



A rapid scoping review of COVID-19 and vulnerable workers: Intersecting occupational and public health issues

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Funding information

Institut de Recherche Robert-Sauvé en Santé et en Sécurité du Travail,
Grant/Award Number: IRSST-2020-0060

Abstract

Background: This article reports the results of a rapid scoping review of the literature on COVID-19 transmission risk to workers in essential sectors such as retail, health care, manufacturing, and agriculture, and more particularly the experiences of workers in precarious employment and social situations.

Methods: Following scoping review methods, we included 30 studies that varied in terms of methodology and theoretical approaches. The search included peer-reviewed articles and grey literature published between March and September 2020.

Results: Based on the studies reviewed, we found that COVID-19 infection and death rates increased not only with age and comorbidities, but also with discrimination and structural inequities based on racism and sexism. Racial and ethnic minority workers, including migrant workers, are concentrated in high-risk occupations and this concentration is correlated to lower socioeconomic conditions. The COVID-19 pandemic appears in the occupational health and safety spotlight as an exacerbator of already existing socioeconomic inequalities and social inequalities in health, especially in light of the intersection of issues related to racism, ethnic minority status, and sexism.

Conclusions: This review provides early evidence about the limitations of institutions' responses to the pandemic, and their capacity to provide a safe and decent working environment for all workers, regardless of their employment status or the social protections they may enjoy under normal circumstances. It is also important to think about these issues in the postpandemic context, when conditions of precariousness and vulnerability persist and possibly worsen.

KEYWORDS

COVID-19, health inequities, occupational health, precariousness, public health, racial/ethnic disparities, review, vulnerable workers

1 | INTRODUCTION

The first cases of COVID-19 appeared in late 2019 in Wuhan in central China.¹ Although measures to counter COVID-19 have been rapid, international trade and population movements have led to worldwide infection, killing nearly two million people within a few months while causing considerable damage to national economies and destabilizing whole societies.

From January 30, 2020, when the World Health Organization declared the outbreak of SARS-CoV-2 (then called 2019-nCoV) a "Public Health Emergency of International Concern,"² governments around the world have been commissioning a series of responses and protective measures to minimise transmission. These measures have been too little too late from the perspective of some experts, address wrong targets for others, and have been perceived as too drastic and abusive for a considerable part of the population; it is clear that the lack of evidence on the nature of this virus and its mode of transmission has left the impression that it was a trial and error approach without a precise plan.³ Action had to be taken quickly and in consideration of limited existing knowledge and the technical, financial and human resources on which health systems could rely.

While it is still too early to take a complete step back and draw lessons from the pandemic (at the time of writing, the pandemic is ongoing and not yet under control), it is possible to draw a first picture of the occupational health and safety (OHS) situation in relation to exposure to SARS-CoV-2 (COVID-19). From a public health standpoint, in terms of reducing exposure and transmission, it is critical that we understand the impact of precarious working conditions, particularly for the health of populations designated as more vulnerable (e.g., newcomers, foreign migrant workers, ethnic or racial minority workers, women, ageing workers, workers in high risk occupations, those in underserved communities, and those with lower language proficiency).¹ These workers are more likely to be in types of employment (e.g., temporary, part-time, on call, subcontractor, gig workers) where working conditions are less favourable and the risks to their health and safety are greater. For example, agency workers or those with poor working language skills and limited knowledge of their OHS rights may be less likely to ask for better protections or to report symptoms related to COVID-19 for fear of suffering financial losses. Those without citizenship may fear deportation and keep their symptoms under wraps, increasing the risk of transmission in the workplace.

For many researchers, the work context is an unavoidable element to consider, even if OHS and public health are not always integrated entities in various countries and jurisdictions.

The aim of this article is to report the results of a rapid scoping review of the literature on COVID-19 and prevention, and more particularly on the experiences of workers in precarious situations

and vulnerable groups. We define precariousness here as a set of accumulated adversities (e.g., type of job contract, working hours, employment relationship, low income, low access to training and career opportunities, migratory status).^{4,5}

We prioritised a rapid review of the literature with the goal of providing an understanding of the emerging knowledge base to facilitate the use of evolving evidence in time-sensitive, pandemic-driven decision making at a time when COVID-19 still affects many countries. At the time of writing, the world was still in the first wave of the pandemic and no vaccine was yet available.

2 | METHODS

To reach our goal, we modified Arksey and O'Malley's⁶ framework for scoping reviews to fit an accelerated timeline, given the urgency of the research questions and immediate need for evidence to inform pandemic decision-making.

2.1 | Identifying broad research questions

To meet our aim of reporting the results of a rapid scoping review of the literature on COVID-19 and prevention, and more particularly on the experiences of workers in precarious situations and vulnerable groups, we used the following questions to guide our systematised approach to identifying relevant studies and as a framework for the content analysis. What are the most vulnerable occupations or industries in regard to SARS-Cov-2 infection and transmission? How are precarious employment situations endangering workers' OHS? What are the conditions that prevent transmission in precarious work environments, and how do employers, workers, and practitioners address this OHS issue? These questions led us to investigate the fields of OHS and public health as they pertain to the COVID-19 pandemic. The literature related to these research questions provides a first picture of prevention approaches and actions in essential services between March 2020 and September 2020, corresponding to the first wave of the pandemic.

2.2 | Identifying relevant studies

We followed a systematised approach to our literature review,⁷ using keywords and Boolean logic. To meet our research aim, we adapted existing scoping review methods in the design of our approach.^{6,8} Because our goal was to summarise the scope of the existing literature, we used an integrative approach,⁹ which made it possible to include studies that varied in terms of methodology (quantitative, qualitative), the theoretical approaches proposed, and the concepts put forward. This enabled us to capture the full scope of the knowledge landscape without imposing preconceived ideas of the nature of the evidence. The documentary approach and the database query were carried out by a professional librarian specialising

¹Throughout this article, we refer to vulnerable workers, especially when describing groups that face discrimination and other barriers related to social and economic equity. We wish to clarify that we conceptualize vulnerability as a situation that affects these groups in the context of work, and not as an inherent attribute of their social identities.

TABLE 1 Search string

COVID-19	COVID-19 or coronavirus or coronavirus disease or 2019-nCoV or novel coronavirus or SARS-COV* or SARS-CoV-2 or Severe Acute Respiratory Syndrome
AND Precariousness	at-risk or disparities or disparity or ethnic or inequality*, inequit* or insecurity or low-income or low-wage or migrant or minorities or minority or migrant or minority groups (MH) or precarious or précarité or precarity or racial or social determinants of health (MH) or transients and migrants (MH) or vulnerabilit* or vulnerable or vulnerable population
AND Context of work, OHS issues	work or emploi or employé or employee or employment (MH) or job or labour or labor or main d'oeuvre or manpower or métier or occupation* or occupational or occupational disease (MH) or occupational exposure (MH) or occupational groups (MH) or occupational health (MH) or occupations (MH) or profession or professionnel or staff or travail or travailleur or women, working (MH) or work (MH) or worker* or workforce (MH) or working or workplace (MH) or worksite*

Note: MH = indexing term (CINAHL heading).

in OHS. Eleven databases were used: OHS blog, CAIRN Info, COVID-19 Research, Current Contents, Embase, Google Scholar, ISST, OSH Update, ProQuest Dissertation and Theses, PsycInfo, PubMed, and Social SciSearch. Two references were added following a hand search by the librarian.

The search included peer-reviewed articles published from March through September 2020, which were identified using search terms in English and French. The search string used for the databases is presented in Table 1.

2.3 | Study selection and data management

After removing duplicates, 74 references were imported to Endnote.² Our search criteria enabled us to identify studies addressing COVID-19 workplace issues and challenges to vulnerable groups. We then applied a 5-star rating system so we could sort the studies according to their relevance to our research goals. Given the urgency of the health situation and the need to share data and thinking on the best strategies to prevent and mitigate coronavirus disease and influence the most informed decision-making, we synthesised only 5-star studies for this review. Our criteria for classifying studies were as follows:

- 5-star studies: addressed COVID-19 by (a) providing empirical data on OHS and precarious workers in essential services, (b) providing sociodemographic data, or (c) providing a review of the literature on COVID-19, precarious employment and vulnerabilities;
- 4-star studies: addressed COVID-19 and OHS issues in precarious employment, but from a theoretical perspective (e.g., commentaries, position papers, statements, discussions, etc.);
- 3-star studies: addressed COVID-19 by providing empirical data on OHS issues, but not addressing precarious employment issues;

- 2-star and 1-star studies: addressed interesting theoretical issues, but far from our research goals.

Inclusion and exclusion criteria: Studies identified with our search terms (see Table 1) that were (1) peer-reviewed, (2) published in English or French, and (3) rated 5 stars, were included. Studies that did not meet all of these criteria were excluded.

For an overview of the search and selection process, see Figure 1.

2.4 | Charting the data

Details about the included articles were extracted systematically. The extracted data capture the following fields: geographical location; study type (qualitative, quantitative, or mixed methods); study objectives; research approach; workers' occupational identity; definition of vulnerability/precariousness; main results; recommendations for intervention; and, when applicable, recommendations for further research. Key elements of the data extracted are summarised in Tables 2–4.

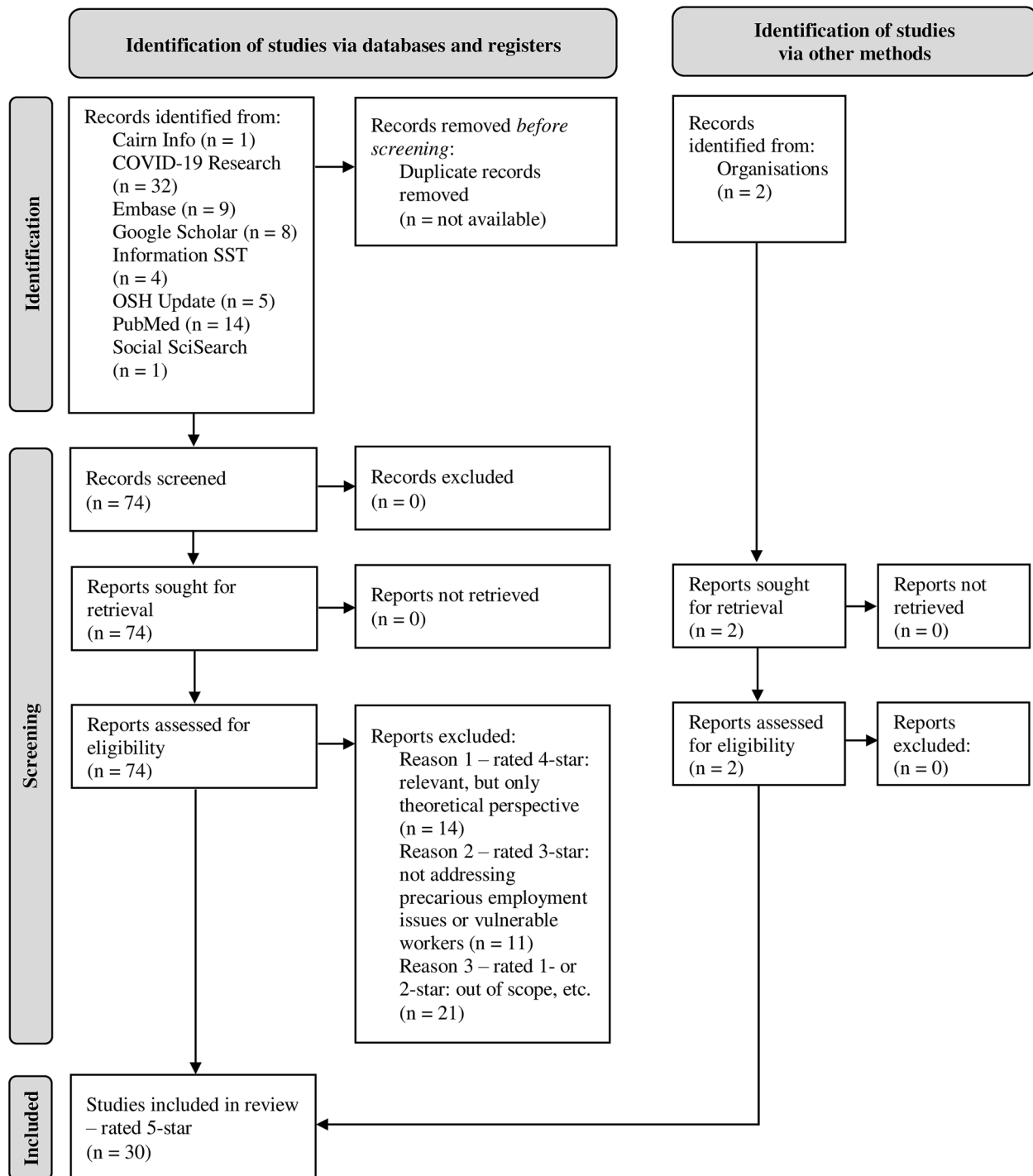
2.5 | Reporting the results

The extracted data were synthesised by our inter-disciplinary team. From this synthesis, we mapped main issues by occupational categories (see Table 3) and by the main recommendations for levels of intervention (see Table 4). The main themes identified were then analysed for the intersections between OHS and public health.

3 | RESULTS

Of the total number of studies imported to Endnote (74), 30 (28 from the database search, 2 added manually) were classified as 5 star and included in this rapid review (see Table 2 for a summary of studies included in the review). Of these studies, 30 were identified as relevant to workplace challenges for vulnerable groups. Of the studies

²After duplicates were identified and removed, studies were sourced from 8 of the 11 databases searched. The databases and number of studies imported from them are as follows: Cairn Info: 1; COVID-19 Research: 32; Embase: 9; Google Scholar: 8; Information SST: 4; OSH Update: 5; PubMed: 14; Social SciSearch: 1.



Adapted from: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71. doi: 10.1136/bmj.n71.

FIGURE 1 Flow diagram of search and selection process

not included, 14 were classified as 4 star, 11 as 3 star, 6 as 2 star, and 15 as 1 star.

Most of the included studies were conducted in North America ($N = 17$, 15 in the United States, 2 in Canada) (see Table 2). Six were conducted in Europe (including the UK), whether within a national territory ($N = 4$) or at the pan-European scale ($N = 2$), and five were

conducted in Asia (Eastern, Southeast, Western—also known as Middle East). Two studies addressed COVID-19 issues worldwide. There was a tremendous heterogeneity of study design and types of analysis. Most of the studies are quantitative ($N = 21$), and used methods including census data descriptive statistics, longitudinal analysis, multivariate regression analysis, and so forth. Qualitative

TABLE 2 Studies included, by occupational category^a

First author and year	place	Study type and approach	Objectives	Data collection(time)	Population highlights*
<i>Agricultural workers</i>					
Tutor marcom et al. (2020) ¹⁰	USA	Qualitative: collaborative, field report	Not explicit. Deductively, could be to report a community-based initiative in response to COVID-19 in North Carolina	First wave COVID-19 lock down	N ≥ 78,000 migrant seasonal farm workers (MSFW) in North Carolina
<i>Construction</i>					
Brown et al. (2020) ¹¹	USA	Quantitative: descriptive statistics of national employment data, comparisons by ethnicity and age	To assess the potential risk of severe illness from COVID-19 in the construction industry	Up to 2019	N = 14.9 million
<i>Direct care staff</i>					
Almeida et al. (2020) ¹²	USA	Quantitative: approach not explicit, but clearly related to social disparities in health and living conditions	To show how financial vulnerability can be amplified by the current COVID-19 pandemic	2019	N = ~3.5 million direct care staff for the elderly and people with disabilities
Kuhlmann et al. (2020) ¹³	Europe	Qualitative: trans-sectoral exploratory approach based on secondary sources, document analysis and expert information	To explore the situation of migrant carers in LTC in EU Member States and the disruptions caused by the COVID-19 pandemic from a public health perspective	January to May 2020	Migrant carers in long-term care (LTC) (N not explicit)
Sterling et al. (2020) ¹⁴	USA	Qualitative: grounded theory, thematic analysis	To understand the experiences of home health care workers caring for patients in New York City during the COVID-19 pandemic	March to April 2020	N = 33 home care workers
<i>Factory workers</i>					
Tran et al. (2020) ¹⁵	Vietnam	Review: fast review using terms that correspond to "health," "industrial worker," and "Vietnam"	To provide evidence on health problems, behaviors, and healthcare access of industrial workers in Vietnam	N/A	17 studies (sample sizes not explicit)
<i>Gig-economy drivers</i>					
Apouey et al. (2020) ¹⁶	France	Mixed methods: longitudinal analysis	To explore how precarious workers, particularly those employed in the gig economy, balance financial uncertainty, health risks, and mental well-being during the COVID-19 crisis	March and April 2020	N = 137
<i>Hotels and restaurants</i>					
Sönmez et al. (2020) ¹⁷	USA	Review	Not explicit, but could be (1) to document the social and economic impacts of the pandemic among immigrant workers in hotel and food service industry in the United States; (2) to provide an overview	N/A	Immigrant workers (N not explicit)

(Continues)

TABLE 2 (Continued)

First author and year	place	Study type and approach	Objectives	Data collection(time)	Population highlights*
<i>Meat processing</i>					
Donohue et al. (2020) ¹⁸	Nebraska, USA	Quantitative: descriptive statistics: sociodemographics and occupational exposure, workplace preventive measures, and so forth	Not explicitly addressed, but could be to describe the characteristics of meat processing facilities in Nebraska to provide a portrait of the preventive measures to control the virus infection	May 8–25, 2020	N = 241
Waltenburg et al. (2020) ¹⁹	USA	Quantitative: sociodemographic statistics	To better understand the effect of COVID-19 on workers in the meat and poultry facilities nationwide	May 31, 2020	N = 112,616 workers, 16,223 cases
<i>Medically trained midwives</i>					
Smith (2020) ²⁰	Indonesia	Qualitative: ethnographic case study	To identify social and health systems issues will come into play and structure the forms of risk that various subgroups of healthcare workers are likely to face during the pandemic	Late 2019, early 2020	Not explicit
<i>Other/general</i>					
Alahmad et al. (2020) ²¹	Kuwait	Qualitative: cumulative risks assessment	Provide a qualitative evaluation of multiple stressors affecting migrant workers	First wave of the COVID-19 pandemic	Migrant workers (N not explicit)
Baena-Diez et al. (2020) ²²	Spain	Quantitative: ecological study on the incidence rate and mean age	To analyse the differences in COVID-19 age-standardised incidence rate by mean income of the 10 districts of the city of Barcelona	February 26 to April 19, 2020	Confirmed cases of COVID-19 in Barcelona by districts (N not explicit)
Baker (2020) ²³	USA	Quantitative: descriptive statistics of national employment data	To estimate the number of United States workers frequently exposed to infection and disease in the workplace	Employment by sectors and occupations on May 2018 + survey on exposure during the pandemic	N = 14.4 million workers employed in occupations exposed to COVID-19
Bui et al. (2020) ²⁴	USA	Quantitative: descriptive statistics and χ^2 tests were used to summarise and compare demographics and outcomes	To calculate the outbreak incidence (cases per 100,000 workers) in various sectors	March 6 to June 6, 2020	N = 11,448 in Utah
Coggon et al. (2020) ²⁵	UK	Quantitative: cohort of 16,749 patients with COVID-19 admitted to hospitals in England, Wales, and Scotland. Multivariate Cox regression to estimate mutually adjusted hazard ratios for death in hospital. Study based on more than 5000 deaths attributed to COVID-19	To assess and compare risks of fatality in people who contract SARS-Cov-2 infection, according to their age, sex, ethnicity, smoking habits, and various comorbidities	February 6 to April 18, 2020	N = 16,749 patients

TABLE 2 (Continued)

First author and year	place	Study type and approach	Objectives	Data collection(time)	Population highlights*
Goudet et al. (2020) ²⁶	Canada (QC)	Quantitative: descriptive statistics from online survey distributed through a network of community organisations working with immigrant and refugee populations	To document the reality of immigrants, refugees and undocumented migrants who worked in essential services in Québec during the period of confinement related to COVID-19	May 14 to June 15, 2020	Asylum seekers working in essential services (N not explicit)
Hawkins et al. (2020) ²⁷	USA	Quantitative: data about employment combined with information about industries likely or possibly essential during the COVID-19 pandemic and the frequency of exposure to infections and close proximity to others by occupation	To calculate the percentage of workers in essential industries and occupations with a high risk of infection and close proximity to others by race and ethnicity.	Employment data for 2019	Not explicit; data from 2019 U.S. labour statistics
Khalatbari et al. (2020) ²⁸	Worldwide	Review: extent to which SEP has been considered as one of the potential risk factors of COVID-19	To review the extent to which SEP has been considered as one of the potential risk factors of COVID-19	To April 3, 2020	16 studies, with sample sizes ranging from 18 to 72,314
Koh (2020) ²⁹	Singapore	Quantitative: data gathered from daily reports by health authorities	To examine the cause of a surge of cases in April 2020 and the national response and regulation on migrant workers' accommodation	March, April and early May 2020	N = 17,758 migrant workers
Lambert et al. (2020) ³⁰	France	Quantitative: descriptive statistics based on socioeconomic comparisons	To document the situation before and during confinement based on the following themes: housing and general living conditions, working conditions, family life and neighbourhood relations and isolation	April 30 to May 4, 2020	N = 2003; Paris metropolitan area working population
Lee and Kim (2020) ³¹	Korea	Quantitative: census data were linked with data from the fifth Korean Working Conditions Survey	To identify occupational groups at high-risk of coronavirus disease 2019 (COVID-19) infection	N/A	N = 10.7 million workers in high-risk occupations
Lytelton et al. (2020) ³²	USA	Quantitative: current population survey microdata combined with occupational data	To estimate the number of such workers To examine the prevalence of protective resources by employment status To estimate occupational differences in sickness-related absences and their contribution to income, educational, and racial/ethnic differences in health inequalities	March–June 2020	N = 538,785 workers in essential occupations
Moore et al. (2020) ³³	USA	Quantitative: cumulative county-level data, reported to CDC by jurisdictions or		February–June, 2020	

(Continues)

TABLE 2 (Continued)

First author and year	place	Study type and approach	Objectives	Data collection(time)	Population highlights*
Pouliakas and Branka (2020) ³⁴	Europe	extracted from state and county websites and disaggregated by race/ethnicity Quantitative: skills-based approach to identifying the industries and occupations most likely to be affected using the European skills and jobs survey (ESJS)	To identify health disparities in COVID-19 cases and inform strategies for preventing and slowing SARS-CoV-2 transmission To provide an assessment of the potential impact of the Covid-19 confinement and social distancing measures on the European labour market	Not specified other than the confinement period	N = 535,000 (cumulative probable and confirmed cases; counties in 33 states identified as hotspots) N = 48,676 respondents
Rogers et al. (2020) ³⁵	USA	Quantitative: Population data by race/ethnicity in each U.S. state and in the entire United States were collected from the U.S. Census Bureau	To investigate racial disparities in COVID-19 mortality among essential workers in the United States To establish a deeper understanding of the compounding factors and indicators contributing to the inequalities permeating the novel coronavirus	All COVID-19 death data up to April 24, 2020	N = 2669 deaths
Selden et al. (2020) ³⁶	USA	Quantitative: data from the Medical Expenditure Panel Survey—examination of health risks by age group	To explore the hypotheses that (1) COVID-19 disparities stem from racial/ethnic differences in employment-related risk for infection, (2) disparities in COVID-19 outcomes arise from pre-existing differences in underlying health conditions that increase the disease severity	Not clear	N = 100,064; community noninstitutionalised, thereby excluding hard-hit populations in nursing homes, long-term care facilities, and correctional facilities
St-Denis (2020) ³⁷	Canada	Quantitative: distributional statistics	To estimate how occupational risks of exposure to COVID-19 vary across sociodemographic characteristics	Census 2016	Not explicit; census data covers Canadian population
Wang et al. (2020) ³⁸	Worldwide	Systematic review: PRISMA guideline; 11 electronic databases were used	To systematically review the existing literature on how epidemic infectious diseases affect the wellbeing of migrant workers and what are the interventions to improve their wellbeing	Various epidemic diseases since the first SARS in early 2000s (i.e., Ebola, H1N1, MERS)	17 studies (sample sizes not explicit); unskilled migrant workers (foreign and internal)
Wilson et al. (2020) ³⁹	USA	Quantitative: online survey. Linear regression	To determine whether job insecurity due to COVID-19 and financial concern were associated with worse mental health during the COVID-19 pandemic	April 6–12, 2020	N = 474
Various items described					

*Number of individuals or studies where available, and key characteristics of the population(s) sampled. For some studies, the "Objectives" column provides additional information about the broader area of focus.

TABLE 3 Cartography of the main issues by occupational categories

Occupational categories	Authors	Main issues
Agricultural workers	Koh, ²⁹ Tutor Marcom et al., ¹⁰ and Alahmad et al. ²¹	<ul style="list-style-type: none"> • Among seasonal migrant workers: Housing, communication, testing, contact tracing barriers, lack of internet connectivity, and availability of PPE • Health programmes halted to avoid staff exposure and telehealth visits were limited due to the lack of internet connectivity
Construction	Brown et al. ¹¹	<ul style="list-style-type: none"> • Previous medical condition to increase risk for COVID-19 • Inadequate health insurance coverage
Direct care staff (incl. home carers)	Ameida et al. ¹² and Sterling et al. ¹⁴	<ul style="list-style-type: none"> • Lack of paid sick leave • Inadequate PPE • Working long hours • Inconsistent delivery of information • Aggravation of already existing physical and mental health problems • Long-term care among migrant carers in the European Union as showcase of system deficit and precarious labour market
Factory workers	Tran et al. ¹⁵	<ul style="list-style-type: none"> • Health issues before pandemic with high prevalence of respiratory system problems • Self-treatment without medication • Crowded public transportation facilities
Gig economy drivers	Apouey et al. ¹⁶	<ul style="list-style-type: none"> • Instable income • Concerns for one's own health and for the future
Hotel and restaurants	Sönmez et al. ¹⁷	<ul style="list-style-type: none"> • Combination of life and work stressors • Feeling of insecurity (health, financial)
Meat processing	Donahue et al. ¹⁸ and Waltenburg et al. ¹⁹	<ul style="list-style-type: none"> • Lack of flexible medical leave policy • Closeness to each other • A certain number of positives asymptomatic • Disproportionate burden of illness and death among racialized minority workers
Medically trained midwives	Smith ²⁰	<ul style="list-style-type: none"> • Lack of access to PPE • Being culturally rooted in local customs, positive effect in creating trust among community members

studies ($N = 4$) used a wide variety of approaches: grounded theory thematic analysis, cumulative risk assessment, document analysis based on expert information, ethnographic case study, collaborative field report, and so forth. The only mixed methods study included used a longitudinal analysis frame to explore how precarious workers, and particularly gig economy drivers, balance financial uncertainty, health risks, and mental wellbeing.¹⁶ The review studies ($N = 4$) were very diverse in scope. They reviewed the extent to which socioeconomic position (SEP) has been considered as one of the potential risk factors of COVID-19²⁸; documented the impact of the ongoing pandemic on immigrant workers in certain specific sectors¹⁷; provided evidence on industrial workers' health problems before the pandemic To identify vulnerability to COVID-19¹⁵; and

systematically reviewed the existing literature on how epidemic infectious diseases affect the wellbeing of migrant workers, and on interventions to improve their wellbeing.³⁸ The research focus of the included studies is diverse, making direct comparisons unlikely. At the same time, this heterogeneity makes it possible to draw up a cartography of issues by occupational category. This offers an aerial view of the main issues that make up the fight against the COVID-19 pandemic, with the expectation that observation of these issues can contribute to the development of strategies and policies for tackling the persistent problem of inequality and social fracture during the COVID-19 pandemic.

Table 3 presents issues identified in our review, which we have grouped into eight occupational categories covered in the literature.

TABLE 4 Cartography of the main recommendations

Level of action*	Recommendations	Studies
<i>Individual level</i>		
1.1 Demographic	Need to recognise specific socioeconomic status factors as being clinically relevant to people's risk of COVID-19	Khalatbari-Soltani et al. ²⁸
1.2 Financial	Quick action for providing better social security for those who can't afford taking sick leave	Almeida et al. ¹²
<i>Organisational level</i>		
2.1 Workplace environment	As far as possible, provide testing facilities near industrial sites or at-risk environment to avoid travelling	Tran et al. ¹⁵
	Need for workplace and sector-specific guidance or tailored strategies and interventions (incl. culturally responsive)	Brown et al., ¹¹ Sterling et al., ¹⁴ Sönmez et al., ¹⁷ Waltenburg et al., ¹⁹ Smith, ²⁰ Bui et al., ²⁴ Moore et al., ³³ and Pouliakas and Branka ³⁴
	Provide better workers protection and conditions, including access to proper PPE	Brown et al., ¹¹ Almeida et al., ¹² Alahmad et al., ²¹ Hawkins ²⁷
	For migrant farm workers especially, to set up strike teams to do on-farm testing and prevention	Tutor Marcom et al. ¹⁰
	For temporary workers, to improve housing conditions and communication facilities	Alahmad et al. ²¹ and Koh ²⁹
	To address social inequality among the most vulnerable groups or among groups most at risk for unfair treatment**	Sönmez et al., ¹⁷ Smith, ²⁰ and Rogers et al. ³⁵
	Plans to ensure safe return to work, not only control methods to reduce exposures at work	Baker ²³
2.2 Healthcare, social assistance, and insurance systems	Characteristics of high-risk occupations and composition of the workforce (e.g., gender, wage, PPE, policy) need to be better understood and reflected in governmental actions	Lee and Kim ³¹ and St-Denis ³⁷
	Improved real-time data collection reporting ethnic and racial minorities hospitalisation and death	Selden and Berdahl ³⁶
	Develop continuous monitoring and adjustment as conditions change	Alahmad et al. ²¹
	Improved access to health information	Alahmad et al. ²¹
	Address the psychological health issues emerging from the health crisis	Wilson et al. ⁵⁵
2.3 Community network	To improve health care access and insurance coverage to all	Brown et al., ¹¹ Almeida et al., ¹² and Alahmad et al. ²¹
	Involve traditional healers, health providers or village traditional health collaborators in COVID-19 health strategy	Tran et al. ¹⁵
	Recognise the interaction between workplace environment and community	Waltenburg et al. ¹⁹
<i>Societal level</i>		
3.1 Policies and legislation	Develop health strategies for the most vulnerable populations and areas***	Beana-Diez et al. ²²
	Policies to protect workers from psychological health crisis during the pandemic	Sönmez et al. ¹⁷
	Attention needed to understand the impact of life and work conditions that may render some vulnerable groups more susceptible to COVID-19 infection	Sönmez et al. ¹⁷

TABLE 4 (Continued)

Level of action*	Recommendations	Studies
	Provide assistance for migrant workers in the long-run	Wang et al. ³⁸
	Develop better interministerial coordination in the planning of services offered to newcomers	Goudet ²⁶
	Provide increased capacity or authority of local governments (decentralization)	Lyttelton and Zang ³²
3.2 Sociodemographic and social trends	Better integration of OHS and public health (concerted actions, databases, comorbidities)	Coggon et al. ²⁵ and Rogers et al. ³⁵
3.3 Labour market dynamics	Advocacy for a trans-sectoral and trans-national governance approach to improve migrant workers protection and support	Kuhlmann et al. ¹³
3.4 Intercultural communication	To develop mitigation strategies that are culturally and linguistically responsive	Bui et al. ²⁴

*Classification inspired by Lederer, Loisel and Rivard's scoping review of diverse conceptualizations of work ability.⁵⁶

**This is explicitly addressed in three studies, but it could be deducted implicitly from most of the reviewed documents.

***This might be overlapping organisational level health and social assistance dimension.

Only 12 studies dealt with a specific occupational category. Key issues include risks related to physical proximity, lack of access to personal protective equipment (PPE) and information related to prevention, and inadequacy of organisational and government policies to protect vulnerable workers.

While many of the risks identified by the studies covered in Table 3 were known to the OHS authorities and the various workplaces in these sectors, COVID-19 brought a renewed urgency to addressing them. Furthermore, it was not common for OHS authorities to think of physical proximity as an occupational risk before COVID-19; understanding of this risk developed urgently during the pandemic. As such, interactions between colleagues or with clients suddenly had to be adapted very quickly. The identification of physical proximity as a risk, along with the heightened attention to other risks, put significant pressure on workplaces. Many workplaces were not prepared to apply drastic measures to prevent and control the spread of the virus. Furthermore, the pandemic has led to numerous temporary and permanent closures of businesses and bankruptcies, causing a significant increase in the unemployment rate worldwide.⁴⁰

The studies that do not focus on a specific sector were grouped thematically as pertaining to social disadvantage, as they all address issues that concern precarious or vulnerable workers. These studies were of a socio-demographic or epidemiological nature. For example, it was claimed that disadvantaged socioeconomic categories expose workers to job strain, stress, and unemployment.^{22,28} These categories largely include workers from ethnic and racial minorities or recent immigrants, including asylum seekers and temporary migrants (generally unskilled).^{13,21,26,29,33,37,38} Individuals from these groups were found in greater proportions among frontline workers.²⁷ Some authors went even further and discussed "occupational segregation"²⁷ or "structural inequities."^{35,36} This is consistent with the long-standing observation that immigrants and people from ethnic and

racial minorities are found in greater proportions in occupations and sectors where OHS risks and working conditions are more difficult.⁴¹⁻⁴⁵ As well, women are more prevalent among precariously employed workers. Precarious work engagement is linked with insecurity, low wages, lack of protection and insurance, and there is a dimension of gender inequity involved.^{31,32} Unsurprisingly, one study showed that rates of SARS-CoV-2 infection were higher in workplaces with minimal enforcement of existing OHS standards.³⁴ This European Union-wide study raises the issues and challenges affecting small businesses and, in the context of COVID-19, the inter-site or inter-establishment mobility of workers, resulting in an unfortunate and undue increase in interpersonal contacts.³⁴ This leads us to consider whether better relationships between public health and OHS could have determined which workplaces could have been targeted for additional supports to prevent the spread of COVID-19. In Montreal, Québec, the city most affected in Canada in terms of COVID-19 cases and death rates early in the pandemic,⁴⁶ the local press has reported similar practices in the health care community. To counter a labour shortage, agency workers are massively employed.⁴⁷⁻⁵⁰ These workers can operate in four or five different establishments in a single week despite the Public Health authority not recommending it. However, they have not banned it completely, even six months after the first wave of the disease.⁵⁰ There is a high ratio of immigrant and minority workers among temporary work agencies in Canada⁵¹ and in designated essential service jobs as well, which are also characterized by a very high proportion of women (e.g., nurse aide, orderly, and patient service associate occupations).⁵² The risk level for COVID-19 transmission is considered high for these jobs, in health care and social assistance, and in accommodation and food services, retail trade, and so forth.⁵³

Several studies^{10,21,29} focussed specifically on how the pandemic affects migrant workers, including care workers and seasonal farm

workers. Risks related to housing conditions were discussed in relation to temporary migrants; several countries have temporary work programmes that attract many transnational migrants⁵⁴ who are housed by the employer in crowded dormitories that do not allow physical space for distancing.^{10,29,36} These housing conditions as well as issues with internet connectivity, lack of access to PPE, and overlapping exposures at different levels were identified as particularly relevant to migrant workers. Another study reports that the housing issue not only affects migrant workers, but also precarious and low-wage workers who have to share a cramped space with several family members, some of whom may also have jobs where interpersonal or public contact is frequent.²⁵

Mental health issues during the COVID-19 pandemic are also reported in many of the reviewed studies: these issues include feelings of guilt in putting relatives at risk, anxiety, stress, uncertainty about the future, social isolation and lack of support.^{17,26,28,38,55} For workers in situations of vulnerability or precariousness, the pandemic may worsen an already challenged state of physical and mental health, especially among populations of immigrant workers.¹⁷

3.1 | Recommendations made in the studies included

The studies included in this review make a number of practical recommendations at different levels and in different areas. At the individual level, recommendations pertain to recognition of demographic characteristics and financial interventions. Organisational-level interventions call for changes to workplace environments; to healthcare, social assistance, and insurance systems; and to community networks. Societal-level interventions pertain to policies and legislation; to sociodemographic and social trends; to labour market dynamics; and to intercultural communication. Individual and organisational level recommendations can be related to societal issues, but they would require responses that have an impact at the level of individual circumstances or workplace measures. Recommendations from the included studies are presented by these levels and areas of intervention in Table 4.

In light of this rapid scoping review, it is clear that actions to respond to COVID-19 need to be carried out simultaneously at different levels and in different areas, and that they apply internationally. Taken together, the recommendations made by the included studies point to OHS and public health issues as domains that cannot be dealt with in silos. Furthermore, they identify the usefulness of producing indicators of risk of disease transmission by industry and employment category. For example, while physical proximity had been identified as a risk for disease transmission in health-care settings before the COVID-19 pandemic, it was not widely understood as an occupational risk in other sectors. It is also clear that markers of socioeconomic disadvantage need to be better integrated into the health profile of populations, if not given clinical relevance. The pandemic highlights the intersection between health risks in workplaces and issues pertaining to the health of

populations, especially disadvantaged groups, which points to the need for integration of public health and OHS approaches to research and developing policy interventions.

4 | DISCUSSION

This rapid scoping review captures early evidence from the first wave of the COVID-19 pandemic. New studies are being published every week, providing growing evidence of the issues identified in this review. Overall, the studies included in this review highlight the impact of disadvantaged SEP and poor working conditions on the risk of COVID-19 infection and transmission. They identify heightened risks in specific occupational categories, and they shed light on the intersection of issues related to racism, ethnic minority status, and sexism.

The findings of the included studies illustrate that the COVID-19 pandemic appears in the OHS spotlight as an exacerbator of already existing socioeconomic inequalities and social inequalities in health. As such, the correlation between precarious work and OHS risks,⁵ including risks of prolonged disability,⁵⁷ are better known. This knowledge illustrates the shortcomings of our social security systems and the need to adopt measures and interventions that target specific sectors and categories of workers who encounter various forms of precariousness and vulnerability. As reported in many studies, COVID-19 infection and death rates increase not only with age and comorbidities, but also with discrimination and structural inequities based on racism and sexism.^{10,11,18,24,25,27,28,32–38} Racial and ethnic minority workers, including migrant workers, are concentrated in high-risk occupations³¹ and this concentration is correlated to lower socioeconomic conditions.^{12,17,28,38}

Some of the included studies highlight the crucial issue of mental health during the pandemic, calling attention to the harmful effects of stress, anxiety, job insecurity, and social isolation on the health of vulnerable workers.^{17,26,28,38,55} As mentioned by Sönmez et al.,¹⁷ mental health issues concerning vulnerable populations of workers are worsened, adding a layer to physical and mental health conditions that are already under strain.⁴⁵ This observation is reinforced by numerous position papers and commentaries on the importance that should be placed on mental health in general during the pandemic, and more specifically on issues facing workers most affected by difficult living conditions.^{58–61}

Work precariousness is a feature of current economies worldwide. The suffix *-ization* (as in precarization)⁶² reflects an insidious process through which working conditions are continually threatened and weakened. The number of unstable employment situations and temporary and short-term hiring contracts is ever-increasing, which corresponds with a deterioration in wage conditions and protections.^{4,5,57,63–70} Studies focussing on gig-economy drivers were included in this review due to these workers' potentially increased risk for COVID-19 exposure, their particular financial precariousness, and increased concerns towards their mental wellbeing.¹⁶ The gig economy is subsumed into the neologism "uberization," which is now used worldwide to characterize the

"activities through digital platforms that arrange transaction between providers and customers,"^{71(p4)} often with minimal regulation. The gig economy is structured as a new business model designating workers as self-employed. This designation renders it possible to bypass existing labour and occupational health standards that apply for salaried employees or wage earners.⁷²

Taken together, the findings of the included studies pose a fundamental question: If various forms of precarious work engagement (gig workers, temporary migrant workers, agency workers, etc.) are here to stay and to respond to the impulses of the market economy, is it not time to provide these workers with benefits and equal rights? In addition to considering physical and biological occupational hazards, it is now common to consider work contexts and work organisation as risk factors for taking sick leave or as protection factors as well.^{73,74}

Scoping reviews function to identify implications for practice. In Table 4, we have captured the current scope of actions and considerations for addressing COVID-19 transmission risks to vulnerable workers that can be immediately implemented or adapted more broadly.

The recommendations in the included studies encompass interventions at the individual, organisational, and societal levels, and cover a wide range of policy areas at these levels. Appeals for more flexible medical leave policy allowing for time off without financial burden are a consistent feature among the studies included in this review. The studies also consistently emphasized the urgency of tackling structural inequalities in health and work conditions.

Among studies that focus on the individual level, policy changes recommended include interventions to improve financial security, and to understand workers' socio-demographic situations to better inform policy. Studies focussed on the organisational level offer a very wide variety of recommendations. These include testing at work sites, provision of adequate PPE, further efforts to understand workers' level of risk, and enhanced measures to engage and inform workers. Fundamental organisational-level changes to health, social security, and insurance systems have also been proposed, along with the strengthening of community networks. At the societal level, recommendations for policy reform address issues pertaining to legislation, labour market dynamics, and intercultural communication, and call for better integration of OHS and public health to address sociodemographic and social trends. However, the heterogeneity of health systems and protective measures already in place to counter the impact of the COVID-19 make it difficult to determine the applicability of different measures for different jurisdictions, so consideration of context is critical.

Meanwhile, heterogeneity of research methods corresponds with heterogeneity of variables and definitions of vulnerability/precariousness. Nonetheless, the heterogenous studies included in our review clearly illustrate the correlation between hazardous work situations and the presence of a strong contingent of racial or ethnic minority workers, including those hired under foreign temporary work programmes and the like. This convergence underscores the importance of addressing the various dimensions of vulnerability in designing and implementing policy interventions. More specifically, it illustrates the need to strengthen the integration of public health and OHS systems to understand and respond effectively to the

heightened risks facing vulnerable workers, given the many ways that risks arising from precarious work and from socioeconomic marginalization overlap and intersect.

Scoping reviews have methodological limitations. The main limitation of this study relates to our very broad research questions. On the other hand, the breadth of the studies identified by posing this question enabled us to identify themes that emerge across different occupational categories. This approach created an opportunity to explore how COVID-19 has exacerbated existing inequalities and created new risks in the context of precarious work.

This review was not intended to validate the relevance of the recommendations identified, nor does it seek to show their adaptation to all national, regional or local contexts that are subject to specific laws and regulations. However, in reviewing the studies, several limitations in the literature came to our attention. While many of the studies identified general areas and strategies for improvement, very few suggested specific recommendations for how concrete changes could be implemented; as such, there appears to be a need for further research that explicitly addresses how prevention and protection could be achieved. We also observed that many studies were sparse in detail about sample size and population characteristics (as illustrated in Table 2). Furthermore, while a number of studies that did include population data focused on comparison based on presumed nationality or ethnicity, they often did not include details about gender. Inclusion of data pertaining to gender could facilitate a better understanding of the impact of COVID-19 on the most vulnerable workers, given the over-representation of women, and especially women from ethnic-minority groups, in precarious employment. We note that several scientific journals have recently published comments, position papers or statements calling on public health and OHS authorities to pay more attention to these more vulnerable workers during the pandemic.^{58,60,61,75-77}

The studies included in this review appeal for more systematic collection of data on education, employment status, and job characteristics in COVID-19 epidemiological data.³⁷ This proposed research could increase the statistical evidence on the existence and role of work-related factors in COVID-19 disparities, with a focus on occupational differences within a specific sector.³⁶ Future studies should also examine the relation between the nature of work during the pandemic (e.g., essential workers, home-based workers) and the occurrence of depression and anxiety problems.⁵⁵ Gender and work-family balance should also be central to future studies on this topic. More targeted literature reviews should be elaborated to address issues within specific occupations or industries. These reviews could pair studies of employment data, compensation, and public health data, with case studies providing thick descriptions of organisational process and work environment dynamics, and corresponding perceptions.

5 | CONCLUSION

The current COVID-19 pandemic and all the damage following in its wake cannot be reduced to a viral or microbiological reality alone. Economic and budgetary disasters have already been

declared, and the scale of the containment measures has exacerbated mental health issues. People who are isolated or living alone, those with precarious incomes, and the poorest members of society have had to cope with even greater uncertainty, as they were already vulnerable to uncertain and harsh employment conditions. As far as epidemiology is concerned, despite still fragmentary and incomplete data, studies internationally show us that the COVID-19 pandemic highlights, if not directly causes, a worrying social divide and fracture that some authors have called "occupational segregation."²⁷ From an OHS perspective, further research should consider the intersection between COVID-19 protections and financial pressures facing businesses, as these pressures may lead businesses to make trade-offs that put workers' health at risk.

Poverty, precariousness, stigmatisation, ethnic discrimination, and systemic racism mark many workers' careers. In times of health crisis, workers with precarious status, who are often (im)migrants, members of ethnic minority groups and women, have found themselves on the front line of maintaining the provision of essential services, at the risk of their own health and that of their relatives and other colleagues, when the conditions for preventing transmission and controlling the disease are not adequate. This rapid review raises questions about institutional responses to the pandemic, and about the capacity of institutions to provide a safe and decent working environment for all workers, regardless of their employment status or the social protections they may enjoy under normal circumstances. Recent news from the Russian Federation, where seven workers at a poultry plant became the first human cases of avian influenza H5N8 infection,⁷⁸ highlights that we must think about these issues beyond the COVID-19 pandemic context, when the same conditions of precariousness and vulnerability continue, and the issue of equal access to health care and protection from occupational hazards needs to be addressed again and again.

How can workers in vulnerable and precarious situations be protected, and how can occupational injustices resulting from previous situations of structural inequality be eliminated? Social divides are important and COVID-19 is just one of many indicators of social inequalities. It is becoming increasingly clear that OHS issues related to COVID-19 cannot be treated separately from other socio-economic issues. As well, they cannot be treated as a silo without integration with public health issues. Instead, our public systems need concerted efforts and greater coordination in the planning of social programmes, including temporary migration and permanent immigration programmes.

ACKNOWLEDGMENTS

This review was supported by the grant sponsor Institut de recherche Robert-Sauvé en santé et en sécurité du travail (IRSST) (grant/award: 2020-0060).

CONFLICTS OF INTEREST

The authors declare that there are no conflicts of interest.

DISCLOSURE BY AJIM EDITOR OF RECORD

John Meyer declares that he has no conflicts of interest in the review and publication decision regarding this article.

AUTHOR CONTRIBUTIONS

Daniel Côté and Ai-Thuy Huynh conceptualized the idea for this review and developed the search string used for the databases, and peer-reviewed the articles. Daniel Côté processed the selected material and proposed a first draft of the manuscript. Steve Durant contributed to the inclusion of other authors' comments on the first draft. Marie Laberge revised the manuscript critically in regard to gender issues. Jessica Dubé provided insights pertaining to management issues and precarious employment. Ellen MacEachen, Shannon Majowicz, and Samantha Meyer provided insights into defining and documenting the type of review, as well as insights pertaining to occupational health and safety (Ellen MacEachen and Samantha Meyer) and epidemiology (Shannon Majowicz). All authors contributed to the review and final revision of the manuscript and agree to be accountable for all aspects of the work to the best of their knowledge.

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How to cite this article: Côté D, Durant S, MacEachen E, et al. A rapid scoping review of COVID-19 and vulnerable workers: Intersecting occupational and public health issues. *Am J Ind Med*. 2021;64:551-566. <https://doi.org/10.1002/ajim.23256>