Grand Challenges for Worker Health, Safety, and Well-Being

# Promoting Health Equity and Eliminating Precarity in the Workplace

aiha.org

AIHA®

3120 Fairview Park Drive
Suite 360
Falls Church, VA 22042

## Contributors

Deborah Imel Nelson, PhD, MPH, CIH: chair

Preethi Pratap, MSc., PhD: team member

Aurora Le, PhD, MPH, CIH, CSP, CPH: team member

Marianne Levitsky, MES, CIH, ROH: team member

Marie-Anne Rosemberg, PhD, MN, RN, FAAOHN, FAAN: team member

We are grateful to the members of the initial working group who laid out the basic elements of this Grand Challenge: Marissa Baker, PhD, April Clayton, PhD, MPH, CHMM, Mike Flynn, PhD, Paul Landsbergis, PhD, EdD, MPH, and Trevor Peckham, PhD, MS, MBA.

## Introduction

In 2021, the AIHA Board of Directors approved the Grand Challenges for Worker Health, Safety, and Well-Being. According to the White House Office of Science and Technology Policy under the Obama Administration (n.d.), Grand Challenges are "ambitious but achievable goals that harness science, technology, and innovation to solve important national or global problems and that have the potential to capture the public's imagination" (para. 1).

## Criteria for the Grand Challenges

The criteria selected by AIHA's Grand Challenges Leadership Team require the Grand Challenges for Promoting Equity and Eliminating Precarity in the Workplace to be:

- Big, important, compelling initiatives geared toward solving critical world needs.
- Likely to achieve progress in solving global needs within five to 10 years.
- Capable of generating defined, measurable outcomes.
- Reliant on interdisciplinary collaboration, significant innovations, and long-term sustained commitments to make progress.

The Grand Challenges addressed in this concept paper were chosen from a perspective that considered workers, the work they perform, the communities in which they live, and the need for their voices to be heard. Other Grand Challenges may be delineated, and future iterations of the project may include different goals.

Workers' health, safety, and well-being are inextricably linked to the types of work they do, as well as to the health and economic statuses of the communities in which they live. Millions of people around the world live in unhealthy communities and suffer inequities at work due to their race, ethnicity, gender, class, or other social determinants of health (SDOH). None of these SDOH are independent of the others, and several may occur together in the same person.

We are living in a time of great economic, political, social, and technological changes that may benefit the health of some but not all workers. Increased reliance on nonstandard employment arrangements, the decline of union representation, and reduced government oversight are changes that may place workers at greater risk. Professionals in the field of occupational and environmental health and safety (OEHS), which encompasses industrial hygiene and allied disciplines, must be aware of the social contexts that can detract from efforts to prevent injuries and promote health and well-being for all workers.

For example, immigrant Latino workers are more likely to die on the job than their U.S.-born counterparts. Temporary workers are more likely to be injured at work than permanent employees. Women are less likely to receive properly fitting personal protective equipment (PPE) than men. Avoidable differences in work-related fatalities, injuries, and illnesses that are closely linked with social, economic, or environmental disadvantages are called occupational health inequities. As the National Institute for Occupational Safety and Health (NIOSH) stated, "Not all workers have the same risk of experiencing a work-related health problem, even when they have the same job" (2024, March 8, para. 1).

Accounting for occupational health inequities is an essential but challenging part of ensuring workplace health, safety, and well-being. Significant economic, political, social, and technological changes can make it even more difficult to do so, but these changes also offer opportunities to establish more equitable practices. This paper aims to discuss the factors contributing to occupational health inequities and explain the links between workers' health, safety, and well-being, their employment, and their communities. We propose Grand Challenges that seek to eliminate inequities in the workplace, improve community health, minimize precarious work, and uphold workers' voices. We discuss preventive actions, potential outcomes, metrics of progress, opportunities for interdisciplinary involvement and innovation, next steps, and the potential roles of OEHS professionals in addressing occupational health inequities.

## Factors Contributing to Occupational Health Inequities

The factors contributing to occupational health inequities are numerous, complex, and intertwined. For the purposes of describing the Grand Challenges for Promoting Equity and Eliminating Precarity in the Workplace, the discussion in this paper will be limited to the roles of work and other SDOH, as well as to the topics of vulnerable workers, precarious work, and community health. SDOH contribute to workers' vulnerability. Vulnerable workers are often engaged in precarious work, have poor health, and live in communities that do not provide conditions supporting their health, safety, and well-being.

### *Social Determinants of Health*

The conditions in which people are born, grow, live, work, play, and age are known as SDOH. Along with societal norms and political, legal, and economic policies and conditions, SDOH play a significant role in perpetuating health inequities (Solar & Irwin, 2010). Identifying and addressing the root causes of these inequities is critical for the health and well-being of workers and the general population. Work is increasingly recognized as a SDOH, as are the ways in which work arrangements and working conditions contribute to stress, mental health conditions, work-life strain, and other effects on the health and well-being of workers, families, communities, and populations. Growing recognition of health disparities, especially as a result of the COVID-19 pandemic, has also increased social pressure on employers and brought to light the ways in which they can promote and support population health and well-being. More businesses have begun to focus on SDOH and the creation of organizational "cultures of health" that prioritize health equity.

### *Vulnerable Workers*

Vulnerable, often referred to as disadvantaged, workers are those who are at higher risk of injury, illness, or death due to conditions such as their age—whether they are young people or older adults—as well as their gender; race and ethnicity; disability; level of education, skills, or experience; immigration status; degree of fluency in a dominant language; or involvement in migrant or forced labor (CCOHS, 2024; Quirós-Alcalá, 2023). For example, immigrants tend to work in seasonal jobs, frequently those that may be described as dirty, dangerous, and demanding, for longer hours, with little or no training, and low pay, in which they may be exposed to hazardous substances and human rights violations. Because of their status, they tend to face greater risks and are less likely to advocate for themselves than more secure workers.

Disadvantaged or vulnerable populations may include, but are not limited to, unemployed and underemployed people; immigrant and migrant workers; marginalized workers; workers in precarious employment; young workers; older workers; women; members of the LGBTQ+ community; pregnant workers; members of racial and ethnic minority groups; refugees; people with physical, mental, social, and educational disabilities; residents of rural communities; unauthorized workers; homeless workers; prisoners; and military personnel. The COVID-19 pandemic created a new vulnerable population: essential workers required to cope with an increased risk of infection, often without adequate resources. Disadvantage is often multifactorial, with race, ethnicity, age, and gender intersecting with factors such as poverty, poor housing, inadequate education, familial abuse, and lack of access to health care.

A report by the American Society of Safety Engineers and NIOSH underscored how these overlapping categories compounded the risks encountered by vulnerable workers (Flynn et al., 2015). This study evaluated three populations at greater risk for adverse work-related health outcomes—immigrants born in Latin America and living in the U.S., workers in businesses with fewer than 20 employees, and workers under 25 years of age—with a specific focus on implications for the construction industry. For workers who fell into one or more of these three categories, the overlapping vulnerabilities resulted in a combination of risk factors that has implications for OEHS (Flynn et al., 2015). Additional overlapping vulnerabilities listed by Quirós-Alcalá (2023) include gender, migrant status, fear of speaking up, lack of knowledge of worker rights, and exemptions from child labor laws.

Young workers are especially vulnerable, as they tend to work in low-paying jobs, to lack awareness of their rights, and to not receive safety training. These workers' risks are compounded by their incomplete physical and emotional development. For more information on this topic, see the AIHA Safety Matters Center (n.d.), as well as the section in this paper on child labor.

### *Examples of Vulnerable Worker Groups*

Historically, Black workers are more vulnerable in the labor market and face higher unemployment, fewer job opportunities, lower pay, poorer benefits, and greater job instability (Escobari et al., 2020; Michel & Ben-Ishai, 2016; Weller, 2019). Black women face a unique burden that includes a steep pay gap and caregiving responsibilities (Weller, 2019).

Minority and immigrant workers, who are more likely to have less education, may engage in precarious employment that exposes them to high levels of stress, as well as to work in conditions that put them at greater risk of injuries and fatalities (CDC, 2013). Job precarity and income inequality are associated with increased risk for depression and burnout (Theorell et al., 2015). A recent meta-analysis found increased odds of poor self-rated health and poor mental health associated with persistent precarious employment (Pulford et al., 2022). Minority and immigrant workers are often disproportionately represented in the informal economy, where they lack legal protection, as well as documentation of their wages or hours worked.

### *Workers with Chronic Health Conditions*

Another population of vulnerable workers—those with chronic health conditions—deserves particular mention due to its large and growing numbers. Brownstein (2025) found that 58% of U.S. employees reported physical chronic health conditions, a category that excluded chronic mental health conditions. According to Butorff et al. (2017), 60% of the American public reported having at least one chronic health condition, and 42% reported having multiple chronic conditions.

Unlike acute injuries, chronic conditions are long-lasting and require ongoing care. Over the past decades, there has been a substantial increase in the number of workers with chronic conditions, such as asthma, diabetes, heart disease, and cancer. These numbers will continue to rise due to factors such as the aging population, the prevalence of harmful coping behaviors such as substance abuse and unhealthy diets, and environmental pollution. Although some chronic conditions, such as heart disease, are associated with age, chronic health conditions are increasingly prevalent among younger workers. Many chronic conditions, including depression, chronic fatigue syndrome, and others relating to psychosocial factors at work, and conditions with debilitating effects, such as cancer, require a multifactorial approach to support workers and ensure they are able to manage their conditions while working to the best of their capacity.

### *Children in the Workplace and Child Labor*

Children, defined by the Food and Agriculture Organization of the United Nations (n.d.) as people under the age of 18, are an especially vulnerable segment of the labor force. Not all young people who work are considered child laborers, and under the right conditions, work can provide young people with valuable experiences. FAO considered child labor to be "work that is inappropriate for a child's age, affects children's education, or is likely to harm their health, safety or morals" (n.d., para. 4).

The International Labour Organization (n.d.a) has stated that child labor may be identified by the following features:

- Any form of employment of children aged five to 11 years old or younger.
- Employment of children aged 12 to 14 for 14 or more hours per week.
- Employment of children aged 15 to 17 for 43 or more hours per week.
- Employment of children in hazardous work, which includes:
  - Work that exposes children to physical, psychological, or sexual abuse.
  - Work underground, underwater, at dangerous heights, or in confined spaces.
  - Work with dangerous machinery, equipment, or tools.
  - Work that involves carrying heavy loads.
  - Work that involves exposures to hazardous substances, agents, processes, temperatures, noise levels, or vibration.

Furthermore, in Article 3 of the Worst Forms of Child Labour Convention (1999), ILO defined the "worst forms of child labor," which include slavery, all practices similar to slavery, sex work, illicit activities, and other work likely to harm children's health, safety, or morals.

A joint ILO and United Nations Children's Fund report (2025) found that in 2024, 137.6 million children around the world were child laborers, including 54 million employed in hazardous work. Furthermore, 61% of the world's child laborers worked in agriculture.

According to the European Commission (n.d.), children working in hazardous conditions suffer from higher levels of illness and injury and, compared to adults, are at greater risk from workplace hazards due to their age and developmental level. ILO (n.d.c) states that young workers between 15 and 24 years old make up more than 15 per cent of the world's labor force and suffer from nonfatal occupational injuries at a rate of up to 40 percent higher than workers older than 25. ILO (2013a) also found that in 2008, 15.1 million children had reported work injuries that caused them to miss at least one day of work or school.

According to ILO and UNICEF (2025), Sub-Saharan Africa was the region with largest number of child laborers as of 2024—with about two-thirds of the global total. However, child labor also exists in high-income countries, including the U.S. According to AIHA's white paper on young workers and child labor in the U.S. (Hirsh et al., 2025), the agricultural industry and retail trade are especially hazardous for young workers.

According to the U.S. Government Accountability Office (2018), as of 2014, there were more than 500,000 children employed as household and hired farm workers in the country. Working children employed in agriculture suffered more than 50% of all work-related child fatalities between 2003 and 2016, although this population comprised less than 5.5% of all working children in the U.S. for any year during that period. The National Children's Center for Agricultural Health and Safety (2022) found that a child occupational fatality occurred in the agricultural sector once every three days, on average. Transportation incidents, contact with machinery, and violent contact with animals and humans were leading causes of fatalities among young agricultural workers.

After agriculture, the second highest rates of workplace fatalities among young workers in the U.S. occur in the retail trade. Homicides or violent acts caused 63% of these fatalities. Children working in construction are also at serious risk of injury from hazards such as falls from ladders or scaffolding (Hirsh et al., 2025).

Despite the high incidence of child worker fatalities and injuries in the U.S., child labor protection laws are threatened in many states. Since 2021, 14 states have introduced or passed bills that have weakened child labor protections by lowering age restrictions for hazardous work and allowing young workers to work longer hours. The U.S. Department of Labor (2023) has reported a 69% increase in the number of children employed illegally by companies since 2018, many of them migrants. Advocates are calling for efforts to prevent the weakening of child protection laws (Sherer & Mast, 2023, June 23; December 21).

### *Precarious Work*

Although there is no formal definition of the term, precarious work is a subset of nonstandard work characterized by a high degree of vulnerability. ILO (2016) has described precariousness as associated with low pay, uncertain employment continuity, high risk of job loss, little or no choice in working conditions, and few job protections. Common features of precarious work include irregularity, insecurity, lack of social protections, lack of control over working conditions and wages, poor pay or wage theft, short-term duration, hazardous conditions and harassment, lack of a fixed work location, and shift work. Workers in precarious, informal, and nonstandard work are, for the most part, vulnerable workers who may experience general health inequities.

Contingent work, including work in the gig economy, is often precarious, with a few exceptions, such as high-end professional work in nonstandard arrangements. Contingent work is typically temporary or freelance work managed by short-term contracts or with casual work arrangements, such as via digital labor platforms, which don't provide employment benefits. Black and Hispanic or Latino workers are overrepresented in contingent work (BLS, 2018). Rodriguez et al. (2022) have described work in the gig economy as another social determinant of health.

An increasing proportion of the U.S. workforce is engaged in nonstandard work arrangements, including precarious work. This has exacerbated the country's existing labor insecurities, including at-will employment, a low federal minimum wage, and the absence of paid sick leave or childcare leave requirements (Blustein et al., 2018; Duffy et al., 2016). Workers in nonstandard arrangements are likely

to face hazards in their work, lack regulatory protection, lack knowledge about hazards, and be unable to speak up about hazardous conditions. They typically do not have a single regular employer or worksite, precluding them from the benefits of traditional workplace health and safety protections, health promotion programs, health insurance, and other work-related regulatory safeguards. Workers in nonstandard arrangements are hard to reach through traditional health protection and promotion approaches, leaving them vulnerable to adverse physical and psychosocial working conditions (Muntaner et al., 2010). Labor insecurities and inequalities were amplified by the COVID-19 pandemic, which disproportionately sickened, killed, or financially devastated low-wage workers of color.

### *Informal Work*

ILO (2018) has estimated that over 60% of the world's adult labor force—about two billion workers—is employed in the informal economy. According to ILO:

> Informal employment now refers to all employment arrangements that do not provide individuals with legal or social protection through their work, thereby leaving them more exposed to economic risk than the others, whether or not the economic units they work for or operate in are formal enterprises, informal enterprises or households. (2013b, p. 3)

The International Monetary Fund (2021) has reported that "informal workers are more likely to be poor and to earn lower wages compared to their peers in the formal sector," and that these workers "lack social protection, access to credit and are generally less educated" (section 4, para. 3). The informal economy is global, IMF found, but the highest levels of informal work are found in Latin America and sub-Saharan Africa, while the lowest levels are reported in Europe and East Asia. Furthermore, IMF has noted that informal work is related to gender inequality:

> Globally, 58 percent of employed women work in the informal sector, and are more likely to be in the most precarious and low-paid categories of informal employment. In sub-Saharan Africa, women's average share of informal employment in the region's nonagricultural sector is 83 percent. (section 4, para. 4)

### *The Relationship Between Work and Health*

Extensive research documents the relationship between precarious work and negative health outcomes. Unstable employment is associated with increased acute myocardial infarction risk, cardiovascular mortality, and all-cause mortality (Dupre et al., 2012; Kivimäki et al., 2020; Niedhammer et al., 2021). Low income is associated with increased rates of heart disease, diabetes, stroke, and other psychological and chronic disorders. Not only is precarity associated with higher injury rates and increased hazard exposures (Quinlan et al., 2001), it also adversely impacts mental health (Ferrie et al., 2002; Ferrie et al., 2008), with outcomes that include anxiety and depression (Butterworth et al., 2013; Lewchuk et al., 2008; Nätti et al., 2009). Precarity results in greater psychological strain and injury rates compared to standard full-time work (Allan et al., 2021; Koranyi et al., 2018; Quinlan et al., 2001).

### *The Basis of Worker Health in Community Health*

The U.S. lags on key health indicators, especially life expectancy, compared to peer countries (Bor et al., 2023). Research supports the intuitive link between worker health and community health, since workers are a subset of the general population. The U.S. Surgeon General (2021) and the Vitality Institute (Oziransky et al., 2015) have published reports that connect worker health with community health.

The 2021 U.S. Surgeon General report summarized the nation's health disadvantage compared to other wealthy nations, stating that American workers are less healthy and have less access to health care but pay more for it. This disadvantage increases health care costs, reduces productivity, and hinders business growth. It is rooted in neighborhoods and communities that do not meet seven vital conditions for many residents: basic health and safety needs, meaningful work and wealth, humane housing, reliable transportation, a healthy environment, lifelong education, and a sense of inclusion and power (Surgeon General, 2021).

A report for the Vitality Institute by Oziransky et al. (2015) presented county health data to demonstrate connections between workforce and community health. This quantitative analysis identified correlations between employment sector, health risk, and disease burden at the local level. Efforts to improve workers' health, safety, and well-being must account for and make efforts to improve the health of the communities in which they live and work.

## Preventive Actions

Without a doubt, the problems outlined above will require long-term, sustained efforts by OEHS professionals, workers experiencing occupational health inequities, and community stakeholders. This will involve collaboration and innovation by each group, as well as the use of a wide array of knowledge, talents, and skills. Because we believe that the path forward is to promote the role of work in reducing health inequities, we propose four broad areas of action.

1. ***Reduce health inequities in the workplace, including those due to social determinants of health, and establish work and workplaces as determinants of health.***

> What drives health is beyond just health behaviors and access to the doctor.... There's a whole host of environmental and social determinants that are actually much more influential on our health trajectories, and we have no organized practice for dealing with them.
>
> Anthony Iton, MD, JD, MPH, at a meeting of the Accelerating Change in Medical Education consortium (quoted in Parks, 2016, section on root causes, para. 3).

Although SDOH are the "conditions in which people are born, grow, live, work, and age" (WHO, n.d., para. 1), employment and working conditions are largely absent from research and discussions related to health and health inequities (Ahonen et al., 2018). Long-term unemployment, precarious employment, or underemployment can have significant effects on individuals' mental, physical, social, and emotional well-being. What a person does for a living influences other aspects of their life, such as their ability to afford health care, access safe housing, and spend time with their family, as well as their overall social status in their community. Pratap et al. (2021) highlighted the need to "shift the paradigm around the value of work and its impact on individual health and communities" (section 5, para. 5). Through work and the workplace, we have the ability to address and mitigate health inequities related to other determinants of health (Ahonen et al., 2018; Flynn et al., 2014; Pratap et al., 2021; WHO, 2008).

2. ***Improve community health through innovative, cross-sectoral partnerships.***

> Today's business leaders can play a meaningful role in the lives of their employees, consumers, and community members. By investing in the health and well-being of communities across the country, businesses have the potential to change the trajectory of wellness for generations to come.
>
> U.S. Surgeon General, 2021, p. 5.

The factors discussed in this paper—worker health and occupational health disparities, community health, vulnerable workers, precarious work, and SDOH—are interconnected, directly and indirectly. A recurring theme of the Surgeon General's 2021 report on community health and economic prosperity is the role of businesses to support and improve community health by creating cross-sectoral partnerships. The report presents community health improvement strategies employed by 40 businesses, along with eight case studies. These employers recognized that their business problems arose from community health issues, and they formed partnerships with a variety of organizations to find and implement solutions. Similarly, the Vitality Institute interviewed representatives of 26 organizations to determine what strategies employers were using to improve the health of communities and their long-term profitability (Oziransky et al., 2015). Both reports contain valuable information on opportunities, barriers, costs and resource requirements, and metrics.

For-profit and nonprofit organizations, including businesses, academic institutions, health care organizations, community developers, financial institutions, social enterprises, health departments, foundations and philanthropic organizations, community membership organizations, and anchor institutions, all contribute to local economies and community economic prosperity, which in turn affect community health, job availability, working conditions, social determinants of health, and other outcomes.

### 3. *Minimize precarious work by supporting work that promotes the health, safety, and well-being of all, including children.*

> Health inequities attributable to employment can be reduced by promoting safe, healthy and secure work across all sectors of employment and making occupational health services available to all, including high-risk groups and people who are traditionally excluded from the labour market.
>
> Lima et al., 2019, p. 1.

Occupational health inequities attributed to work may be reduced by promoting safe, healthy, and secure work for all, including children. A 1999 report by the director-general of the ILO introduced the concept of decent work in direct response to the challenges associated with globalization. ILO (n.d.b) considered decent work to be:

> work that is productive and delivers a fair income, security in the workplace and social protection for all, better prospects for personal development and social integration, freedom for people to express their concerns, organize and participate in the decisions that affect their lives and equality of opportunity and treatment for all women and men. (para. 1)

ILO's "Decent Work Agenda" has four major pillars—job creation, rights at work, social protection, and social dialogue—and applies to all job types and sectors, including to formal and informal work, and to all people and families globally without exception. The concept of decent work was incorporated into the U.N. Sustainable Development Goals as Goal 8, "Promote Inclusive and Sustainable Economic Growth, Employment and Decent Work for All" (ILO, 2019; U.N., n.d.c).

The U.S. has not officially adopted ILO's "Decent Work Agenda," but in 2022, the Department of Health and Human Services published The U.S. Surgeon General's Framework for Workplace Mental Health and Well-Being, a call to improve workers' mental health through better working conditions. In 2023, the American Public Health Association (APHA) adopted a policy supporting decent work for all as a sustainable public health goal in the United States, which recognized workforce health as population health and discussed

the relationships between working conditions and the health of individuals, families, and communities. This policy called for partnerships and collaborations across industry, government, and public health "to explore, coordinate, and evaluate metrics, activities, and policies to develop and support implementation of a decent work strategic framework for the United States" (APHA, 2023, p. 16).

Governments, employers, and economists are key stakeholders in developing policies and strategies to boost labor force participation and stimulate the economy and employment creation. They also have the responsibility to support an equitable and healthy future of work. The public health field can play a crucial role in elevating employers, businesses, and governments as contributors to workforce and population health and well-being. Schulte et al. (2025) highlighted the integral role of the occupational safety and health field "in achieving and maintaining decent work" (introduction, para. 3) and reiterated the need to expand the field's role to consider decent work and worker well-being. Work by Schulte and others further outlines key considerations for OEHS researchers, practitioners, professional educators, advocates, government officials, and policy makers on how to approach and address the pillars of decent work (Schulte et al., 2022; Schulte et al., 2025).

4. ***Issue a global call to action on worldwide worker health, safety, and well-being that includes workers, worker organizations, professional associations, and other advocates for workers.***

The Global Occupational Safety and Health (GOSH) Coalition, which emerged from the May 2024 International Congress on Occupational Health in Marrakesh, Morocco, has issued a global call to action on OEHS (2025). The aim of this call to action is to elevate OEHS on the agendas of global institutions, especially those outside the health and safety community. Priorities under this call to action include:

- Greater protection for informal workers.
- Incorporation of health and safety requirements into grants and loans from global financial institutions and funding bodies, such as the World Bank.
- Better health and safety education for employers, workers, and health care providers.
- Reestablishment of the joint ILO/WHO Committee on Occupational Health.
- More ambitious OEHS targets in the United Nations Sustainable Development Goals.
- More funding for health and safety initiatives (GOSH Coalition, 2025).

ILO's recognition of the right to a safe and healthy working environment as one of the fundamental principles and rights at work in 2022 means this call to action has arrived at an opportune moment.

## Potential Outcomes

Addressing the challenges outlined in this paper would result in work that supports health, safety, and well-being for all; significantly reduced numbers of occupational injuries, illnesses, and fatalities; improved community health; reduced health care costs; greater productivity and profitability; and the creation of a global forum for workers' voices. Recognizing the effects of work, working conditions, and SDOH on population health metrics could lead to better understanding of injuries, illnesses, and fatalities. Efforts to increase the awareness of students, community members, and OEHS professionals of the factors contributing to injuries, illnesses, and fatalities could lead to wider public understanding of preventative measures and creativity in their design. Partnerships between stakeholders could result in additional positive outcomes, such as improved social cohesion and trust. Healthier workers and communities may lead to increased prosperity, as well as inclusive and sustainable development.

Promoting health equity and eliminating precarity in the workforce could result in increased costs of goods and services; spark organized backlash against campaigns to improve worker health, safety, and well-being; and arouse discontent among those who feel that progress has come too late or passed them by. However, we strongly believe that the benefits of healthier workers and communities far outweigh any negative impacts.

## Metrics and Assessing or Measuring Progress

The "moonshot" of the AIHA Grand Challenges Project is the elimination of occupational injuries, illnesses, and fatalities, as demonstrated by regional, national, and international data. Meeting this ambitious goal will require decades of intense effort and investment. The challenges addressed in this paper alone—protecting vulnerable workers; recognizing workers and the workplace as an integral part of community health; advocating for work that promotes health, safety, and well-being; and issuing a global call for a voice for workers—are of so great a scale that progress measurable by lagging metrics may not be possible within the next decade. However, the following leading indicators could signal progress within 10 years, with lagging indicators measuring improvement beyond that time:

- The creation of new partnerships, collaborations, and investments aimed at improving worker and community health.
- The implementation of new health-enhancing international or national policies, laws, and regulations.
- The promotion of healthy, safe, secure work for all by associations, governments, financial institutions, and other organizations.
- The publication of studies making use of tools such as the NIOSH precariousness scale (Bhattacharya & Ray, 2022) to demonstrate improvements in the workplace.
- The adoption and use of Total Worker Health® (TWH) metrics by organizations (Sahmel et al., 2023).
- Decreasing rates of occupational injuries, illnesses, and fatalities, with vanishing occupational health inequities, across all worker populations.

Current efforts to improve OEHS are hindered by lack of data, or low-quality data, with respect to:

- The health impacts associated with nonstandard work conditions, such as underemployment, gig work, and precarious work.
- The ways health impacts are stratified by race or ethnicity, gender, and SDOH.
- The impacts of factors such as working conditions, wages, and unions on worker health, safety, and well-being.
- The connections between labor and health metrics, which are currently reported separately.
- The relationships between robust economic development and worker and population health.

## Interdisciplinary and Cross-Sector Involvement

If, as suggested by leaders in the fields, the OEHS profession is to reorient itself to its public health roots, and embrace community health, we must assume different roles in our organizations and become champions for partnerships throughout the community. This will require access to an expanded knowledge base and skill set and collaboration with professionals within and across disciplines. According to Schulte et al. (2019), OEHS may consider collaborations with disciplines such as applied economics, sociology, anthropology, human relations, political science, gerontology, informatics, education, program evaluation, business,

corporate social responsibility, climate science, architecture, urban planning, and sustainability. These collaborations would be in addition to those with professions already working in the OEHS space, such as occupational medicine, human resources, engineering, legal, and occupational psychology.

Cross-sector involvement would embrace public and community health experts; government at all levels, including that of tribal nations; academic and research institutions; financial organizations; businesses; non-governmental organizations; consultants; health care institutions; activists, such as those advocating for environmental justice; chambers of commerce; and community development organizations, among others. Collaborations with professional and technical organizations could involve APHA, the NIOSH Total Worker Health Centers of Excellence, the American Conference of Governmental Industrial Hygienists, Workplace Health Without Borders, the American Society of Safety Professionals, the Occupational Hygiene Training Association, and other worker health advocates.

## The Need for Innovation

Addressing and resolving occupational health inequities will require innovations in the OEHS professions, which have become highly technical fields. Many OEHS professionals and researchers have not been trained to recognize and account for the effects of social context on workplace health, safety, and well-being. The result is that many conceptual models, research methods, and professional practices within OEHS benefit some groups more than others. For example, PPE tends to be designed following measurements taken from military recruits from the mid-1900s, which allows white men to find equipment that fits them more easily, compared to women and racial minorities. Reliance on limited anthropometric data may also result in standards and norms that don't provide equal protection for all workers, such as older workers who are more vulnerable to heat stress.

OEHS practitioners must find ways to reintegrate social perspectives through professional training and expanded collaborations with social scientists and community organizations. Schulte et al. (2019) underscored the need for the OEHS fields to prepare for and promptly respond to the changing nature of work. A paradigm shift in OEHS practice, research towards interdisciplinary collaboration, and recognition of the inequities that exist within structures of work will assist in efforts to address worker health, safety, and well-being going forward.

Integrating a social approach to OEHS requires work in three key areas. First, we need to address how factors such as age, gender, sexual orientation, race, ethnicity, nativity, ability, and class put some workers at increased risk of injury or illness compared to others in similar roles and positions. Specifically, we must identify which of these social factors contribute to increased risk, explain how disadvantages materialize in the lives of workers, and develop interventions to overcome these disadvantages. Second, we must investigate how these factors impact the ways we understand and practice workplace safety. This will require us to identify and address implicit bias in our scientific models—for example, the 70-kilogram male standard used in toxicological modeling—and how these models inadvertently disadvantage some workers over others. Finally, we need to expand our understanding of the relationships between health, work, and well-being. This includes transitioning from focusing solely on preventing injuries to promoting worker well-being, as it affects health in and out of the workplace.

### *Emerging Strategies for Corporate Policy*

Several strategies are emerging that will expand our understanding of the relationships between work, health, and well-being. One example is the environmental, social, and governance (ESG) model, which has become popular in many workplaces within the past two decades. ESG comprises the standards

used to measure an organization's environmental and social impact (Krantz & Jonker, 2024). Indicators for environmental impact include greenhouse gas emissions, carbon emissions, waste management, and pollution. Social impact measures aspects of culture, diversity, inclusivity, human rights, and supply chains that ultimately affect workers' equity (Krantz & Jonker, 2024). In a similar vein, corporate social responsibility (CSR) is an internal framework of an organization or company that ensures adherence to local and international laws, such as labor regulations and worker rights. CSR aims for organizations to adopt policies and practices that support sustainability, both socially and ethically (McGrath & Jonker, 2023). The integration of checkpoints for equity in top-down management principles and production may benefit workers.

Work itself must be recognized as a determinant of health. Occupational health outcomes are intertwined with individual, organizational, and community health, and addressing workplace inequities requires integrated solutions. One example is the TWH approach, which combines all aspects of work into integrated interventions via policies, programs, and practices to improve worker health, safety, and well-being (NIOSH, 2024, May 31). This includes assessing how the workplace environment impacts worker health; embracing a holistic model for health, safety, and well-being; and recognizing the relationships between work and nonwork conditions, as well as how those conditions are affected beyond traditional workplace hazards. Approaches like TWH not only improve physical health outcomes, such as obesity, sleep disorders, and cardiovascular disease, but also enhance psychosocial factors of work, such as workers' job satisfaction and turnover intentions.

### *Novel Approaches for Research*

Community-based participatory research (CBPR) is an equitable approach to research that has been used in health disparities studies. It involves cooperation between organizations and community members on all aspects of research projects, particularly those conducted in disadvantaged communities. CBPR is primarily used in health and environmental research and is intended to increase the value of studies not only for the researchers but also for the community under study. Although CBPR is not a novel strategy, it has not been widely used in OEHS research.

The use of CBPR and long-standing CBPR partnerships to address health disparities has been found to result in sustained, positive long-term health effects in various settings (Brush et al., 2020; Tapp et al., 2013; Wallerstein et al., 2020). For example, a CBPR study conducted between 2017 and 2019 trained community health workers to conduct breast cancer training interventions for Latino farm workers in southern Florida. Community and stakeholder participation in the development of the breast cancer educational intervention among these farm workers resulted in education that was comprehensive, relevant, culturally and linguistically appropriate, and easily disseminated to the target population (Rodriguez et al., 2020). CBPR approaches will become even more essential as the workforce grows more diverse.

## Next Steps: Progress and Future Directions in Research, Education, Practice, and Policy

The work required to address the Grand Challenges proposed in this paper will be difficult and demanding. Nevertheless, it may result in new and innovative ways of applying integrated innovations in local communities, such as those covered in the Surgeon General's 2021 report.

The plan for communicating and disseminating the AIHA Grand Challenges for Worker Health, Safety, and Well-Being will make use of articles in The Synergist, a book encompassing the work of all four concept paper teams, and presentations at AIHA Connect and other professional conferences, such as those hosted

by ASSP and APHA. Other methods of increasing visibility and outreach for the Equity Grand Challenges may include:

- Developing a body of knowledge for the Grand Challenges, which will be distributed by AIHA to other organizations.
- Developing a training module on the Grand Challenges, which may be included in TWH programs.
- Partnering with the AIHA Social Concerns Committee to design and present sessions at AIHA Connect.
- Inviting subject matter experts to create a professional development course on the Grand Challenges to present at AIHA Connect.
- Identifying an educational track on topics related to the Grand Challenges at AIHA Connect and inviting subject matter experts to present.
- Working with NIOSH Centers of Excellence for Total Worker Health at academic institutions to create areas of concentration on topics related to the Grand Challenges within degree or certificate programs.
- Advocating for the adoption and enforcement of strong child labor legislation, data collection on child labor, training of workers and management, and corporate responsibility for young workers.

## The Roles of OEHS Professionals and Other Collaborators

The workplace and workforce have undergone significant changes in recent decades, and knowledge that workers' health is affected by factors outside the workplace has increased. However, the OEHS field has not always kept pace. Our professions and the workers we protect will benefit if we deepen our awareness and understanding of workplace health inequities, as well as adapt our roles to effectively protect and promote worker health, safety, and well-being, both nationally and globally. Many approaches for addressing the Grand Challenges presented in this paper will draw upon core OEHS competencies, such as exposure assessment and control, while others will require developing awareness of issues outside our current scope of practice, adopting new models for OEHS, returning OEHS to its public health roots, and taking on innovative roles as we collaborate with new partners.

We can benefit workers by collaborating with partners both within and beyond the workplace, as well as by taking responsibility for needs that may be less familiar to us, such as community support and healthy community design, family-supportive work arrangements, and productive aging and other challenges affecting workforce demographics. We can work with other professionals, community members, and external organizations to create and nurture community-based partnerships that promote the seven vital conditions identified in the Surgeon General's 2021 report as shaping health, wealth, and well-being.

## Conclusion

Protecting vulnerable workers will require a multilevel, multifaceted approach to reduce occupational health disparities connected to race, ethnicity, gender, age, socioeconomic status, and other SDOH. By advocating for and adopting work that promotes health, safety, and well-being for all, we can highlight the critical role of work in public health. Community health improvements can begin in the workspace. In turn, by improving worker health through innovative, cross-sectoral partnerships, we can positively impact community health. Lastly, it is of utmost importance to give workers a voice, nationally and globally. We have issued a call for worldwide action on worker health, safety, and well-being that encompasses workers, employers, worker organizations, professional associations, governments, nonprofit organizations, international agencies, and other advocates.

OEHS professionals can build on our knowledge, skills, and abilities to increase understanding of the need to use different models of thinking about the workplace, such as by adding a social perspective to our already robust technical skills, as well as by perceiving worker health as based in community health. We can build awareness among ourselves and ensure that incoming OEHS professionals receive this additional perspective, whether in academic settings or through continuing education. We can become competent in the social, economic, and political aspects of worker health, safety, and well-being, as well as demonstrate leadership and technical proficiency. We can become champions in the workplace and community and develop skills in breaking down silos and building partnerships. Nothing less than the health, safety, and well-being of workers, their families, and their communities are at stake.

We call on OEHS professionals and partners to take the next steps to eliminate occupational injuries, illnesses, and fatalities:

1. Reduce health inequities in the workplace, including those due to social determinants of health, and establish work and workplaces as determinants of health.
2. Improve community health through innovative, cross-sectoral partnerships.
3. Minimize precarious work by supporting a public health goal of work that promotes health, safety, and well-being of all, including children.
4. Issue a global call to action on worker health, safety, and well-being that includes workers, worker organizations, professional associations, and other advocates for workers.

## References


Allan, B. A., Autin, K. L., & Wilkins-Yel, K. G. (2021). Precarious work in the 21st century: A psychological perspective. *Journal of Vocational Behavior, 126*, 103491. https://doi.org/10.1016/j.jvb.2020.103491

Ahonen, E. Q., Fujishiro, K., Cunningham, T., & Flynn, M. (2018). Work as an inclusive part of population health inequities research and prevention. *American Journal of Public Health, 108*(3), 306–311. https://doi.org/10.2105/AJPH.2017.304214

American Industrial Hygiene Association. (n.d.). *AIHA safety matters center*. https://www.aiha.org/get-involved/safety-matters-center

American Public Health Association. (2023). Support decent work for all as a public health goal in the United States. *New Solutions: A Journal of Environmental and Occupational Health Policy, 33*(1), 60-71. https://doi.org/10.1177/10482911231167089

Bhattacharya, A., & Ray, T. (2022, August 9). Precarious work, job stress, and health-related quality of life. *NIOSH Science Blog*. https://blogs.cdc.gov/niosh-science-blog/2022/08/09/precarious-work/

Blustein, D. L., Kenny, M. E., Di Fabio, A., & Guichard, J. (2018). Expanding the impact of the psychology of working: Engaging psychology in the struggle for decent work and human rights. *Journal of Career Assessment, 27*(1), 3–28. https://doi.org/10.1177/1069072718774002

Bor, J., Stokes, A. C., Raifman, J., Venkataramani, A., Bassett, M. T., Himmelstein, D., Woolhandler, S. (2023). Missing Americans: Early death in the United States—1933–2021, *PNAS Nexus, 2*(6), 173, https://doi.org/10.1093/pnasnexus/pgad173

Brownstein, M. (2025, February 11). *Poll: Most U.S. workers with chronic conditions manage them at work, haven't told employer*. Harvard T. H. Chan School of Public Health. https://hsph.harvard.edu/news/poll-most-u-s-workers-with-chronic-conditions-manage-them-at-work-havent-told-employer/

Brush, B. L., Mentz, G., Jensen, M., Jacobs, B., Saylor, K. M., Rowe, Z., Israel, B. A., & Lachance, L. (2020). Success in long-standing community-based participatory research (CBPR) partnerships: A scoping literature review. *Health Education & Behavior, 47*(4), 556–568. https://doi.org/10.1177/1090198119882989

Bureau of Labor Statistics. (2018, June 7). *Contingent and alternative employment arrangements*. https://www.bls.gov/news.release/archives/conemp_06072018.htm

Butterworth, P., Leach, L. S., McManus, S., & Stansfeld, S. A. (2013). Common mental disorders, unemployment, and psychosocial job quality: Is a poor job better than no job at all? *Psychological Medicine, 43*(8), 1763–1772. https://doi.org/10.1017/S0033291712002577

Buttorff, C., Ruder, T., & Bauman, M. (2017). *Multiple chronic conditions in the United States*. RAND Corporation. https://www.rand.org/pubs/tools/TL221.html

Canadian Centre for Occupational Health and Safety. (2024, June 17). *Vulnerable workers*. https://www.ccohs.ca/topics/workers/vulnerable

Centers for Disease Control and Prevention. (2013). CDC health disparities and inequalities report—United States, 2013. *Morbidity and Mortality Weekly Report, 62*(Suppl. 3). https://www.cdc.gov/mmwr/pdf/other/su6203.pdf

Department of Labor. (2023, February 27). *Departments of Labor, Health and Human Services announce new efforts to combat exploitative child labor*. https://www.dol.gov/newsroom/releases/osec/osec20230227

Duffy, R. D., Blustein, D. L., Diemer, M. A., & Austin, K. L. (2016). The psychology of working theory. *Journal of Counseling Psychology, 63*(2), 127-148. https://doi.org/10.1037/cou0000140

Dupre, M. E., George, L. K., Liu, G., & Peterson, E. D. (2012). The cumulative effect of unemployment on risks for acute myocardial infarction. A*rchives of Internal Medicine, 172*(22), 1731–1737. https://doi.org/10.1001/2013.jamainternmed.447

Escobari, M., Seyal, I., & Daboin Contreras, C. (2020, November 16). *New but narrow job pathways for America's unemployed and low-wage workers*. Brookings Institution. https://www.brookings.edu/blog/up-front/2020/11/16/new-but-narrow-job-pathways-for-americas-unemployed-and-low-wage-workers/

European Commission. (n.d.). *Child labour has a profound impact on the health and wellbeing of children*. https://international-partnerships.ec.europa.eu/news-and-events/stories/child-labour-has-profound-impact-health-and-wellbeing-children_en

Ferrie, J. E., Shipley, M. J., Stansfeld, S. A., & Marmot, M. G. (2002). Effects of chronic job insecurity and change in job security on self reported health, minor psychiatric morbidity, physiological measures, and health related behaviors in British civil servants: The Whitehall II Study. *Journal of Epidemiology and Community Health, 56*(6), 450–454. https://doi.org/10.1136/jech.56.6.450

Ferrie, J. E., Westerlund, H., Virtanen, M., Vahtera, J., & Kivimäki, M. (2008). Flexible labor markets and employee health. *Scandinavian Journal of Work, Environment & Health Supplements,* (6), 98–110. https://www.sjweh.fi/article/1257

Flynn, M. A., Carreón, T., Eggerth, D. E., & Johnson, A. I. (2014). Immigration, work, and health: A literature review of immigration between Mexico and the United States. *Revista de Trabajo Social, 6*, 129–149. https://pmc.ncbi.nlm.nih.gov/articles/PMC5334002/

Flynn, M. A., Cunningham, T. R., Guerin, R. J., Keller, B., Chapman, L. J., Hudson, D., & Salgado, C. (2015) *Overlapping vulnerabilities: The occupational safety and health of young workers in small construction firms*. National Institute for Occupational Safety and Health and American Society of Safety Engineers. https://www.cdc.gov/niosh/docs/2015-178/pdfs/2015-178.pdf

Food and Agriculture Organization of the United Nations. (n.d.). *Module 4: Child labour*. https://www.fao.org/rural-employment/toolbox/module-4--child-labour/en

Global Occupational Safety and Health Coalition. (2025, June 3). Briefing note [unpublished].

Government Accountability Office. (2018, November). *Working children: Federal injury data and compliance could be strengthened*. https://www.gao.gov/assets/gao-19-26.pdf

Hirsh, R., Warren, H., & Richards, R. (2025). *Young Worker/Child Labor in the U.S.* American Industrial Hygiene Association.

International Labour Office. (1999). *Report of the Director-General: Decent work. International Labour Conference, 87th Session*. https://webapps.ilo.org/public/libdoc/ilo/P/09605/09605(1999-87).pdf

International Labour Organization. (n.d.a). *Child labour statistics (CHILD database)*. https://ilostat.ilo.org/methods/concepts-and-definitions/description-child-labour-statistics/

International Labour Organization. (n.d.b). *Decent work*. https://www.ilo.org/topics-and-sectors/decent-work

International Labour Organization. (n.d.c). *Young workers*. https://www.ilo.org/young-workers

International Labour Organization. (2013a). *A global estimate of work-related injuries among children*. https://www.ilo.org/sites/default/files/2025-05/Global_Estimate_on_Work_Related_Injury.pdf

International Labour Organization. (2013b). *Women and men in the informal economy: A statistical picture* (2nd ed.). https://www.ilo.org/sites/default/files/wcmsp5/groups/public/@dgreports/@stat/documents/publication/wcms_234413.pdf

International Labour Organization. (2016). *Non-standard employment around the world: Understanding challenges, shaping prospects*. https://www.ilo.org/sites/default/files/wcmsp5/groups/public/%40dgreports/%40dcomm/%40publ/documents/publication/wcms_534326.pdf

International Labour Organization. (2018). *Women and men in the informal economy: A statistical picture.* (3rd ed.). https://www.ilo.org/sites/default/files/2024-04/Women_men_informal_economy_statistical_picture.pdf

International Labour Organization. (2019). *Time to act for SDG 8: Integrating decent work, sustained growth and environmental integrity*. https://www.ilo.org/sites/default/files/wcmsp5/groups/public/%40dgreports/%40inst/documents/publication/wcms_712685.pdf

International Labour Organization. (2022). *ILO declaration on fundamental principles and rights at work and its follow-up*. https://www.ilo.org/resource/conference-paper/ilo-1998-declaration-fundamental-principles-and-rights-work-and-its-follow

International Labour Organization and United Nations Children's Fund. (2025). *Child labour: Global estimates 2024, trends and the road forward*. https://www.ilo.org/sites/default/files/wcmsp5/groups/public/%40ed_norm/%40ipec/documents/publication/wcms_797515.pdf

International Monetary Fund. (2021, July 28). *Five things to know about the informal economy*. https://www.imf.org/en/news/articles/2021/07/28/na-072821-five-things-to-know-about-the-informal-economy

Kivimäki, M., Batty, G. D., Pentti, J., Shipley, M. J., Sipilä, P. N., Nyberg, S. T., Suominen, S. B., Oksanen, T., Stenholm, S., Virtanen, M., Marmot, M. G., Singh-Manoux, A., Brunner, E. J., Lindbohm, J. V., Ferrie, J. E., & Vahtera, J. (2020). Association between socioeconomic status and the development of mental and physical health conditions in adulthood: A multi-cohort study. *The Lancet Public Health*, Q(3), e140–e149. https://doi.org/10.1016/S2468-2667(19)30248-8

Koranyi, I., Jonsson, J., Rönnblad, T., Stockfelt, L., & Bodin, T. (2018). Precarious employment and occupational accidents and injuries—A systematic review. *Scandinavian Journal of Work, Environment & Health*, *44*(4), 341–350. https://doi.org/10.5271/sjweh.3720

Krantz, T. & Jonker, A. (2024, January 24). *What is environmental, social and governance (ESG)?* https://www.ibm.com/think/topics/environmental-social-and-governance

Lewchuk, W., Clarke, M., & de Wolff, A. (2008). Working without commitments: Precarious employment and health. *Work, Employment & Society*, *22*(3), 387-40. https://doi.org/10.1177/0950017008093477

Lima, J., Rohregger, B., & Brown, C. (2019). *Health, decent work, and the economy*. World Health Organization. https://iris.who.int/bitstream/handle/10665/346140/WHO-EURO-2019-3487-43246-60607-eng.pdf

McGrath, A. & Jonker, A. (2023, December 22). *What is corporate social responsibility (CSR)?* IBM. https://www.ibm.com/think/topics/corporate-social-responsibility

Michel, Z. Z., & Ben-Ishai, L. (2016, March 31). *Good jobs for all: Racial inequities in job quality*. Center for Law and Social Policy. https://www.clasp.org/sites/default/files/public/resources-and-publications/publication-1/Race-and-Job-Quality-Brief-3_30ar.docx-FINAL.pdf

Muntaner, C., Solar, O., Vanroelen, C., Martínez, J. M., Vergara, M., Santana, V., Castedo, A., Kim, I. H., & Benach, J. (2010). Unemployment, informal work, precarious employment, child labor, slavery, and health inequalities: Pathways and mechanisms. *International Journal of Health Services: Planning, Administration, Evaluation*, *40*(2), 281–295. https://doi.org/10.2190/HS.40.2.h

National Children's Center for Rural and Agricultural Health and Safety. (2022). *2022 fact sheet: Childhood agricultural injuries*. Marshfield Clinic Research Institute. https://marshfieldresearch.org/Media/Default/NFMC/National%20Childrens%20Center/2022_Child_Ag_Injury_Fact_Sheet.pdf

National Institute of Occupational Safety and Health. (2024, March 8). *Occupational health equity program*. https://www.cdc.gov/niosh/research-programs/portfolio/ohe.html

National Institute of Occupational Safety and Health. (2024, May 31). *About the Total Worker Health® Approach*. https://www.cdc.gov/niosh/twh/about/index.html

Nätti, J., Kinnunen, U., Mäkikangas, A., & Mauno, S. (2009). Type of employment relationship and mortality: Prospective study among Finnish employees in 1984-2000. *European Journal of Public Health*, *19*(2), 150–156. https://doi.org/10.1093/eurpub/ckp002

Niedhammer, I., Bertrais, S., & Witt, K. (2021). Psychosocial work exposures and health outcomes: A meta-review of 72 literature reviews with meta-analysis. *Scandinavian Journal of Work, Environment & Health*, *47*(7), 489–508. https://doi.org/10.5271/sjweh.3968

Office of Science and Technology Policy. (N.d.) *21st century grand challenges*. The Obama White House Archives. https://obamawhitehouse.archives.gov/administration/eop/ostp/grand-challenges

Office of the Surgeon General. (2021, January). *Community health and economic prosperity: Engaging businesses as stewards and stakeholders—A report of the Surgeon General*. https://www.hhs.gov/sites/default/files/chep-sgr-full-report.pdf

Office of the Surgeon General. (2022). *The U.S. Surgeon General's framework for workplace mental health and well-being*. https://www.hhs.gov/sites/default/files/workplace-mental-health-well-being.pdf

Oziransky, V., Yach, D., Tsao, T.Y., Luterek, A., & Stevens, D. *Beyond the four walls: Why community is critical to workforce health*. (2015, July). Vitality Institute. https://www.vitalitygroup.com/wp-content/uploads/2016/12/VitalityInstitute-BeyondTheFourWalls-Report-28July2015-1.pdf

Parks, T. (2016, August 25). *Death by zip code: Investigating the root causes of health inequity*. American Medical Association. https://www.ama-assn.org/public-health/health-equity/death-zip-code-investigating-root-causes-health-inequity

Pratap, P., Dickson, A., Love, M., Zanoni, J., Donato, C., Flynn, M. A., & Schulte, P. A. (2021). Public health impacts of underemployment and unemployment in the United States: Exploring perceptions, gaps and opportunities. *International Journal of Environmental Research and Public Health*, *18*(19), 10021. https://doi.org/10.3390/ijerph181910021

Pulford, A., Thapa, A., Thomson, R. M., Guilding, A., Green, M. J., Leyland, A., Popham, F., & Katikireddi, S. V. (2022). Does persistent precarious employment affect health outcomes among working age adults? A systematic review and meta-analysis. *Journal of Epidemiology and Community Health*, *76*(11), 909–917. https://doi.org/10.1136/jech-2022-219292

Quinlan, M., Mayhew, C., & Bohle, P. (2001). The global expansion of precarious employment, work disorganization, and consequences for occupational health: A review of recent research. *International Journal of Health Services: Planning, Administration, Evaluation*, *31*(2), 335–414. https://doi.org/10.2190/607H-TTV0-QCN6-YLT4

Quirós-Alcalá, L. (2023, March 16). Vulnerable workers: *How structural and work level factors impact health risks among workers* [Presentation]. 2023 Chesapeake AIHA & ASSP Educational Seminar: Current Topics in Safety, Health, and Environmental Issues, Laurel, MD, United States. https://publichealth.jhu.edu/sites/default/files/2023-07/quirosvulnerable-workerslocal-ih-meeting-march-16-2023.pdf.

Rodriguez, N. M., Casanova, F., Pages, G., Claure, L., Pedreira, M., Touchton, M., & Knaul, F. (2020). Community-based participatory design of a community health worker breast cancer training intervention for South Florida Latinx farmworkers. *PloS One, 15*(10), e0240827. https://doi.org/10.1371/journal.pone.0240827

Rodriguez, F., Sarraju, A., & Turakhia, M.P. (2022). The gig economy worker—A new social determinant of health? *JAMA Cardiology, 7*(2), 125–126. https://doi.org/10.1001/jamacardio.2021.5435

Sahmel, J., Chang, C. C., Laszcz-Davis, C., & Nelson, D. I. (2023). Chapter 16: *Total Worker Health® metrics*. In R. S. Lawson & C. Booth (Eds.), *Industrial Hygiene Performance Metrics Manual* (pp. 131-138). (2nd ed.). American Industrial Hygiene Association.

Schulte, P. A., Delclos, G., Felknor, S. A., & Chosewood, L. C. (2019). Toward an expanded focus for occupational safety and health: A commentary. *International Journal of Environmental Research and Public Health, 16*(24), 4946. https://doi.org/10.3390/ijerph16244946

Schulte, P. A., Iavicoli, I., Fontana, L., Leka, S., Dollard, M. F., Salmen-Navarro, A., Salles, F. J., Olympio, K. P.K., Lucchini, R., Fingerhut, M., Violante, F. S., Seneviratne, M., Oakman, J., Lo, O., Alfredo, C. H., Bandini, M., Silva-Junior, J. S., Martinez, M. C., Cotrim, T. … Fischer, F. M. (2022). Occupational safety and health staging framework for decent work. *International Journal of Environmental Research and Public Health, 19*(17), 10842. https://doi.org/10.3390/ijerph191710842

Schulte, P. A., Pot, F. D., Iavicoli, I., Leso, V., Fontana, L., Almeida, I. M., Auntunes, E. D., Araujo, T. M., Caraballo-Arias, Y., Balogun, M. O., Buralli, R., Choi, W. J., Cotrim, T., Fischer, F. M., Fisher, D. L., Martinez, M. C., de Anchieta Messias, I., Oakman, J., Olympio, K. P. K., Omokhodion, F., … Violante, F. S. (2025). Furthering decent work by expanding the role of occupational safety and health. *WORK: A Journal of Prevention, Assessment & Rehabilitation, 80*(2), 680–690. https://doi.org/10.3233/WOR-240230

Sherer, J. & Mast, N. (2023, June 23). Iowa governor signs one of the most dangerous rollbacks of child labor laws in the country: 14 states have now introduced bills putting children at risk. *Working Economics Blog*. Economic Policy Institute. https://www.epi.org/blog/iowa-governor-signs-one-of-the-most-dangerous-rollbacks-of-child-labor-laws-in-the-country-14-states-have-now-introduced-bills-putting-children-at-risk/

Sherer, J. & Mast, N. (2023, December 21). *Child labor laws are under attack in states across the country*. Economic Policy Institute. https://www.epi.org/publication/child-labor-laws-under-attack/

Solar, O., & Irwin, A. (2010). *A conceptual framework for action on the social determinants of health*. World Health Organization. https://iris.who.int/server/api/core/bitstreams/ca294183-3263-470f-a5fe-8e124ec48c72/content

Tapp, H., White, L., Steuerwald, M., & Dulin, M. (2013). Use of community-based participatory research in primary care to improve healthcare outcomes and disparities in care. *Journal of Comparative Effectiveness Research, 2*(4), 405–419. https://doi.org/10.2217/cer.13.45

Theorell, T., Hammarström, A., Aronsson, G., Träskman Bendz, L., Grape, T., Hogstedt, C., Marteinsdottir, I., Skoog, I., & Hall, C. (2015). A systematic review including meta-analysis of work environment and depressive symptoms. *BMC Public Health, 15*, 738. https://doi.org/10.1186/s12889-015-1954-4

United Nations. (n.d.a). *2024 theme: Let's act on our commitments: End child labour!* World Day Against Child Labour 12 June. https://www.un.org/en/observances/world-day-against-child-labour/2024

United Nations. (n.d.b). *Promote inclusive and sustainable economic growth, employment and decent work for all*. United Nations Sustainable Development Goals. https://www.un.org/sustainabledevelopment/economic-growth/

Wallerstein, N., Oetzel, J. G., Sanchez-Youngman, S., Boursaw, B., Dickson, E., Kastelic, S., Koegel, P., Lucero, J. E., Magarati, M., Ortiz, K., Parker, M., Peña, J., Richmond, A., & Duran, B. (2020). Engage for equity: A long-term study of community-based participatory research and community-engaged research practices and outcomes. *Health Education & Behavior*, *47*(3), 380–390. https://doi.org/10.1177/1090198119897075

Weller, C. E. (2019, December 5). *African Americans face systematic obstacles to getting good jobs. Center for American Progress*. https://www.americanprogress.org/article/african-americans-face-systematic-obstacles-getting-good-jobs/

World Health Organization. (n.d.). *Social determinants of health*. https://www.who.int/health-topics/social-determinants-of-health#tab=tab_1

World Health Organization. (2008). *Closing the gap in a generation: Health equity through action on the social determinants of health*. https://iris.who.int/server/api/core/bitstreams/cb08095c-55c8-484e-bff6-0e9c78fd38dd/content

Worst Forms of Child Labour Convention, June 1, 1999. https://normlex.ilo.org/dyn/nrmlx_en/f?p=NORMLEXPUB:12100:0::NO::P12100_INSTRUMENT_ID:312327