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Worker and employer experiences with COVID-19 and the California Workers' Compensation System: A review of the literature

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Abstract

Background: Given workplace risks from COVID-19, California policymakers passed Senate Bill (SB) 1159 to facilitate access to workers' compensation (WC) benefits for frontline workers. However there has been no review of the available evidence needed to inform policy decisions about COVID-19 and WC.

Methods: We conducted a literature review on worker and employer experiences surrounding COVID-19 and WC, adhering to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

Results: Forty articles were included (16 about worker experiences and 24 about employer practices). Most were not about experiences and practices related to COVID-19 and WC. Worker studies indicated that paid sick leave reduced new COVID-19 cases and COVID-19 activity. Studies also found that rural agricultural and food processing workers lacked sick leave protection and faced severe housing and food insecurity. Studies on workplace health and safety indicated that health-care workers with access to personal protective equipment had lower stress levels. Studies about employer practices found that unrestricted work in high-contact industries was associated with increased risks to at-risk workers, and with health disparities. No studies examined worker COVID-19 experiences and WC claims or benefits, job loss, retaliation, workers' medical care experiences, and return-to-work or leave practices.

Conclusions: Our review identified experiences and practice *related to* COVID-19 and the WC system, but not specifically *about* WC and COVID-19 WC claims or benefits. Further research is needed to document and understand evidence underpinning the need for WC coverage for COVID-19 and to evaluate the impact of the current SB 1159 bill on WC in California.

KEYWORDS

California, COVID-19, employers, worker's compensation, workers

1 | INTRODUCTION

The novel coronavirus SARS-CoV-2, which causes the disease known as COVID-19, has led to the most severe global pandemic in over 100 years. The virus is highly contagious, spreading easily through respiratory droplets and aerosol transmission. COVID-19 is deadly for some and can often lead to serious illness or long-term symptoms even in nonfatal cases. From March 2020 through August 2021, over four million Californians have been infected, hospitals have experienced intermittent overwhelming surges, and 65,000 Californians have been killed by COVID-19.[1] In the beginning of the pandemic, there were no vaccines to prevent infection. Even now, once persons are infected there is no cure or effective targeted treatment. As a result, state and local authorities have relied on mask guidelines and other public health measures to save lives.[2] Yet even as some workers were able to minimize their exposure by working from home, healthcare workers, first responders, and workers across most sectors of the economy had to risk infection and death by continuing to work outside the home.[3]

In recognition of the deadly workplace risks that millions of workers suddenly found themselves facing, California policymakers moved quickly to facilitate access to workers' compensation (WC) benefits for healthcare workers and other frontline workers who had to continue working outside the home, and who were thus most exposed to the coronavirus. A temporary presumption for COVID-19 covering all frontline workers was established by executive order (EO-N-62-20)[4] on May 6, 2020. Senate Bill (SB) 1159, which was signed into law on September 17, codified this temporary presumption and created two new presumptions for workers who fell ill on July 6, 2020, or later.[5] The COVID-19 presumptions in California cover large segments of the private-sector workforce in addition to public safety workers, and they provide coverage for a disease that is extremely widespread.

Even though presumptions have been used for decades in California's WC system,[6] the presumptions established in response to the pandemic represent a striking departure from the way that presumptions have been used in the past. Critics of SB 1159[7] understandably raised concerns about COVID-19 claims fairness to employers due to the complexity of counting outbreak cases in a given place over a period of time and the associated administrative burden of such an outbreak definition for the SB 1159 outbreak presumption, and its associated impact on WC system costs. Even if the costs and overall system impacts of SB 1159 could be predicted in isolation, interactions with a rapidly evolving policy environment and the unpredictable course of the pandemic itself made the bill's influence and significance exceedingly difficult to foresee at the time of its enactment.

Understanding the context and experiences of workers and employers related to COVID-19 and the WC system is critically important to both the future of this legislative effort and its overall consequence on the WC system. We conducted a systematic review of the available peer-reviewed and grey literature on worker experiences surrounding COVID-19 and the WC system and any related literature regarding employer best practices.

2 | MATERIALS AND METHODS

We reviewed English language peer-reviewed literature examining workers' experiences surrounding COVID-19 and the California WC system. We included news reports and findings from literature reviews given that much of the information in this area is likely not to have yet been published in peer-reviewed literature. Although this was not a formal systematic literature review given that we did not rate the quality of the studies, for literature retrieval and review we adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.[8]

2.1 | Search strategy

We conducted structured search strategies via PubMed and Web of Science to identify peer-reviewed studies, limited to English-language peer-reviewed articles published from March 2020 to May 26th, 2021, in the United States. We identified articles with at least (1) one COVID-19 term, (2) one worker term inclusive of frontline worker industries (e.g., agriculture, firefighter/public services, etc.), and then (3) one WC term including qualified medical examiner, applicants' or defense attorney, claims adjustor or administrator, leave, temporary disability, benefits, wage loss, retaliation, claims, denial, utilization review, medical access, and workers compensation. We conducted a separate search with the same terms in Business Source Complete. We also conducted a grey literature search in Policy File Index and advanced Google searches (i.e., Workers Compensation Research Institute [WCRI], Society for Human Resource Management [SHRM], National Council on Compensation Insurance [NCCI], California Coalition on Workers Compensation [CCWC], etc.). The search strategies are listed in Supporting Information Materials (i.e., Supporting Information Methods.doc). To ensure comprehensiveness, we reference-mined articles to identify additional relevant literature, and asked experts about any known studies.

2.2 | Article screening

We reviewed titles and abstracts of published articles retrieved through the search. All three reviewers (DQ, NQ, GG) undertook an initial period of double coding to establish consistency in decisions about inclusion of full articles in this review, with the first author included in all double coding for consistency. Criteria for inclusion were that titles/abstract be US-based, about COVID-19 worker issues, specific to frontline or outbreak workers, employers or both, and WC (including benefits, outbreaks, medical access or care, and leave). Reviewers discussed discrepancies during regular meetings and resolved incongruencies to gain consensus on article inclusion (set at >95% agreement), achieving 100% interrater agreement. Once consistency was established, the remaining abstracts were independently reviewed to determine eligibility for inclusion, with an audit check on every third article conducted by another reviewer to ensure consistency. All abstracts marked for inclusion were then double reviewed by the team lead (DQ).

2.3 | Abstraction

To ensure a consistent approach to full article review, 15 articles were selected for double review by two coders (five each) and discussion. Once agreement was reached the type and detail of data to abstract, coders independently abstracted the remaining articles. After abstraction, each article was reviewed by another coder to ensure accuracy of abstracted content and discussed, if needed, to gain consensus on the abstracted data. Abstraction focused on identifying data on worker experiences with COVID-19 related to the WC system and included experiences of frontline workers or workers in an outbreak scenario at work.

3 | RESULTS

As shown in Figure 1 our PRISMA flow diagram, the searches identified 206 articles (*N* = 68 from PubMed 68, *N* = 9 from Web of Science, *N* = 87 from news reports identified via Business Source Complete, *N* = 42 from the grey literature). Experts identified an additional 12 articles for a total of 218 articles for title and abstract screening. Articles were excluded if they did not address COVID-19 worker experiences (*N* = 50); were not about essential workers or outbreak workers (*N* = 15); were not about WC or WC related experiences (*N* = 30); or were not based on work conducted within the United States (*N* = 12).

A total of 111 articles were identified for full review after article screening. During full text review an additional 71 studies were excluded: not COVID-19 and worker related (*n* = 18); not WC or WC related (*n* = 13); Information about the passing of a new law reported in an association report (*n* = 25); not conducted in the United States (*n* = 4); commentaries (*n* = 4); and an announcement (*n* = 7).

Altogether, 40 articles were identified as relevant for inclusion. Of the included 40 articles, 16 examined worker experiences and 24 were about employer experiences only. Table S.I provides a description of the article focus, type of study, design, timeframe, main topics, sample size, description of sample, and relevant results for the 16 articles that focus on workers. Table S.II provides the same information for the 24 articles that focus only on employer experiences related to COVID-19 and WC.

3.1 | Articles focused on workers

Of the 16 articles that focused on workers, seven analyzed data (five were peer-reviewed studies, two were grey literature studies).

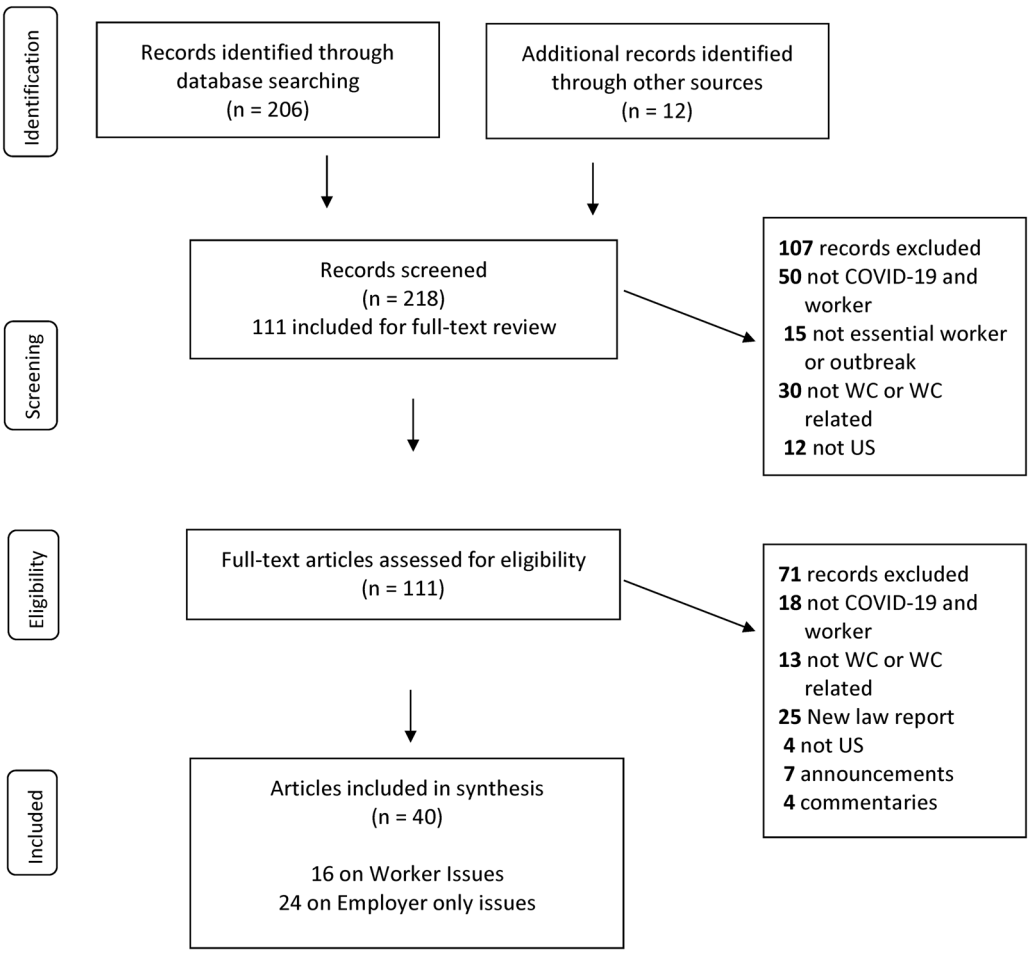

FIGURE 1 PRISMA flow diagram

In addition, there were two peer-reviewed literature reviews and seven news reports that we also summarize. Table 1 lists these studies of workers by study type and content.

3.2 | Evidence based on analysis of data

Of the seven articles that analyzed data, four were about healthcare workers,[9–12] two were about workers in rural San Joaquin Valley (primarily agricultural and food processing jobs),[13,14] and one was about workers in general[15] (comparing states where workers had gained the right to paid sick leave to those states where workers had not).

In terms of the data utilized, four of the seven studies used secondary[10,12,14,15] data from a variety of sources, two conducted surveys,[9,13] and one[11] linked a survey with secondary data.

None of the seven peer-reviewed or grey literature worker studies that analyzed data were about WC claims or benefits or about job loss or retaliation or about medical care. Instead, they were primarily about leave or paid leave ($n = 3$ studies)[13–15] and the workplace related to health or safety ($n = 3$ studies)[9,10,13] as well as some specifically on personal protective equipment (PPE) ($n = 2$ studies),[9,14] COVID-19 testing or screening ($n = 2$ studies).[9,11] There was one study each on lost work time/return to work ($n = 1$ study),[12] and hazard pay ($n = 1$ study).[14]

3.3 | Paid sick leave

Three studies[13–15] examined paid sick leave, which is an important adjacent topic to WC in California given that in SB1159 paid leave from other sources must be exhausted before WC benefits can be claimed. One study[15] used COVID-19 data from March through May of 2020 and policy measures to perform a difference-in-differences regression model that tested whether the emergency sick leave provision—the Families First Coronavirus Response Act (FFRCA), signed into law on March 18—reduced COVID-19 activity in the short term. Data were compiled from various sources, including the number of newly reported COVID-19 cases for all US states from the COVID Tracking Project at the daily level; number of daily tests performed; policy measures such as stay-at-home orders as compiled by the Kaiser Family Foundation; and state- and city-level sick pay mandates. The analyses used weighted regressions based on state-level population counts from the Census Bureau to obtain representative estimates. States where employees gained access to paid sick leave because of the FFCRA were found to have a statistically significant decrease in confirmed new cases per state per day (approximately 400 fewer) relative to the pre-FFCRA period and to states that had already enacted sick pay mandates before enactment of the FFCRA. This decrease in roughly 400 fewer cases translates into a decrease of 56% and is in line with the existing sick pay and influenza-like-illness literature[16,17]; this model estimate also translates into roughly one prevented case per day per 1300 workers who

TABLE 1 Worker studies ($n = 16$), by study type and content

Study type	Workers' compensation (WC) ($n = 3$)	WC death benefits ($n = 1$)	Job loss/ retaliation ($n = 2$)	Lost work time/ return to work ($n = 2$)	Leave/sick leave ($n = 7$)	COVID-19 screening/ testing ($n = 2$)	Personal protective equipment (PPE) ($n = 3$)	Workplace issues: health, safety ($n = 6$)	Other: lack of health insurance/ hazard pay ($n = 2$)
Peer-Reviewed: Studies ($n = 5$)				Shenoy (2020)	Pichler (2020)	Coto (2020)	Coto (2020)	Coto (2020)	
						Niu (2020)		Iddins (2021)	
Literature Reviews ($n = 2$)					Cherry (2020)		Cherry (2020)		Cherry (2020)
					Ghilarducci (2020)				
Grey Literature Studies ($n = 2$)					Flores (2020a)		Flores (2020b)	Flores (2020a)	Flores (2020b)
					Flores (2020b)				
News Reports ($n = 7$)	Sams (2020)	Almeida (2021)	Eidelson (2020)	Sclafane (2021)	Almeida (2021)			Almeida (2021)	
	Sclafane (2021)		Flores (2020b)		Perry 2020			Eidelson (2020)	
	Simpson (2021)							Perry (2020)	

had newly gained the option to take up to two weeks of paid sick leave. The FFCRA emergency sick leave provision also may have been more generous than some of the sick leave available to workers in the control states, implying that these results are lower-bound estimates and recognizing that paid sick leave policies changed throughout the pandemic.

Two grey literature studies[13,14] focused on workers in agricultural and food processing jobs in San Joaquin Valley. One study[13] summarized the results of a survey fielded in June 2020 from 301 respondents (68% Latino/a) in small rural cities across three counties. Nearly half (44%) of the sampled households had experienced income reduction since March 2020, with 30% of households having gone without food, or relied on food stamps or a food bank. Fifteen percent of renters were unable to pay rent in April or May. Only 28% of workers said they qualified for 10 days of paid sick leave. In the second study,[14] the authors reported that San Joaquin Valley workers lack robust sick leave protections, despite many valley workers being exposed to consistent and severe housing and food insecurity. Workers in crucial linkages in the valley's food chain (agriculture or grocery retail) lack extended paid sick leave, which exposes the public to the risk of COVID-19. Among California's five most populous cities, only Fresno (which is in the San Joaquin Valley) has workers that are not protected by local paid sick leave ordinances.

3.4 | Workplace related to health and safety

Three studies[9,10,13] (two peer-reviewed studies[9,10] and one grey literature studies[13]) examined health and safety in the workplace. One study[9] surveyed healthcare workers in hospitals (including Veterans Administration hospitals, skilled nursing facilities, rehabilitation facilities) at the beginning of the pandemic. The 34-question survey was distributed electronically to allied health professionals across 48 states through listservs of professional organizations and social media groups, and asked about the work environment, access to PPE, and levels of stress. Of the 920 respondents, most were female and between the ages of 25 and 34 years. Overall, the majority (86%) of respondents, reported feeling stressed about changes in their clinical activity and transmission of the virus to their family member or other individuals. Although the majority also expressed that having access to PPE helped to mitigate their levels of stress, with those reporting no access to PPE having significantly higher levels of stress.

Another study[10] of over 5500 employees at one large health care workplace developed and implemented a set of evidence-based benchmarks over a 9-month period. The benchmarks were designed to support the health and safety of individuals as well as organizational decision-making, with continuity of operations the ultimate goal. The data collected included results from molecular testing and surveillance, screening for SARS-CoV-2 variants of concern, assertive contract tracing, case management of employees with COVID-19, and antibody monitoring of recovered and vaccinated employees. Overall, the information from these exemplar workplace-related SARS-CoV-2 benchmarks provided evidence upon which clarity, reassurance, and guidance could be delivered to management decision makers.

Finally, a household survey[13] of 301 respondents in small rural cities in San Joaquin Valley found that more than half of workers (57%) stated that they had not been able to work from home—for any amount of time—since the Governor's stay-at-home order in March 2020. Nearly half (46%) were unable to affirm that their workplaces had safe practices for preventing COVID-19 spread.

3.5 | Lost work time

One study[12] of a testing-based strategy to allow return to work obtained data from 8930 employees tested at a Massachusetts General Brigham (MGB) institution and to assess loss of work time due to testing, and possible delays in subsequent return to work. The testing-based strategy resulted in a median return to work time of 19 days, presumably due to prolonged viral shedding, whereas a symptom-based approach would result in an average of 7.2 days fewer of work lost per employee. The full psychological toll on healthcare workers was not fully assessed, but some workers reported stress and anxiety due to having to isolate in their home for an extended period, as well as to delays in returning to work. The article notes that most employers have shifted away from a testing-based strategy to allow a return to work, and instead rely on a time plus symptom-based approach.

3.5.1 | Literature reviews

There were two literature reviews, of which one was about gig workers[18] and the other one about frontline workers over 50 years of age.[19] The first review[18] focused on experiences related to sick leave, PPE, and unemployment benefits faced by gig workers who have had difficulty gaining access to “essential worker” status. Based on the authors' review, they conclude that income security for gig workers will be critical for them to engage fully in the economy, and that they should receive the same labor market protections that other workers receive under the law. The Economic Security Act (CARES Act) has since granted gig workers sick leave and federal unemployment benefits.

The second review[19] examined the literature on sick leave specific to older workers in essential frontline jobs. One notable finding based on their review was that among older workers, who constitute a significant proportion of those working in crucial care and service professions and who are much more susceptible than younger workers to becoming seriously ill from COVID-19, 40% do not have paid sick days (based on data from the CDC 2018 National Health Interview Survey [NHIS]). Moreover, a significant number of older people are unpaid caregivers, thus risking exposure of even higher risk individuals they care for to COVID-19. The authors conclude that the COVID-19 pandemic has highlighted the need for additional legislation to strengthen worker protections, specifically accurate

information, robust training, adequate equipment, and paid leave in the event of quarantines or illness.

3.5.2 | News reports

Of the seven news reports, three discussed WC at a broad, national level, identifying industries that have large volumes of COVID-19 claims, changes in patterns of medical care due to COVID-19, and potential costs from COVID-19 for the WC system. One news report[20] discussed the WC death benefit. Two news reports[14,21] discussed job loss and retaliation against workers, with a focus on businesses asking workers not to discuss cases or conditions in the workplace. One news report[22] discussed lost work time and return to work policies faced by workers. Two news reports[20,23] discussed sick leave and other leave policies surrounding COVID-19, largely focusing on guidance for those who are infected in the workplace and potential sick leave reimbursement based on condition. Finally, three news reports[20,21,23] discussed the workplace related to health and safety. See Table S.I under the Worker News Reports section for the findings on the news reports on workers.

3.6 | Articles focused on employers only

Of the 24 articles that focused on employers, three analyzed data (two were peer-reviewed studies and one was a grey literature study). In addition, there were three peer-reviewed literature reviews and 18 news reports. Table 2 lists the employer-focused studies by study type and content.

3.6.1 | Evidence based on analysis of data

Of the three studies that analyzed data, one was about nursing homes and their staff,[24] one was about construction workers,[25] and one[26] did not focus on any particular sector. These studies were on workplace health and safety, hospitalizations and medical care, and staffing.

3.7 | Workplace related to health and safety

One study[25] used hospitalization data from the Austin-Round Rock metropolitan area in Central Texas to model the impacts of unrestricted construction work on COVID-19 transmission and outcomes. The findings suggest that unrestricted work in industries with a high level of contact (such as construction) is associated with a higher community transmission rate, increased risks to at-risk workers, and larger health disparities. Another study[24] examined the relationship of staffing in nursing homes and compared homes with and without COVID-19 residents in California. The study found that nursing homes with low registered nurse (RN) and total staffing levels meant that residents were more vulnerable to COVID-19 infections (described in more detail below).

3.8 | Impact on hospitalizations and medical care

The study[25] that modeled the impact of unrestricted construction work described above found that a lack of restriction was associated with an increase of COVID-19 hospitalization rates from 0.38 to 1.5 per 1000 residents and 0.22 to 9.3 per 1000 workers. Transmission was reduced by 50% with the implementation of safety measures.

The grey literature study[26] also looked at hospitalizations and medical care, using claims data from the state of Minnesota to estimate costs and impacts of COVID-19, including on medical bills. The claims data that were analyzed revealed a higher-than-expected proportion of indemnity-only claims, which per the authors was likely a reflection of the quarantine period for mild cases. Not surprisingly, the severity of claims increased sharply as the degree of medical care required increased.

3.9 | Staffing

Another study[24] used infection rates in Los Angeles Department of Public Health and RN staffing data to examine the relationship between nursing home staff ratios and COVID-19 infection rates among residents. The study found that nursing homes with staffing ratios for RNs below the minimum standard had twice the probability of having a resident with COVID-19. In addition, nursing homes with lower Medicare five-star ratings on total nurse and RN staffing levels, higher total health deficiencies in the residents, and more beds had a higher probability of having residents with COVID-19.

None of the peer-reviewed or grey literature worker studies were about job loss or retaliation, return to work, or leave. However, the grey literature study that used claims data from the state of Minnesota[26] also looked at WC claims and policies, and WC death benefits in estimating the costs and impacts of COVID-19 as described above.

3.10 | Literature reviews

There were three peer-reviewed literature reviews.[27–29] Two studies were about return to work[27,29] including COVID-19 testing or screening and/or health insurance. One literature review[27] focused on managing population health as employees return to work during the COVID-19 pandemic. The article identified strategies that were supported by reasonable levels of evidence, including daily symptom tracking, maintaining social contact with employees, having open lines of communication on pandemic protocols, and maintaining positivity in the workplace to reduce employee stress, promote positive attitudes, and keep employees cohesive.

TABLE 2 Employer studies ($n = 24$), by study type and content

Study type	Workers' compensation (WC) ($n = 7$)	WC death benefits ($n = 1$)	Job loss ($n = 1$)	Return to work ($n = 2$)	Leave/sick leave ($n = 11$)	COVID-19 screening/ testing ($n = 3$)	Workplace issues: health, safety including PPE ($n = 5$)	Hospitaliza-tions/ medical care ($n = 2$)	Other: staffing, health insurance ($n = 2$)
Peer-reviewed: studies ($n = 2$)							Pasco (2020) Harrington (2020)	Pasco (2020)	Harrington (2020)
Literature reviews ($n = 3$)				Plantes (2021) Fragala (2021)		Plantes (2021) Fragala (2021)	Gravina (2020) Fragala (2021)		Fragala (2021)
Grey literature studies ($n = 1$)	Everling (2021)	Everling (2021)						Everling (2021)	
News reports ($n = 18$)	Chordas (2020) Darragh (2020) Darragh (2021) Hanna (2020) Moynihan (2020) Sams (2020)		Stout-Tabackman (2020)		Alix (2020) Almeida (2020) Boyle (2020) Buckley (2020) Camillo (2020) Day (2020) Jacobs (2020) Luna (2020) Massar (2020) Sundar (2020) Thorn (2020)	Sundar (2020)	Massar (2020)		

Another literature review[29] assessed different strategies used by countries to implement national testing and surveillance and describe in detail a bioinformatics platform informed by real-time polymerase chain reaction test data at the county and subcounty levels. The authors conclude that widespread testing of populations for COVID-19, which includes employee populations with and without symptoms, can play a key role in curbing further transmission.

A third review[28] examined policies highlighted by the CDC to reduce the spread of COVID-19 in the workplace, including promoting proper hand hygiene, cleaning and sanitizing the work area, encouraging sick employees to stay home, using PPE, and social distancing. The paper reviews the literature on strategies to change work behavior, including training, prompts, the reduction of response effort, clear workplace policies, feedback, and consequences are discussed, and practical recommendations and suggestions, are discussed as possible mechanisms to improve workplace policies to protect employees from COVID-19 spread.

3.11 | News reports

Six news report articles[30–35] discussed WC generally, including the potential costs to the WC system in California under a range of scenarios, discussions of the reasonability of the presumptions in California, and a discussion of the confusion around included worker types under the California presumptions. One news report[36] discussed job loss, including how the Families First Coronavirus Response Act (FFCRA) impacted furloughs, temporary shutdowns, or reduced hours plans as alternatives to layoffs. Eleven news reports[20,37–46] discussed sick leave and other leave policies surrounding COVID-19. In particular, those news reports discussed remote work policies at banks; paid leave policies for workers in essential businesses such as the meat industry and shipping via Amazon; retail and service industry leave policies at Target, Macy's, McDonald's, and Starbucks; and national leave policies through the FFCRA. Another news report[43] discussed COVID-19 screening and testing protocols at large retail stores nationwide, including Target, Macy's, and Walmart. Finally, one news report[42] discussed health issues experienced in the workplace, including how CVS provided PPE and updated their safety measures nationwide to protect employees from COVID-19. See Table S.II under the Employer News Reports section for the findings on the news reports on employers.

4 | DISCUSSION

Our review of the literature on workers' experiences surrounding COVID-19 and the WC system, including any related literature regarding employer practices, identified a small number of studies, even when explicitly including grey literature, news reports and literature reviews. Understanding the landscape and available evidence on how the WC system relates to COVID-19 experiences of workers and employers is critical to assessing SB 1159s provision of WC coverage for COVID-19 for essential workers and its overall influence on the WC system. Debate about SB 1159 and the need for such California legislation was contentious. Employer groups voiced particularly strong opposition to the establishment of a presumption covering private-sector workers outside the health care industry.[7] Concerns were, understandably, raised about the potential unfairness of breaking with precedent and making the WC system responsible for an ordinary disease of life. Our review found that studies about COVID-19 and WC claims or benefits, job loss, retaliation, workers' medical care experiences, and employer return-to-work or leave practices were lacking. That said, there is a lack of WC-related peer-reviewed literature for most specific conditions.

Early estimates of the costs of covering COVID-19 through a presumption were staggeringly large, with the potential to more than double the yearly cost of the WC system under worst-case scenarios.[47] Specifically, as of April 2020, the WCIRB analyzed the cost of a conclusive presumption (which would have been much stronger than the rebuttable presumptions actually adopted in California) and reached a central cost estimate of $11.2 billion, or nearly two-thirds the statewide cost of insured losses and loss adjustment expenses (LAE) that was projected for 2020 before the pandemic. This estimate was produced under enormous uncertainty, and costs ranged across different scenarios from $2.2 billion to $33.6 billion. Cost estimates published in June 2020 for the governor's presumption were far more modest (ranging from $0.6 billion to $2.0 billion), both because the governor's order was temporary (so the projected costs were not annualized) and because the presumption was disputable. Our review identified one grey literature study[26] that examined hospitalizations and medical care using claims data from Minnesota to estimate costs and impacts of COVID-19. The claims data revealed a higher-than-expected proportion of indemnity-only claims, which per the authors was likely a reflection of the quarantine period for mild cases. Not surprisingly, the severity of claims increased sharply as the degree of medical care required increased.

On the other side of the debate of those in favor of the SB 1159 frontline and outbreak presumptions, the legislative record and popular discourse reflected a number of arguments in favor of covering COVID-19 through WC. It is widely recognized that essential workers were facing substantial risks so that society could continue to function–risks that were not present just a few months earlier. This was most obviously true of healthcare workers. While comprehensive US data on the number of healthcare workers lost to COVID-19 are not yet available, one recent study reports that 2900 healthcare workers died of COVID-19 in 2020.[48] By way of comparison, the number of fatal occupational injuries experienced by healthcare workers nationwide in 2019 was below 100.[49] Preliminary evidence suggest that essential, frontline workers outside the health care industry have also been hit hard by the coronavirus. The United Food and Commercial Workers Union (UFCW), for instance, reported over 100 grocery worker deaths just among its union members as of September[50]; the number of fatal occupational injuries experienced by grocery store employees nationwide in 2019 was 40. Although it is unknowable how many of these workers were infected outside of

employment, it seems indisputable that the pandemic made work outside the home vastly more dangerous than it was a year previously, including in many occupations that typically have minimal fatality risk. Racial and ethnic disparities in the impact of the pandemic also align closely with disparities in the ability to work from home, especially among adults with chronic conditions that make them more vulnerable to COVID-19.[51]

Our review and synthesis of the included relevant articles found that paid sick leave was important in reducing new COVID-19 cases and COVID-19 activity in the short term; with leave not provided for many types of essential, frontline workers. For example, rural agricultural and food processing workers lacked sick leave protection besides facing severe housing and food insecurity. In terms of workplace health and safety, our review found that healthcare workers in hospitals nationwide were stressed about clinical activity changes and transmission of the virus to family members and others, with access to PPE helping mitigate stress levels. With studies indicating that in the CA Central Valley workers in small rural cities were not in workplaces employing safe practices preventing the spread of COVID-19 transmission. Our review also pointed to evidence that unrestricted work in industries with a high level of contact (such as construction) is associated with a higher community transmission rate, increased risks to at-risk workers, and larger health disparities. Another study found that nursing homes with low RN or total staffing levels meant that residents were more vulnerable to COVID-19 infections.

However, there are several gaps in this emerging literature with a lack of studies about COVID-19 and WC claims or benefits. Studies are also needed on job loss, retaliation, workers' medical care and billing experiences, and employer return-to-work or leave practices. Our review underscores the need for more documented evidence and research on COVID-19 and WC that includes a diverse range of employers and types of frontline workers. More specifically, research is needed to understand the following issues, including how they changed over the course of the pandemic: proportion of claims for exposure only; inclusion of evidence of a positive COVID-19 test; denial rates for these two distinct types of claims (to quantify the claims administration burden of these claims); and how denial rates differed across occupations and industries, particularly those covered by the outbreak presumption. Additionally, research on these same issues is needed for claims for post-acute sequelae SARS-CoV-2 infection, often referred to as "long COVID-19," which includes prolonged symptoms (e.g., fatigue, prolonged cough, trouble breathing). Understanding these issues will be important because large numbers of claims are still being processed and there are few legal cases and little guidance on how to handle COVID-19 cases, including long COVID-19 cases. There is growing concern about how the WC system will handle both COVID-19 and long COVID-19 claims over injured workers' needs to cover medical care, their accommodations to return to work, disability ratings, medical maximum improvement, and future medical needs. Additional research about potential disparities in how the WC law is applied is also essential, particularly given well-documented existing disparities in both the risk of, and outcomes from, COVID-19 in different racial and ethnic groups.[52–55] Ensuring as full an understanding as possible of the evidence underpinning the need for WC coverage for COVID-19 across a broad set of essential, frontline workers is critical to both evaluate the influence of the current bill and its significance on the WC system. Our review found that studies are needed specifically about COVID-19 and WC claims and benefits across a diverse range of employers and types of frontline workers. Important questions remain, such as the cost-benefit of the SB 1159 legislation and whether the COVID-19 presumptions differed from other presumptions. Lessons learned from the impact of this legislation are important not only for this pandemic but have implications for future pandemics and other crises that impact the workplace.

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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 conflict of interest in the review and publication decision regarding this article.

ETHICS STATEMENT

Institution and ethics approval and informed consent: This review of the literature did not require institution and ethics approval, nor is informed consent applicable.

AUTHOR CONTRIBUTIONS

Concept and design (Denise D. Quigley); acquisition of data (Denise D. Quigley); analysis and interpretation of data (Denise D. Quigley, Grace Gahlon, Nabeel Qureshi, Courtney Gidengil); drafting of the manuscript (Denise D. Quigley, Courtney Gidengil); critical revision of the manuscript for important intellectual content (Denise D. Quigley, Courtney Gidengil); provision of patients or study materials (Denise D. Quigley); obtaining funding (Denise D. Quigley); administrative, technical, or logistic support (Denise D. Quigley, Grace Gahlon, Nabeel Qureshi, Courtney Gidengil); and supervision (Denise D. Quigley).

DATA AVAILABILITY STATEMENT

As a literature review, we did not collect any data. So no data is available.

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.

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