MSD Solutions Lab
an nsc program

# Frontline Workers' Perspectives on Musculoskeletal Disorder Prevention

## Executive Summary

This report explores frontline workers' perspectives on musculoskeletal disorder (MSD) risk reduction, safety culture, and innovation and collaboration efforts of their workplaces, drawing on survey data from 1,000 non-managerial employees across diverse industries. Findings reveal significant perception gaps between frontline workers and safety and health leaders regarding the presence of MSD prevention programs, access to ergonomic tools, communication about safety, and opportunities for involvement in safety-related decision-making. While most workers are aware of their organization's safety initiatives, many lack a clear understanding of MSDs and how to report symptoms, particularly older workers. These gaps in awareness and engagement are associated with delays in reporting pain and less favorable views of their organization's ability to prevent MSDs.

The report highlights participatory ergonomics as a promising strategy to close these gaps. When workers are actively involved in identifying risks and shaping solutions, organizations benefit from improved communication, stronger trust and better safety outcomes. Participatory practices — such as involving workers in equipment design, job task planning and feedback mechanisms — can foster a more inclusive safety culture and enhance the effectiveness of MSD prevention efforts. These findings underscore the importance of aligning leadership intentions with frontline realities through structured, collaborative approaches.

## Key Takeaways

**Participatory safety practices** that actively involve frontline workers in safety and ergonomics efforts can enhance information sharing, increase understanding and reduce perception gaps between workers and leadership — ultimately leading to better health and safety outcomes.

**Awareness and Understanding of Safety Programs**

- Most workers are aware of their organization's safety and health initiatives, but nearly 1 in 5 don't have a good understanding of MSDs and very few demonstrate understanding of how tasks can contribute to MSD risk.
- About 70% say their workplace has an MSD prevention or ergonomics program, though awareness may not always reflect actual participation in ergonomic initiatives.
- Workers who hear about ergonomics more often tend to have a more positive view of their organization's ability to prevent injuries.

**Pain Reporting and Early Intervention**

- Nearly 30% of workers who have experienced pain at work don't report it.
- About 1 in 4 workers either don't know how to report pain or aren't sure if a process exists.
- Workers are more likely to report pain promptly when they understand safety programs, hear about ergonomics regularly and are asked about symptoms.

**Age and Experience Trends**

- Older workers are less likely to have a good understanding of their organization's safety programs, report pain promptly and feel confident in their workplace's ability to prevent injuries.
- Newer employees are less likely to suggest safety improvements compared to more tenured workers.

**Workplace Tools and Training**

- Just under 60% of workers say they consistently have access to proper ergonomic tools and equipment.
- While most workplaces offer new hire orientations, key MSD-related topics, like how to use ergonomic tools or report issues, are often missing.
- About half of represented workplaces provide regular ergonomics or MSD prevention training.

**Feedback and Engagement**

- Around 60% of workers know how to suggest safety improvements, but older workers are less likely to be aware of or use these systems.
- Respondents reporting their workplace collects employee feedback and follows up on it tend to have better safety perceptions and faster pain reporting.
- Trust and engagement are stronger when workers feel their input is valued and acted on.

**Safety Culture and Trust**

- Workers feel most involved in improving job tasks and workflow, but less so in areas like return-to-work processes or mental health.
- Trust decreases with organizational hierarchy: Most workers trust their peers, but fewer trust senior leadership.
- Stronger safety culture and trust are linked to better perceptions of MSD prevention and more proactive reporting.

**Non-Physical Risk Factors**

- Fatigue and workplace stress were the most commonly reported non-physical risk factors contributing to workplace MSDs, especially among newly hired employees.

**Technology and Innovation**

- About 41% of workers are excited about using technology (like wearables or robots) to improve their jobs.
- However, of those concerned about using technology, over half have concerns about how their data will be used, and nearly half worry about job replacement.
- Workers are more comfortable with technology when they feel involved in decisions, trust leadership and have access to proper tools.

**Leadership vs. Frontline Perceptions**

- Safety leaders consistently rate their organization's safety culture, communication and worker involvement more positively than frontline workers do.
- These perception gaps suggest a need for more inclusive, transparent and participatory approaches to safety planning and communication.

## Introduction

Frontline workers are directly involved with essential workplace tasks and interact daily with equipment, machinery and work environments. Due to their work, frontline workers often have a firsthand understanding of their risk exposure. They also have the most to gain or lose from an effective or ineffective safety program. Despite this, workplace safety initiatives often lack significant and meaningful frontline worker involvement. While there is increasing recognition of the importance of frontline worker inclusion and participation in the development of safety solutions, many organizations still use a top-down approach when developing safety policies and procedures, where management makes decisions without any direct involvement of frontline workers (Chang et al., 2019; Nobrega, 2020). Even when organizations do encourage frontline worker input, there are not always formal structures or channels to involve them in safety decision making.

The Occupational Safety and Health Administration (OSHA) recommends that workplace safety and health programs actively encourage worker participation and reporting of safety and health concerns. This can involve, among other things, making sure frontline workers have access to all safety and health information, establishing reporting and follow-up processes, and considering frontline worker input at every step of program design and implementation (OSHA, 2016). Some specific actions to increase the involvement of frontline workers include forming safety committees that include a mix of management and frontline employees, conducting regular safety meetings or workshops, appointing employee safety champions, involving frontline workers in conducting job hazard analyses, incentive programs and offering the opportunity to provide input on workplace safety practices.

While general understanding of frontline workers' perception of their workplace's safety initiatives is limited, there is some evidence of discrepancies between the perspectives of workers at various levels of an organization and leadership perspectives (Findley et al., 2007; Goldstein et al., 2017; Marin et al., 2019; Moore & Haynes, 2023; MySafetySign, 2015; Tear et al., 2020; Van Eerd et al., 2022). Some studies found differences in safety attitudes by group. For example, managers and staff support personnel in the nuclear energy industry tend to perceive a better safety climate than foremen and other frontline workers (Findley et al., 2007), and administrative leaders among health care organizations tend to perceive a better safety culture than leadership involved in clinical care on the front line (Goldstein et al., 2017). Differences in safety perception in the workplace have also been analyzed in terms of power dynamics. Findings among air traffic control staff indicated a more positive perception of safety culture among those in higher hierarchal positions (i.e., management) compared to air traffic controllers lower in the hierarchy, and that this gap is wider in more hierarchal societies (Tear et al., 2020). Safety perceptions in terms of hierarchy are also commonly discussed in health care, where leadership culture and power imbalances can impact frontline health care workers' willingness to speak up and influence safety culture in an organization (Abrams et al., 2023; Moore & Haynes, 2023; Munn et al., 2023; Tawfik et al., 2023).

A survey among over 10,000 frontline workers and managers found that 50% of workers and 55% of managers observe an “us vs. them” mentality. Despite differences in the perception of safety culture, frontline workers and managers tend to share the same top concerns. These include slow response to resolving issues or risks, unreasonable expectations or burnout, and pressure to cut corners to save time or money. Another study by MySafetySign (2015) surveyed 500 safety professionals and asked how senior leaders and staff viewed safety in their organizations. The responses indicated that the safety professionals have more confidence in senior leadership to prioritize health and safety than staff, with respondents commonly viewing staff behavior as one of the biggest barriers to safety culture. The authors make the point that workers may be viewed as more of a liability to safety culture, as opposed to an asset, and that it is necessary to start viewing frontline workers as part of the solution. **Participatory practices that actively involve frontline workers in safety and health initiatives may offer a promising approach to bridging these perception gaps and fostering a more unified, collaborative safety culture.**

## Ergonomics and Frontline Workers

As opposed to acute injuries, MSDs are injuries or disorders affecting the bones, muscles, tendons, ligaments, nerves and discs that can develop gradually and are often cumulative. Frontline workers, as a group, are more likely to engage in job tasks that involve **forceful exertions**, **repetitive movements**, and **awkward postures**, factors that significantly increase their risk of developing MSDs

Subsequently, frontline workers are commonly aware of job tasks that cause them pain and are likely familiar with the work activities that could gradually develop into an injury, making their involvement in identifying solutions to risks especially important in ergonomics and MSD prevention. Participatory ergonomics refers to a collaborative approach to ergonomics that actively includes workers, supervisors and other stakeholders in identifying areas where improvement is needed and designing and implementing solutions (Burgess-Limerick, 2018). **When an organization engages in participatory ergonomics, frontline workers are partners in the solution development process and valued for their direct experience with the work environment.**

Participatory ergonomics can look different depending on the industry or job tasks. Some examples of ways to partner with frontline workers and implement participatory ergonomics are to involve them in decision making regarding:

- Tool and workstation design
- Job rotation or enlargement
- Processes and procedures
- Introduction of new technology, equipment or solutions

There should be a balance and collaboration between the technical expertise of safety professionals and hands-on experience of frontline workers to create and implement an encompassing safety program and reduce the likelihood of gaps in safety procedures. Benefits including MSD risk reduction, improved flow of information sharing, more meaningful work, faster implementation of changes and improved performance have been reported in connection with participatory ergonomics programs. These programs can vary in terms of complexity and level of worker involvement, and the extent of these factors is likely to moderate the impact of the program (Burgess-Limerick, 2018). A literature review of participatory ergonomic interventions found organizations that achieved worker participation tend to center workers' needs, implement interventions in a positive environment, have clearly defined roles and responsibilities, have sufficient resources and have leadership commitment and involvement in health and safety (Hansen et al., 2024). Additionally, a study exploring the experiences of workers, managers and occupational health and safety practitioners in MSD prevention found that participants commonly emphasized the value of worker engagement and involvement for proactive MSD prevention (Van Eerd et al., 2022).

## Objective

The purpose of this report is to dive deeper into frontline worker perspectives and knowledge of their workplace's safety and health initiatives, including how informed and involved they are in decisions on ergonomics-related improvements, by exploring survey data from a sample of 1,000 frontline workers in various industries. Additionally, this report seeks to compare similarities and differences in perspectives on safety and health metrics using data collected from frontline workers and safety and health leaders of organizations.

# Methodology

## Materials and Measures

The Frontline Worker Survey was designed with three subsections each encompassing a different focus area related to ergonomics and MSD prevention: risk reduction, safety culture and innovation and collaboration efforts to mimic items asked on the MSD Solutions Index. The MSD Solutions Index is a survey designed to evaluate an organization's MSD prevention initiatives from the perspective of a safety and health leader. The methodology and design of the MSD Solutions Index is explained in more detail in the **MSD Solutions Index Community Reports**.

Items on the Frontline Worker Survey were refined from the MSD Solutions Index. Adjustments were made to some items from the MSD Solutions Index to better align with roles and responsibilities of frontline worker participants. For example, items about specific risk assessments and procurement were only asked of safety professionals, while items about comfort using technology and experiences of pain were only asked of frontline workers.

The final Frontline Worker Survey included 23 questions addressing the three subsections of risk reduction, safety culture, and innovation and collaboration using multiple-choice, yes/no, Likert scale or open-ended answer options. Three attention check items, structured as "Please select strongly agree for this item" were also added to the survey to check for careless responding (Meade & Craig, 2012). Respondents were removed from the data if they missed an attention check item.

## Participants

One thousand workers were recruited to participate in the survey. The survey was administered by a third party through an online survey platform. Workers were required to be 1) employed full time, 2) residing within the United States, 3) 18 to 65 years of age, and 4) currently employed in a non-managerial role in their organization. Non-managerial roles were clustered into the following categories:

- Skilled/manual labor (e.g., construction, manufacturing, farming)
- Health care workers (e.g., nurse, doctor)
- Technology/science professional (e.g., IT, researcher, engineer)
- Clerical/administrative
- Civil servants (e.g., postal worker, police officer, firefighter)
- Educator (e.g., teacher, professor, instructor)
- Licensed professional (e.g., electrician, plumber)
- Customer service representatives
- Other (e.g., drivers, cooks)

To mirror data collected from the MSD Solutions Index, participants were also required to be from the following industries:

- Manufacturing
- Professional, scientific and technical services
- Utilities
- Construction
- Retail trade
- Health care and social assistance
- Educational services
- Transportation and warehousing
- Information
- Public administration
- Finance and insurance
- Accommodation and food services
- Other services

## Procedure and Data Collection

The survey was administered through an online survey platform. Each worker received an invitation with a link to complete the survey. Some items would lead respondents to specific follow-up items, which allowed for differences in survey progression dependent upon each worker's unique responses.

Data collection began on May 7 and concluded on June 11, 2024. Due to missing data or respondents not fitting the specifications of the study, several responses were discarded from the survey. Several more participants were then recruited to replace the discarded responses to make a complete sample of 1,000 responses.

## Data Analysis

After survey closure, collected data were reviewed for completion and cleaned for analysis. Data were cleaned and re-coded as necessary in Excel (Microsoft Corporation, 2016) and the Statistical Package for the Social Sciences version 30 (SPSS, Chicago, IL), and statistical analyses were conducted in SPSS. Analyses conducted included descriptives, frequencies and Pearson's correlations with $\alpha = 0.05$. Scale scores of like items (e.g., items concerning employee trust, items concerning general safety culture and items concerning frontline worker involvement) were also calculated to create more succinct "involvement," "trust" and "safety culture" variables for analyses. Descriptive and correlational results are detailed in the findings section, and a full correlation table is available in the Appendix.

## Results and Discussion

One thousand workers were in the final data set. Of those workers, the median age was 45 years of age, with the majority of employees between 35 and 55 years of age (63.4%). Workers' industries (Figure 1) and roles varied, with technology/science professionals (21.9%) and skilled/manual labor positions (21.1%) being the most common (Figure 2). Additionally, most (67.2%) respondents had been employed at their current position for more than six years.

**Figure 1.** *Distribution of respondents by industry*

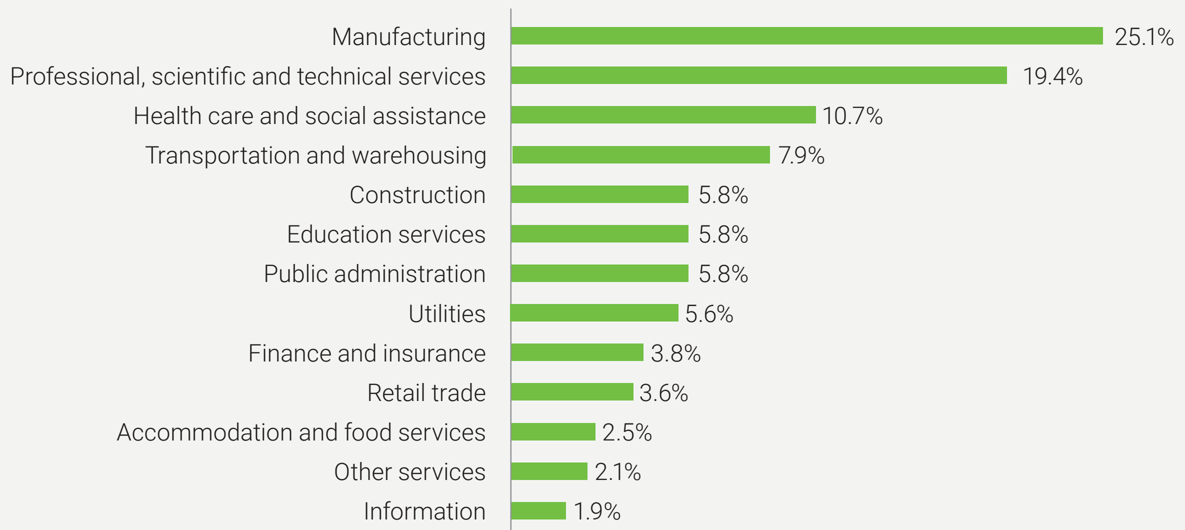
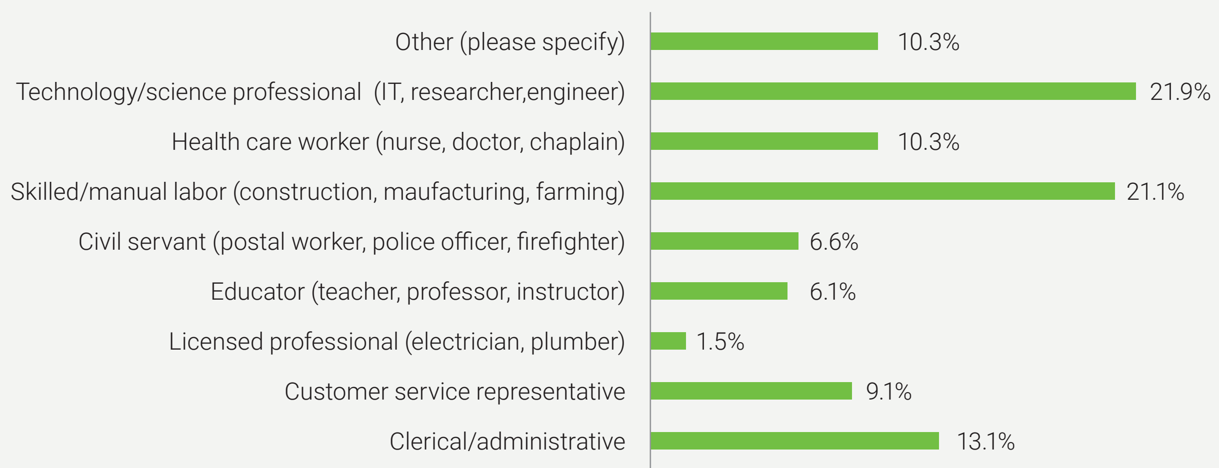


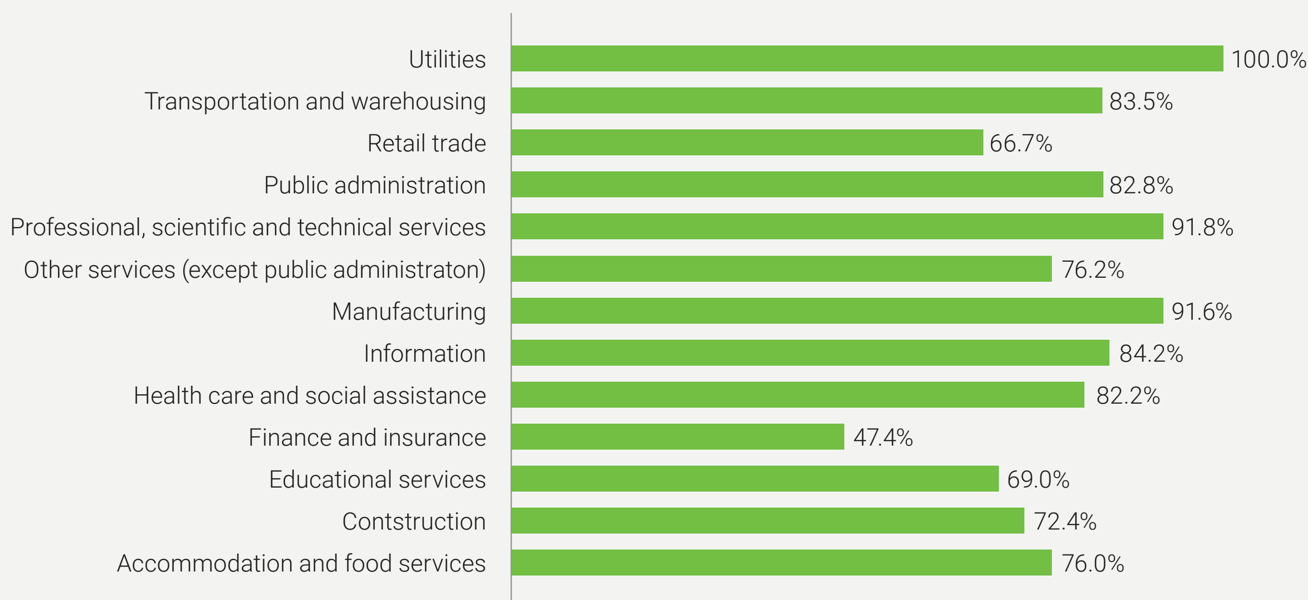

**Figure 2.** *Distribution of respondents by job role*



## Risk Reduction

Results from the survey offered some perspective into employees' experiences and perceptions of their organizations' ergonomics and MSD prevention activities. Most respondents (84.1%) knew of their organizations' safety and health initiatives, while 6.8% were unsure if their organization had any safety and health initiatives. Respondents in the finance and insurance industry were least likely to report that they knew their organization had safety and health initiatives (47.4%), while all respondents in the utilities industry (100%) knew about their organizations' initiatives (Figure 3). Of those who knew about safety and health initiatives, 95.4% rated having a "good," "very good" or "excellent" understanding of them.

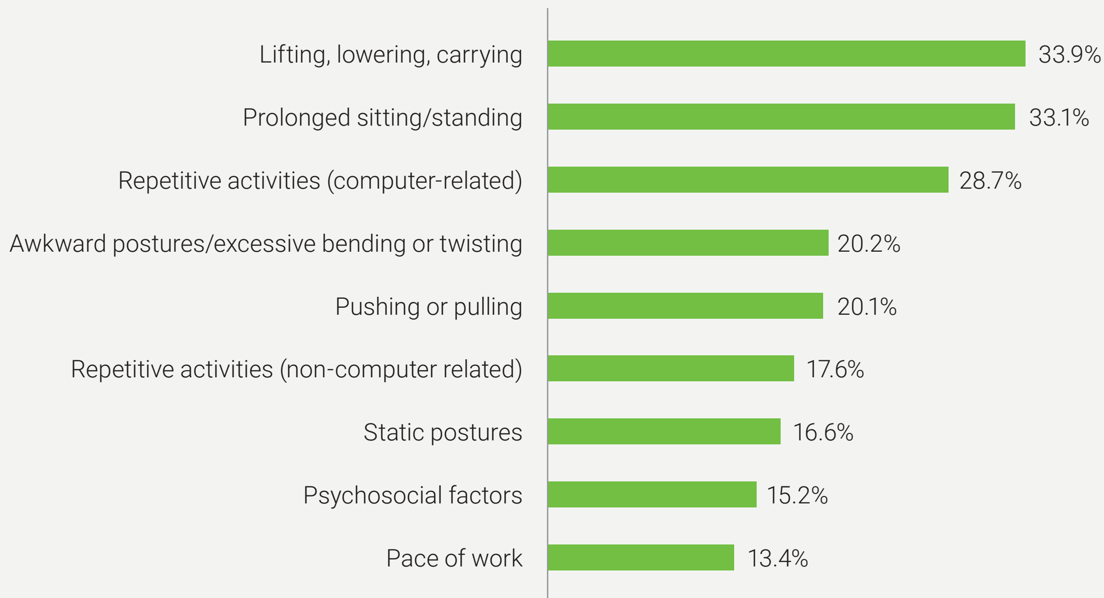
**Figure 3.** *Awareness of safety and health initiatives by industry*




Respondents were also asked to describe their understanding of the definition of MSDs. Qualitative analysis of those responses indicated almost 20% had little to no concept of MSDs, and while respondents were commonly aware that MSDs impact muscles, bones, joints and connective tissues, less than 1% associated MSDs with ergonomics in these written responses.

Respondents were asked about their organizations' top three greatest MSD risk factors, and while there was variation by industry, the most common risk factors were 1) lifting, lowering or carrying; 2) prolonged sitting/standing; and 3) computer-related repetitive activities (Figure 4). The neck and back were consistently named by respondents as body parts most impacted by MSDs, though there was some variation by age and industry. Younger respondents, along with those in the accommodation and food services, educational services, and professional, scientific, and technical services industries were more likely to report the lower body (hip, knee, ankle, foot/toes) as the most impacted by MSDs. Older respondents and those in the construction, finance and insurance, manufacturing, public administration, and utilities industries were more likely to report upper extremities (shoulder/upper arm, elbow/forearm, wrist and hand/fingers) as the most impacted by MSDs.

**Figure 4.** *Most common MSD risk factors as reported by frontline workers*



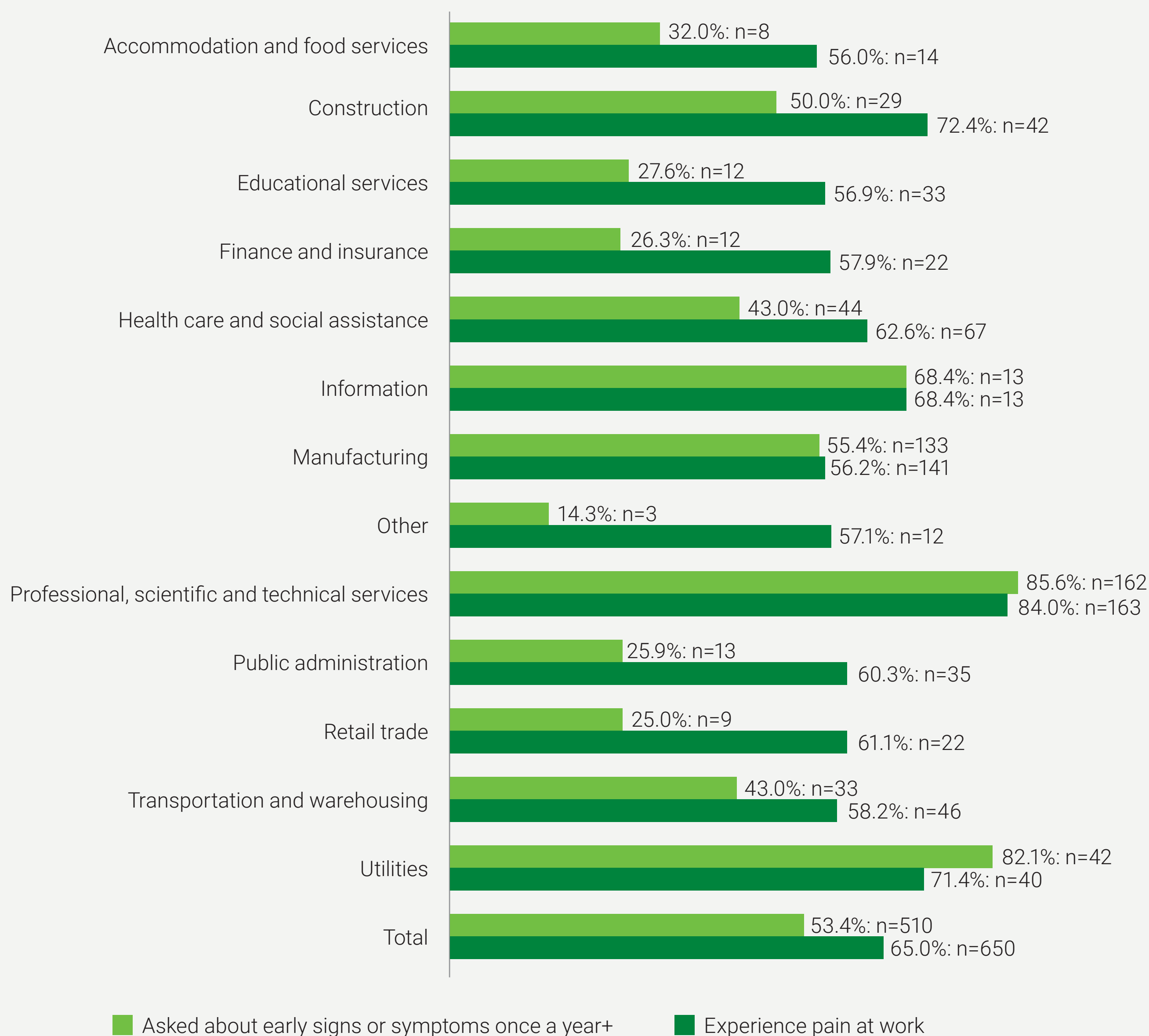

Majority (69.8%) of respondents reported that their organization has an ergonomics and/or MSD prevention program. Majority of respondents also indicated that they sometimes (29.3%), often (35.5%) or always (8.9%) hear ergonomics mentioned in their workplace, whether in trainings, meetings or other day-to-day activities. Additionally, respondents' perception of their workplaces' ability to prevent work-related MSDs is significantly associated with the frequency with which ergonomics is discussed in the workplace ($r = .57$, $p < .001$; Figure 5). When it comes to injury treatment/return-to-work programs, respondents reported their organizations having light-duty options and job modification most commonly, and onsite medical clinics and physical/occupational therapy least commonly.

**Figure 5.** *Relationship between ability to prevent MSDs and frequency of ergonomics mentioned at work*

Almost two-thirds of respondents (65%) reported experiencing pain at work, and among those who have experienced pain, 54.2% stated that they report pain immediately or within the day while 28.8% responded that they do not report pain at work. Reporting to a supervisor was the most common method in place for reporting early signs of MSDs, such as pain, though 23.2% of respondents reported not having a method in place for early reporting or are unsure of their options.

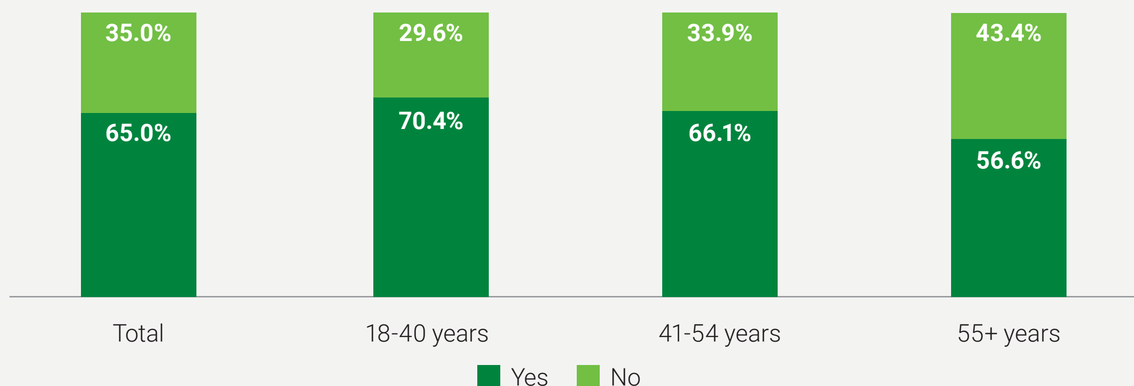
Additionally, 26.9% of respondents indicated that they and their colleagues are never asked about early signs or symptoms of MSDs. Level of understanding of their organization's safety and health initiatives ($r = .24$, $p < .001$), frequency of hearing ergonomics mentioned at work ($r = .35$, $p < .001$) and frequency being asked about early signs or symptoms of MSDs were all positively associated with how promptly pain is reported. Trends were also seen by industry when discerning the frequency that a worker was asked about their signs or symptoms of MSDs (such as muscle or joint soreness, discomfort, pain, tingling, decreased range of motion) at work and whether they have experienced pain (Figure 6). For example, only the utilities and professional, scientific, and technical services industries asked about MSD signs and symptoms at a higher rate than pain was experienced. Overall, however, having experienced pain at work is associated with more frequently being asked about signs or symptoms of MSDs ($r = .15$, $p < .001$).

**Figure 6.** *Disparity between being asked about signs and symptoms of MSDs and experiencing pain at work by industry*



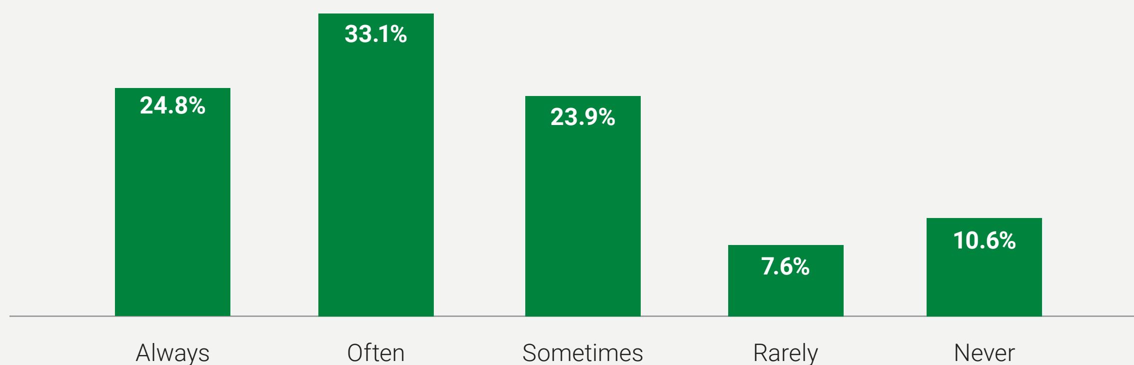
As age increased, there was a lower understanding of their organizations' safety and health initiatives ($r = -.08$, $p = .019$), less favorable perception of their organizations' ability to prevent MSDs ($r = -.14$, $p < .001$) and less prompt reporting of pain ($r = -.20$, $p < .001$; Figure 7).

**Figure 7.** *Frontline workers reporting experiencing pain at work by age*




A majority of workplaces represented in the survey (57.9%) were reported by respondents as always or often providing proper ergonomic tools and equipment. However, 18.2% of respondents indicated that their workplaces never or rarely provided proper tools and equipment (Figure 8). Additionally, there was a weak but statistically significant negative correlation between age and access to proper tools and equipment, with older workers less likely to report having them ($r = -.09$, $p = .006$).

**Figure 8.** *Frequency of providing proper ergonomic tools and equipment to frontline workers*



## Discussion of Risk Reduction Results

The majority of workers reported being aware of their organizations' safety initiatives and having at least a good understanding of them. While awareness does not necessarily translate to meaningful participation or trust in these initiatives, the survey findings suggest that accessibility and understanding of them do make a difference in risk reduction efforts. This is reflected in the positive correlations of prompt reporting of pain with both the level of understanding of safety and health initiatives and frequency of hearing about ergonomics and being asked about signs of MSDs. Similarly, the strong association between the frequency respondents hear about ergonomics at work and more favorable perceptions of their workplace's ability to prevent MSDs shows that regular communication and discussion regarding ergonomics and its role in preventing MSDs is key to creating an environment where employees feel safe at work. These findings reinforce current research on MSD prevention perceptions, which indicates that awareness and direct communication about MSDs are necessary components to MSD risk reduction strategies (Van Eerd et al., 2022).

The observed positive association between having experienced pain at work and more frequent inquiries about early MSD signs and symptoms suggests that organizations where employees are more likely to experience pain may be more proactive in monitoring for signs of MSDs. Similarly, organizations that frequently ask workers about pain may also foster environments where workers feel safer in reporting their pain. Related, findings indicated that perceptions of MSD risk and awareness of safety initiatives vary notably by industry, which could reflect how workers in more safety-sensitive industries such as utilities, where physical risks are more immediate or visible, compared to an industry like finance and insurance, may have more robust safety communication and training efforts. There may be opportunity to learn from risk reduction work being done in these safety-sensitive industries. For example, Merck's Stonewall plant had success incorporating more participatory approaches to ergonomics training that emphasize collaborative leadership between management and labor (Mahan et al., 2013). Additionally, the SAVE (Safety Voice for Ergonomics) protocol combines ergonomics training with communication skills and significantly reduced MSD risks among masonry apprentices (Kincl et al., 2016). Those receiving the integrated training spoke up for safety more, participated more in safety initiatives, adopted more ergonomic practices and engaged in less high-risk postures (Hess et al., 2020). This study and the current study support embedding this dual-focused approach in vocational programs to address behavioral and environmental drivers of MSDs.

Regarding methods to report early signs of MSDs, 23.2% of respondents do not know of a method. Additionally, almost 20% of respondents reported having little to no understanding of what MSDs are when they were asked to describe their understanding of the definition. While respondents commonly associated MSDs with pain or injury to the muscles, bones, joints and connective tissues, very few mentioned ergonomics or the processes that can lead to or prevent MSDs. These findings align with published studies showing that many workers lack a clear understanding of what MSDs are or how their tasks contribute to them (Van Eerd et al., 2022), that poor organizational communication often limits awareness of reporting procedures and that some workers view MSD symptoms as a normal part of the job and therefore choose not to report them (Kyung et al., 2024; Yazdani & Wells, 2018). The European Agency for Safety and Health at Work (EU-OSHA) found a similar trend of underreporting by workers suggesting perceived consequences of reporting and a lack of understanding of what constitutes a work-related condition or the compensation that comes with that recognition (Howard et al., 2019).

These results represent an opportunity to educate and empower workers to better recognize risk factors, engage in early reporting and actively participate in prevention efforts that reduce the likelihood of developing MSDs. To this effect, the campaign led by EU-OSHA, "Healthy Workplaces Lighten the Load," aimed to raise awareness and share practical guidance on preventing and managing MSDs. Similar campaigns may be impactful in other workplaces as well.

While workplace safety interventions are more effective when implemented at the group or organizational level as opposed to focusing on individuals (Dyreborg et al., 2022), risk reduction strategies should be context specific, accounting for the nature of the work and unique characteristics of the workforce. For example, the age range of workers should be considered given the age-related patterns that emerged in the current study. Younger workers were more likely to report that they have experienced pain at work compared to older age groups (Figure 7). Additionally, results indicated that older respondents may have a lower understanding of and confidence in their workplaces' safety and health initiatives, report pain less promptly and may be generally unaware of processes to report pain and symptoms.

A higher proportion of younger workers reporting that they have experienced pain at work aligns with previous findings that younger individuals may be at greater risk of workplace injuries and face greater exposure to certain MSD risk factors such as vibration, extreme temperatures, awkward postures, heavy lifting, repetitive tasks, high-pressure work and tight deadlines compared to older workers (Muhammad & Marcham, 2021; Verjans et al., 2007). However, that does not necessarily translate to higher MSD prevalence. A report by the EU-OSHA demonstrated that advancing age is significantly associated with a higher likelihood of reporting MSDs. Even after controlling for country, sector, occupation, and physical, organizational and psychosocial risk factors, age remained a strong predictor of MSD prevalence (de Kok et al., 2019).

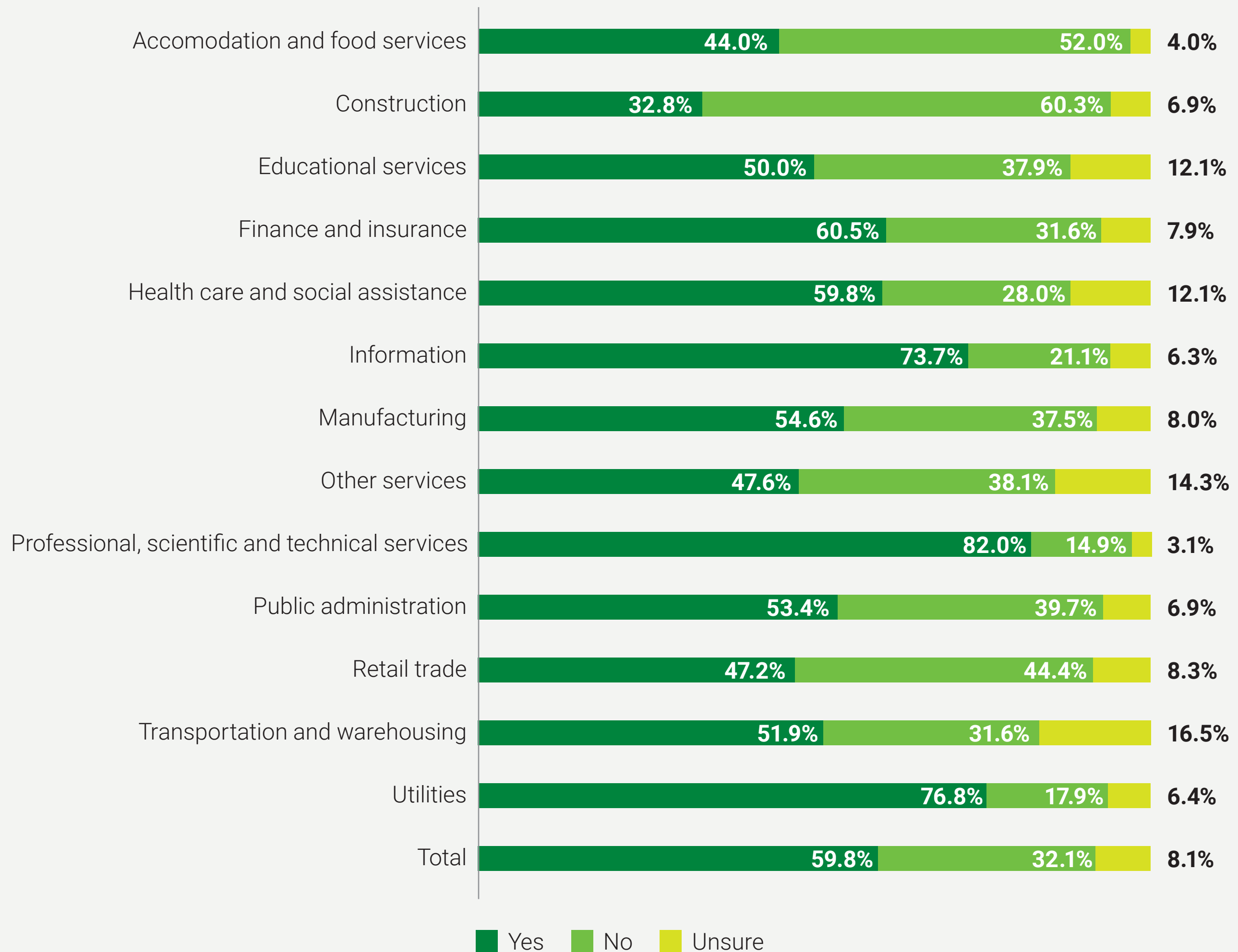
The results of the current study that older workers were less prompt in reporting when they experience pain could be due to an increased pain threshold, or that they may perceive pain less acutely than younger individuals (Domenichiello & Ramsden, 2020). This altered pain perception can contribute to delayed recognition and reporting of pain symptoms. Additionally, the findings that older respondents have lower confidence and understanding of safety and health initiatives may be impacting how promptly they report pain and MSD symptoms. It is also possible that older workers have developed greater tolerance for discomfort or found effective workarounds to manage MSDs over time, while those who were less tolerant or unable to adapt may have already left these roles, potentially influencing the current sample.

These findings related to older workers coupled with an aging workforce (Delloiacono, 2015) emphasize the need for tailored ergonomics and safety training programs that ensure full understanding, engagement and inclusion. These programs should address aging employees' unique physical, cognitive and experiential needs. Clear, accessible communication and ongoing reinforcement are especially important, and without such targeted efforts, older workers may be less familiar with or less confident in applying workplace safety and ergonomic initiatives.

## Safety Culture

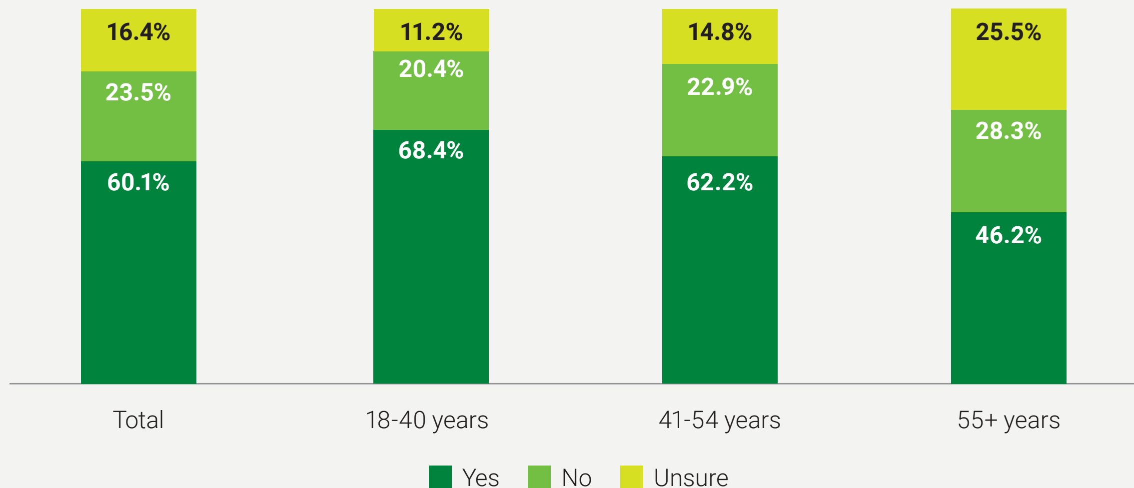
Over half (59.8%) of respondents indicated that their workplace conducts employee culture, perception or engagement surveys, though they are less common among respondents in the construction and accommodation and food services industries (32.8% and 44.0%, respectively). In all other represented industries, employee perception surveys were more common (over 50% stating they had such surveys), with over three-quarters of utilities workers expressing they had perception surveys (76.8%; Figure 9).

**Figure 9.** *Perception surveys administered by industry*



Similarly, majority of respondents (60.1%) are aware of methods to share safety and ergonomic improvement suggestions, although compared to younger employees, those who are in the 55+ age group were more likely to report no methods to suggest improvements or being unsure if there are methods in place (Figure 10).

**Figure 10.** *Awareness of methods to share safety and ergonomic improvement suggestions by age*




Related, of those who are aware of methods to suggest improvements, utilization of those methods is less common with increased age. Only 9.2% of 18- to 40-year-old employees have opted to not share safety/ergonomic improvement ideas, compared to 21.6% of 41- to 54-year-olds and 33.9% of employees 55 or older. Newer employees were also less likely to suggest safety/ergonomic improvements in comparison to more tenured employees. Of those who are aware of methods to suggest improvements, 73.1% of respondents stated that they often or always receive follow-up on the feedback they provide, while only 6% rarely or never receive follow-up.

Correlation analyses revealed significant positive associations between feedback mechanisms and employees' perceptions of their workplace's ability to prevent MSDs. Respondents who reported that their workplace conducts culture, perception or engagement surveys were more likely to rate their organization's MSD prevention ability favorably ($r = .34$, $p < .001$). Similarly, the presence of methods for employees to share safety and ergonomic suggestions was strongly associated with more favorable perceptions of their organization's MSD prevention ability ($r = .51$, $p < .001$). Frequency of receiving follow-up on feedback was also positively associated with these perceptions ($r = .31$, $p < .001$). Additionally, mechanisms for employees to share feedback and receive follow-up were associated with faster reporting of pain among those who have experienced pain at work (conducts culture, perception or engagement surveys $r = .24$, $p < .001$; methods to share safety/ergonomic suggestions $r = .38$, $p < .001$; frequency of receiving follow-up on feedback $r = .29$, $p < .001$).

While most (81.4%) of respondents indicated that their organization has a new hire orientation, instructions on how to safely use ergo equipment, instructions on how to report when ergo equipment breaks and other MSD prevention information are least commonly included in new hire orientations. Ergonomics and MSD prevention training was conducted in just over half (51.1%) of all represented workplaces, generally taking place on a monthly (27.4%) or quarterly (24.3%) basis.

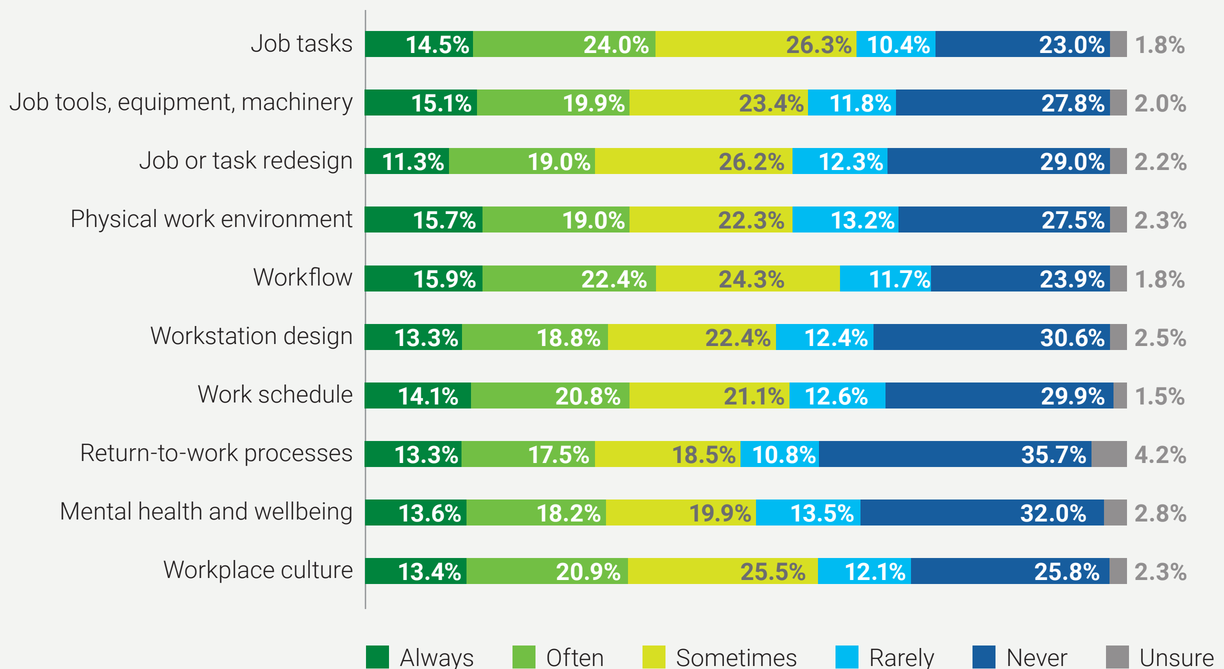
Fatigue and workplace stress were the highest non-physical risk factors contributing to MSDs in the workforce, reported by 40.8% and 40.3% of employees respectively. Fatigue is most common in the construction and transportation and warehousing industries, as well as in newly hired employees. Regarding job types, workplace stress was most common in service positions (customer service representatives, licensed professionals, civil servants and health care workers).

## Frontline Worker Involvement, General Culture and Trust

The following results are based on responses to three sets of Likert-style questions designed to assess aspects of the work environment related to employee engagement. Each set targets a specific construct relevant to understanding organizational dynamics and potential risk factors for MSDs among frontline workers.

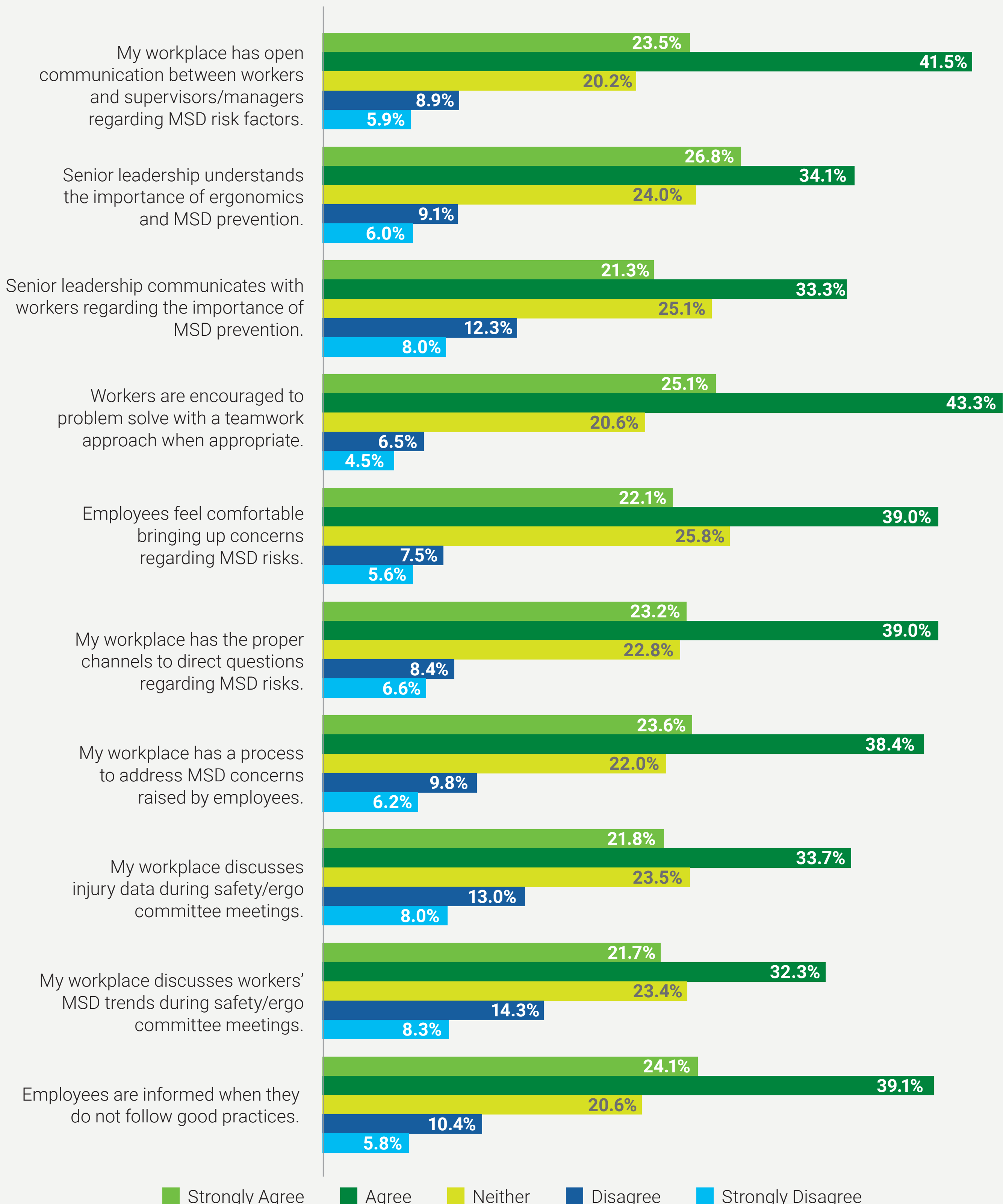
The first set of questions measures how frequently frontline employees report being involved in identifying opportunities for improvement when it comes to job tasks; job tools, equipment and machinery; job or task redesign; physical work environment; workflow; workstation design; work schedule; return-to-work processes; mental health and wellbeing; and workplace culture. Respondents were most often involved in determining where improvements should be made regarding job tasks, workflow and workplace culture and were the least involved when it came to return-to-work processes, mental health and wellbeing, and workstation design (Figure 11).

**Figure 11.** *Frontline worker perceptions of involvement in various areas*



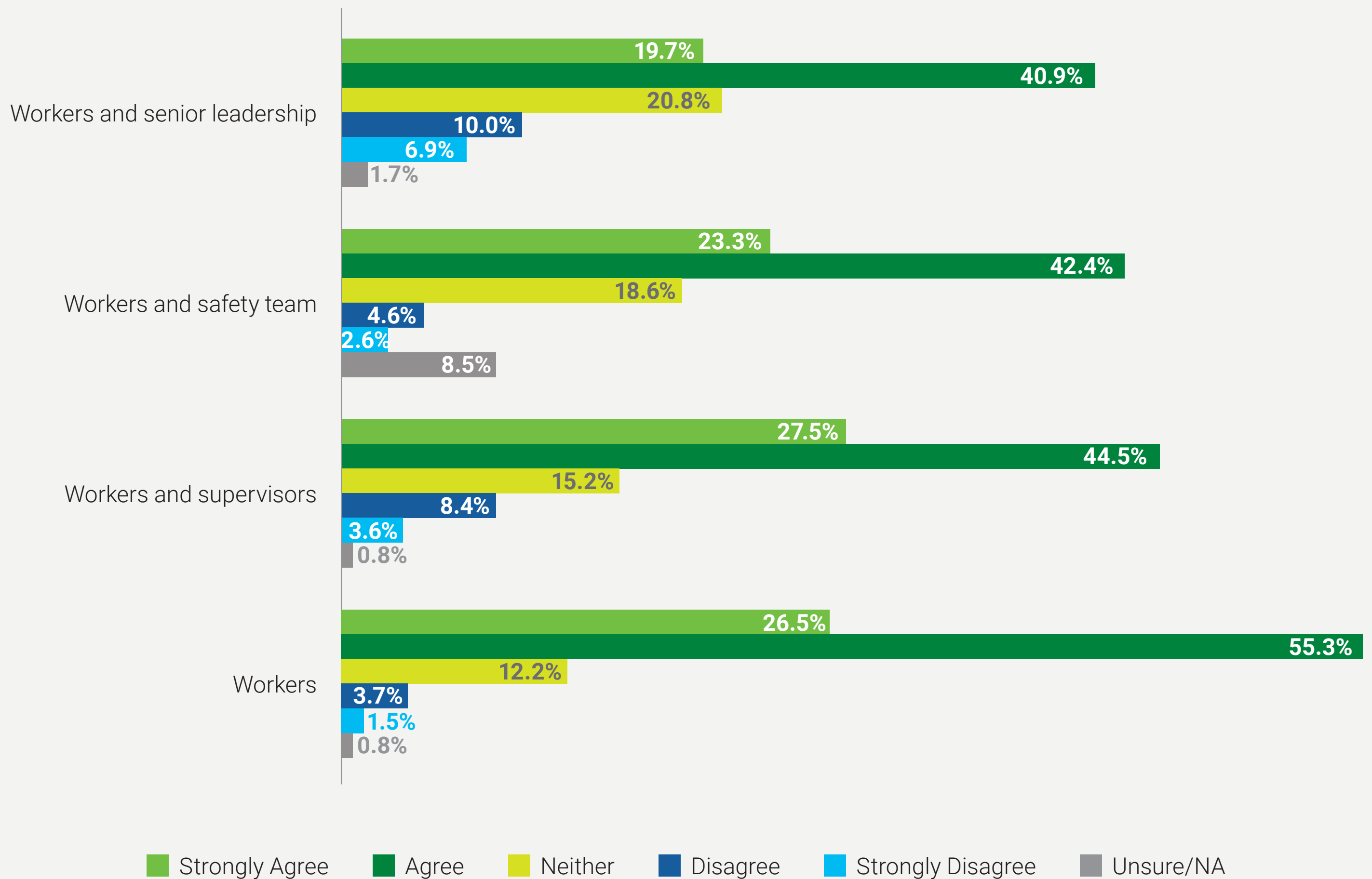
The second set of questions captures respondents' level of agreement with statements (Figure 12) that address workplace safety culture and communication about MSDs. Respondents had the highest level of agreement with the statements that workers are encouraged to problem solve using teamwork and that there is open communication between workers and supervisors/managers regarding MSD risk. Agreement was lowest with the statements that MSD trends are discussed during safety/ergonomic meetings and that senior leadership communicates the importance of MSDs (Figure 12).

**Figure 12.** *Frontline worker perceptions of safety culture and communication about MSDs*



The third set assesses perceptions of the level of trust in the workplace, asking respondents their level of agreement that there is trust between workers; workers and supervisors/managers; workers and safety team; and workers and senior leadership. Responses indicated that there is less trust between employees with more hierarchal distance in their positions. Most (81.8%) of respondents agreed or strongly agreed that there is trust between workers, 72% agreed or strongly agreed there is trust between workers and supervisors/managers, and 60.6% agreed or strongly agreed there is trust between workers and senior leadership (Figure 13).

**Figure 13.** *General trust perceptions between workers at different levels*



Scores were calculated for overall involvement, general workplace culture and trust. Higher scores indicate more agreement with the item (more frequent involvement, more favorable perception of safety/ergonomics culture, higher levels of trust), while lower scores indicate less agreement. Higher involvement, culture and trust scores were all negatively correlated with age, indicating that older respondents had less positive perceptions of frontline worker involvement ($r = -.27$, $p < .001$), safety culture ($r = -.15$, $p < .001$) and trust ($r = -.15$, $p < .001$). Involvement, culture and trust scores were positively correlated with more favorable perceptions of their organization's ability to prevent MSDs ($r = .52$, $p < .001$; $r = .68$, $p < .001$; $r = .55$, $p < .001$, respectively) and faster reporting once pain is experienced ($r = .51$, $p < .001$; $r = .51$, $p < .001$; $r = .37$, $p < .001$, respectively). Additionally, there were strong correlations between involvement, culture and trust scores (involvement and culture, $r = .67$, $p < .001$; involvement and trust, $r = .51$, $p < .001$; culture and trust, $r = .70$, $p < .001$).

## Discussion of Safety Culture Results

Many perspectives of workplace safety culture leaned more positive than negative. For example, over half of employees cited having employee perception surveys in their workplaces, which is a great first step in getting employees' voice when trying to understand an organization's culture and where improvements can be made. Similarly, over half of workers stated that their organization provides a process to share safety and ergonomic improvement suggestions, and that the majority of organizations follow up on those suggestions.

Although 60.1% of respondents were aware of methods to suggest ergonomic improvements and only 6% reported not receiving follow-up, there remains a significant opportunity for more organizations to establish clear feedback channels and actively encourage employees to use them. It is promising, however, that most organizations appear to follow a process to receive feedback, as following up on employee surveys can lead to various benefits, including improved workplace culture, morale and employee relations. On the other hand, when follow-up is absent, it can significantly undermine the impact of employee feedback. Inconsistency or lack of follow-up has been shown to weaken the benefits of engagement efforts, leading to mixed outcomes and even declines in job satisfaction when employees feel their input is disregarded (Huebner & Zacher, 2019). This is corroborated by results of the current survey, as there are strong correlations between employees being able to provide feedback and receive follow-up and more favorable perceptions of how well their organization prevents MSDs and faster reporting when pain is experienced.

Similarly, the correlations of involvement (level of frontline worker involvement in identifying opportunity for improvements), culture (level of favorability of workplace culture) and trust (level of perceived trust in workplace) with more favorable perceptions of their organization to prevent MSDs and faster reporting of pain suggest a connection between safety culture and risk reduction, and that encouraging employee participation in ergonomic processes may enhance trust and confidence in MSD prevention efforts.

An example of this in practice is demonstrated in a case study by Merck's Stonewall plant (Mahan et al., 2013), where significant improvements in workplace health and safety was the result of a collaborative training effort between management and workers. The transformation began with a plant-wide commitment to OSHA 10-hour General Industry training, which is considered the industry standard. The trainings were comprehensive and conducted jointly among hourly employees and managers to foster shared understanding and accountability. These efforts led to a noticeable shift in workplace culture, marked by increased respect and collaboration between labor and management, which enabled the joint development of new solutions, such as a tool to assist with glass loading, a task previously linked to wrist and shoulder injuries. This example of participatory ergonomics demonstrates the power of worker-centered strategies and that frontline worker involvement is an asset to effective MSD prevention.

Along with involving frontline workers in identifying ergonomic improvement opportunities and regular communication about ergonomics, trust is a crucial factor when it comes to fostering a culture of safety and is a key driver of improved safety outcomes. In the current study, reported trust levels decreased as hierarchal distance in position increased, supporting previous research that highlights how power dynamics and organizational hierarchy can shape not only perceptions of safety culture, but also trust, communication and willingness to report concerns (Abrams et al., 2023; Moore & Haynes, 2023; Munn et al., 2023; Tawfik et al., 2023; Tear et al., 2020).

In the current survey, 20% strongly agreed there is trust between workers and senior leadership, which is similar to a report by Gallup, where only 21% of U.S. employees strongly agree that they trust their organization's leadership. Their analyses suggest that when leaders communicate early, inspire confidence in the future, and lead and support change, the percentage of employees that strongly agree they trust leadership increases to 95%. Similarly, Zavaglia (2023) concludes that a culture of trust that fosters psychological safety encourages employees to participate actively in problem-solving and continuous improvement, which enhances tasks and systems, strengthens the overall safety culture and ultimately helps reduce workplace incidents. When employees perceive strong management commitment to health and safety, the positive link between trust and safety behavior is further strengthened, amplifying safety benefits across the organization (Ordysiński, 2024). These takeaways are in line with the strong correlations in the current survey of frequent communication about MSDs and frontline worker involvement in suggesting improvements with increased trust levels in the workplace.

Perceptions of safety culture varied by worker characteristics, and similar to the Risk Reduction findings, some concerning trends related to older workers emerged. Older workers reported being less aware of methods to suggest safety and ergonomic improvements (Figure 9), and reported using such methods at lower rates compared to younger workers. The Mature Workers in Organisations Survey in Australia found that only 45% of workers aged 55 to 64 feel their leaders value employee contributions (compared to 58% of younger workers), thus reporting fewer positive experiences regarding workplace engagement and knowledge sharing. Specifically, over one quarter (26%) of workers aged 55 and above reported that their colleagues do not provide them with knowledge and advice, compared to only 15% of those under 55 (Iles et al., 2019). Also, Drake et al. (2017) reported that discussions with older workers reveal they do not feel supported or engaged, and are fearful of reporting any capability changes that may affect their ability to perform work tasks as they believe this may have negative consequences for their future employment. These two studies and the current survey's findings indicate an opportunity for workplace improvement discussions among older workers. Additionally, older workers may need reminders about their options for reporting feedback and might benefit from training on how to utilize such systems.

Similarly, as per the current survey, newer workers were less likely than more tenured employees to suggest improvements related to safety and ergonomics. This highlights potential issues related to accessing information and organization policies related to ergonomics, or a lack of an inclusive, psychologically safe environment where speaking up is encouraged. Pairing these new employees with tenured employees, who often possess valuable institutional expertise and may be more confident speaking up, is one potential method to improve employee engagement (Holt et al., 2016).

Organizations should ensure new workers understand processes for suggesting safety improvements, especially given that the risk for injury is often higher for workers newer to the job (Breslin et al., 2019). While it is promising that 81% of the current survey respondents indicate that their organization has a new hire orientation, as per Travelers Risk Control (2023), onboarding should not stop after a new hire's first week. A thorough orientation process introduces employees to the facility layout, safety culture, emergency procedures and reporting protocols. Then, onboarding should be a continuous process that supports employee safety, engagement and retention throughout their employment. These training components help build a safety culture, ensuring employees know how to work safely and why it matters throughout their careers. In a study that asked workers, managers, and occupational health and safety practitioners about the most useful MSD prevention practices, participants emphasized that both formal and informal communication, such as regular discussions between workers and managers or safety professionals about new safety ideas or specific ergonomic risks, were effective in raising and maintaining awareness of MSDs (Van Eerd et al., 2022). They also stressed that training should not be limited to orientation but delivered on an ongoing basis, with materials regularly reviewed and updated to reflect current evidence.

## Innovation and Collaboration

Most employees (40.9%) expressed excitement about how technology such as robots, cobots or wearables could improve their jobs, while fewer reported feeling conflicted (13.4%), hesitant (17.7%) or neutral (28.0%) toward adopting new technologies. Only workers from the retail trade, finance and insurance, and other services industries reported more reservations than excitement about technology (Figure 14). Perceptions about adopting emerging technology also varied by the role of the worker (Figure 15).

**Figure 14.** *Perceptions of adopting emerging technology by industry*

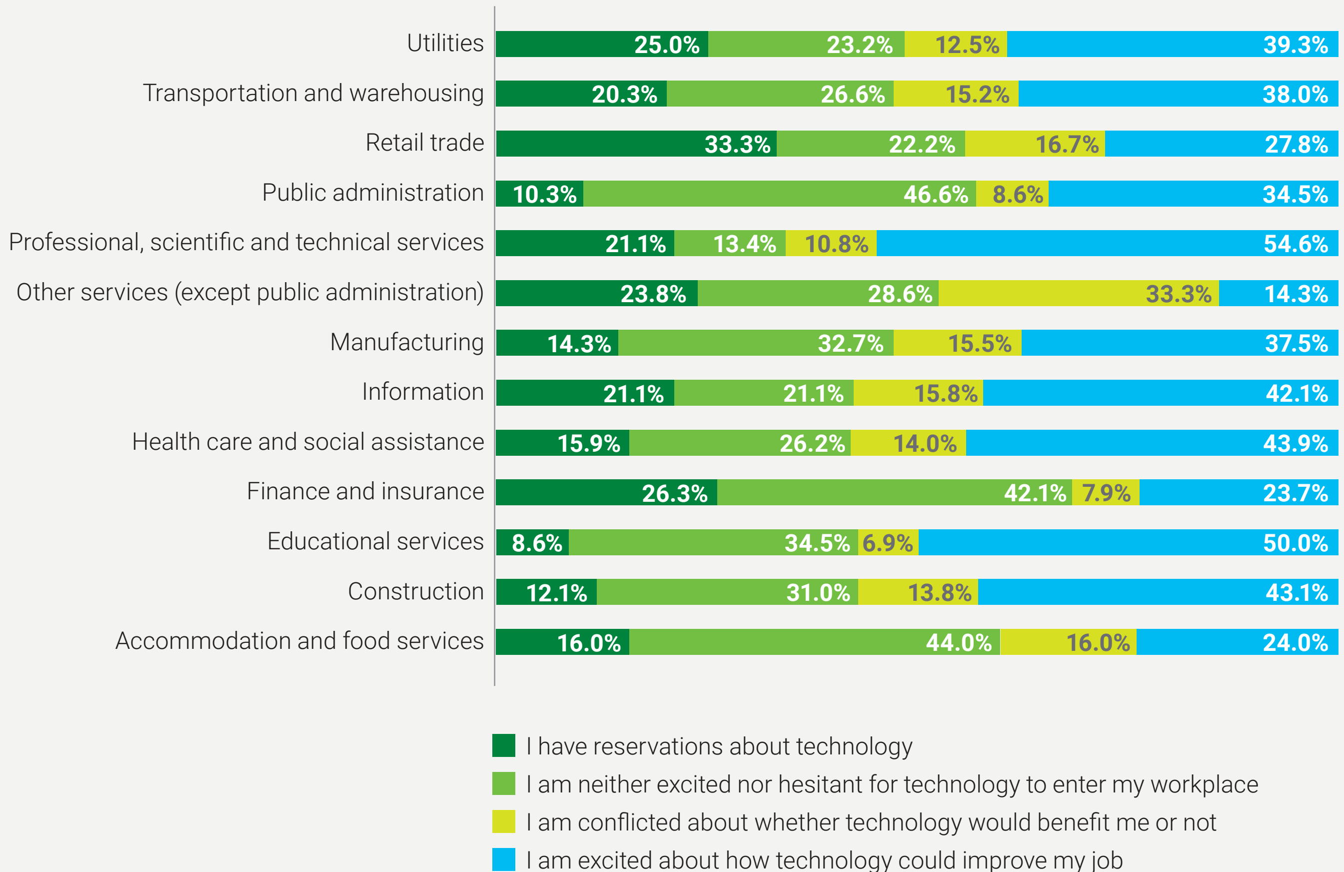
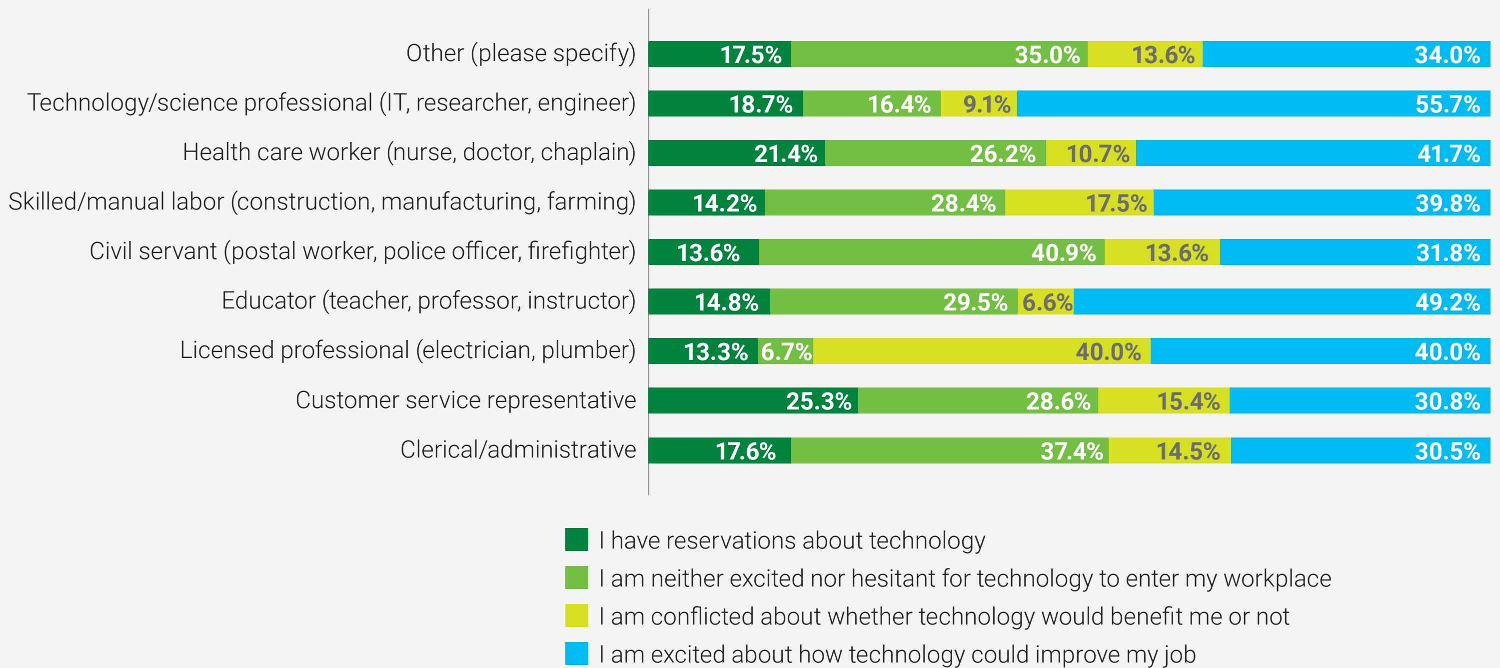


**Figure 15.** *Perceptions of adopting emerging technology by job role*




For those with reservations about technology, data usage concerns (55.4%) and potential job replacement (48%) were the primary reservations. These concerns varied by role and industry, with data usage concerns common among respondents in the educational services, other services, accommodation and food services, and finance and insurance industries. A **study conducted by the National Safety Council Work to Zero initiative** found similar data privacy concerns with safety technologies, with 49% of employers and 40% of employees voicing concerns regarding data privacy. Potential job replacement concerns are most prominent among respondents with 3 to 5 years of tenure and among workers in the information and finance and insurance industries.

For those who stated they were excited about implementing technology at work, increased productivity/efficiency (72.1%) and providing better product/service quality (64.5%) were the primary excitements about technology. More specifically, respondents in the clerical/administrative industry and licensed professionals (e.g., electrician, plumber), as well as those in the other services and information industries reported being most excited about increased productivity and efficiency. Civil servants (e.g., postal workers, police officers, firefighters) and those in the public administration industry were most excited about providing better product/service quality. Less than half (40.8%) indicated safety improvements as a reason they were excited for implementing technologies at work. Employers may need to more explicitly draw a connection between safety improvements and emerging technologies to increase acceptance and excitement around technology's benefits.

Although most (66.9%) respondents across tenure levels, role, age and industry were comfortable or very comfortable with the idea of using technologies at work for MSD risk reduction, there was a small but statistically significant negative correlation between older age and comfortability using technology ($r$ = -.19 , $p$ < .001). On the other hand, higher frontline worker involvement in decision making ($r$ = .44 , $p$ < .001), more favorable perceptions of safety/ergonomics culture ($r$ = - .40, $p$ < .001) and higher trust scores ($r$ = .43 , $p$ < .001) were strongly correlated with comfortability using technology at work. Additionally, higher comfortability using technology at work was positively correlated with more favorable perceptions of their organization's ability to prevent MSDs ($r$ = .35 , $p$ < .001) and the availability of proper ergonomic equipment ($r$ = .34 , $p$ < .001). Just over 60% (61.8%) of respondents reported that their workplace either does not utilize technology to reduce MSD issues or were unsure.

## Discussion of Innovation and Collaboration Results

The innovation and collaboration section of the survey focused on the use of emerging technologies such as cobots, robots or wearable devices at work for MSD prevention. While majority of respondents are comfortable with the idea of using these kinds of workplace technologies, there were some concerns. Just under half expressed concerns about technology replacing their jobs, and just over half had concerns about how their data would be used. Yet, many of the current survey respondents were also excited about the possibilities of increased efficiencies, productivity and quality of work that technology could bring.

Specifically, clerical, trade, service and information workers were most excited about increased productivity, while civil servants and public administration workers prioritized improved service quality. Excitement or reservations about technology use seemed to follow some other industry, job type and age trends as well. Unsurprisingly, industries oriented to delivering products or services, such as civil servants, were excited about possible productivity gains from technology, while industries with access to sensitive data, like finance and insurance, expressed being hesitant about technology due to concerns over data usage. Additionally, older age was associated with less comfortability using technology at work.

These mixed feelings about emerging technology adoption are reflected in other surveys as well, although there is some discrepancy. For example, in a 2023 global survey of nearly 35,000 private-sector workers across 18 countries, the ADP Research Institute found that 85% believe artificial intelligence (AI) will impact their jobs within the next two to three years; 43% expect it to help them, while 42% fear it will replace some of their tasks through automation. Notably, those confident in their abilities were more likely to see AI as supportive. In contrast to the current survey, older employees were more likely to see AI as helpful rather than replacing them, while over half (51%) of the youngest workers believed AI would replace some or most of their tasks (Hanowell & Richardson, 2024). This discrepancy may be due to differences in the technology's perceived purpose or end goal. Older workers may be more receptive to AI when it's framed as a tool for support or productivity but less comfortable with it when it is applied in safety or risk contexts, where unfamiliarity or physical interface concerns may play a larger role.

According to a 2024 Pew Research Center survey, more American workers were worried (52%) than hopeful (36%) about AI's future impact on jobs. One-third felt overwhelmed, 32% believed AI would reduce job opportunities and 29% felt excited (Lin & Parker, 2025). As per a 2023 Gallup poll, 22% of workers worry about their jobs being replaced by technology, an increase of seven percentage points since 2021. The increase was driven almost entirely by college-educated workers, while concern among non-college-educated workers has remained steady (Saad, 2023).

As per a CNBC Workforce Survey, over 40% of workers expressed concern about AI's impact on their jobs. Concerns varied notably by job type, income and education level. Individual contributors were more likely to be concerned (44%) than managers or higher-level employees (38%), suggesting those in non-leadership roles may feel more vulnerable to potential displacement or change. Income level also played a role with 47% of workers earning less than $50,000 annually expressing concern, compared to 39% earning $50,000 to $99,999 and 36% making $100,000 or more (Gutierrez, 2023). These patterns suggest that lower-income and non-managerial workers, often with lower levels of formal education, may hold greater reservations about AI, potentially due to fears of job displacement or limited access to reskilling opportunities.

While emerging technologies have potential to improve frontline worker experiences, the ambiguity about how data from these technologies might be used concerned a little over half of the current survey respondents. Yet, the current survey found that the more involved workers are in decision making, the higher the feelings of trust, and the stronger the culture, the more likely workers are to report comfortability with technology. This is a robust finding and corroborates findings from Jacobs et al. (2019), which emphasized that a strong safety climate that actively involves employees early in the decision making and implementation process, thereby fostering a sense of ownership and trust, played a key role in employee acceptance of wearable technology. The authors further stressed that providing clear and transparent communication about how data will be used and protected also helps alleviate privacy concerns and supports long-term adoption.

As technology use, especially automation and AI, increases, organizations and safety and health leaders should work to abate feelings of concern over technology by clearly defining the purpose of such technologies and the generated data. Often, if workers can access their own data, and if technology is viewed as a way to help them get their work done, as opposed to get their work done for them, workers can be more comfortable with such technology integration into work systems. Khoza et al. (2024) reported that employees' technology readiness and acceptance are positively associated with work engagement. The authors found that technology enhances engagement when perceived as a supportive resource rather than a replacement. This reinforces the notion that technology is best adopted when it empowers, not threatens, the workforce.

Similarly, when employees have higher technology self-efficacy and are supported by their workplace in using technology as a tool (through training and simplified features), their comfort and performance improve (Rasool et al., 2022). This supports the current study's findings that comfort with using technology is associated with access to proper ergonomic equipment and more favorable perceptions of their organization's efforts to prevent MSDs. In work environments where employees feel adequately supported and equipped, and trust that their organization prioritizes their wellbeing, they may be more willing to embrace new technologies.

## Comparisons to MSD Solutions Index

Fostering agreement between safety and health leaders and frontline workers in their perceptions of safety and health initiatives can play an important role in improving workplace outcomes. For example, discrepancies in safety perceptions between organizational levels have been linked with higher injury rates, and having a better understanding of these discrepancies may provide insight into effectively involving workers, supervisors and managers in developing solutions (Marin et al., 2019). Similarly, greater agreement, or "sharedness," in perceptions of psychological safety within teams has been linked to stronger team performance (Fyhn et al., 2022). These findings underscore the value of identifying and addressing gaps in safety perceptions across organizational roles.

As previously indicated, the MSD Solutions Index is completed by safety and health leadership as compared to the current survey completed by the frontline workers. Hence, differences were expected that might reflect their distinct roles, experiences and perspectives within the organization. Analysis comparing the frontline worker survey data and MSD Solutions Index data were conducted for relevant variables.

Safety and health leaders perceive that proper ergonomic tools and materials are more often supplied to workers, with 74.6% of Index respondents indicating that such tools were always or often supplied, while only 57.9% of workers indicated having access to proper tools always or often. This discrepancy in perceptions deserves further exploration. Possibly, frontline workers may not know the details of what constitutes a proper ergonomic tool or piece of equipment, yet it is also possible that safety leaders have an inflated view of their delivery of proper tools and equipment to their workers.

Additionally, 76.7% of workers perceive that there is a method in place to report pain or symptoms at work, while 100% of Index respondents indicated having a method in place to report pain. This discrepancy shows a possible lack of awareness or education regarding methods in place to report pain for workers despite those methods actually being in place, or, safety and health leaders' interpretation that methods are in place when workers do not feel that such methods exist. Some of this could also be subject to how work is planned versus how work is done. For example, it could be planned for worksites to have methods in place for reporting pain and symptoms, yet worksites in actuality might not have such methods in place.

Lastly, 83.5% of safety and health leaders participating in the MSD Solutions Index indicated they had ergonomics and/or MSD prevention programs in place, while only 69.8% of workers indicated having such programs in place in their workplaces. While part of this may be due to differences in the organizations sampled, it could also be due to workers being less aware of the presence of such programs in their workplaces in comparison to safety leaders. If frontline workers are unaware of these programs, they are unlikely to participate in them, provide meaningful input or feel empowered to request changes. Results from the current survey support this, specifically that more frequent communication about MSDs is positively associated with improved perceptions of their organization's ability to prevent MSDs and more prompt reporting of pain. All of this suggests that even well-designed safety programs may fall short if they do not effectively engage and inform the workers they are intended to protect.

## Safety Culture and Presence of Participatory Ergonomics Perceptions

Perceptions of frontline worker involvement in identifying opportunities for improvement across various aspects of work differed substantially between frontline workers and organizational safety and health leaders (as captured in the MSD Solutions Index). Across all areas, including job tasks, equipment, task redesign and the physical work environment, Index respondents consistently reported higher frequencies of frontline worker involvement than frontline workers did themselves (Figure 16).

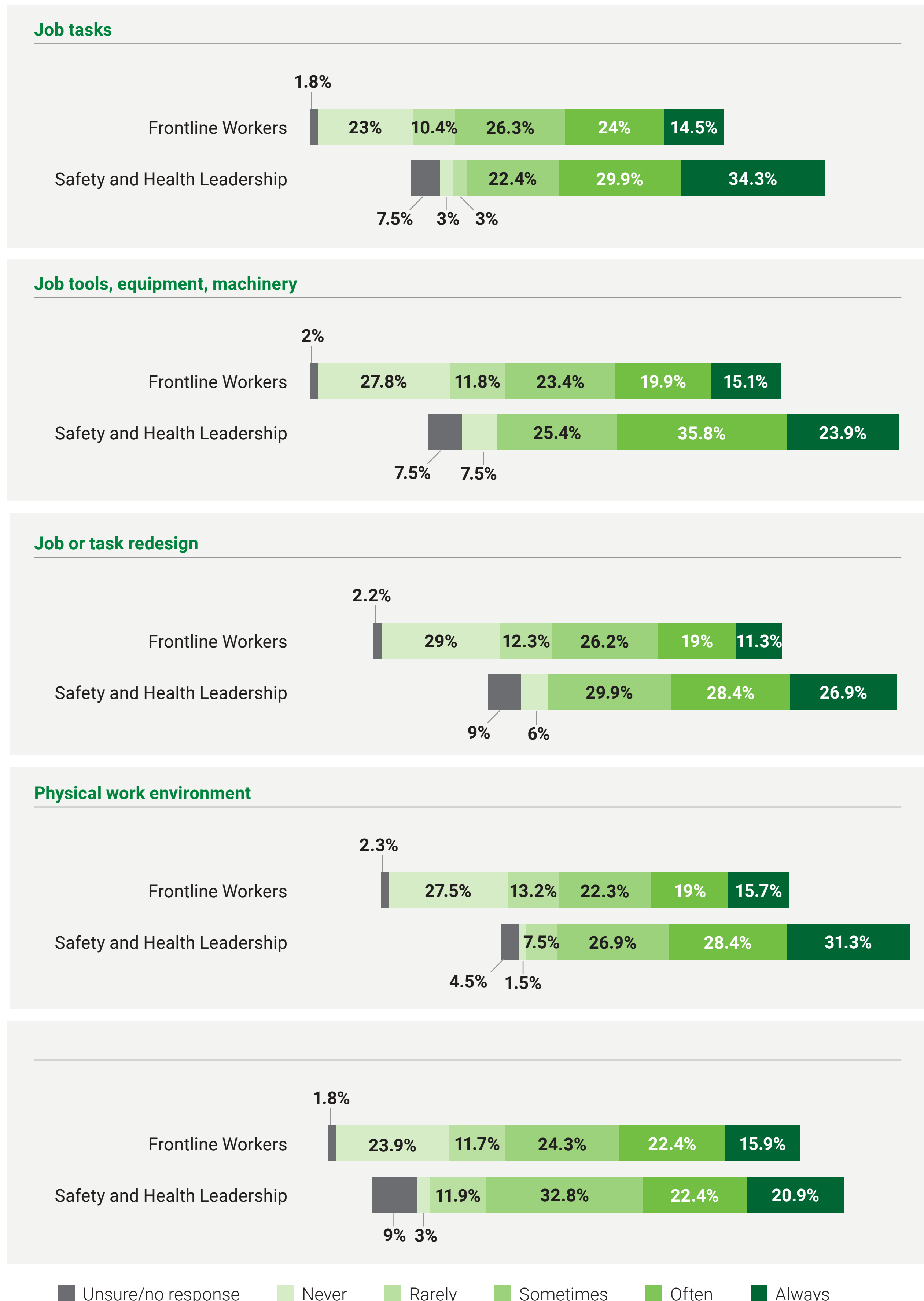
For example, 34.3% of Index respondents indicated that frontline workers are always involved in shaping job tasks, compared to just 14.5% of frontline workers reporting they were involved in determining their job tasks. Similarly, in areas such as workstation design and workflow, 41.8% and 22.4% of Index respondents, respectively, reported often involving frontline workers, while frontline worker responses were much lower (18.8% and 22.4%, respectively). The largest gaps were seen in domains like return-to-work processes and mental health and wellbeing efforts, where more than 30% of frontline workers reported never being involved, compared to just around 10% of Index respondents reporting never involving frontline workers in such processes and efforts. These discrepancies suggest differences between organizational perceptions and frontline realities when it comes to participatory approaches in MSD prevention and ergonomics planning. The findings are consistent with previous research exploring MSD prevention perceptions among workers, managers, and occupational health and safety practitioners, which similarly found that managers and safety professionals were more likely than frontline workers to report that worker feedback is used to improve the organization of job tasks (Van Eerd et al., 2022).

In addition to perceptions of involvement, differences emerged between frontline workers and organizational leaders regarding safety culture, communication and trust. Across all items, Index respondents (i.e., safety and health leaders) expressed stronger agreement than frontline workers that open communication, trust and processes for addressing MSD concerns were present in the workplace. For example, 91.1% of Index respondents agreed or strongly agreed that the workplace has open communication between workers and supervisors about MSD risks, compared to only 65% of frontline workers. Similarly, a greater proportion of Index respondents felt that senior leadership understands and communicates the importance of MSD prevention. Findings corroborate those of Van Eerd et al. (2022) who also identified a notable discrepancy between workers and organizational leaders, with managers and occupational health and safety professionals more likely to believe that workers feel supported when raising concerns about MSD hazards and that clear, timely responses are provided. While both groups generally agreed that there is trust between workers and their peers or direct supervisors, frontline workers were consistently less likely than Index respondents to strongly agree that trust exists between workers and senior leadership or the safety team. These discrepancies mirror findings of hierarchical power dynamics, where frontline workers may feel less empowered to voice concerns or influence safety practices (Abrams et al., 2023; Munn et al., 2023; Tear et al., 2020).

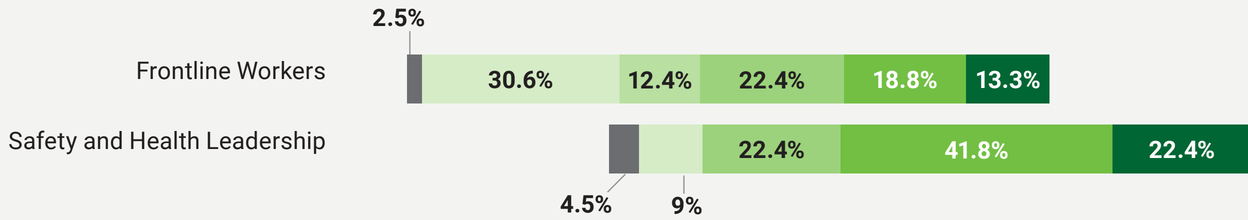
Overall, safety and health leaders perceive stronger safety cultures and risk reduction methods than frontline workers from similar industries, corroborating previous research findings of perception gaps between differing employee levels (Findley et al., 2023; Goldstein et al., 2017; Marin et al., 2019; Moore & Haynes, 2023; MySafetySign, 2015; Tear et al., 2020). These gaps highlight the need for more intentional and structured participatory practices, especially given that participatory ergonomics programs that actively involve workers in identifying risks and shaping solutions have been linked to improved flow of information and MSD risk reduction (Burgess-Limerick, 2018). By fostering collaboration and shared ownership of safety initiatives, participatory approaches can help align perceptions across organizational levels, improve communication and ultimately lead to more effective and sustainable MSD prevention efforts.

**Figure 16.** *Frontline worker perceptions versus organizational safety and health leader perceptions on the frequency of frontline worker involvement in determining where improvements can be made regarding the included factors.*

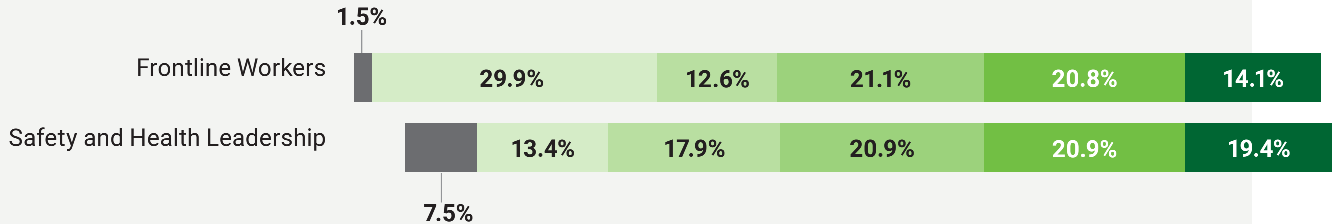
Note: Responses are centered on "Sometimes" to highlight directional differences; frontline workers report more frequency involvement, while safety and health leaders perceive less frontline worker involvement.



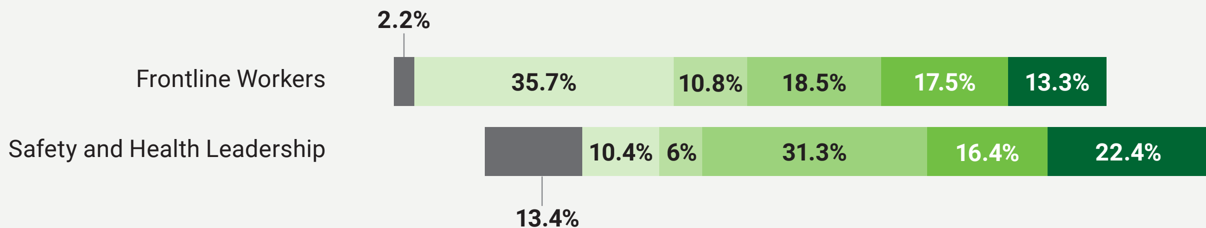
## Workstation design



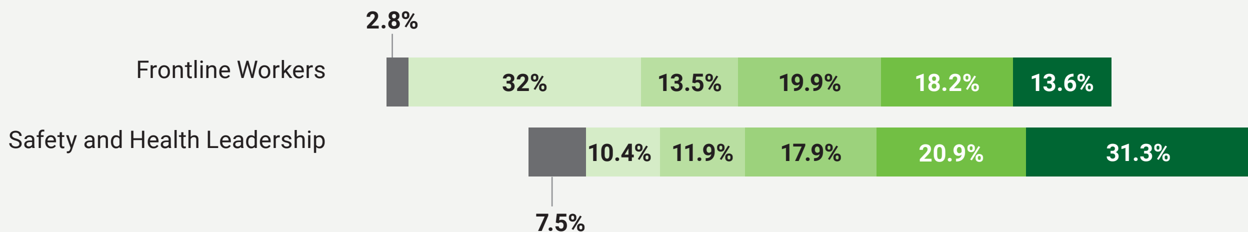

## Work schedule



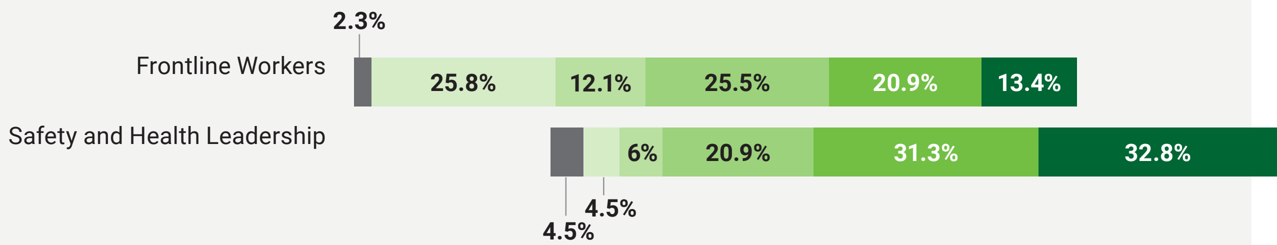

## Return-to-work processes




## Mental health and wellbeing




## Workplace culture




Unsure/no response | Never | Rarely | Sometimes | Often | Always

## Action Items

Based on the findings from the survey, some clear action items have emerged. Employers are encouraged to consider these action items and implement those that are a good fit for their workplace and workforce.

1. **Increase Awareness and Understanding of MSDs and MSD Prevention Strategies**
   - **Integrate communication about ergonomics into daily routines** through toolbox talks (i.e., short, informal meetings before a shift or task), shift meetings and regular communications.
   - Include ergonomics, safe equipment use and MSD reporting procedures in **new hire orientations**.
   - **Reinforce ergonomics training** during equipment or process changes.
   - Offer **regular ergonomics and MSD prevention training** (monthly or quarterly) across departments.
   - **Tailor messaging to different worker groups** (e.g., age, role, language, experience) to ensure relevance and accessibility.
   - **Use clear, relatable language**. For example, consider terms like "sprains and strains" or "repetitive strain injuries" instead of "MSDs."

2. **Improve Pain Reporting and Early Intervention**
   - **Conduct proactive check-ins** with workers using symptom surveys or informal conversations **to identify early signs of discomfort**.
   - Ensure all employees know **how and to whom they can report pain or discomfort**.
   - **Normalize reporting** by promoting a culture where early reporting is encouraged and free of stigma.
   - **Train supervisors to recognize and respond** to early pain reports with supportive action.

3. **Support Workers Who May Be Underserved in Safety Efforts**
   - Provide **targeted communication and training** for groups that may have lower awareness or engagement with safety programs, such as older workers, less tenured employees, or others based on role, language or access.
   - Ensure these groups are **actively included** in feedback systems, safety conversations and decision-making processes to be sure the needs of the workforce are being met.
   - Consider **pairing newer or less experienced employees with seasoned mentors** to support engagement and knowledge sharing.

4. **Ensure Access to Ergonomic Tools and Training**
   - **Audit and update ergonomic tools regularly**, considering job role, age, tenure and language needs.
   - **Communicate** tool availability and updates **clearly to all employees**.
   - **Solicit feedback from workers** on ergonomic equipment, especially from those who may be underrepresented in design decisions.
   - **Provide hands-on training** for new tools and equipment **during onboarding and at regular intervals**.

5. **Strengthen Feedback and Engagement Systems**
   - **Promote participation** in employee surveys and anonymous feedback channels.
   - **Ensure surveys are accessible** (e.g., appropriate reading level, language options) and relevant to all roles.
   - Actively seek **input from older and less tenured workers**.
   - **Standardize follow-up on feedback** and communicate actions taken at least quarterly.
   - Track engagement levels to **ensure all workers are participating and feel heard.**

6. **Foster a Stronger Safety Culture and Trust**
   - **Involve workers in identifying improvements** to job tasks, workflows and safety procedures.
   - **Include both workers and supervisors** in developing ergonomics and MSD **policies** and **evaluating policies** already in place.
   - Provide training for workers on how to **speak up for safety, recognize hazards and contribute to safety planning**.
   - Reinforce leadership commitment to safety through **transparent communication and visible action in response to worker feedback**.

7. **Address Non-Physical Risk Factors**
   - Develop **fatigue risk management programs** tailored to your workforce.
   - Offer **stress management resources** such as resilience training, workload assessments and mental health support — especially for those in high-stress roles.

8. **Build Trust Around Technology Use**
   - **Involve frontline workers in decisions** about new technologies.
   - Engage a **diverse range of employees**, especially older workers or others who might feel less emboldened to engage otherwise, in **user testing and pilot projects** to increase buy-in and ensure feasibility and organizational fit.
   - **Promote real-world examples** of how technology improves safety, productivity and service quality.
   - Use **department-specific messaging** to connect technology benefits to workers' daily tasks.
   - Clearly **communicate how data will be used and protected**.
   - **Reassure employees** that technology is meant to support — not replace — them through upskilling and job enrichment.
   - **Avoid using any technology for punitive use**, opting instead for coaching.
   - Emphasize the role of technology in MSD prevention during training and onboarding.
   - **Regularly survey employees** about their comfort, trust and concerns related to workplace technology.
   - **Track the impact of technology** on MSD rates, productivity and satisfaction.

## Limitations

There are some limitations that should be considered when interpreting these findings. A significant portion of respondents demonstrated limited understanding of MSDs and ergonomics. While this result itself is relevant, this lack of knowledge may have influenced how some survey questions were interpreted and answered. Additionally, while the majority of respondents were frontline workers, a small number held roles such as researchers, engineers or science professionals that may not typically be classified as frontline workers. However, the results are still representative of non-leadership-level employees, and comparisons between workers and safety and health leadership remain relevant and informative.

Other limitations relate to the scope and representativeness of the data. Demographic information other than age was not collected, limiting the ability to analyze results across different population subgroups like gender and race. Moreover, the sample was selected to match the industry distribution of the MSD Solutions Index sample and therefore is not representative of all industries with higher MSD risks. As such, industry-specific conclusions should be interpreted with sample size in mind — especially in cases like the construction and utilities industries, where there were a small number of respondents (5.8% and 5.6%, respectively, $N < 60$). Finally, the sample size of Index participants was relatively small ($N = 67$), which limited the ability to conduct more robust comparisons between frontline workers and safety and health leadership, especially by subgroup. The organizations represented in the Index data are also different from the organizations represented in the current data set, which might have caused other interpretation discrepancies. However, matching the data on industry was intended to circumvent such issues.

## Conclusions and Directions for Future Research

The objective of deploying this survey was to address an important knowledge gap in understanding frontline worker perceptions of workplace safety and MSD prevention. The findings offered some unique insights. The strong correlations between Risk Reduction (i.e., frequent discussion of ergonomics at work, early reporting of MSD signs or symptoms), Safety Culture (i.e., involvement, culture, and trust scores, implementation of mechanisms to collect and respond to employee perceptions and feedback), and Innovation and Collaboration (i.e., comfortability using technologies at work for MSD risk reduction) indicators suggest that when employees feel supported, heard and equipped with the right tools and communication channels, they are more likely to trust their organization's ability to prevent MSDs — and, in turn, show greater openness and engagement in adopting new technologies and solutions aimed at improving workplace safety.

Despite aforementioned sampling limitations, comparisons between frontline worker and safety and health leadership responses revealed significant perception gaps when it comes to MSD prevention efforts, safety culture and worker involvement, suggesting a need for organizations to bridge these gaps through improved communication, education, and truly participatory safety practices to ensure frontline realities are better aligned with leadership intentions. Future research should confirm and continue to explore this gap.

Additionally, future research about frontline workers and MSD prevention should aim to include more representative samples, particularly from industries with the highest MSD risk, including trade, transportation and utilities, manufacturing, natural resources and mining, educational and health services, and construction (U.S. Bureau of Labor Statistics, 2022). Finally, the current study found significant evidence that MSD prevention may not be reaching older workers as intended. Further investigation into the barriers older workers face when it comes to health and safety is warranted, and surveys deployed in the future should also collect demographic data in addition to age to further explore differences in how workplace safety initiatives are perceived by subgroup (e.g., gender, race/ethnicity, education, income). Frontline workers are an asset to workplace safety and health initiatives, and viewing them as such is vital to participative ergonomics strategies and safety cultures that encourage employee voice and subsequently reduce MSD risks.

## Authors

Marley Reynoso, MPH
Ram Maikala, PhD, ASP, FHFES
Paige DeBaylo, PhD

## Funding

This research was supported by Amazon.com, Inc. Its contents and results reflect the authors' contributions and are solely their responsibility, and do not necessarily represent the views of Amazon, or the official position of NSC.

## References


Abrams, R., Conolly, A., Rowland, E., Harris, R., Kent, B., Kelly, D., Couper, K., & Maben, J. (2023). Speaking up during the COVID-19 pandemic: Nurses' experiences of organizational disregard and silence. *Journal of Advanced Nursing*, *79*(6), 2189–2199. https://doi.org/10.1111/jan.15526

Breslin, F. C., Dollack, J., Mahood, Q., Maas, E. T., Laberge, M., & Smith, P. M. (2019). Are new workers at elevated risk for work injury? A systematic review. *Occupational and Environmental Medicine, 76*(9), 694–701. https://doi.org/10.1136/oemed-2018-105639

Brynjolfsson, E., Li, D., & Raymond, L. R. (2023). Generative AI at work (NBER Working Paper No. 31161). *National Bureau of Economic Research.* https://doi.org/10.3386/w31161

Burgess-Limerick, R. (2018). Participatory ergonomics: Evidence and implementation lessons. *Applied Ergonomics, 68*, 289–293. https://doi.org/10.1016/j.apergo.2017.12.009

Chang, J., Han, S., AbouRizk, S. M., & Kanerva, J. (2019). Stratified statistical analysis for effectiveness evaluation of frontline worker safety intervention: Case study of construction steel fabrication. *Safety Science, 115*, 89–102.

de Kok, J., Vroonhof, P., Snijders, J., Roullis, G., Clarke, M., & van der Woude, K. (2019). Work-related musculoskeletal disorders: Prevalence, costs and demographics in the EU. *European Agency for Safety and Health at Work (EU-OSHA)*. Retrieved from https://osha.europa.eu/en/publications/work-related-musculoskeletal-disorders-prevalence-costs-and-demographics-eu

Delloiacono, N. (2015). Musculoskeletal safety for older adults in the workplace: Review of current best practice evidence. *Workplace Health & Safety, 63*(2), 48–53. https://10.1177/2165079915570299

Domenichiello, A. F., & Ramsden, C. E. (2019). The silent epidemic of chronic pain in older adults. *Progress in Neuro-Psychopharmacology & Biological Psychiatry, 93*, 284–290. https://doi.org/10.1016/j.pnpbp.2019.04.006

Drake, C. M., Haslam, R., & Haslam, C. (2017). Facilitators and barriers to the protection and promotion of the health and safety of older workers. *Policy and Practice in Health and Safety, 15*(1), 4–18. https://doi.org/10.1080/14773996.2017.1289453

Dyreborg, J., Lipscomb, H. J., Nielsen, K., Törner, M., Rasmussen, K., Frydendall, K. B., Bay, H., Gensby, U., Bengtsen, E., Guldenmund, F., & Kines, P. (2022). Safety interventions for the prevention of accidents at work: A systematic review. *Campbell Systematic Reviews, 18*(2), e1234. https://doi.org/10.1002/cl2.1234

European Agency for Safety and Health at Work. 2020–22: *Healthy Workplaces Lighten the Load*. Retrieved from https://healthy-workplaces.osha.europa.eu/en/previous-campaigns/musculoskeletal-disorders-2020-22/campaign-summary

Findley, M., Smith, S., Gorski, J., & O'neil, M. (2007). Safety climate differences among job positions in a nuclear decommissioning and demolition industry: Employees' self-reported safety attitudes and perceptions. *Safety Science, 45*(8), 875–889. https://doi.org/10.1016/j.ssci.2006.08.027

Fukumura, Y. E., Gray, J. M., Lucas, G. M., Becerik-Gerber, B., & Roll, S. C. (2021). Worker perspectives on incorporating artificial intelligence into office workspaces: Implications for the future of office work. *International Journal of Environmental Research and Public Health, 18*(4), 1690. https://doi.org/10.3390/ijerph18041690

Fyhn, B., Bang, H., Egeland, T., & Schei, V. (2022). Safe among the unsafe: Psychological safety climate strength matters for team performance. *Small Group Research, 54*(4), 439–473. https://doi.org/10.1177/10464964221121273

Goldstein, D. H., Nyce, J. M., & Van Den Kerkhof, E. G. (2017). Safety perceptions of health care leaders in 2 Canadian academic acute care centers. *Journal of Patient Safety, 13*(2), 62–68. https://doi.org/10.1097/PTS.0000000000000112

Gutierrez, S. (2023). CNBC|SurveyMonkey Workforce Survey December 2023. Retrieved from https://commons.erau.edu/publication/1624/

Hanowell, B., & Richardson, N. (2024). Most workers think AI will affect their jobs. They disagree on how. ADP Research. Retrieved from https://www.adpresearch.com/worker-sentiment-ai-impact/

Hansen, A. F., Hasle, P., Caroly, S., Reinhold, K., Järvis, M., Herrig, A. O., Heiberg, B. D., Søgaard, K., Punnett, L., & Jensen Stochkendahl, M. (2024). Participatory ergonomics: What works for whom and why? A realist review. *Ergonomics, 67*(1), 13–33. https://doi.org/10.1080/00140139.2023.2202842

Hess, J. A., Kincl, L., Weeks, D. L., Vaughan, A., & Anton, D. (2020). Safety Voice for Ergonomics (SAVE): Evaluation of a masonry apprenticeship training program. *Applied ergonomics, 86*, 103083. https://doi.org/10.1016/j.apergo.2020.103083

Holt, D. T., Markova, G., Dhaenens, A. J., Marler, L. E., & Heilmann, S. G. (2016). Formal or informal mentoring: What drives employees to seek informal mentors? *Journal of Managerial Issues, 28*(1/2), 67–82. http://www.jstor.org/stable/44114733

Howard, A., Antczak, R., & Albertsen, K. (2019). Third European Survey of Enterprises on New and Emerging Risks (ESENER 2019): Overview Report. *European Agency for Safety and Health at Work (EU-OSHA).*

Huebner, L. A., & Zacher, H. (2021). Following up on employee surveys: A conceptual framework and systematic review. *Frontiers in Psychology*, *12*, 801073. https://doi.org/10.3389/fpsyg.2021.801073

Iles, L. (2019). Maximising Potential: Mature Workers in Organisations Survey Findings. *ARC Centre of Excellence in Population Ageing Research*. Australia. Retrieved from https://coilink.org/20.500.12592/r3s3hb. COI: 20.500.12592/r3s3hb.

Jacobs, J. V., Hettinger, L. J., Huang, Y. H., Jeffries, S., Lesch, M. F., Simmons, L. A., Verma, S. K., & Willetts, J. L. (2019). Employee acceptance of wearable technology in the workplace. *Applied Ergonomics, 78*, 148–156. https://doi.org/10.1016/j.apergo.2019.03.003

Khoza, T., Mabitsela, T., & Nel, P. (2024). Technology readiness, technology acceptance, and work engagement: A mediational analysis. *SA Journal of Industrial Psychology, 50*. https://doi.org/10.4102/sajip.v50i0.2131

Kincl, L. D., Anton, D., Hess, J. A., & Weeks, D. L. (2016). Safety voice for ergonomics (SAVE) project: protocol for a workplace cluster-randomized controlled trial to reduce musculoskeletal disorders in masonry apprentices. *BMC Public Health, 16,* 362. https://doi.org/10.1186/s12889-016-2989-x

Kyung, M., Lee, S. J., Wagner, L. M., Harris-Adamson, C., & Hong, O. (2024). Factors associated with reporting attitudes of work-related musculoskeletal disorders among direct care workers in South Korea. *Workplace Health & Safety, 72*(8), 345–353. https://doi.org/10.1177/21650799241247078

Lin, L., & Parker, K. (2025). U.S. Workers Are More Worried Than Hopeful about Future AI Use in the Workplace. *Pew Research Center.* Retrieved from https://www.pewresearch.org/social-trends/2025/02/25/u-s-workers-are-more-worried-than-hopeful-about-future-ai-use-in-the-workplace/

Mahan, B., Morawetz, J., Ruttenberg, R., & Workman, R. (2013). Workplace safety and health improvements through a labor/management training and collaboration. *New Solutions: A Journal of Environmental and Occupational Health Policy, 23*(4), 561–576. https://doi.org/10.2190/NS.23.4.c

Marin, L. S., Lipscomb, H., Cifuentes, M., & Punnett, L. (2019). Perceptions of safety climate across construction personnel: Associations with injury rates. *Safety Science, 118*, 487–496. https://doi.org/10.1016/j.ssci.2019.05.056

McLain, D., & Pendell, R. (2023). Why Trust in Leaders Is Faltering and How to Gain It Back. Gallup. Retrieved from https://www.gallup.com/workplace/473738/why-trust-leaders-faltering-gain-back.aspx

Meade, A. W., & Craig, S. B. (2012). Identifying careless responses in survey data. *Psychological Methods, 17*(3), 437–456.

Moore, Q. T., & Haynes, K. W. (2023). Perceptions of radiation safety culture in medical imaging by role. *Radiologic Technology, 94*(5), 337–347.

Muhammad, K., & Marcham, C. (2021). Age's influence on workplace safety. *Professional Safety, 66*(7), 35–39. https://commons.erau.edu/publication/1624/

Munn, L. T., Lynn, M. R., Knafl, G. J., Willis, T. S., & Jones, C. B. (2023). A study of error reporting by nurses: the significant impact of nursing team dynamics. *Journal of Research in Nursing, 28*(5), 354–364. https://doi.org/10.1177/17449871231194180

MySafetySign. (2015). Health and Safety Industry Survey 2015. https://www.mysafetysign.com/health-safety-survey

Nobrega, S. (2020). Engaging Frontline Workers in Designing Solutions That Promote Workplace Safety, Health, and Well-Being. *AIHA Synergist*. https://www.aiha.org/blog/engaging-frontline-workers-in-designing-solutions-that-promote-workplace-safety-health-and-well-being

Occupational Safety and Health Administration. (2016). Recommended Practices for Safety and Health Programs. 11–14. https://www.osha.gov/sites/default/files/publications/OSHA3885.pdf

Ordysiński, S. (2024). The role of trust in occupational safety: research results. *International Journal of Occupational Safety and Ergonomics, 30*(3), 741–753. https://doi.org/10.1080/10803548.2024.2367335

Rasool, T., Warraich, N. F., & Sajid, M. (2022). Examining the impact of technology overload at the workplace: A systematic review. *SAGE Open, 12*(3). https://doi.org/10.1177/21582440221114320

Saad, L. (2023). More U.S. Workers Fear Technology Making Their Jobs Obsolete. *Gallup*. Retrieved from https://news.gallup.com/poll/510551/workers-fear-technology-making-jobs-obsolete.aspx

SafetyCulture. (2024). Feedback from the Field: Time for Change. https://blog.safetyculture.com/feedback-from-the-field/feedback-from-the-field-2024-insights-from-our-global-frontline-worker-survey

Tawfik, D. S., Adair, K. C., Palassof, S., Sexton, J. B., Levoy, E., Frankel, A., Leonard, M., Proulx, J., & Profit, J. (2023). Leadership behavior associations with domains of safety culture, engagement, and health care worker well-being. *Joint Commission Journal on Quality and Patient Safety, 49*(3), 156–165. https://doi.org/10.1016/j.jcjq.2022.12.006

Tear, M. J., Reader, T. W., Shorrock, S., & Kirwan, B. (2020). Safety culture and power: Interactions between perceptions of safety culture, organisational hierarchy, and national culture. *Safety Science, 121*, 550–561. https://doi.org/10.1016/j.ssci.2018.10.014

Travelers Risk Control (2023). How to Onboard and Train Employees into a Safety Culture. Retrieved from https://www.travelers.com/resources/business-topics/workplace-safety/onboarding-and-training-employees-into-a-safety-culture

U.S. Bureau of Labor Statistics (2022). Workplace injuries. https://www.bls.gov/data/#injuries

Van Eerd, D., Irvin, E., Le Pouésard, M., Butt, A., & Nasir, K. (2022). Workplace musculoskeletal disorder prevention practices and experiences. *Inquiry: a Journal of Medical Care Organization, Provision and Financing, 59*, 469580221092132. https://doi.org/10.1177/00469580221092132

Verjans, M., De Broeck, V., & Eeckelaert, L. (2007). OSH in figures : young workers : facts and figures. *European Agency for Safety and Health at Work (EU-OSHA).* https://osha.europa.eu/sites/default/files/Report_-_OSH_in_figures-_Young_workers_-_Facts_and_figures.pdf

Zavaglia, S. (2023). The safety professional's road map to workplace trust and psychological safety. *Professional Safety, 68*(12), 38–40.

## Appendix

### Statistical output – Pearson Correlations of pertinent variables

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | .379** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | -.039 | -.004 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | -.081* | .081* | .c | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | -.136** | .099** | .370** | .357** | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | -.140** | .069* | .276** | .460** | .574** | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | -.106** | .075* | .039 | .053 | .125** | -.036 | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | -.198** | .024 | .302** | .244** | .349** | .418** | .c | | | | | | | | | | | | | | | | | | | | | | |
| 9 | -.270** | .021 | .265** | .328** | .556** | .530** | .148** | .599** | | | | | | | | | | | | | | | | | | | | | |
| 10 | -.087** | .051 | .332** | .282** | .504** | .582** | .027 | .384** | .492** | | | | | | | | | | | | | | | | | | | | |
| 11 | -.139** | .019 | .274** | .209** | .381** | .342** | .001 | .242** | .382** | .340** | | | | | | | | | | | | | | | | | | | |
| 12 | -.122** | .011 | .386** | .254** | .533** | .508** | .054 | .384** | .522** | .556** | .529** | | | | | | | | | | | | | | | | | | |
| 13 | -.054 | .055 | -.052 | .201** | .188** | .310** | .068 | .285** | .291** | .405** | -.002 | .c | | | | | | | | | | | | | | | | | |
| 14 | .016 | -.026 | .333** | .088* | .290** | .211** | .009 | .112** | .200** | .245** | .418** | .389** | -.026 | | | | | | | | | | | | | | | | |
| 15 | .004 | .022 | .154** | .259** | .294** | .338** | -.050 | .248** | .239** | .353** | .153** | .294** | .207** | .c | | | | | | | | | | | | | | | |
| 16 | -.121** | .036 | .190** | .332** | .396** | .521** | -.058 | .352** | .412** | .475** | .199** | .453** | .288** | .c | .579** | | | | | | | | | | | | | | |
| 17 | -.023 | -.037 | .145** | .264** | .269** | .328** | -.085* | .222** | .246** | .316** | .107** | .314** | .158** | .c | .718** | .623** | | | | | | | | | | | | | |
| 18 | -.033 | -.048 | .163** | .228** | .187** | .321** | -.089* | .159** | .222** | .316** | .087* | .277** | .200** | .c | .673** | .615** | .649** | | | | | | | | | | | | |
| 19 | .030 | .044 | .185** | .242** | .282** | .389** | -.083* | .237** | .251** | .368** | .146** | .312** | .208** | .c | .724** | .623** | .639** | .653** | | | | | | | | | | | |
| 20 | -.106** | .007 | .110** | .306** | .329** | .444** | -.021 | .363** | .401** | .407** | .156** | .348** | .303** | .c | .549** | .674** | .552** | .591** | .547** | | | | | | | | | | |
| 21 | -.082* | .012 | .173** | .298** | .423** | .542** | -.019 | .366** | .448** | .469** | .280** | .463** | .335** | .c | .556** | .751** | .600** | .566** | .597** | .687** | | | | | | | | | |
| 22 | -.070 | .033 | .173** | .282** | .347** | .483** | -.010 | .367** | .438** | .470** | .203** | .408** | .296** | .c | .536** | .742** | .572** | .563** | .566** | .695** | .723** | | | | | | | | |
| 23 | -.088* | .015 | .204** | .277** | .402** | .522** | -.036 | .386** | .468** | .512** | .227** | .454** | .316** | .c | .579** | .739** | .586** | .635** | .592** | .670** | .717** | .808** | | | | | | | |
| 24 | -.209** | .021 | .323** | .302** | .551** | .586** | .055 | .495** | .625** | .543** | .461** | .630** | .197** | .346** | .312** | .546** | .319** | .311** | .357** | .440** | .568** | .521** | .588** | | | | | | |
| 25 | -.191** | -.027 | .172** | .230** | .325** | .347** | .062 | .260** | .353** | .343** | .198** | .330** | .222** | .126** | .233** | .285** | .226** | .215** | .237** | .268** | .253** | .269** | .279** | .359** | | | | | |
| 26 | -.192** | .059 | .245** | .242** | .449** | .491** | .083* | .385** | .562** | .462** | .403** | .507** | .271** | .240** | .140** | .348** | .136** | .150** | .180** | .336** | .391** | .372** | .372** | .592** | .398** | | | | |
| 27 | -.274** | .034 | .196** | .375** | .497** | .522** | .151** | .511** | .641** | .453** | .382** | .491** | .394** | .121** | .277** | .452** | .277** | .251** | .289** | .453** | .496** | .476** | .489** | .558** | .442** | .580** | | | |
| 28 | -.148** | .051 | .349** | .388** | .592** | .677** | .003 | .508** | .644** | .656** | .406** | .661** | .435** | .248** | .462** | .670** | .471** | .423** | .485** | .603** | .677** | .662** | .682** | .677** | .404** | .563** | .668** | | |
| 29 | -.150** | -.012 | .169** | .328** | .348** | .551** | -.020 | .372** | .431** | .480** | .264** | .417** | .395** | .104** | .335** | .510** | .384** | .344** | .341** | .498** | .503** | .490** | .502** | .442** | .425** | .429** | .513** | .696** | |

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).
c. Cannot be computed because at least one of the variables is constant.

**Key:**

| | |
|---|---|
| 1 | Age |
| 2 | How long have you been employed in your current position? |
| 3 | Do you know if your organization has any safety and health initiatives (such as training, policies, availability of personal protective equipment)? |
| 4 | Please rate your understanding of your organization's safety and health initiatives. |
| 5 | How often have you heard ergonomics mentioned in your workplace (such as in trainings, meetings, day-to-day activities)? |
| 6 | Overall, my workplace's ability to prevent work-related MSDs is... |
| 7 | Have you experienced pain at work? |
| 8 | How soon do you report once pain is experienced? |
| 9 | How frequently are you and your colleagues asked about early signs or symptoms of MSDs (such as through check-ins) |
| 10 | Does your workplace provide you with proper ergonomic tools/equipment (such as an adjustable chair, appropriate-sized hand tools, assistive devices for moving materials)? |
| 11 | Does your workplace conduct employee culture/perception/engagement surveys? |
| 12 | Are there methods in place for you to share safety/ergonomic improvement suggestions, including ideas for reducing MSD risk? |
| 13 | How often do you receive follow-up on feedback you provide? |
| 14 | Does your organization have a new hire orientation? |
| 15 | To what degree included in new hire orientation: Review of safety and health procedures, policies and regulations |
| 16 | To what degree included in new hire orientation: Review of ergonomics procedures, policies and regulations |
| 17 | To what degree included in new hire orientation: How to apply safety and health policies |
| 18 | To what degree included in new hire orientation: Instructions on how to do the job safely |
| 19 | To what degree included in new hire orientation: Instructions on how to report an incident/injury |
| 20 | To what degree included in new hire orientation: Instructions on how to stop work/take a break |
| 21 | To what degree included in new hire orientation: Other MSD prevention information |
| 22 | To what degree included in new hire orientation: Instructions on how to report when ergo equipment breaks |
| 23 | To what degree included in new hire orientation: Instructions on how to safely use ergo equipment |
| 24 | Does your workplace conduct ergonomics and MSD prevention training? |
| 25 | How comfortable are you using technologies at work for MSD risk reduction? |
| 26 | Does your workplace actively utilize technology to reduce MSD issues? |
| 27 | Involvement: Overall perceived level of involvement of frontline workers in determining where ergonomic improvements are needed |
| 28 | Culture: Overall perception of how favorable workplace safety culture and communication about MSDs is |
| 29 | Trust: Overall perceived level of trust in the workplace |