was analyzed descriptively; 2) **Qualitative phase:** Eleven participants from equity-deserving groups took part in one or two in-depth interviews. Transcripts were thematically analyzed to identify shared experiences and perspectives.

The survey examined several work-related health factors, including burnout, mental health, health-related quality of life, presence of pain, and sleep quality. Compared to previous years, apprentices and indigenous persons had a higher participation rate in this annual research study. Personal burnout remains high among electrical workers in Ontario, possibly related to difficulties in work-life balance, work-family conflict, and delays in career progression. Half of the participants reported experiencing mild-to-moderate mental health distress, with apprentices more likely to report mental health difficulties compared to non-apprentices. Apprentices also reported lower physical health scores than non-apprentices. Therefore, further health promotion activities may be warranted to improve apprentices' physical health and mental well-being. We found no significant challenges with sleep quality and health-related quality of life among the participants. Lastly, we could not find any regional health-related differences when comparing workers from Western Ontario and Eastern Ontario.

Four themes were identified from the interview data. Theme 1 (*workplace mental health awareness*) highlights multiple mental health barriers experienced by the participants, as well as a "toughness" culture within the industry that hinders open discussion and support on workers' mental health. Theme 2 (*perpetuation of working women stereotypes and importance of role-modeling*) presents the integration challenges for women and a need for role-modeling to

increase women's representation in trades. Theme 3 (*feelings of inferiority and/or prejudice of workers from Indigenous and ethnic minority backgrounds*) showcases the varying experiences of workers from diverse cultural backgrounds and the impact of language barriers. Theme 4 (*workplace demands on persons with disabilities*) demonstrates the effect of physical and mental demands on workers with disabilities and the importance of necessary accommodation provided by employers.

Targeted strategies to address workplace culture, personal burnout and poor mental health in apprentices remain priority areas to improve workplace satisfaction, work-life balance, and prevent negative health-related outcomes for small business electrical workers. Fostering peer support through increasing the representation of workers from diverse backgrounds and refining employer-employee hierarchies may contribute to a more supportive work environment and improved workers' mental health. Furthermore, assigning well-being champions to facilitate the uptake of established resources (e.g., mental health toolkits) can help organizations work towards improving rates of help-seeking and help-giving behaviours in the workplace. Business leaders are encouraged to actively address workplace discrimination, take fair action on harmful behaviours, and reduce stressors contributing to negative work environments. Collectively, these actions aim to improve the health and well-being of electrical trades workers, now and in the future. Our applied research agenda for 2025-2026 will continue to advance mental health awareness and well-being strategies for SMB electrical workers while examining the influence of physical health and ergonomics on workplace stress and well-being.

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SECTION 1: OVERVIEW

1.1 TERMINOLOGY

Term	Definition
Apprentice	A qualified trainee who has signed a written agreement with their sponsor and the Ministry of Training, Colleges, and Universities (Skilled Trades Ontario) to receive the opportunity to learn and work in a designated trade.
Diversity, Equity, and Inclusion (DEI)	A framework which strives for the promotion of equal treatment and participation of people who are historically underrepresented and/or discriminated against due to their background, disability, sexual orientation, and other identities.
Well-being	Well-being is a state of good social, physical, spiritual, and mental health that allows an individual to reach their potential in all aspects of their lives.
Mental Health	One's emotional, psychological, and social well-being. Mental health affects how one feels, acts, and thinks about oneself.
Skilled Trades	Occupations that involve working with your hands. These specialized trades can only be worked by apprentices and licensed journeypersons.
United Nations' Sustainable Development Goals (SDG)	A collection of 17 objectives established by the United Nations to address global challenges to promote peace, prosperity, and the health of the planet.
Small and Medium Sized Businesses	A small to medium enterprise is one with fewer than 100 employees. Medium enterprises have 100-499 employees.
Work Related Musculoskeletal Disorders (WRMSD)	Muscles, tendons, and nerve disorders that are painful. WRMSDs are characterized by gradual development due to the overuse of the musculoskeletal system.

1.2 LIST OF ABBREVIATIONS

CBI	Copenhagen Burnout Inventory
CIHR	Canadian Institutes of Health Research
DEI	Diversity, Equity, and Inclusion
HRQoL	Health-related Quality of Life
K-6	Kessler Psychological Distress Scale
NMQ	Nordic Musculoskeletal Questionnaire
OEL	Ontario Electrical League
OS&OT	Occupational Science and Occupational Therapy
PSQI	Pittsburgh Sleep Quality Index
REB	Research Ethics Board
ReSTORE	Rehabilitation Sciences Through Occupational Research and Engagement
SDF	Skills Development Fund
SDG	Sustainable Development Goal
SF-12	Short Form Survey, 12-Item
SMB	Small-to-Medium Sized Businesses
UofT	University of Toronto
WHO	World Health Organization
WRMSD	Work-Related Musculoskeletal Disorders

1.3 ABOUT THE ONTARIO ELECTRICAL LEAGUE

The OEL is a non-profit member-based organization which was originally established as the Electric Home League on January 11th of 1922. The OEL has over 38,000 members province-wide including electrical contractors, inspectors, utilities, distributors, manufacturers, agents, engineers, educators, and more. The OEL's mission is to promote, strengthen, and represent non-unionized electrical workers in the electrical industry in Ontario. Their goal is to promote, strengthen, and represent the electrical industry in Ontario as they bring current issues in the industry (e.g., labour laws) to the attention of various government authorities through chapter meetings, conference seminars, trade shows, training programs and government relations initiatives. Additionally, the OEL helps with the hiring process for companies seeking apprentices. This includes providing a hiring tool to find qualified apprentices and training to assist employers with the required administrative processes. The OEL membership includes more than 38,000 individuals that span across Ontario and is supported by a provincial office. As an employer-

based organization established 100 years ago, the OEL is a staunch supporter of the apprenticeship training model, one of the oldest, most respected forms of education and training.

1.4 ABOUT THE UNIVERSITY OF TORONTO

Founded in 1827, the University of Toronto (UofT) stands as one of Canada's top universities and is one of the world's top research-intensive universities, bringing together top minds from different backgrounds and disciplines to collaborate. Their goal is to prioritize city and community building, international partnerships, and transformative education to strengthen their standing as a globally ranked research powerhouse and leader in research-intensive education.

1.4.1 THE DEPARTMENT OF OCCUPATIONAL SCIENCE AND OCCUPATIONAL THERAPY

The Department of Occupational Science and Occupational Therapy (OS&OT) at the UofT is a place to learn the knowledge and skills of occupational therapy that will lead to a Master of Science in Occupational Therapy degree. The department provides excellence in research and teaching in Occupational Science and Occupational Therapy. It contributes to the population's

well-being by advancing knowledge regarding engagement in life's occupations. Furthermore, the Department of OS&OT provides graduate and continuing education programs that enable occupational therapists to be leaders in research and clinical practice to continue promoting health and well-being in the workplace.

1.4.2 TEMERTY FACULTY OF MEDICINE

The Temerty Faculty of Medicine at the UofT overlooks the medical education and rehabilitation sciences departments and programs, including the Department of OS&OT.

1.4.3 ReSTORE LAB

[The Rehabilitation Sciences Through Occupational Research and Engagement (ReSTORE)](#) Lab was established in 2021 and is led by the Principal Investigator of this study, Dr. Behdin Nowrouzi-Kia. The ReSTORE lab is a multidisciplinary research group with backgrounds in occupational therapy, occupational health and safety, public health, psychology, work disability prevention, workability, and stroke rehabilitation. The mission of the ReSTORE lab is to identify and assess risk and develop occupation-based interventions for preventing high-risk behaviours, optimizing functioning, and improving mental and physical health in the workplace. Using a biopsychosocial lens, the ReSTORE lab seeks to understand how work disability is influenced by personal characteristics (e.g. age, temperament), psychosocial factors (e.g. workplace dynamics) and societal/environmental (e.g., healthcare system, workplace, workers' compensation system) factors to improve health outcomes.

Research Contributions through OEL Partnership:

Lo, J., Jaswal, S., Yeung, M., Chattu, V. K., Bani-Fatemi, A., Howe, A., Yazdani, A., Gohar, B., Gross, D. P., & Nowrouzi-Kia, B. (2024). A systematic review of the literature: Gender-based violence in the construction and natural resources industry. *AIMS public health*, *11*(2), 654–666. https://doi.org/10.3934/publichealth.2024033

Howe, A. S., Lo, J., Jaswal, S., Bani-Fatemi, A., Chattu, V. K., & Nowrouzi-Kia, B. (2023). Engaging Employers in Apprentice Training: Focus Group Insights from Small-to-Medium-Sized Employers in Ontario, Canada. *International journal of environmental research and public health*, *20*(3), 2527. https://doi.org/10.3390/ijerph20032527

Nowrouzi-Kia, B., Bani-Fatemi, A., Howe, A., Ubhi, S., Morrison, M., Saini, H., & Chattu, V. K. (2023). Examining burnout in the electrical sector in Ontario, Canada: A cross-sectional study. *AIMS public health*, *10*(4), 934–951. https://doi.org/10.3934/publichealth.2023060

Bani-Fatemi, A., Sanches, M., Howe, A. S., Lo, J., Jaswal, S., Chattu, V. K., & Nowrouzi-Kia, B. (2022). Mental Health Outcomes among Electricians and Plumbers in Ontario, Canada: Analysis of Burnout and Work-Related Factors. *Behavioral sciences (Basel, Switzerland)*, *12*(12), 505. https://doi.org/10.3390/bs12120505

Howe, A.S., Bani-Fatemi, A., Tjahayadi, E. *et al.* A quantitative examination of sleep quality, burnout, psychological distress, and social support availability of electrical workers in Ontario, Canada. *Discov Public Health* **21**, 55 (2024). https://doi.org/10.1186/s12982-024-00177-y

Howe, A. S., Tan, J., Yuen, B., Saini, H., Saade-Cleves, N., Obeidat, D., Shahzad, M., Chattu, V. K., Fatemi, A. B., & Nowrouzi-Kia, B. (2024). Physical and Psychosocial Correlates of Occupational Physical Injury in the Global Construction Industry: A Scoping Review. *Environmental health insights*, *18*, 11786302241270371. https://doi.org/10.1177/11786302241270371

Previous SDF Reports

SDF3: *Nowrouzi-Kia, B., Howe, A., Bani-Fatemi, A., Li, Y., Haritos, A., Long, B-Z. S., Formuli, E., Nandan, S., Balakrishnar, K., Zhu, S. & Hao, Y, (2024). Wired for Change: Examining Recruitment, Retention and Mental Health to Diversify the Electrical Skilled Trades. University of Toronto.*

SDF2: *Nowrouzi-Kia, B., Bani-Fatemi, A., Howe A., Shahzad, M., Chattu, V., Nega, N., Yuen, B., Alam, B., Youn, E. (2023). Supporting Employers in Apprentice Training: Outcomes of a Training and Mentoring Program for Electrical and Plumbing Employers. (Report No 2.). University of Toronto. http://restore.rehab/OEL_Report_Year2_May2023.pdf.*

SDF1: *Nowrouzi-Kia, B., Bani-Fatemi, A., Howe A., Akeela, F., Lo, J., Jaswal, S. Krishan, A. (2022). Ontario Electrical League: Supporting Employers in Apprentice Training. Ontario Electrical League: Supporting Employers in Apprentice Training. University of Toronto.*

1.4.4 ReSTORE Lab Members

Dr. Behdin Nowrouzi-Kia (he/him) is an occupational therapist and assistant professor at the Department of OS&OT at the UofT, where he also holds the inaugural Emily Geldsaler Grant Early Career Professorship in Workplace Mental Health. His research program is studies occupations in the areas of work disability prevention, return to work, and disability management. This approach is designed to identify and assess risk and develop interventions for preventing or improving high-risk behaviours in the workplace. His work is motivated by efforts in the field of work disability prevention that extends beyond the efforts to prevent or cure diseases from a purely physical perspective, toward more holistic approaches.

Dr. Ali Bani-Fatemi (he/him) is a research associate at the Department of OS&OT at the UofT. His research focuses on evaluating the influences of genetic and epigenetic alterations as potential risk factors for mental disorders. Using a biopsychosocial approach, he investigates the sociocultural and clinical variables that may be related to mental illnesses. He has expertise in conducting rigorous research and has strong methodological experience in review studies, quantitative methods, and analyses.

Aaron Howe (he/him) is a research coordinator/consultant within the ReSTORE lab. He completed his master's studies at Columbia University in Clinical Psychology. He has experience in various clinical settings, including hospitals, clinics, and academic institutions. His expertise is conducting clinical and research mental health assessments of mood disorders, psychoeducational assessments, and short-term cognitive behavioral therapy. He is interested in workplace mental health and improving work experiences for equity groups. He provides expertise in occupational mental health research design and analysis within the ReSTORE lab.

Dr. Zhiyang (George) Shi (he/him) is a postdoctoral fellow at the ReSTORE lab led by Dr. Nowrouzi-Kia at the University of Toronto. He obtained his doctoral degree from the Department of Kinesiology and Physical Education at McGill University, under the supervision of Dr. Shane Sweet. His research is focused on understanding and utilizing peer support to promote social participation and quality of life for individuals with spinal cord injuries. He uses quantitative and qualitative methodologies and adopts an integrated knowledge translation approach in his research program.

Donia Obeidat (she/her) is an occupational therapist and a PhD student in rehabilitation science at the University of Toronto. As an occupational therapist and a future scientist, Donia is mainly interested in the working environment and related disabilities, engagement in community, and improving quality of life. Her research is focused on preventing and managing work-related musculoskeletal disorders and identifying related risk factors to advance working environment.

Bao-Zhu Stephanie Long (she/her) is a research assistant at the ReSTORE lab and a BSc candidate at the University of Toronto, majoring in Health Studies with a focus on Population Health. She brings valuable experience from a range of research settings and disability-focused organizations. Her work centers on advancing mental health and therapeutic outcomes for individuals with language and learning disabilities. At the ReSTORE lab, she contributes her expertise in the design and analysis of occupational mental health and work disability research.

Raihana Premji (she/her) is a research assistant at the ReSTORE Lab and an HBSc candidate at the University of Toronto Scarborough, specializing in Mental Health Studies. She draws on a strong research background, where she has supported projects across multiple domains of psychology and mental health. At the ReSTORE lab, she plays an active role in advancing research projects focused on improving mental health outcomes, while refining her academic and professional interests in clinical psychology.

Joyce Lo (she/her) is a research assistant at the ReSTORE lab. She holds a Bachelor of Science degree in Mental Health Studies from the University of Toronto. At the lab, Joyce has worked on projects that focus on topics such as gender-based violence in the workplace, return to work, and psychosocial factors at work. Her research interests include occupational and mental health.

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SECTION 2: BACKGROUND INFORMATION

2.1 SKILLED TRADES WORKFORCE IN CANADA AND ONTARIO

Skilled trades workers are essential contributors to Canada's economy, employed across key sectors such as construction, transportation, manufacturing, and services. According to Statistics Canada, there are 81,141 registered skilled trade workers in Canada, with the top three occupations being electricians (13,428), carpenters (11,766), and automotive services (8,295) (Figure 1) [1]. Skilled trade workers require specialized qualifications and skills and must often undertake both "in-class" and "on-the-job" vocational training as apprentices before becoming a licensed tradesperson [2]. However, completing this training remains a challenge for many individuals, as four out of five apprentices fail to complete their program within the expected timeframe [3]. In addition, there remains a stigma towards skilled trades – that is, pursuing a job in the trades can be regarded as a "last resort" for students in post-secondary education institutions. The issues around apprentice training and societal perceptions have contributed to a persistent and significant labour shortage in the skilled trade industries.

Figure 1. Top three professions of the skilled trades according to Statistics Canada.

Statistics from the Ontario Newsroom and Statistics Canada underscore the urgency of the labour shortage issue. Approximately 300,000 skilled trades jobs remain unfilled in Ontario [4], with merely 8% of females constituting the total trades employment [5]. Additionally, Indigenous Peoples make up a mere 2.7% of Canada's construction sector [6]. Immigrants and racial minorities are also lacking, as 26% of immigrants constitute the total construction workforce in Ontario, whereas racial minorities make up approximately 10% of the workforce in various trade occupations [7]. In the electrical sector, diversity is even lower, with 16.1% of workers being racial minorities, 2.6% Indigenous Peoples, 1.6% women, and 10% individuals with disabilities (Figure 2 and 3). These numbers are particularly worrying when compared to the ones

in other countries. For instance, women are particularly underrepresented in the Canadian skilled trades workforce at just 8%, whereas Australia has 18.5%, China 14%, and the UK 15.8% [8].
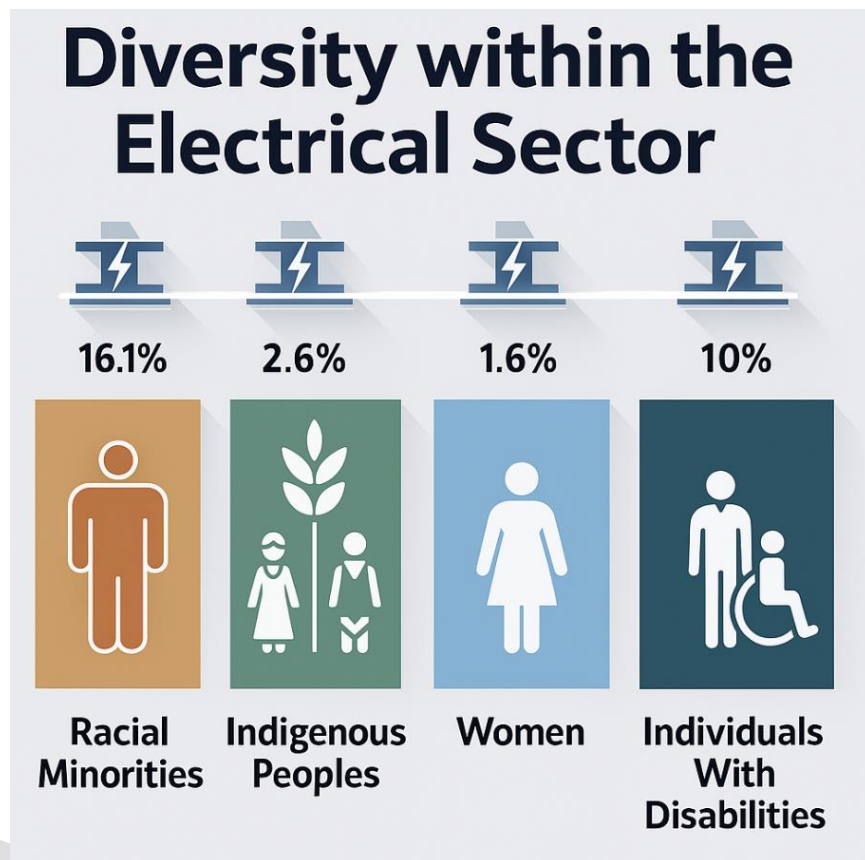
Figure 2. Representation of equity-deserving groups in the electrical sector workforce.

With nearly 700,00 skilled trade workers projected to retire between 2019 and 2028, the labour shortage is expected to intensify in the coming years [9]. In response, the federal and provincial governments have launched various programs and initiatives to promote careers in the trades [10–12]. Skilled Trades Ontario implements strategies to address the labour shortage at the provincial level (Figure 4) by promoting and advancing apprenticeship and certification, conducting research, and fostering a diverse workforce [13,14]. Increasing the participation of individuals from underrepresented groups in the skilled trades is critical to addressing this ongoing challenge. Furthermore, promoting the engagement of the younger generations is essential to mitigate the impact of aging and retirement within the current workforce and ensure continued growth in these sectors.

CURRENT DIVERSITY IN THE ELECTRICAL TRADES

Ethnicity Electrical Trades Sector 2021 (Ontario)

Asian
12.5%

North American
33.4%

European
54.1%

DEI Groups in the Skilled Trades Sector 2021 (Ontario)

Disabilities
16.8%

Women
17.2%

Indigenous
4.6%

Immigrants
32.6%

Racial minorities
28.9%
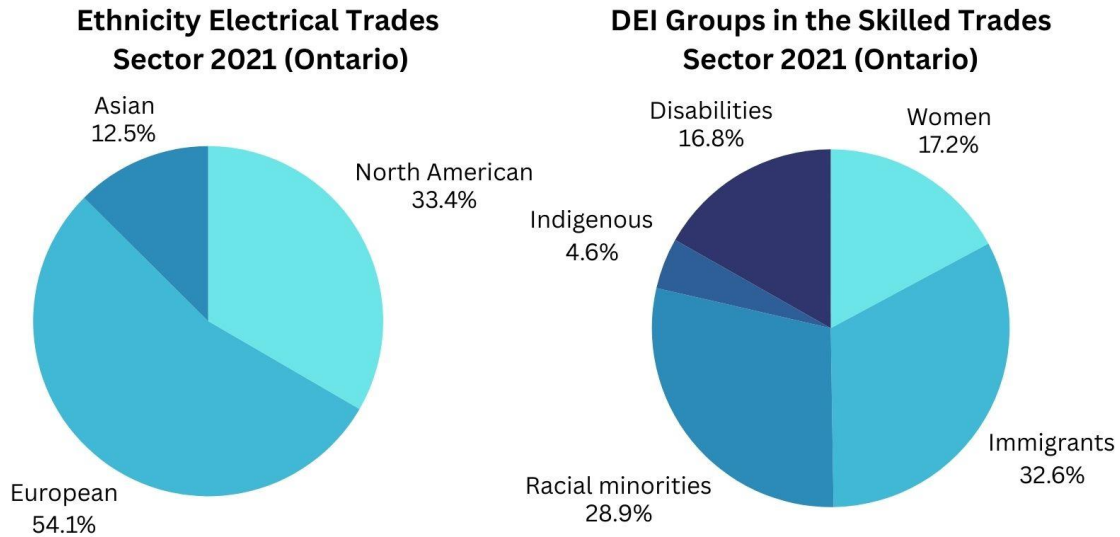
The overall diversity in the electrical trades has increased slightly from 2016 to 2021, however it remains below the diversity observed among the skilled trades sector.

DEI Groups in the Electrical Trades (Ontario)

● 2016   ● 2021

Group	2016	2021
Women	1.2%	1.6%
Immigrants	23%	20.4%
Racial minorities	13.2%	16.1%
Indigenous	2.6%	2.6%
Disabilities	10%	10%
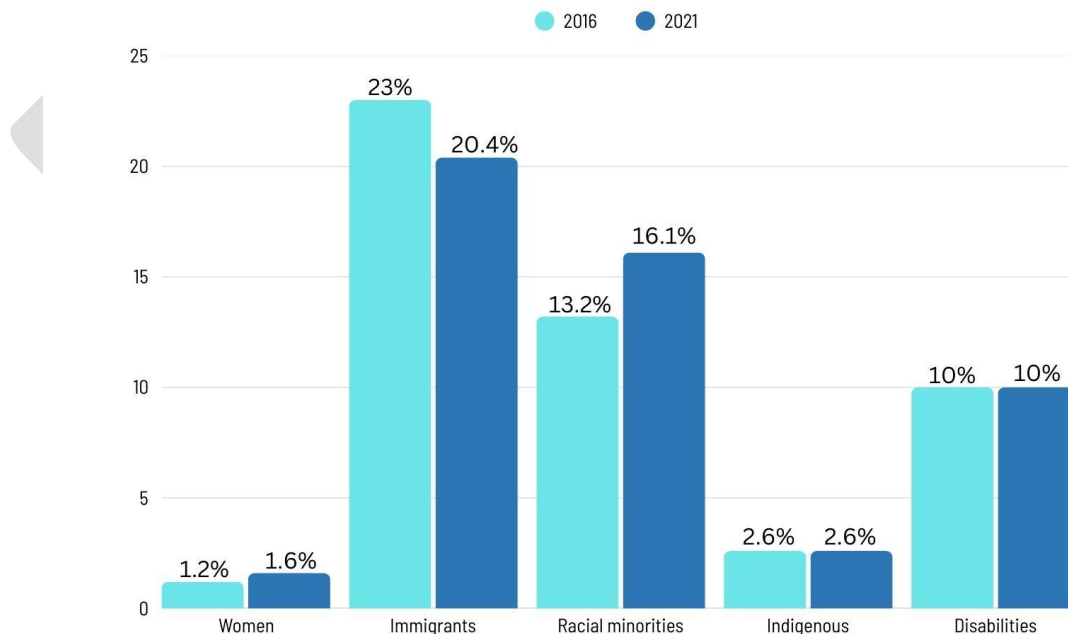
Figure 3. Current diversity in the electrical trades.

Figure 4. Skilled Trades Ontario's initiatives to address the provincial labour shortage in the skilled trades.

2.2 DIVERSITY, EQUITY, AND INCLUSION (DEI) IN THE SKILLED TRADES

Diversity, equity and inclusion (DEI) refers to a set of principles, policies, and practices designed to foster a workplace culture of understanding, fair treatment, and equal opportunity for all workers respect, fairness, and opportunity for all, regardless of individual differences [15–18]. DEI efforts aim to support equity-deserving groups, such as women, racialized individuals, Indigenous Peoples, newcomers, persons with disabilities, and members of the 2SLGBTQIA+ community, by reducing systemic barriers and enhancing access to opportunity and support. Specifically, DEI can be articulated through various acronyms such as EDI, IDE, DEI+A (A stands for Accessibility), DEIB (B stands for Belonging), and JEDI (J stands for Justice) [19]. In Canada, DEI is more frequently used in the occupational health context and has become an essential consideration for businesses in many industries (Figure 5).
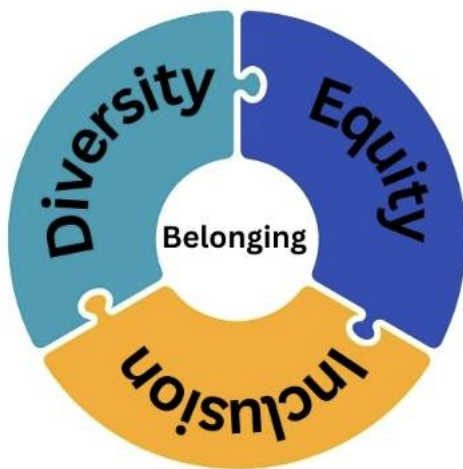
Figure 5. Diversity, equity and inclusion (DEI).

Diversity refers to the presence of differences in the workplace, including age, sex, gender, race, physical and mental ability, education, and other attributes. **Equity** involves cultivating a workplace environment that provides all workers with the potential to succeed by recognizing conditions of disadvantage, reducing barriers, and providing support and reasonable accommodation. **Inclusion** means creating a workplace environment where everyone experiences a sense of belonging, openness, understanding, and acceptance through actively respecting and valuing individual differences [15,16].

DEI initiatives and policies have been widely adopted across industries. Many businesses and organizations have committed to DEI policies to eliminate discrimination and foster inclusive workplaces. However, as highlighted in the previous section, DEI-related challenges remain prevalent in the skilled trades industry. For example, the skilled trades industry has been historically men-dominated, in which women have limited opportunities and often experience disparities and challenges [20]. Furthermore, many skilled trades businesses may not recognize the lack of diversity within their organizations [21]. The diversity extends beyond their employees' composition and encompasses the suppliers and business partners they choose. Iyer (2022) attributed this lack of awareness to those from advantaged groups who benefit from the status quo, such as men and racial/ethnic majority groups. Leadership in the skilled trades is predominantly composed of white, heterosexual men who may underestimate the barriers that diverse employees encounter, such as sexism, racism, and ableism [22].

Women are not the only equity-deserving group facing significant challenges in the skill trades. Indigenous Peoples, immigrants, racial minorities, and individuals with disabilities are also vastly underrepresented in this industry. In recent years, the Ontario government has

implemented policies to improve recruitment and retention of equity-deserving groups in the skilled trades. These efforts have led to some increases in the number of apprentices and registrations. However, retention continues to challenge these equity-deserving groups due to many workplaces' structural, cultural, and psychosocial barriers.

2.2.1 BARRIERS EXPERIENCED BY WOMEN

The experiences of underrepresented workers in the skilled trades, particularly women, are not ideal. Past research identified numerous barriers experienced by women in trades, which our team categorized into four main themes: 1) sexism, discrimination, & harassment; 2) social isolation; 3) poor workplace support; and 4) career advancement (Figure 6). Within the local context, Ontario woman workers reported facing discriminatory remarks and felt that their work environment was "unwelcoming" [23]. The Canadian Labour Market Information Council highlighted the wage disparity, revealing that women in the skilled trades earn less on average than their male counterparts due to their overrepresentation of lower-earning trades [23]. This reveals the inadequacy of existing measures in dismantling systematic barriers confronting underrepresented groups in the sector.
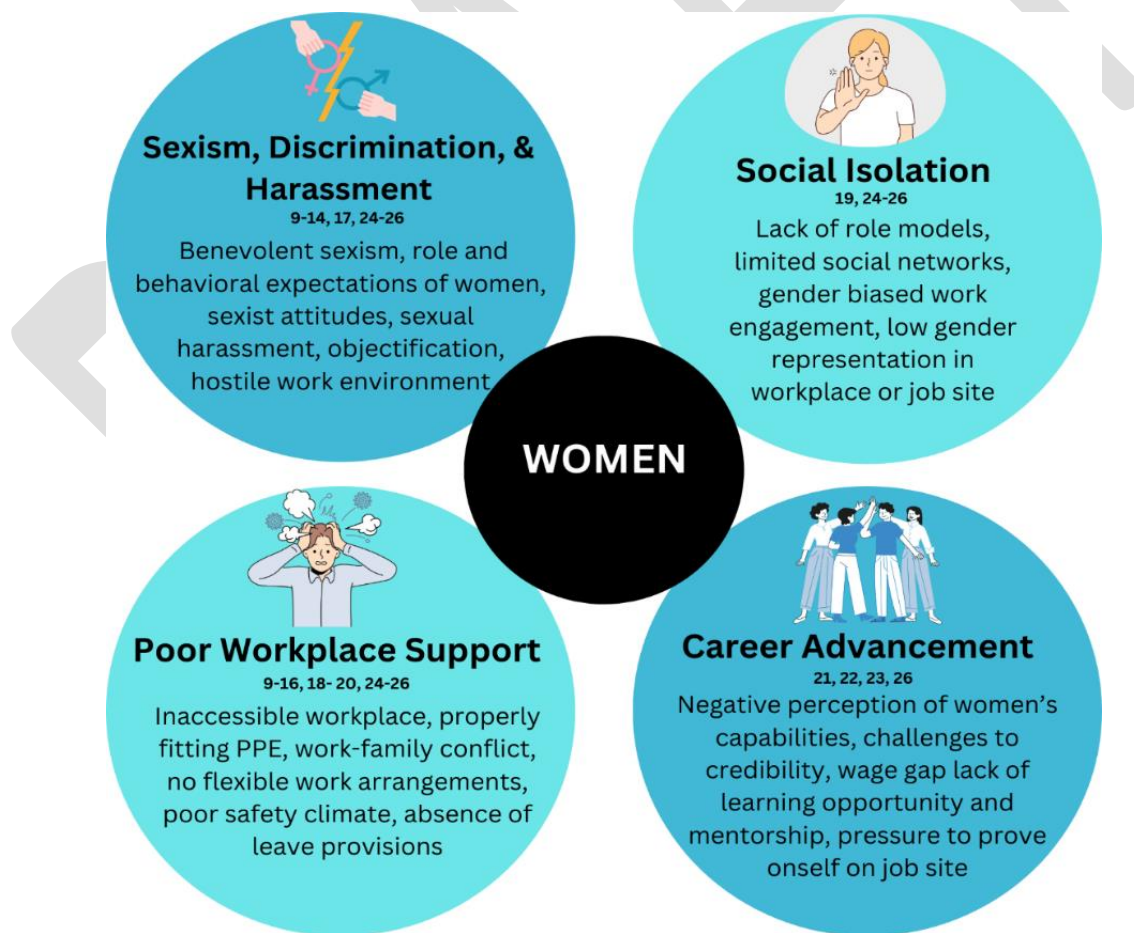
Figure 6. Barriers experienced by women working in the skilled trades.

2.2.2 BARRIERS EXPERIENCED BY ETHNIC AND RACIAL MINORITIES

Ethnic and racial minority groups also face a variety of disparities while working in the skilled trades industry (Figure 7). These barriers can be grouped into five domains: 1) skills and performance, 2) safety, 3) social and public health, 4) legal and regulatory, and 5) communication [24]. The five domains often intersect; for instance, language and communication barriers are associated with a higher rate of onsite work injuries and accidents among Hispanic workers in the American construction industry [25]. These workers also reported dealing with job insecurity, high productivity pressures, and disrespectful attitudes and treatments from colleagues and employers [25]. The tendency of ethnic and racial minority workers to form groups with colleagues of similar backgrounds can further affect workplace productivity, communication, and safety [8].

Figure 7. Challenges faced by ethnic and racial minority workers in the skilled trades sector.

2.2.3 BARRIERS EXPERIENCED BY INDIVIDUALS WITH DISABILITIES

Compared to studies on other equity-deserving groups, research on individuals with disabilities within the skilled trades context is relatively limited. The number of individuals with disabilities in the Canadian skilled trades workforce is currently unknown. However, some studies highlighted the barriers that workers with disabilities tend to face (Figure 8), including physical barriers, inaccessible workplace environments, employers' negative attuites, and assumptions of higher costs, lower productivity, and safety risks [26]. Research also suggested that individuals who acquired disabilities on the job may experience direct and indirect discrimination that could lead to job loss [27]. Some workers may not be willing to disclose their disabilities due to the fear of losing job opportunities [26]. Although these challenges have been highlighted, few studies provide concrete solutions to facilitate the engagement of individuals with disabilities in the skilled trades. Addressing this knowledge gap is needed, as there is significant potential to increase the participation of individuals with disabilities in the skilled trades [26].

Figure 8. Barriers that workers with disabilities tend to face.

Overall, previous research has started exploring the barriers for equity-deserving groups in the skilled trades, although this area of literature still "remained limited" [8]. While more studies focused on the perspectives of workers who identify as women, fewer have investigated

the lived experiences of other equity-deserving groups, including racial/ethical minorities and individuals with disabilities. Future research should also explore the intersection of multiple minority identities. In general workplace settings, women report experiencing more sexual harassment than their man counterparts, with racial minority women encountering even higher rates of harassment compared to majority women [28]. This problem may be even more pronounced for minority tradeswomen due to the industry's historically male-dominated nature. Thus, adopting an intersectional lens to examine diverse genders, races, ethnicities, abilities, and socioeconomic statuses can provide and greater insights into DEI.

2.3 IMPORTANCE OF PROMOTING DEI IN SKILLED TRADES

Emerging scientific and market research highlights that promoting DEI yields numerous benefits across sectors. At an organizational level, businesses with diverse leadership and workforce tend to exhibit stronger organizational culture, enhanced business performance, higher productivity, and increased worker retention, attendance, engagement, accountability, and receptiveness to feedback [16–18] (Figure 9). For instance, achieving a balanced gender representation within a company can help leverage a broader range of expertise and skills, directly contributing to increased productivity [29]. Inclusive workplace environments, where employees feel respected and valued, encourage individuals to perform at their best. As a result, businesses benefit from reduced productivity losses and lower employee turnover. In addition, businesses that that reflect the diversity of their client base are better equipped to understand and meet the unique needs of their customers [29].

Figure 9. Operational benefits for businesses with diverse leadership and workforce.

At a societal level, expanding recruitment efforts to include individuals from equity-deserving groups can help address the labour shortages currently affect the skilled trade industry. The Canadian federal government aims to attract 3000 new skilled trades workers every year through immigration [30]. While many newcomers experience language and cultural barriers

and unfamiliarity with Canadian work environments, evidence shows that most migrant workers bring valuable work experience and skills when entering the workforce [31]. By creating opportunities for these historically marginalized groups, the skilled trades can foster greater inclusivity while contributing to nationwide economic growth and resilience.

2.4 PHYSICAL HEALTH IN THE SKILLED TRADES

Construction workers account for the second-highest number of emergency department visits and serious injuries among occupational groups. Injuries most frequently affect the lower extremities (22%), followed by spine, spinal cord, and back (16%), and upper extremities (15%) [32]. As construction trades are male-dominated, there is limited research on gender-based physical health differences in the field. However, existing studies suggest that men working in high-risk occupations experience higher injury rate than [33]. High-risk occupations are those where workers are exposed to notable dangers and stressors, including physically demanding jobs, which impact their health and safety and increase the risk of injury.

Work-Related Musculoskeletal Disorders (WMSD) refers to a variety of degenerative and inflammatory conditions affecting muscles, tendons, ligaments, joints, nerves, and blood vessels (Figure 10), mainly caused by physically demanding workplace activities [34]. WMSDs are a major cause of pain that results in absenteeism, reduced productivity, and early retirement. Moreover, WMSDs can lead to a long-term health issue, it is reported it is a leading cause of occupational disability among construction workers [35], it accounted for nearly 35% of early retirement due to permanent disability and it increases with age [36,37]. Multiple factors including age, experience, and weight increases the occurrence of WMSDs, physical factors contribute to the development of WMSDs, including: awkward postures, repetitive movements, heavy lifting, prolonged static postures, and working in non-neutral body posture [38–40].
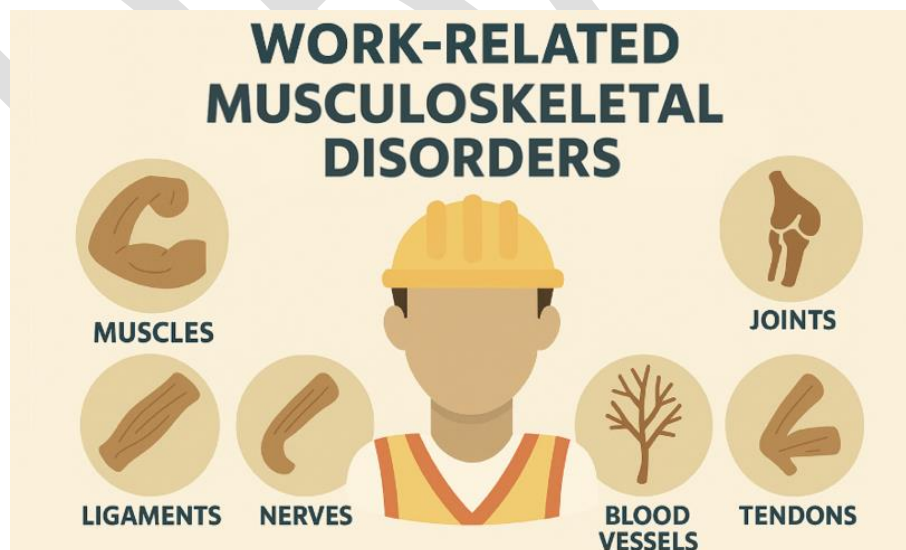
Figure 10. Body areas impacted by poor ergonomic practices.

Skilled trades workers report high prevalences of WMSDs and are more susceptible to them (Figure 11). In a recent systematic review by Rahman and Sakamoto in 2023, WMSDs among these workers ranges from 33% to 89%. This review identified awkward body postures, vibrating, repetitive body movement, and manual material handling as strong ergonomic risk factors contributing to the development of WMSDs, meanwhile, static loads and excessive workload count as moderate effect factors [41].

Figure 11. Causes of pain complaints among electricians.

Electricians reported back and upper limb complaints due to occupational task conditions, including overhead work, hand-intensive work, manual material handling, and ground/floor-level work. Over 50% of electricians surveyed reported shoulder discomfort while performing electrical work [39,42]. Due to the physical demands placed on multiple joints, WMSDs frequently affect more than one area of the body—more than half of participants in one skilled trades study reported experiencing multiple WMSDs [43]. The presence of WMSDs displayed a negative effect on occupational stress, workers with WMSDs experience higher occupational stress [44]. According to World Health Organization (WHO) having chronic pain caused by musculoskeletal disorders is often associated with comorbidities like depression and anxiety [45]. Identifying WMSDs reported by electricians in Ontario will pave the path into further research toward understanding the associated risk factors and ergonomic risks they face. Gaining a comprehensive perspective will contribute into the development of effective interventions, ergonomic improvements, and specialized tools aimed at preventing the onset and recurrence of WMSDs among electricians in the field.

2.5 MENTAL WELL-BEING IN THE SKILLED TRADES

A psychologically safe workplace is essential for worker well-being and retention, particularly within small businesses in the skilled trades sector. Since the onset of the COVID-19 pandemic, small- to medium-sized businesses in Ontario have faced mounting pressures, including rising wage demands, limited availability of skilled workers, and unanticipated project delays [2,46,47]. These stressors have contributed to increased worker burnout and pose significant economic and mental health challenges when turnover or apprentice dropout occurs [48]. Our previous research reports have identified that apprentice dropout can lead to productivity losses of $40,000 - $50,000 CAD for a small electrical business [2]. These productivity losses can affect workers' mental health through a phenomenon called "emotional contagion". Emotional contagion is where small business owners experiencing work-related stress may negatively influence their workers' mental health and behaviours given their regular contact with their workforce [49]. It may also lead to a negative perception of hiring new apprentices and workers with less experience, leading to a lack of opportunity and negative career progression (e.g. reduced time availability and workplace support for licensing exams) for their existing workforce [50]. This negative perception may also discriminate and stigmatize efforts to promote diversity in the trades as owners may choose to maintain their male-dominated, able-bodied work culture [8]. Therefore, improving support for small businesses will ultimately impact the recruitment and retention of new entrants from diverse backgrounds in the skilled trades.

In small businesses, occupational health and safety promotion is often centralized with the owner/operator. Therefore, a small business's health, resilience, and adaptability depends on the owner's experience, workplace behaviours, and mental health [49]. Small business owners have higher role ambiguity and role conflict as they manage several responsibilities (e.g. human resources, administration/finance, operational capacity, health and safety), long working hours, and heavy workloads with limited resources [51]. As such, previous research has shown that small business owners may be more vulnerable to adverse outcomes of work-related stress, poor sleep quality, and psychological distress (e.g. depression, anxiety, suicide) [40]. To combat this, small business owners in Ontario need access to education about workplace mental health in the construction context and the development of mental health support programs within their operational structure. Historically, the Ontario Electrical League has largely provided steadfast support to help small business owners with recruitment and workforce administrative management. However, this annual year of research activities has prioritized further efforts to bolster occupational mental health promotion and worker equity. In collaboration with the Ontario Electrical League, the ReSTORE Lab of the University of Toronto has developed two toolkits to support mental health and diversity, equity, and inclusion within small businesses operating primarily in the electrical skilled trades. These toolkits contain information, accessible resources, and recommended practices for all small business workers. However, further efforts are required to adopt a Total Worker Health approach to holistically address these workers' physical and mental health [52].

The prevalence and awareness of mental health concerns remain relatively consistent across different social identities, including gender, migration status, age and race (Figure 12). Women in the skilled trades are more likely to experience depression and anxiety due to a greater incidence of workplace harassment, gender discrimination, lack of workplace accommodations, and fear of job insecurity [53]. They also deal with gender-specific workplace safety challenges, including inadequate washroom facilities, lack of safety equipment, dangerous work environments, and no formalized workplace policies against workplace harassment [53]. Research has found migrant and racially diverse workers have a higher prevalence of depression and anxiety than non-migrant workers, with contributing factors including an unhealthy work environment, poor job satisfaction, social isolation due to language barriers, job insecurity, and poor physical health [54,55]. Younger construction workers experience poor mental health related to instances of workplace bullying, low job support, and fears of work inadequacy [56,57]. Historically, these groups have been underrepresented in the construction industry of Ontario as there have been significant dropout rates related to a lack of visibility and a struggle to get their voices heard regarding their workplace experiences. In this report, we seek to clarify the experiences of trades workers with diverse social identities to develop mental and physical health supports specific to the Ontario construction context.
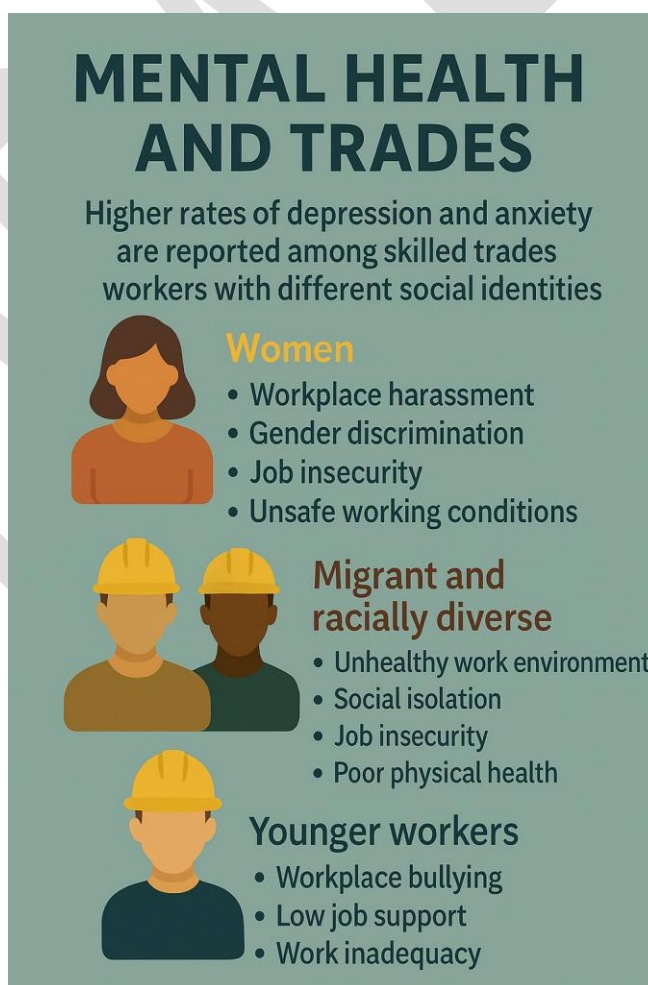
Figure 12. Challenges faced by women, migrant and racially diverse workers, and younger workers in the trades.

2.6 UNITED NATION'S SUSTAINABLE DEVELOPMENT GOALS (SDGS)

In 2015, the United Nations (UN) released the 2030 Agenda for Sustainable Development, providing a universal blueprint for achieving global peace, prosperity, and environmental sustainability. The 17 Sustainable Development Goals (SDGs) are central to this agenda—a comprehensive framework addressing the most pressing global challenges. These goals (Figure 13) call for collaborative efforts from developed and developing countries to implement strategies that improve health and education, reduce inequality, foster economic growth, and address climate change while preserving ecosystems.
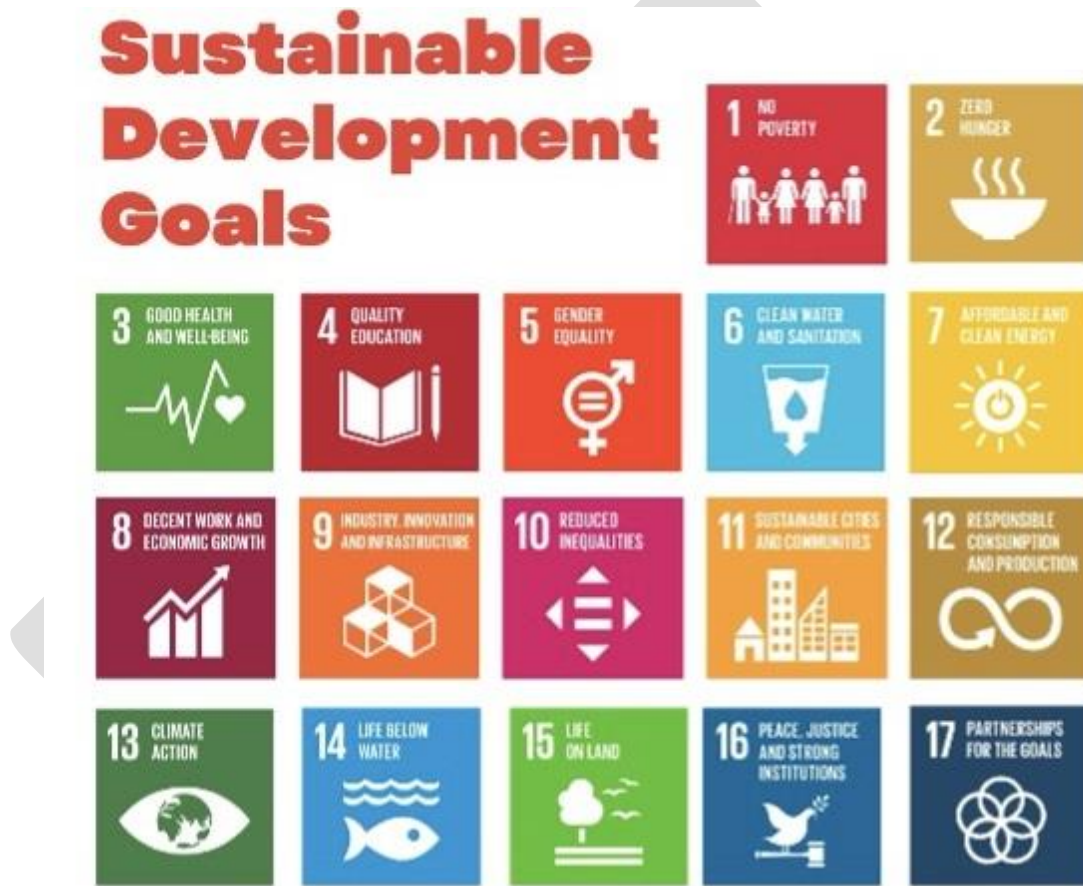
Figure 13. UN's Sustainable Development Goals (from sdgs.un.org/goals).

Each of the 17 SDGs is supported by a set of 169 specific targets. Since their adoption, the SDGs have inspired significant global action, resulting in 4,006 events, 1,351 publications, and 7879 actions aimed at driving sustainable change. By aligning policy and practice with the SDGs, countries are working towards a future that balances economic development, social equity, and environmental protection.

The SDGs and the DEI are deeply interconnected, as both aim to foster an inclusive and equitable society where all individuals can thrive. Several SDGs explicitly highlight the importance of DEI, which these goals encompass empowering women and girls and eliminating

disparities based on income, gender, race, ethnicity, disability, and more factors. Our proposed research aligns closely with the research theme of "Designing Instruments and Interventions to Rethink the SDGs" by developing solutions and strategies that directly contribute to advancing several SDGs.

2.7 RESEARCH OBJECTIVES

This research aims to address the sustainable development goals (SDGs) in the skilled trades context through the following research objectives:

1) To assess the prevalence and impact of physical and mental health challenges among contractors, electricians, and apprentices in the skilled trades and identify factors contributing to physical and mental health issues.
2) To explore the lived experiences of equity-deserving groups (e.g. women, Indigenous Peoples, ethnic minorities, persons with disabilities) in the skilled trades.

2.8 ALIGNMENT BETWEEN RESEARCH OBJECTIVES AND SDGS

Through a comprehensive examination of lived experiences and perspectives of contractors, electricians, and apprentices in the skilled trades, our study addresses key SDGs, including good health and well-being (SDG 3), gender equality (SDG 5), decent work and economic growth (SDG 8), industry, innovation, and infrastructure (SDG 9), sustainable cities and communities (SDG 11), and peace, justice, and strong institutions (SDG 16).

Our research objective 1 is designed to address SDG 3 (good health and well-being) actively. By evaluating the physical and mental health of individuals in the skilled trade industry, we can capture this population's physical and mental health profile. By understanding the unique stressors and demands experienced by diverse groups within the industry, we can develop targeted interventions to enhance health and overall well-being among skilled trades workers.

Our research objective 2 is designed to actively address these SDGs by targeting specific areas within the skilled trades industry. By exploring the lived experiences of woman skilled trades workers, we aim to identify barriers that impact women differently than men in the industry, thereby contributing to SDG 5 (Gender Equality) and SDG 8 (Decent Work and Economic Growth). Understanding these factors allows us to develop more inclusive recruitment strategies tailored to attract individuals of all genders, fostering a more equitable and sustainable work environment. Furthermore, our study delves into workers' lived experiences through the intersectionality framework, providing insights into how intersecting identities could create challenges for equity-deserving groups in the skilled trades using a sequential explanatory mixed-methods study design. This also contributes to SDG 3 (Good Health and Well-Being) by addressing physical and mental health challenges and promoting supportive workplace cultures. Moreover, the intersectional framework proposes that multiple marginalized identities can overlap to create compounded discrimination. Additionally, by gathering and analyzing worker and employer perspectives, we aim to identify areas for improvement and inform interventions

that promote fairness and equal opportunities, aligning with SDG 5 (Gender Equity), SDG 8 (Decent Work and Economic Growth), SDG 9 (Industry, Innovation, and Infrastructure) and SDG 16 (Peace, Justice, and Strong Institutions). and Economic Growth). By fostering a workplace environment that values diversity and inclusivity, we build stronger and more resilient institutions that uphold principles of fairness and equality.

In alignment with the nexus theme of "Work, Poverty, and Justice," our research focuses on improving work conditions, job satisfaction, and equal opportunities within the skilled trades industry. By addressing barriers to DEI, our research project can help foster decent work and economic growth (SDG 8). Furthermore, by ensuring fair treatment and diversity in the workplace, we aim to advance SDG 16 (Peace, Justice, and Strong Institutions).

Moreover, our research has implications for sustainable urban development and infrastructure, aligning with SDG 11 (Sustainable Cities and Communities). By fostering a diverse, inclusive, and well-supported skilled trades workforce, we contribute to creating vibrant and resilient communities where all individuals have access to meaningful employment opportunities and essential services.

Our research aims to create a more equitable, just, and sustainable environment for skilled traded workers. Furthermore, this will contribute to broader efforts toward achieving sustainable development and promoting social justice. Through collaboration with industry stakeholders, policymakers, and community partners, we aim to translate our research findings into tangible actions and policies that drive positive change and foster long-term prosperity for all stakeholders involved.

By comprehensively understanding the factors influencing recruitment, retention, and workplace dynamics within the skilled trades industry, our study offers actionable insights and evidence-based recommendations that can inform policy decisions, organizational practices, and community initiatives. By disseminating our findings via academic publications, policy briefs, and stakeholder workshops, we aim to amplify the impact of our research and facilitate knowledge exchange among diverse stakeholders. Additionally, engaging with industry partners and community organizations throughout the research process ensures that our work remains relevant, responsive, and impactful, fostering a culture of collaboration and co-creation in addressing complex societal challenges.

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SECTION 3: METHODOLOGY

3.1 STUDY DESIGN

We employed **a mixed-methods sequential explanatory design** (Figure 14) to assess the health status of skilled trades workers and to understand their lived experiences. The research consists of two sequential phases: 1) online surveys and 2) semi-structured interviews. Selecting mixed-methods research is appropriate, as it helps us explore complex and multi-aspect areas of DEI and health, fostering a comprehensive understanding [58–62].
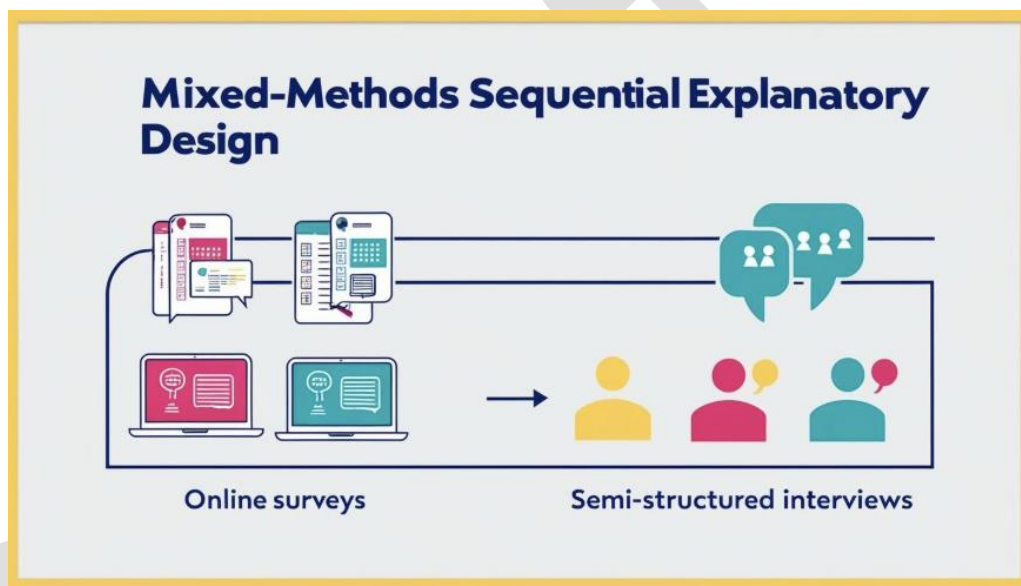
Figure 14. Mixed-methods sequential explanatory design diagram.

The online survey included a demographic questionnaire and multiple physical and mental health outcome measures. The interplay between physical and mental health among skilled trades workers is complex and often mediated by various individual and contextual factors, such as sex, age, and education level. The survey allowed us to collect a wide range of physical and mental health outcomes and examine the relationships with these factors, addressing the first objective of our research.

Semi-structured interviews aligned with our second research objective, which offered a deeper understanding of skilled trades workers' beliefs, ideas and lived experiences [63]. These interviews were particularly effective in uncovering factors not captured through quantitative methods, such as nuanced perspectives on DEI challenges.

DEI and health outcomes are inherently multidimensional. A mixed-methods sequential approach facilitated an integrated exploration of these complexities. For instance, interviews helped us contextualize and identify mechanisms underlying the quantitative results, enabling us to investigate participants' perspectives on the patterns, disparities, and associations revealed through the quantitative analysis. Moreover, the mixed-methods design facilitated

collaboration with diverse stakeholders (e.g., community members and policymakers), ensuring the results' inclusivity and relevancy and providing an easier way to incorporate feedback [64]. Therefore, this design directly supported the third research objective of this research. Overall, the mixed-methods sequential explanatory design was well-suited to address the complexity of DEI and health within this population.

3.2 THEORETICAL FRAMEWORK

This research utilized **intersectionality** as the primary theoretical framework to explore mental health challenges among skilled trades workers from equity-deserving groups. Intersectionality, proposed by professor Kimberlé Crenshaw, initially focused on Black women who were influenced by the oppression of sexism and racism but received less attention from academia and industry [65]. This framework has since been expanded to focus on how multiple minority identities, such as gender, race and ethnicity, and disability, could combine to create significant disadvantages for certain individuals within society [65,66] (Figure 15). It has been widely used in health research, assisting researchers in understanding that negative health outcomes could result from non-medical factors, such as social discrimination and socioeconomic status. The intersectionality framework was suitable for this research as it aided our team in unpacking the complexity of the construction work environment's influence on physical and mental health. Specifically, intersectionality informed the development of survey and interview questions by collecting socio-demographic information and exploring the combined influence of intersecting identities on lived experiences. Moreover, it guided the interpretation of data by considering participants' multiple identities.

Figure 15. The concept of intersectionality.

Diversity, Equity, and Inclusion (DEI) principles were also integrated into the study design and analysis. In this research, DEI principles were applied to examine how organizational policies and practices can promote equitable treatment and equal opportunities for minority populations in the skilled trades industry.

This study commenced on April 1, 2024. The first four months were a preparatory period, which included obtaining ethics approval. Research Ethics Board (REB) approval was obtained from the University of Toronto for this project (Protocol #: 41519). Participant recruitment was from September 1, 2024, to March 15, 2025. This annual research project's final three months (February – April 2025) were used to collect data, analyze, and write up this report. A summary of the research project stages is shown in Figure 16.

April – July 2024
Preparation, including ethics approval

August 2024
Ethics approval received
(Protocol #: 41519, University of Toronto)

September 2024 – March 2025
Participants recruited

February – April 2025
Data collected, analyzed, report written

Figure 16. Research project stages.

3.3 RECRUITMENT AND DATA COLLECTION

Participants of this study included apprentices, workers, and employers in the electrical sector. They were recruited using a convenient method (i.e., availability sampling), a form of non-probability sampling relying on data collection from a readily available population. We recruited through the OEL membership with a priority to recruit women, Indigenous Peoples, ethnic minorities, and individuals with disabilities to ensure diverse representation in our sample. Potential participants were contacted by the OEL staff members, who then shared the participants' contact information (email and/or phone number) with the research team. The research team contacted potential participants by email and phone calls. Recruitment was also carried out at OEL's chapter meetings. The research team attended chapter meetings in different locations across Ontario and recruited participants from these events. Participants were required to provide informed consent prior to taking part in the study.

3.3.1 ONLINE SURVEY

Participants received and completed an online survey via REDCap (i.e., an online survey platform) at a preferred time and place.

The survey included a demographic questionnaire (see appendix) and the following measures:

Nordic Musculoskeletal Questionnaire (NMQ) is a standard questionnaire used to ask about presence of pain in joints in nine body areas: neck, shoulder, elbows, wrists/hands, upper back, lower back, hips/thighs, knees, and ankle/foot [67].

Pittsburgh Sleep Quality Index (PSQI) is a survey used to measure sleep quality. The PSQI looks at seven different parts of sleep, such as sleep quality, sleep disturbances, use of sleep medications, and daytime dysfunction. A score more than 6 indicates bad sleep quality [68].

Short Form Survey, 12-Item (SF-12) is a short survey where people rate their own health that affects their daily life, it checks the effect of both physical and mental health. It is a simple but useful way to measure quality of life [69,70].

Kessler Psychological Distress Scale (K-6) is a short mental health survey that asks about six different emotions: feeling nervous, hopeless or helpless, restless or on edge, and worthless or down. This test is a simple but trusted way to screen mental health concerns in adults [71].

Copenhagen Burnout Inventory (CBI) is a survey measuring three types of burnout: personal, client-related, and work-related. It measures how tired and drained someone might feel in general and/or because of their job.

3.3.2 SEMI-STRUCTURED INTERVIEWS

Twenty semi-structured interviews (Figure 17) were conducted with eleven participants (nine were interviewed twice) who self-identified as being from equity-deserving groups. Each interview lasted about 30 minutes and was conducted online (via Microsoft Teams) or over phone calls, depending on participants' availability and preferences. A researcher moderated the interview session using a prepared interview guide (Appendix). All interviews were audio-recorded for transcription and analysis.
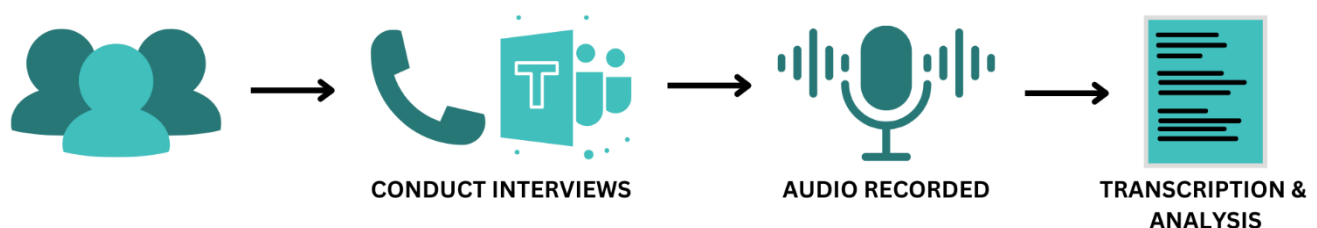

CONDUCT INTERVIEWS → AUDIO RECORDED → TRANSCRIPTION & ANALYSIS

Figure 17. Steps of the interview process.

3.4 DATA ANALYSES

3.4.1 ONLINE SURVEY DATA ANALYSIS

Data from the survey was downloaded and transferred to Excel format. Next, the data was input into R software, a quantitative data analysis tool [72]. Our team followed the guidelines published by O'Leary [73] to perform the quantitative data analysis. First, the researchers de-identified the data by storing respondents' personal information (e.g., name, email address, home address and phone numbers) in an encrypted document. Then, the researchers cross-checked respondents' answers in the de-identified dataset, identifying outliers and missing values [74]. Missing values were tested to determine if they were missed randomly. Second, a descriptive analysis was conducted for the continuous data, encompassing median, mean, standard deviation, 95% confidence intervals, minimum and maximum values, as well as analysis of categorical data for counts and frequencies. Third, inferential analyses (e.g., multiple and logistic regression) were performed to examine participants' burnout scores and whether socio-demographic factors, such as gender, disability, visible minority status, and work-related factors like workload and working hours, influencing participants' mental health status. Last, the researchers interpreted the test results in connection with the research questions, noting significant or not significant results.

3.4.2 INTERVIEW DATA ANALYSIS

The interview data was inputted into NVivo (Version 12), a qualitative data analysis tool [75]. We used a thematic approach to analyze the data [76]. A thematic analysis enabled us to highlight common ideas and threads across participants' lived experiences. The researchers followed the guidelines by Castleberry and Nolen [76] to code the transcripts, categorize codes, and create themes. Two researchers read through all interview transcripts and created codes from each interview. These codes were then discussed between the coders until they reached agreement. This collective coding process led to creating themes and subthemes through active questioning of the data between the researchers [77]. In addition to using software (NVivo) to detect errors and mistakes and following guidelines, the researchers triangulated the narrative thematic analysis results with the quantitative results to identify any controversial or conflicting information [78].

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SECTION 4: RESULTS

4.1 SURVEY RESULTS

A total of 163 participants completed the survey. Most participants (74%) worked in Eastern Ontario, in areas such as Champlain, Ottawa, and Kingston. Consistent with previous reports on Ontario's electrical sector, most respondents were men (92%) who self-identified as White (87%) (Figure 18). Women participation was above the reported industry average of roughly 1.2-1.6% of working females in Ontario's electrical skilled trades [79]; however, participation was lower than the prior OEL report (6% vs 18%). Encouragingly, participation from Indigenous or Métis workers increased from 1% last year to 5% this year. Education levels remained steady compared to previous years, with most participants completing college or trade school (63%). Job satisfaction was high, with 96% of workers reporting they were at least somewhat satisfied and 67% saying they were very satisfied with their job.
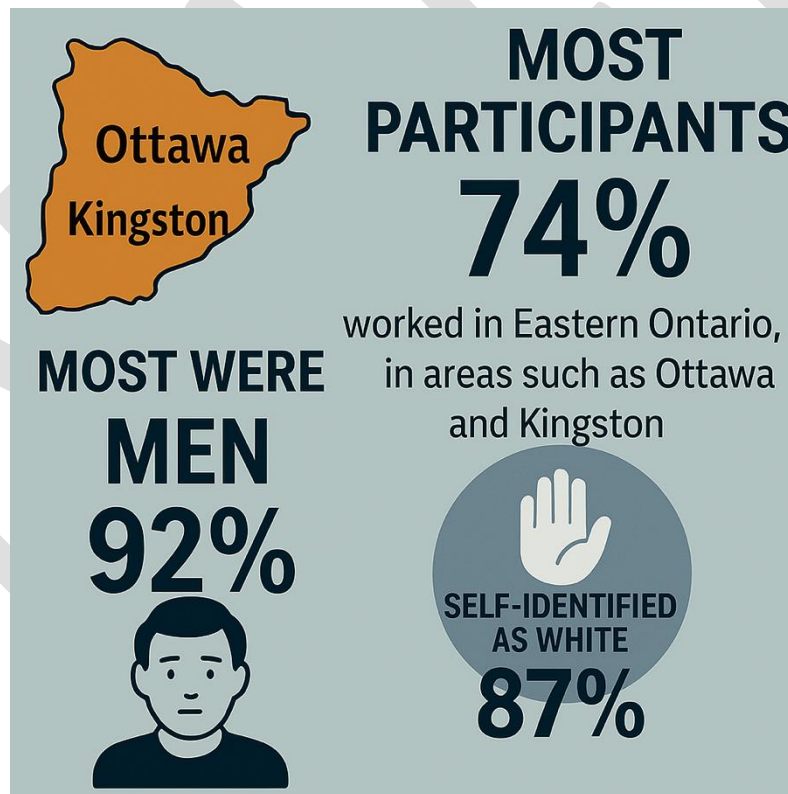
Figure 18. Demographic characteristics of study participants in Ontario's electrical sector.

From a work context, most participants were apprentices (55.2%). This increase in apprentice participation may be due to greater visibility at OEL events (e.g. Chapter Meetings, Apprentice Day), easier digital access to the survey, and growing awareness of mental health and well-being among the younger workers. The average work experience in this year's sample was 10.6 years, lower than the 25.3 years reported previously. However, we believe this sample

is generalizable to the shifting landscape of the electrical sector as more experienced workers continue to retire and efforts by the Ontario government to promote skilled trades to young people.

Table 1. Participant information (n=163)

Variable	Frequency (%)
Gender	150 Men (92.02%)
	10 Women (6.13%)
	3 Prefer Not to Answer (1.84%)
Marital Status	98 Married (60.12%)
	59 Single (36.20%)
	3 Divorced (1.84%)
	3 Separated (1.84%)
Ethnicity	141 White (86.50%)
	6 Indigenous (3.68%)
	4 Black (2.45%)
	3 Middle Eastern (1.84%)
	3 Latin American (1.84%)
	2 Mixed Ethnicity (1.23%)
	2 Metis (1.23%)
	1 East Asian (0.61%)
	1 Other (0.61%)
Education (Figure 19)	102 College (62.58%)
	43 Completed High School (26.38%)
	3 Incomplete High School (1.84%)
	11 University (6.75%)
	4 Other (2.45%)
Job Title	49 Licensed Electrician (30.06%)
	90 Electrical Apprentice (55.21%)
	1 Electrical Technician (0.61%)
	1 Electrical Foreperson (0.61%)
	12 Electrical Journeyperson (7.36%)
	7 Other (6.13%)
Average Working Hours/Week	42 hours
Average Years of Electrical Experience	10.62 years
Job Satisfaction	109 Very Satisfied (66.87%)
	48 Somewhat Satisfied (29.45%)
	5 Not Satisfied (3.07%)
	1 Not Satisfied at All (0.61%)
Work Community[1]	2 Central Ontario (1.25%)
	97 Champlain (60.63%)

1 Erie St. Clair (0.63%)
10 Northeastern Ontario (6.25%)
1 Simcoe-Muskoka (0.63%)
13 Southeastern Ontario (8.13%)
33 Southwestern Ontario (20.63%)
3 Waterloo-Wellington (1.88%)

Notes: [1] Work communities were defined by map regions from Ontario Health at Home, https://healthcareathome.ca/find-my-hccss/
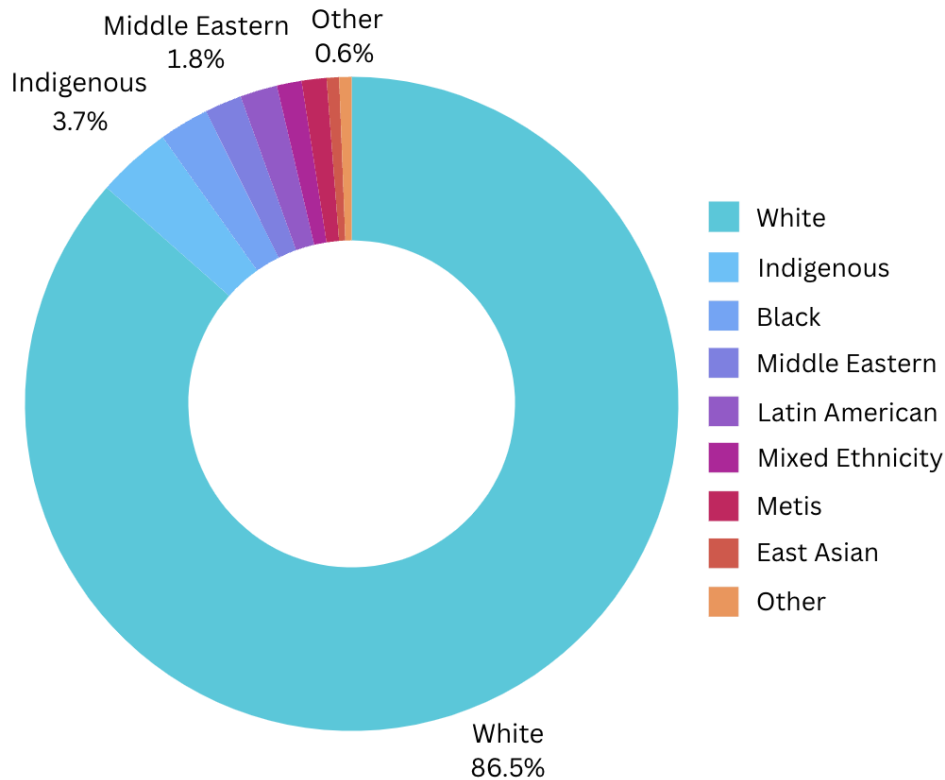
Figure 19. Ethnic composition of the surveyed population.

4.1.1 BURNOUT, MENTAL HEALTH, AND WELL-BEING

Burnout was measured on a scale from 0 to 100, where higher scores indicate greater levels of burnout. This study's average work and personal burnout scores were 36.55 and 40.26, respectively. Both work and personal burnout levels in this research sample were higher than in the 2023 SDF3 OEL report. Average personal burnout scores in this group were similar to those seen in healthcare professionals [80 81]. Consistent with the prior OEL report, personal burnout remained higher than work-related burnout, suggesting ongoing challenges related to work-life balance, career progression delays, and financial stress, especially for younger workers.

Mental health was measured by the Kessler Psychological Distress Scale (K6). The average K6 score for all the participants was 5.10 (range = 0 to 24), which falls within the minimal-to-

moderate psychological distress range. Therefore, this indicates that at least half of the participants are experiencing some form of mental health distress. Furthermore, 14% of participants (n = 23) scored 13 or higher, suggesting a high likelihood of mental illness or a need for further mental health assessment. This proportion is consistent with our previous OEL report, which found that 11% of participants had a positive mental health screen. Further in-depth analyses found that being an apprentice was significantly associated with higher psychological distress (β = 2.09, 95% CI: 0.56 - 3.62, p = 0.008), while being male was associated with lower psychological distress (β = -4.69, 95% CI: -7.47 to −1.91, p = 0.747). No significant association was found between the presence of pain and psychological distress.

Another important predictor of poor mental health status is sleep quality. We measured sleep quality using the Pittsburgh Sleep Quality Index (PSQI). The average PSQI score calculated for this group of participants was 6.31 (range = 1.75 to 14.72), which was higher than the previous sample of 5.26, indicating poorer sleep quality among this group. The increased presence of apprentices and younger workers in this sample may have contributed to this decline, as younger individuals may have different sleep behaviours, social obligations, and attitudes toward sleep.

The SF-12 survey measured health-related quality of life. The average physical health component score was 78.68, while the average mental health component score was 69.86. The overall SF-12 score was 73.47 (range = 14 to 97), suggesting that participants generally rated their health positively at the time of survey completion.

4.1.2 PAIN RATINGS

This year's survey introduced a new measure assessing the presence of pain. A significant majority (92%) of participants reported experiencing some form of pain. The most affected areas were the lower back (60%), shoulder (55%), and neck (53%), while the least reported pain areas were the elbows (15%), feet (18%), and hips (19%) (Figure 20 & Table 2). In localized pain areas of the shoulder, wrist/hands, and elbows, most participants reported experiencing more pain on the right side than on the left. However, when rating shoulder and wrist/hand pain, participants were most likely to report pain on both sides of the body.

4.1.3 SUBGROUP ANALYSES

Two subgroup analyses were conducted to examine differences in health and well-being based on the OEL's membership geography (Eastern vs Western Ontario) and job title (e.g. Apprentice vs non-apprentice). For geographic differences, Eastern Ontario was defined as Champlain, Erie-St.Clair, Northeastern Ontario and Southeastern Ontario (121 participants), while Western Ontario includes Southwestern Ontario, Waterloo, Simcoe-Muskoka, and Central Ontario (39 participants). No significant differences were found in burnout, mental health, sleep quality, or pain measures between these two regions. However, when comparing apprentices and non-apprentices, apprentices had significantly higher psychological distress scores and

lower physical health scores. No significant differences were observed in burnout or sleep quality between the two groups.

Figure 20. Localized areas of pain among the skilled trades.

Table 2. Distribution of pain among participants (n=163)

	Total	Right Side Only	Left Side Only	Both Sides
Presence of Pain [Yes]	150 (92.02%)	N/A	N/A	N/A
Neck Pain [Yes]	87 (53.37%)	N/A	N/A	N/A
Shoulder Pain [Yes]	90 (55.21%)	26 (28.89%)	11 (12.22%)	53 (58.89%)
Elbows [Yes]	25 (15.34%)	12 (48.00%)	5 (20.00%)	8 (32.00%)
Wrist/Hands [Yes]	70 (42.94%)	27 (38.57%)	9 (12.86%)	33 (47.14%)
Upper Back [Yes]	51 (31.29%)	N/A	N/A	N/A
Lower Back [Yes]	98 (60.12%)	N/A	N/A	N/A
Hips [Yes]	31 (19.02%)	N/A	N/A	N/A
Knees [Yes]	58 (35.58%)	N/A	N/A	N/A
Ankles/Feet [Yes]	29 (17.79%)	N/A	N/A	N/A

4.2 INTERVIEW RESULTS

Through the thematic analysis, four themes are developed from the interview data: 1) workplace mental health awareness; 2) perpetuation of working women stereotypes and importance of role-modeling; 3) feelings of inferiority and/or prejudice of workers from Indigenous and ethnic minority backgrounds; 4) workplace demands on persons with disabilities.

Theme 1: Workplace mental health awareness

Subtheme 1: A "toughness" culture in trades

      Participants reported experiencing a variety of work-related mental health challenges, including stress, anxiety, and burnout. However, many acknowledged the presence of a "toughness" culture within the electrical industry that discouraged open discussions about mental health in the workplace.

> *"I would say there's definitely like a kind of culture of being tough. I think that men are sexualized to be like these people, that that don't have any emotion. Not allowed to cry or anything like that. Since this is a male dominated industry, that came with it. Like the men have to be tough. Men can't show emotions. And I think now since I'm part of the industry, I have to be like the stereotype, and I have to be tough and I can't show emotions."*

Figure 21. Participant quote, subtheme 1.

Subtheme 2: Lack of mental health accessibility and support

      Due to this "toughness" culture, some electrical workers and apprentices tend to rely on mental health support outside the workplace, such as health professionals, family, and friends.

"I regularly see a counselor, a therapist. I find that the majority of the time, I talk about work with her. Whether it that would be true, whether I was a woman in the trades or not, that is a necessity in my life --- having that outlet to work through work drama."

      However, participants highlighted the need for greater support from their employers and work environments. They suggested several improvements to mental health support, including regular check-ins, increasing access to mental health resources, and expanded benefits coverage for mental health services.

"I remember specifically, I think it was my dad's benefits and he got an update to his benefit package. They sent out this letter saying like now therapy is in your package, you get $200.00 towards therapy a year per person or what. I didn't at that time, make use of therapy. But it was stuck in my mind. As I age that I had that resource available because I was on his benefits. That like if you're in a mental health crisis, there's some money there for you, right? I only saw it as crisis and thought it wasn't like a maintenance thing. It would be nice if mental health was supported in like company benefits for sure."

Theme 2: Perpetuation of working women stereotypes and importance of role-modeling

With women significantly underrepresented in the electrical industry, their sense of support from employers and co-workers plays a crucial role in shaping their experiences in this male-dominated field.

"I heard some really bad horror stories from even my male colleagues of some of the stuff that they've had to deal with. And I haven't had to deal with any of it. My employer is phenomenal. I think that who you work for and who you work with makes a huge difference. I've been pretty lucky in the fact that if anybody makes a sexist comment in front of me, it's usually one of my colleagues that'll step forward and be like, 'hey no, that's not OK', before I can even say or do anything."

Figure 22. Participant quote, theme 2.

Theme 3: Feelings of inferiority and/or prejudice of workers from Indigenous and ethnic minority backgrounds

Participants recognized the lack of ethnic diversity in the industry but reported varied experiences as minority electrical workers. While incidents such as receiving discriminatory comments were not a day-to-day occurrence for most, they influenced participants' perspectives of themselves and the industry.

"I've had one really negative experience with a very racist customer, and that made me feel pretty awful. He was pretty racist against a number of groups, but it was definitely an anti-Indigenous person kind of point of view. I just smile politely. My boss, who knows I'm an Indigenous person, kind of deflected the guy and redirected some of his attention. I just kept doing my thing and tried to ignore the gentlemen. I don't think he was trying to be malicious per say, but I think he was a very old school, racist kind of dude. And it definitely was a shocking kind of moment, you know."

Figure 23. Participant quote, theme 3.

The workers with immigration backgrounds identified language barriers as a significant challenge. Due to the teamwork-intensive nature of electrical work, non-native speakers might have to develop alternative strategies to communicate effectively with co-workers and clients.

"Sometimes I still have a hard time explaining things to other guys. I just gotta take it easy. it makes it easier to just write it or to draw it down, what they need to do instead of just verbally explaining it, so that goes a long way. That would be the big one for me."

Theme 4: Workplace demands on persons with disabilities

One participant highlighted the impact of their physical disability on daily work as an electrician, including the challenges of navigating workplace demands and mental strains.

> *"Before I had all this [disability], my memory was on point. I'd be able to remember measurements. Now I have to write it down on a piece of paper or on my phone, which kind of takes a little bit more time for me, and then [I also have] a lot of brain fog."*

Figure 24. Participant quote, theme 4.

SECTION 5: DISCUSSION

5.0 OVERVIEW

In this annual research study, we continued our efforts to explore the prevalence and impact of physical and mental health challenges among contractors, journeypersons, and apprentices in the electrical trades. Central to our efforts, as a research team, we travelled alongside the OEL staff across Ontario to recruit participants for the research project and perform knowledge exchange activities related to the development of our mental health and diversity, equity, and inclusion (DEI) toolkits. We visited OEL and non-OEL members engaged in OEL events (e.g. Roadshow, Chapter Meetings, Contractor Meetings, and Apprentice Day) to gather additional perspectives on mental health challenges and reinforce mental and physical health promotion for electrical workers in the non-unionized electrical trades. We hosted interactive mental health presentations with new (Year 1) and experienced apprentices (Year 2 – 5). Lastly, we continuously focused on exploring the lived experiences of equity-deserving groups (e.g. women, Indigenous Peoples, ethnic minorities, persons with disabilities) working in the electrical trades by engaging with these communities in 1-on-1 in depth interviews.

5.1 BURNOUT

Many of our research findings were replicated from prior years of data collection. We continue to see higher rates of personal burnout within the electrical trades. The experience of personal burnout does not appear to be age-specific, as both cohorts of research data collected indicated challenges with burnout. We speculate that there continue to be job-related pressures that exacerbate personal burnout. Younger workers may experience work-life balance disruptions as their job responsibilities and personal priorities become increasingly demanding. The transition from the psychosocial demands of school to entering the workforce may be accompanied by a period of increased stress and feelings of inferiority as they continue to learn technical skills. Moreover, younger workers may also be struggling with financial stress related to work investments in buying tools, safety gear, and work attire, financial gaps in pay when returning to school, and lower wages related to delays in advancement in their apprenticeship (Figure 25). Delays in registration availability for journeyperson licensing exams for 4th or 5th year apprentices can result in wage suppression and increased pressure for employment change. Furthermore, job insecurity has become prominent due to threats of US tariffs and changes in global trade policies impacting potential job and apprenticeship opportunities in 2025. These job pressures may disrupt personal goals, reduce work-life balance, and increase job strain.

Figure 25. Financial pressures on young electrical workers.

For older electrical workers, job-related pressures such as long working hours, high physical and mental demands, and work-family conflict may exacerbate feelings of personal burnout and reduce work-life balance (Figure 26). They may struggle with significant physical and mental demands of higher expectations at work related to providing mentorship to apprentices, continued skill development to ensure adequate technical expertise, and timely completion of assigned tasks and projects. These increased job demands may result in longer working hours during the day and working after hours and on weekends, reducing personal time available for rest and engagement with friends and family. Work-family conflict is an important concern for older workers, especially considering most participants indicated that friends and family were their preferred source of social support. Additionally, many of the apprentices also spoke to the lack of workplace mental health awareness in older workers that may contribute to

interpersonal conflict and poor morale in the workplace. Older workers may influence apprentice mental health through their attitudes, beliefs, and behaviours, a concept described in the literature as emotional contagion [49]. Therefore, targeted burnout interventions to address work-life balance disruptions and mental health literacy and awareness training are essential for continuing to support all electrical workers in the non-unionized electrical industry.
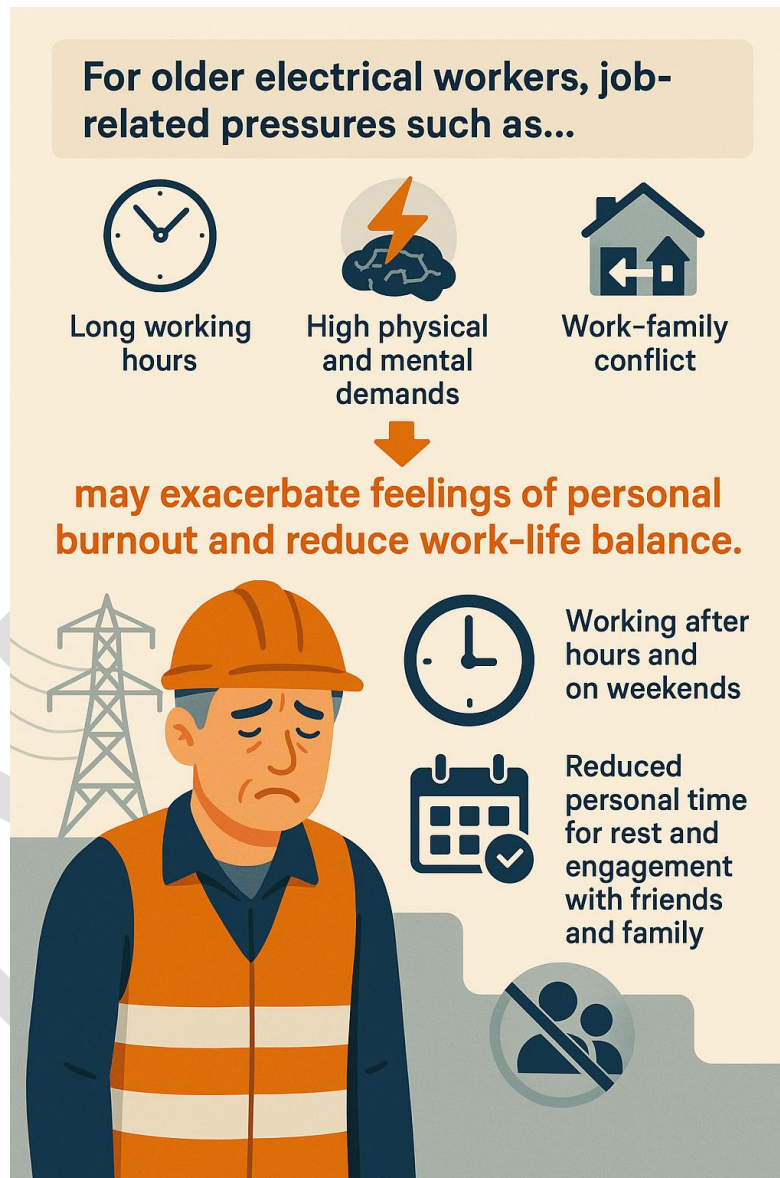
Figure 26. Job-related pressures on older electrical workers.

5.2 MENTAL HEALTH IN THE TRADES

Consistent with the previous OEL report (e.g. SDF3), apprentices continue to indicate that they are experiencing significant levels of mental health symptoms compared to other electrical workers. We hypothesize that poor mental health in these apprentices may be due to increased exposure to psychosocial stress in the workplace. Some examples include interpersonal conflict

with co-workers related to feelings of incompetency and failure when not completing tasks on time, fear of reprimand or judgement when making mistakes, and fear of being judged as weak or incapable when disclosing stress and mental health concerns related to work activities [56]. Furthermore, research has shown that apprentices also experience high rates of bullying and are more likely to accept poor workplace culture, given fear of possible consequences [57,82]. These psychosocial pressures may reduce help-seeking and help-giving behaviors in the workplace to avoid anxiety about perceived weakness by others.

Generational differences in mental health awareness and accessing support may also exacerbate mental health difficulties in apprentices [56,83]. Apprentices may have better mental health awareness resulting in higher reporting rates than older, experienced workers. Throughout our research, we have identified that most workers prefer to receive support from family and friends rather than co-workers [81]. For apprentices, this may be due to psychosocial pressures to uphold ideals of masculinity including emotional suppression, emotional illiteracy, dominance, stoicism, and risk-taking [84]. Therefore, improving mental health literacy and emotional communication in older workers may improve the apprenticeship experience and improve the mental health and well-being of apprentices.

The effects of poor mental health have been widely examined in construction trades workers [85]. Trades workers are frequently exposed to challenging working conditions (e.g. long hours, handling of dangerous and hazardous materials, and poor ergonomic workspaces) with low job control and in many cases, inadequate workplace support to address the psychological demands of their work (Figure 27) [86]. This workplace environment can make trades workers vulnerable to poor mental health outcomes, including anxiety, depression, psychological distress, suicide, substance use, and poor sleep quality (Figure 28) [87–89]. Research has shown that poor mental health and work-related stress is associated with low job control (e.g. low decision-making authority or work schedule flexibility), high job demands (e.g. role strain, burnout), reduced job performance [90] and role ambiguity (e.g. performing work activities below your training or outside of your expertise and training) (Figure 29) [91].

Figure 27. Challenging working conditions for trades workers.

Figure 28. Mental health challenges among trades workers due to a poor workplace environment.

Figure 29. Impact of job characteristics on mental health and work stress.

Poor mental health has also been associated with higher rates of workplace injury, delayed return-to-work after injury, and chronic disability [92,93]. Although there are personal factors that may moderate risk for workplace injury due to poor mental health, work-related factors appear to be quite influential. Psychosocial stressors including workplace bullying, low job support, and delays in career progression present in a male-dominated industry, are especially impactful for apprentices [82,94]. Trades workers also have preferred reactionary rather than proactive coping behaviors outside of work to manage work-related stress [88,95]. Therefore, increasing help-giving behaviors within the workplace and targeting workplace culture may be an important starting point for SMBs to address workplace psychosocial stress and reduce injury risk. Furthermore, improving health promotion strategies, including work schedule flexibility, weekly group health activities during work hours, and opportunities to support one another to promote well-being at work might also be beneficial. Mental health support strategies and timely and accessible resources for small businesses can have wide-reaching effects as workers share their mental health knowledge and help give behaviours to other trades professionals on the work site to support the industry.

5.3 Experiences from Underrepresented Workers

Past literature reported a variety of mental health challenges encountered by electrical workers, yet few studies have examined the unique experiences of those with underrepresented backgrounds. By applying an intersectionality framework and conducting interviews with individuals from diverse backgrounds, we explored the interplay between participants' experiences as underrepresented workers and their mental health. We recruited and interviewed five women, four Indigenous Peoples, two ethnical minorities (including one woman), and one person with a disability. We found that these individuals faced similar mental health issues as the general electrical worker population [88]. However, the prevailing "toughness" culture within the electrical industry may further discourage underrepresented workers from seeking mental health support in the workplace. Our results indicated that underrepresented workers primarily relied on personal social support systems, possibly due to a lack of peer support within their work environments. Fostering peer support through increasing the representation of workers from diverse backgrounds and refining employer-employee hierarchies may contribute to a more supportive work environment and improved workers' mental health.

The common stressors reported by underrepresented workers were consistent with the ones experienced by the general electrical workers [96], highlighting the urgent need to address these stressors within the industry. Despite being one of the most physically demanding skilled trades, electricians from equity-deserving groups face substantial cognitive job demands, contributing to a high rate of workplace fatalities [97]. We found several factors causing the cognitive demands for electricians, including frequent transitions between varying job sites and conditions, unpredictable working hours, and ongoing safety concerns. To mitigate these challenges and meet the SDG of good health and well-being, employers should create a more

secure work environment by improving risk communication, ensuring risks are more apparent to the workers, structuring working schedules, and reinforcing safety protocols.

5.4 GENDER EQUALITY

As one of the SDG goals, gender equality has received growing attention in the trades. Participants acknowledged the underrepresentation of women in the industry and highlighted sexism as a prevalent issue, aligning with past research in this context [98,99]. Perpetuation of masculine norms within this historically men-dominated industry has not only hindered recruitment and retention of women, but also has affected the health and well-being of these individuals [100]. Our results support the literature, as women workers reported experiencing stress, anxiety, and a sense of isolation in the workplace. Participants also reported coping with these challenges mostly through avoidance or individual coping mechanisms and emphasized the need for greater support from their employers and co-workers. To ensure the psychosocial well-being of women workers, employers should focus on improving workers' mental health literacy, enhancing accessibility to treatment, and addressing workload issues [101]. In addition, assigning well-being champions to facilitate the uptake of established resources (e.g., mental health toolkits) can help organizations meet the SDG goal of good health and well-being [102].

5.5 DEI PROMOTION

The lack of awareness and acknowledgement of DEI issues among the participants highlighted a critical need for training, education, accommodations, and policies. Business employers should take on strong leadership in all areas of recruitment, retention, and policy practice, including communicating a clear message about the importance of DEI and establishing a firm stance against harassment and discrimination in the workplace [103]. For small-to-medium businesses, making such workplace improvements relies on a strong organizational commitment to DEI and adequate human resources. Building a DEI-oriented organizational culture can produce mental health benefits for workers from underrepresented groups [104]. DEI-related risk factors (e.g., discrimination, bullying, lack of respect) have a profound impact on workers' mental health (Figure 30) [105]. However, existing occupational interventions for skilled trade workers have predominately focused on physical health outcomes [100]. In our study, some participants prioritized physical health and safety over their mental health needs. Given the high prevalence of poor mental health identified in this population [106], addressing only physical health will not suffice for interventions to ensure the overall well-being of underrepresented workers.

Figure 30. DEI-related risk factors.

Recruiting and hiring apprentices and employees from underrepresented groups may be a good starting point for promoting DEI within small-to-medium businesses. Our study identified a meritocratic approach commonly used by employers in construction skilled trades. While this merit-based hiring approach is well-intentioned, it may overlook the systemic barriers that hinder equal opportunities in the trades, such as sexism, racism, and ableism (Figure 31). DEI hiring policies have challenged the meritocratic approach by increasing underrepresented groups' opportunities. In alignment with previous studies [107], some participants opposed DEI-driven hiring practices. According to Iyer (2022), such opposition "can be particularly fierce from people who belong to advantaged groups that benefit from the status quo (e.g., men, racial/ethnic majority groups)" (p. 1) [108]. Beyond hiring, our findings highlight the importance of addressing skill-related challenges like language barriers. To foster peace, justice, and strong workplaces (SDG 16), we recommend prioritizing training and education initiatives and informing business leaders of the long-term benefits of DEI efforts.

Figure 31. Systemic barriers that hinder equal opportunities in the trades.

Establishing early career opportunities and role models in the education system might promote DEI in the trades. Over 90% of skilled trades businesses are small sized with less than 100 employees [109], often limiting their capacity to offer these resources. Partnering with community organizations, government, agencies, and education institutions may help these small businesses access or co-create resources for their employees. In Ontario, collaboration between not-for-profit organizations and small businesses has improved apprenticeship training model [110]. Such collective efforts will ultimately contribute to decent work and economic growth (SDG 8), industry, innovation, and infrastructure (SDG 9), as well as sustainable cities and communities (SDG 11) at a provincial and national level.

5.6 RECOMMENDATIONS FOR PROMOTING DEI IN SKILLED TRADES

Our team categorized the recommendations identified in the literature for skilled trades businesses into four domains: 1) self-reflection, 2) recruitment and hiring, 3) worker engagement, and 4) workplace safety (Figure 32). Specifically, business leaders should take on strong leadership, advocacy, and commitment to DEI in all areas of recruitment, retention, and policy practice, including communicating a clear message about the importance of diversity and their stance on harassment and discrimination in the workplace. DEI includes establishing clear expectations for new apprentices and employees (e.g. hierarchies of supervision, start and end times, break etiquette, work performance standards, behavioural standards, workplace respect and humour). Business leaders should allow workers to provide open feedback and suggestions to facilitate worker engagement. In addition, business leaders should discuss career advancement and learning opportunities with their employees. To ensure workplace safety, business leaders should address poor workplace behaviours and discrimination with appropriate and fair action and act on any stressors that may contribute to a hostile work environment. Workers who meet and/or exceed behavioural standards in the workplace or on the job site should be praised and recognized. Furthermore, business leaders should encourage workers to report bullying, harassment, and discrimination in the workplace and on job sites without fear of reprisal, judgement, or dismissal.

5.7 FUTURE RESEARCH CONSIDERATIONS

As a result of current research findings, further efforts to improve and maintain these electrical workers' mental health and well-being are imperative. A targeted approach addressing mental health attitudes, beliefs, and awareness among employers and experienced journeypersons is a critical avenue to reduce work-related mental health distress among apprentices and new entrants into the electrical industry. As such, we recommend that our team engage with these groups to deliver evidence-based, and trades' specific mental health training focused on improving communication between supervisors/employers and apprentices/new entrants, helping employers/supervisors identify areas of psychosocial stress within the workplace, and generalized help with health promotion strategies to support and maintain a resilient workforce.

Furthering our efforts from SDF4, we will continue supporting apprentice mental health by creating opportunities for engagement at OEL events to share health and well-being strategies. Opportunities for research integration with OEL activities were vital to the success of SDF4 as we aim further to increase the visibility and awareness of our evidence-based research findings. Secondly, we will seek to evaluate and gain feedback on the utility and gaps of our current toolkits (e.g. mental health and diversity, equity, and inclusion toolkits) that we widely disseminated in Q3 and Q4 of 2024 to ensure these resources are of continued benefit. Lastly, we hope to continue extending our research to examine the reciprocal relationship between physical and mental health within these workers.

For the 5th round of the Skills Development Fund project, our team has planned to shift our research focus to examining physical health challenges within this population of electrical workers. We plan to conduct an observational study and interviews examining repetitive movements, ergonomics risks, and impact of WMSDs on daily life. Onsite observation conducted by an occupational therapist will provide a comprehensive understanding of the working environments, work practices, and potential occupational hazards. Meanwhile, interviews will focus on a deeper understanding of physical health impact on electricians' participation and engagement at work and outside work.

Self Reflection
- Consult resources to increase worker knowledge and awareness of DEI barriers in this toolkit.
- Evaluate and address your unconscious bias and attitudes towards DEI groups.
- Partner with local community agencies (e.g. schools, pre-apprenticeship organizations, DEI organizations) supporting apprentices and DEI groups

Recruitment and Hiring
- Aim to evaluate new apprentices and employees based on skills, experience level, and capability, refrain from relying on prejudice, stereotyping, and reflecting on past negative experiences.
- Evaluate annually whether your policies and practices are effective in fostering inclusivity in your workplace.

DEI Recommendations for Small Business

Worker Engagement
- Plan periodic social events to cultivate team morale and bonding.
- Encourage peer support groups for new apprentices and DEI groups to receive support from their construction/electrical co-workers.
- Monitor work load, usage of vacation and time away from work, and absenteeism. Offer support and reasonable accommodation, as necessary and available.

Workplace Safety
- Consider job design, safety equipment availability, and staff capacity when scheduling projects to ensure high standards of worker health and safety.
- Consider flexible scheduling around worker personal commitment(s), including earlier or later start time(s), staggered work weeks, flexible scheduling arrangements around child care assistance to avoid burnout and poor physical and mental wellbeing.

Figure 32. DEI recommendations for small business.

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SECTION 7: APPENDICES

APPENDIX A: RESEARCH ETHICS BOARD (REB) APPROVAL LETTER

UNIVERSITY OF TORONTO

OFFICE OF THE VICE-PRESIDENT,
RESEARCH AND INNOVATION

RIS Protocol
Number: 47000

Approval Date: 14-Nov-24

PI Name: Dr Behdin Nowrouzi-Kia

Division Name:

Dear Dr Behdin Nowrouzi-Kia:

Re: Your research protocol application entitled, "Wired for Wellness, Investigating Electricians' Physical and Psychological Health: A Mixed-Methods Study"

The Health Sciences REB has conducted a Delegated review of your application and has granted approval to the attached protocol for the period 2024-11-14 to 2025-11-13.

This approval covers the ethical acceptability of the human research activity; please ensure that all other approvals required to conduct your research are obtained prior to commencing the activity.

Please be reminded of the following points:

- An **Amendment** must be submitted to the REB for any proposed changes to the approved protocol. The amended protocol must be reviewed and approved by the REB prior to implementation of the changes.

- An annual **Renewal** must be submitted for ongoing research. Renewals should be submitted between 15 and 30 days prior to the current expiry date.

- A **Protocol Deviation Report** (PDR) should be submitted when there is any departure from the REB-approved ethics review application form that has occurred without prior approval from the REB (e.g., changes to the study procedures, consent process, data protection measures). The submission of this form does not necessarily indicate wrong-doing; however follow-up procedures may be required.

- An **Adverse Events Report (AER)** must be submitted when adverse or unanticipated events occur to participants in the course of the research process.

- A **Protocol Completion Report** (PCR) is required when research using the protocol has been completed.

- If your research is funded by a third party, please contact the assigned Research Funding Officer in Research Services to ensure that your funds are released.

Best wishes for the successful completion of your research.

	Protocol #:41194				
Status:Delegated Review App	Version:0005	Sub Version:0000	Approved On:14-Nov-24	Expires On:13-Nov-25	Page 11 of 11

OFFICE OF RESEARCH ETHICS
McMurrich Building, 12 Queen's Park Crescent West, 2nd Floor, Toronto, ON M5S 1S8 Canada
Tel: +1 416 946-3273 • Fax: +1 416 946-5763 • ethics.review@utoronto.ca • http://www.research.utoronto.ca/for-researchers-administrators/ethics

APPENDIX B: SURVEY ITEMS

Wired for Wellness, Investigating Electricians' Physical and Psychological Health: A Mixed-Methods Study

What is your gender?
- ○ Man
- ○ Woman
- ○ Other, please specify
- ○ Prefer not to answer

_____

What is your marital status?
- ○ Single
- ○ Married/Common-Law
- ○ Separated
- ○ Divorced
- ○ Widowed

What is your ethnicity?
- ☐ Black (e.g., African, African Canadian, Afro-Caribbean descent)
- ☐ East Asian (e.g., Chinese, Japanese, Korean, Taiwanese descent)
- ☐ Indigenous (e.g., First Nations, Inuk/Inuit, Metis descent)
- ☐ Latin America (e.g., Hispanic or Latin American descent)
- ☐ Middle Eastern (e.g., Arab, Persian, West Asian descent (e.g., Afghan, Egyptian, Iranian, Kurdish, Lebanese, Turkish))
- ☐ South Asian (e.g., Bangladeshi, Indian, Indo-Caribbean, Pakistani, Ski Lankan)
- ☐ Southeast Asian (e.g., Cambodian, Filipino, Indonesian, Thai, Vietnamese, or other Southeast Asian descent)
- ☐ White European
- ☐ White North American
- ☐ Other, please specify

_____

Please indicate the highest education you have obtained
- ○ Incomplete high school
- ○ Completed high school
- ○ College
- ○ University
- ○ Other, please specify

_____

What is your age as of your last birthday (in years)?

_____

Please indicate your total work experience in years.

Total years:

_____

Total years as electrician:

_____

| Total years in Ontario: | _____ |

| In which position are you working? Please check all that apply | ◯ Electrical sector
◯ Plumbing sector |

| Electrical sector | ◯ Licensed electrician
◯ Electrical apprentices
◯ Electrical technician
◯ Electrical foreperson
◯ Maintenance technician
◯ Electrician journeyperson
◯ Electrical power supply technician
◯ Other, please specify in box below |

| | _____ |

| Plumbing sector | ◯ Licensed plumber
◯ Plumbing apprentice
◯ Licensed journeyperson plumber
◯ Service technician
◯ Other, please specify in box below |

| | _____ |

| Please indicate the average number of hours you work per week | _____ |

| Do you intend to stay in your current position for the next 5 years? | ◯ Yes
◯ No |

| If you selected "No", kindly specify the reason(s) why you do not anticipate staying (e.g., retirement): | _____ |

| How satisfied would you say you are with your job? | ◯ I am very satisfied
◯ I am somewhat satisfied
◯ I am not too satisfied
◯ I am not satisfied at all |

| Please indicate the community where your workplace is located. (It would be helpful if you could provide both the community's name and postal code) | _____ |

| Optional: Were you diagnosed by a doctor or nurse practitioner with any chronic illness/physical injury? | ◯ Yes
◯ No |

| Please specify below | _____ |

| When were you diagnosed with this illness/injury? | _____ |

| Height (feet and inches): | _____ |

Weight (pounds): _____

Check the box that applied most to you

	Never/almost never or to a very low degree	Seldom or to a low degree	Sometimes or somewhat	Often or to a high degree	Always or to a very high degree
How often do you feel tired?	○	○	○	○	○
How often are you physically exhausted?	○	○	○	○	○
How often are you emotionally exhausted?	○	○	○	○	○
How often do you think: "I can't take it anymore"?	○	○	○	○	○
How often do you feel worn out?	○	○	○	○	○
How often do you feel weak and susceptible to illness?	○	○	○	○	○

Check the box that applied most to you

	Never/almost never or to a very low degree	Seldom or to a low degree	Sometimes or somewhat	Often or to a high degree	Always or to a very high degree
Do you feel worn out at the end of the working day?	○	○	○	○	○
Are you exhausted in the morning at the thoughts of another day at work?	○	○	○	○	○
Do you feel that every working hour is tiring for you?	○	○	○	○	○
Do you have enough energy for family and friends during leisure time?	○	○	○	○	○
Is your work emotionally exhausting?	○	○	○	○	○
Does your work frustrate you?	○	○	○	○	○
Do you feel burnt out because of your work?	○	○	○	○	○

Have you at any time during the last 12 months had trouble (ache, pain, discomfort, numbness) in:

Neck	○ No
	○ Yes

Have you at any time during the last 12 months been prevented from doing your normal work (at home or away from home) because of the trouble?	○ No
	○ Yes

Have you had this trouble *at any time during the last* 7 days:	○ No ○ Yes
Shoulders	○ No ○ Yes, right shoulder ○ Yes, left shoulder ○ Yes, both shoulders
Have you at any time during the last 12 months been prevented from doing your normal work (at home or away from home) because of the trouble?	○ No ○ Yes
Have you had this trouble *at any time during the last* 7 days:	○ No ○ Yes
Elbows	○ No ○ Yes, right elbow ○ Yes, left elbow ○ Yes, both elbows
Have you at any time during the last 12 months been prevented from doing your normal work (at home or away from home) because of the trouble?	○ No ○ Yes
Have you had trouble *at any time during the last 7* days:	○ No ○ Yes
Wrists/hands	○ No ○ Yes, right wrist/hand ○ Yes, left wrist/hand ○ Yes, both wrist/hand
Have you at any time during the last 12 months been prevented from doing your normal work (at home or away from home) because of the trouble?	○ No ○ Yes
Have you had this trouble *at any time during the last* 7 days:	○ No ○ Yes
Upper back	○ No ○ Yes
Have you at any time during the last 12 months been prevented from doing your normal work (at home or away from home) because of the trouble?	○ No ○ Yes
Have you had this trouble *at any time during the last* 7 days:	○ No ○ Yes
Lower back	○ No ○ Yes
Have you at any time during the last 12 months been prevented from doing your normal work (at home or away from home) because of the trouble?	○ No ○ Yes

Have you had this trouble *at any time during the last 7 days:*	○ No ○ Yes

One or both hips	○ No ○ Yes

Have you *at any time during the last 12 months* been prevented from doing your normal work (at home or away from home) because of the trouble?	○ No ○ Yes

Have you had this trouble *at any time during the last 7 days:*	○ No ○ Yes

One or both knees	○ No ○ Yes

Have you *at any time during the last 12 months* been prevented from doing your normal work (at home or away from home) because of the trouble?	○ No ○ Yes

Have you had this trouble *at any time during the last 7 days:*	○ No ○ Yes

One or both ankles/feet	○ No ○ Yes

Have you *at any time during the last 12 months* been prevented from doing your normal work (at home or away from home) because of the trouble?	○ No ○ Yes

Have you had trouble *at any time during the last 7 days:*	○ No ○ Yes

In general, would you say your health is:	○ Excellent ○ Very Good ○ Good ○ Fair ○ Poor

The following two questions are about activities you might do during a typical day. Does YOUR HEALTH NOW LIMIT YOU in these activities? If so, how much?

MODERATE ACTIVITIES, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf:	○ Yes, Limited A Lot ○ Yes, Limited A Little ○ No, Not Limited At All

Climbing SEVERAL flights of stairs:	○ Yes, Limited A Lot ○ Yes, Limited A Little ○ No, Not Limited At All

During the PAST MONTH have you had any of the following problems with your work or other regular activities AS A RESULT OF YOUR PHYSICAL HEALTH?

ACCOMPLISHED LESS than you would like:	○ Yes ○ No

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Were limited in the KIND of work or other activities?	○ Yes ○ No

During the PAST MONTH, were you limited in the kind of work you do or other regular activities AS A RESULT OF ANY EMOTIONAL PROBLEMS (such as feeling depressed or anxious)?

ACCOMPLISHED Less than you would like:	○ Yes ○ No

Didn't do work or other activities as CAREFULLY as usual:	○ Yes ○ No

During the PAST MONTH, how much did PAIN interfere with your normal work (including both work outside the home and housework)?	○ Not at all ○ A little bit ○ Moderately ○ Quite a bit ○ Extremely

The next three questions are about how you feel and how things have been DURING THE PAST MONTH. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the PAST MONTH

Have you felt calm and peaceful?	○ All of the time ○ Most of the time ○ A good bit of the time ○ Some of the time ○ A little of the time ○ None of the time

Did you have a lot of energy?	○ All of the time ○ Most of the time ○ A good bit of the time ○ Some of the time ○ A little of the time ○ None of the time

Have you felt downhearted and blue?	○ All of the time ○ Most of the time ○ A good bit of the time ○ Some of the time ○ A little of the time ○ None of the time

During the PAST MONTH, how much of the time has your PHYSICAL HEALTH OR EMOTIONAL PROBLEMS interfered with your social activities (like visiting with friends, relatives, etc.)?	○ All of the Time ○ Most of the Time ○ A Good Bit of the Time ○ Some of the Time ○ A Little of the Time ○ None of the Time

During the past month, what time have you usually gone to bed at night?	_____

During the past month, how long (in minutes) has it usually taken you to fall asleep each night?	_____

During the past month, what time have you usually gotten up in the morning?	_____

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During the past month, how many hours of *actual sleep* did you get at night? (This may be different than the number of hours you spend in bed).

_____

For each of the remaining questions, check one best response. Please answer all questions...
During the past month, how often have you had trouble sleeping because you

	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
Cannot get sleep within 30 minutes	○	○	○	○
Wake up in the middle of the night or early morning	○	○	○	○
Have to get up to use the bathroom	○	○	○	○
Cannot breathe comfortably	○	○	○	○
Cough or snore loudly	○	○	○	○
Feel too cold	○	○	○	○
Feel too hot	○	○	○	○
Had bad dreams	○	○	○	○
Have pain	○	○	○	○

Other Reason(s). Please describe

_____

How often during the past month have you had trouble sleeping because of this?
- ○ Not during the past month
- ○ Less than once a week
- ○ Once or twice a week
- ○ Three or more times a week

During the past month, how would you rate your overall sleep quality?
- ○ Very good
- ○ Fairly good
- ○ Fairly bad
- ○ Very bad

During the past month,

	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
How often have you taken medicine to help you sleep (prescribed or "over the counter")?	○	○	○	○
How often have you had trouble staying awake while driving, eating meals, or engaging in social activity?	○	○	○	○
How much of a problem has it been for you to keep up enough enthusiasm to get things done?	○	○	○	○

Do you have a bedroom partner or roommate?	○ No bed partner or roommate
	○ Partner/roommate in other room
	○ Partner in same room, but not same bed
	○ Partner in same bed

For each of the remaining questions, check one best response. Please answer all questions. If you have a roommate or a bed partner, ask him/her how often in the past you have...

	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
Loud snoring	○	○	○	○
Long pauses between breaths while sleeping	○	○	○	○
Legs twitching or jerking while you sleep	○	○	○	○
Episodes of disorientation or confusion during sleep	○	○	○	○

How often during the past month have you had trouble sleeping because of your bedroom partner or roommate?	○ Not during the past month
	○ Less than once a week
	○ Once or twice a week
	○ Three or more times a week

The following questions ask about how you have been feeling during the past month:

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
Nervous?	○	○	○	○	○
Hopeless?	○	○	○	○	○
Restless or fidgety?	○	○	○	○	○
So depressed that nothing could cheer you up?	○	○	○	○	○

That everything was an effort?	○	○	○	○	○
Worthless?	○	○	○	○	○

Emergency and Crisis Lines
If you are experiencing long-term stress and/or imminent health and safety risk, please consider reaching out to a healthcare professional or emergency services. Please access the following link for a list of emergency crisis lines and additional resources:

[Attachment: "Mental Health Resource List.pdf"]

Appendix C: Interview guide

Introduction

1. Welcome the participant and thank them for their time.
2. Briefly introduce the purpose of the study:
   a) "We are conducting this study to better understand the lived experiences of electricians, particularly regarding work culture, mental health, and diversity, equity, and inclusion (DEI)."
3. Notice participant the recording.

Section 1: Building Rapport and Discuss Work Culture
1. Can you tell me about your day-to-day work activities? / Can you describe a typical day at your work?
2. How satisfied are you with your current role in your organization?
a) What contributes to your satisfaction or dissatisfaction?
3. How would you describe the general work culture within your organization?
4. Can you share some insights into your experiences as someone who works in this industry as a woman/ethnical minority/person with disability?

Section 2: Lead-in and Mental Health

1. Welcome the participant and thank them for their time.
2. Briefly remind the participant regarding the previous discussion and ask their additional comments or questions.
3. How would you describe your mental health status?
a) Have you experienced any mental health challenges (e.g., stress, depression, anxiety, burnout) associated with your work?
b) To what extent these challenges have interfered with your work?
c) How do you cope with these challenges?
4. How supported do you feel by your colleagues and employers?
a) What kind of support do you receive from them?
b) Any support do you need from your colleges and employers?

Section 3: Social relationships and DEI
1. How do you describe your workplace relationships (e.g., with colleagues, supervisors)?
2. Have you ever felt isolated or excluded at work?
o If so, could you describe the circumstances?
3. Do you feel you have opportunities for growth and development in your role? Why or why not?
4. How would you describe the level of diversity within your workplace, as well as in the general industry?
5. Have you observed or experienced any barriers to DEI in your workplace?
6. To what extent do you believe your organization fosters an inclusive environment?
a) Are there any initiatives or practices in place to promote DEI?
b) If yes, how effective do you think they are?
7. What changes would you like to see in your workplace/industry to improve DEI?

Section 4: Final Reflections and Closing

1. Is there anything else you'd like to share about your experiences that we haven't discussed?
2. Thank the participant for their time and insights.
3. Get their email for gift card
4. Provide contact information in case they have additional thoughts or questions.

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