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The effect of COVID-19 on workplace violence in California's hospitals: An interrupted time series analysis

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Abstract

Aim: This study used California's unique Workplace Violent Incident Reporting System (WVIRS) to describe changes in workplace violence (WV) exposure for hospital-based healthcare workers during the pandemic.

Design: Interrupted time series analysis.

Methods: We compared the linear trends in weekly WV incidents reported during the period before the COVID-19 pandemic (7/1/2017–3/20/2020) to the period following California's shutdown (3/21/2020–6/30/2021). We created mixed effects models for incidents reported in emergency departments (EDs) and in other hospital units. We used hospital volume data from the California Department of Health Care Access and Information.

Results: A total of 418 hospitals reported 37,561 incidents during the study period. For EDs, the number of reported incidents remained essentially constant, despite a 26% drop in outpatient visits between the first and second quarters of 2020. For other hospital units, weekly incidents initially dropped—parallel to a 13% decrease in inpatient days between the first and second quarters of 2020—but then continued parallel to the trend seen in the pre-COVID period.

Conclusion: WV persists steadily in California's hospitals. Despite major reductions in patient volume due to COVID-19, weekly reported ED incidents remained essentially unchanged.

Impact: Surveys and media reported that WV increased during the pandemic, but it has been difficult to measure these changes using a large-scale database. The absolute number of WV incidents did not increase during the pandemic; however, the trend in reported incidents remained constant in the context of dramatic decreases in patient volume. New federal WV prevention legislation is being considered in the U.S. California's experience of implementation should be considered to improve WV reporting and prevention.

Public Contribution: There was no public contribution to this study. The goal of this analysis was to summarize findings from administrative data. The findings presented can inform future discussion of public policy and action.

KEYWORDS
California, healthcare workers, hospitals, incident reporting, nurses, risk management, safety, surveillance, workplace violence

1 | INTRODUCTION

Workplace violence (WV) is defined as incidents where staff are physically or verbally abused, threatened, or assaulted in circumstances related to their work, involving an explicit or implicit challenge to their safety, well-being or health (di Martino, 2002). WV is a serious safety concern for workers in diverse industries around the world. The COVID-19 pandemic has increased the likelihood of confrontations with members of the public for those in retail, food service (University of California Los Angeles Labor Center & University of California Berkeley Labor Center, 2021) and transportation (Hernandez, 2021; Street, 2021), particularly as individual workers have been asked to police mask-wearing and other types of public health measures. The frequency and intensity of these encounters prompted the Centers for Disease Control and Prevention (CDC) to issue guidelines for employers to prevent incidents of violence and minimize contact with customers during the pandemic (National Safety Council, 2020).

Nurses and other healthcare workers have a long history of WV exposure. In 2018, healthcare workers accounted for 73% of non-fatal WV-related injuries and illnesses in the U.S (U.S. Bureau of Labor Statistics, 2020a), and the rate of WV in healthcare settings continues to increase with no signs of abating. As an indication of the importance of this issue for the profession as a whole, the American Nurses Association (ANA) has prioritized and promoted an #EndNurseAbuse campaign in recent years, emphasizing the need for culture change involving legislative, regulatory and hospital-level action to keep nurses safe at work (American Nurses Association, 2018). Since the COVID-19 pandemic, exposure to WV has compounded staff shortages (Yong, 2021) and intensified the psychological consequences of working through the pandemic (Larkin, 2021; National Nurses United, 2021; Zipf et al., 2022). Worldwide, researchers have estimated that healthcare workers have comprised between 4% and 19% of total COVID-19 cases (Centers for Disease Control and Prevention, 2020; Wu & McGoogan, 2020), and many workers suffered profound disruption to their work environments including lack of needed personal protective equipment and inadequate organizational support (Brophy et al., 2021). Ultimately, recent estimates found that there was a drop of 100,000 Registered Nurses (RNs) in the U.S. during 2021, the largest workforce drop seen during the past 40 years (Auerbach et al., 2022).

2 | BACKGROUND

Although workers in all healthcare settings experience WV, those in the emergency department (ED) and psychiatric treatment settings face the highest risk for WV exposure (Liu et al., 2019). Specifically for healthcare workers in EDs, increased WV exposure has been attributed to several factors. First, patients may arrive under the influence of substances and with other acute psychiatric conditions that may increase volatility (Ferri et al., 2020; Nikathil et al., 2017). In addition, at the onset of the COVID-19 pandemic, many EDs reported increased patient volumes, longer wait times and difficulty discharging to other facilities where they ordinarily would (Kelen et al., 2021; Lucero et al., 2021). Further, EDs, many communities' sole safety net, were not able to close their doors for legal or contractual reasons while many outpatient clinics were able to drastically reduce their hours. These heightened stressors contributed to a combustible atmosphere and increased reports of anxiety and distress among healthcare staff (Norman et al., 2021). This study investigated the potential links between hospital location (e.g. in the ED or elsewhere in the hospital), the onset of the pandemic, patient volume and incidents of WV in California's hospitals. Hospital location, patient characteristics and organizational factors have all been previously explored in WV literature (Mento et al., 2020), and this investigation offers an additional inquiry into how these factors intersect to impact workers' safety on the job.

In the U.S., multiple state legislatures have taken steps to improve protections for healthcare workers (American Nurses Association, n.d.), and a federal WV standard has been under discussion for several years (Courtney, 2021). In California, WV prevention legislation went into effect in 2017 and requires hospitals throughout the state to develop and implement plans to prevent violence towards workers. In addition, hospitals are required to submit reports describing incidents of violence to the California Occupational Safety and Health Administration (CalOSHA) in 72 h of the incident through the state's Workplace Violence Incident Reporting System for Hospitals (WVIRS).

Changes in the frequency of incidents over time which were reported using the WVIRS have yet to be explored by researchers, and there are few comparable sources of data which can measure such changes. According to anecdotal experiences of healthcare workers in EDs and recent research findings from Europe (Brigo et al., 2022), WV has increased during the pandemic, but it is difficult to reliably measure these changes with other types of WV reporting tools which may be limited to surveys of a single facility or may aggregate incidents annually. Because California requires WV to be reported immediately after each occurrence, the WVIRS provides one of the most promising approaches to capturing rapid changes.

3 | THE STUDY

3.1 | Aims

The purpose of this study was to use the WVIRS to investigate whether there was a change in the weekly reported incidents of WV towards hospital-based healthcare workers in California during the COVID-19 pandemic. We analysed WV incidents reported in hospital EDs separately from incidents reported in other hospital units to determine if the unique stressors faced by ED staff and patients made a difference in reported WV. In addition, we summarized the changes in hospital volumes during this period to explore the

possibility that fluctuation in patient census may have impacted the number of reported WV incidents.

3.2 | Design

To measure the impact of COVID-19 and the statewide shutdown on reported WV incidents, we employed an interrupted time series analysis. This quasi-experimental design is useful for evaluating the impact of a change in the environment where a control population is not available (Handley et al., 2011; Simonton, 1977). To determine what impact an intervention or environmental change has had on an outcome of interest, an indicator is created, labeling each date as part of the "before" or "after" period. California's initial statewide shutdown order related to COVID-19 occurred on March 20, 2020, which was used as the cutoff date in determining changes in WV incident reports.

3.3 | Data sources

WV data were collected by CalOSHA and were obtained through the Public Records Act request process. Data included for this study were all reports submitted through the WVIRS describing WV incidents from July 1, 2017 (the date the reporting requirement went into effect) to June 30, 2021. Hospital census data were collected by the California Department of Health Care Access and Information (HCAI) and are available for public use on their website. All licensed California hospitals are required to submit quarterly utilization and financial data to HCAI using a web-based reporting system (California Department of Health Care Access and Information, n.d.).

3.3.1 | WV incidents

California's WVIRS represents a unique approach to measuring WV towards healthcare workers. Pursuant to state law, California's General Acute Care and Psychiatric Hospitals are required to submit reports describing WV incidents where force was used against a worker, whether or not an injury occurred. For results to appear in this database, a designated representative from each hospital submits the report using a web-based form. A single report must be submitted for each incident. Designated facility representatives are required to undergo training as part of the standard's implementation and hospitals have been provided guidance on the reporting requirements, primarily through the CalOSHA website.

The primary outcome of interest for this study is number of WV incidents reported by week. We tabulated the number of reported incidents per week to account for the fact that incidents were not always reported to the system immediately and to better describe possible trends. A total of 208 weeks were included in the analysis. Week 1 corresponds to the week of July 1, 2017, the date CalOSHA's reporting requirement went into effect. The pre-COVID-19 period ended with week 141 (March 14, 2020). The COVID-19 period began with week 142 (March 21, 2020) and ended with week 208 (June 19, 2021). We excluded a partial week at the end of the analysis since the number of incidents did not reflect a full 7 days of reporting.

WVIRS reports must include a description of the type of injury sustained during the incident. Types of physical injuries included are described as bruising, choking, laceration, fracture, head injury, open wound, sprain/strain, amputation, or death. The report can also indicate that no injury was sustained or that there was an adverse psychological impact to the incident. In addition, the individual committing the incident of WV is classified based on their role identification, example, patient, patient's family member, co-worker, supervisor and contractor.

3.3.2 | Hospital utilization data

To track the number of patients occupying inpatient beds during the study period, we used HCAI's quarterly reporting data and calculated the total patient days for all hospitals covered by the WVIRS reporting mandate. A patient day was defined as the number of days a patient occupies an inpatient bed in the hospital, excluding newborns. The day of admission was counted but the day of discharge was not counted.

To estimate the number of patients presenting to the ED during the study period, we calculated the total outpatient visits. Although this variable included both ED and outpatient clinic visits, it provides an approximation for the change over time. HCAI collects ED-specific data; however, these totals are only provided annually, an aggregated total which does not adequately reflect the shorter intervals of time needed for this analysis.

3.4 | Ethical considerations

This study was approved by the University of California San Francisco's Institutional Review Board.

3.5 | Data analysis

First, we calculated descriptive statistics to explore selected characteristics of WV incidents reported in the WVIRS, and all incidents were classified as either involving a physical injury to the worker or not resulting in a physical injury. In addition, the assailant for each incident was classified as either a patient or non-patient.

Second, we employed a mixed effects regression model with robust standard errors and a Poisson distribution to examine the trend of reported WV incidents per week during the study period. We calculated coefficients to measure the linear trend over time. To account for the fact that hospitals report incidents repeatedly over the study period, we treated hospitals as random effects in the mixed effects model.

To determine the significance of any change in the frequency of incident reporting from the pre-COVID to post-COVID period, we included an interaction term in the model. We then calculated coefficients for the pre-COVID and post-COVID periods. Significance of the difference between coefficients was met if the 95% confidence intervals (CIs) for the two periods did not overlap. We created an additional mixed effects regression model for the overall study period without the COVID interaction term to describe any linear trend over time.

Next, we created additional models for those incidents reported in EDs and for incidents reported in all other hospital units. The goal of creating these additional models was to better understand whether the experience of ED staff may have been distinct from the other units in reporting hospitals.

Finally, we tabulated hospital inpatient and outpatient utilization data for four quarters of interest: the beginning of the reporting period (7/1/17–9/30/17), the quarter immediately prior to and at the beginning of the COVID-19 shutdown (1/1/20–3/31/20), the quarter encompassing the majority of the COVID-19 shutdown (4/1/20–6/30/20) and the final quarter of the study period (4/1/21–6/30/21). We calculated the mean quarterly outpatient visits and mean quarterly inpatient days for all quarters in the study period.

Statistical analyses were conducted using STATA/SE 15.1 (StataCorp).

3.6 | Rigour

No previously validated measures were used for this study. The linear trend in incident reporting was evaluated visually. We did not observe over-dispersion of data and verified this finding by comparing the standard errors in the model with and without the robust option.

4 | RESULTS

4.1 | Reporting hospitals and incidents

A total of 418 hospitals reported incidents of WV towards healthcare workers during the study period. In these hospitals, there were 301 EDs reporting WV incidents. For the first year of reporting (July 2017–June 2018), 375 hospitals completed reports. For the second year, 356 hospitals completed reports, and 336 completed reports during the third year (2019–2020). For the final year of the study period (2020–2021), 314 hospitals submitted reports of WV through the WVIRS. CalOSHA estimates that there were approximately 485 licensed acute care or psychiatric hospitals covered by the WVIRS reporting mandate during 2020–2021 (State of California Department of Industrial Relations, 2022), indicating that they received reports from about 65% (314/485) of total eligible facilities.

Hospital and incident characteristics are summarized in Table 1. A total of 37,561 WV incidents were reported through the WVIRS during the study period, with 11,816 (31%) resulting in a physical injury to the healthcare worker(s). In most incidents (94%), patients were identified as the assailant.

TABLE 1 Workplace violence incident characteristics in California hospitals.

Variable	Total ($N = 37,561$ incidents)	%
Reporting unit		
Emergency Department	10,587	28
Inpatient unit	15,269	40
Behavioural health	5832	16
All other units/areas	5873	16
Assailant		
Patient	35,627	95
Other	1934	5
Physical injury		
Yes	11,816	31
No	25,745	69

Staff working in EDs reported 10,587 incidents of WV, over 28% of total WV incidents. Of incidents reported in EDs, 3010 (28%) resulted in a physical injury to the ED worker. A total of 26,974 incidents were reported in other hospital units, with 8806 (33%) resulting in a physical injury.

4.2 | Hospital utilization by quarter during the study period

California's hospitals experienced major decreases in patient volume during the early period of COVID-19. Between the first and second quarters of 2020, total patient days dropped by 628,328, or 13%. For outpatient visits, there was a drop of 3,417,809 (26%) visits between the first and second quarters. While both inpatient hospitalizations and outpatient visits rebounded significantly after the initial declines, reports from the first and second quarters of 2021 indicate that these volumes had not yet returned to pre-pandemic levels during the first half of the year. These results are pictured in Figures 2 and 3 and described in Table 2.

4.3 | Change in reported WV incidents over time

The trend of reported incidents of WV over time in all types of hospital units during the pre- and post-COVID-19 periods is illustrated in Figure 1 and described in Table 3. During the first week of the mandated reporting period in 2017, 165 WV incidents were reported through the WVIRS. In the week immediately before the statewide COVID shutdown, 162 incidents were reported for all hospital units. In the week immediately after the shutdown, 146 incidents were reported.

TABLE 2 California hospital patient census and outpatient visits, 2017–2021.

Date range (quarterly)	Total inpatient patient days	Total outpatient visits
July 1, 2017–Sept 30, 2017	4,975,115	14,785,026
Jan 1, 2020–March 31, 2020	4,794,796	13,190,794
April 1, 2020–June 30, 2020	4,166,468	9,772,985
April 1, 2021–June 30, 2021	4,573,866	13,870,610
Mean per quarter – entire study period:	4,934,820 (95% CI: 4,931,989–4,937,651)	14,133,500 (95% CI: 9,772,985–15,645,220)

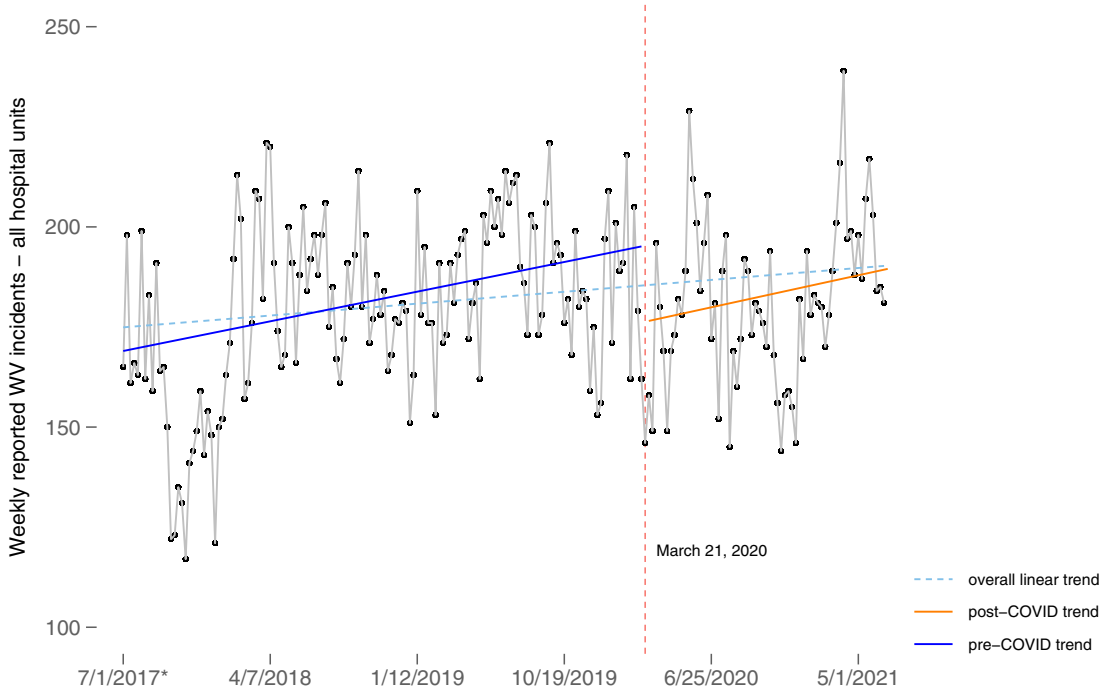

FIGURE 1 Trend of workplace violence incidents reported per week in California hospitals, July 1, 2017–June 30, 2021: All hospital units. Legend: *indicates the first day of the week during which incidents were reported.

The evidence suggests a very slight upward trend in weekly reported incidents over time for both the pre- and post-COVID period. For all hospital units in the pre-COVID period, the incident reporting increased by approximately 0.1% per week (β1 = 0.001, 95% CI: 0.00096, 0.0011). After the March 2020 shutdown, this rate remained essentially constant (β2 = 0.0003, 95% CI: 0.000078, 0.00047). In real terms, this means that the average weekly reported incidents increased by about 0.2 incidents per week during the pre-COVID period.

For incidents reported by EDs, the number of reported incidents remained essentially constant between the week immediately prior to the shutdown and the start of the shutdown (45 vs. 46 incidents). Similar to overall hospital reporting, the linear trend of incidents in EDs remained nearly same as before the COVID-19 shutdown; the slope decreased from 0.15% pre-COVID (β1 = 0.0015, 95% CI 0.0013, 0.0016) to −0.10% (β2 = −0.0010, 95% CI: −0.0014, −0.00064) in the post-COVID period. These data are represented in Table 3 and Figure 2.

For those incidents which occurred in other hospital units (excluding EDs), there was a drop from 117 in the week immediately prior to the shutdown to 100 in the week after. The linear trend of reporting between the two periods was nearly identical, with the slopes' 95% CI for the pre-COVID and post-COVID periods overlapping (pre-COVID: β1 = 0.00083, 95% CI 0.00077, 0.00089 and post-COVID: β2 = 0.00074, 95% CI 0.00053, 0.00094). These data are presented in Table 3 and pictured in Figure 3.

5 | DISCUSSION

This analysis of WV incident reporting data from CalOSHA's WVIRS provides a unique assessment of healthcare workers' exposure to WV during the COVID pandemic. Further, it demonstrates the potential opportunity to use the WVIRS to understand short-term trends in this important occupational health risk. Media coverage (Miller & Sable-Smith, 2021) and surveys of healthcare providers (Byon et al., 2021; National Nurses United, 2022) have indicated that exposure to WV has increased during the COVID-19 pandemic. However, our study analysing hospitals' WV reporting data did not find evidence of a difference in the linear trend from the prior time period under investigation. While more incidents

TABLE 3 Trends in workplace violence incident reporting in California's hospitals by location, July 1, 2017–June 30, 2021.

	Weekly reported incidents at beginning of reporting period (7/1–7/7/17)	Weekly reported incidents immediately before shutdown due to COVID-19 (3/14–3/20/20)	Weekly reported incidents at immediately following shutdown due to COVID-19 (3/21–3/27/20)	Trend in weekly WV incidents during pre-COVID period (7/1/17–3/20/20) β1 (95% CI)	Trend in weekly number of incidents during post-COVID period (3/21/20–6/30/21) β2 (95% CI)	Overall trend in weekly reported incidents during the study period (7/1/17–6/30/21) β3 (95% CI)
All hospital units	165 incidents	162 incidents	146 incidents	0.0010 (0.00096, 0.0011)	0.00027 (0.000078, 0.00047)	0.00036 (0.00032, 0.00041)
Emergency departments	42 incidents	45 incidents	46 incidents	0.0015 (0.0013, 0.0016)	−0.0010 (−0.0014, −0.00064)	0.00088 (0.00080, 0.00096)
Other units/ locations[a]	123 incidents	117 incidents	100 incidents	0.00083 (0.00077, 0.00089)	0.00074 (0.00053, 0.00094)	0.00017 (0.00012, 0.00022)

[a]Locations include: inpatient units, behavioural health units, surgery, labour and delivery, non-patient care areas.

are reported on a weekly basis in the state's inpatient hospital units, incidents in EDs comprise a significant proportion of the total reported WV incidents.

A major consideration in interpreting our study findings is the fluctuation in hospital volumes that occurred before, during and after the California shutdown in March 2020. As utilization data reported by the state's hospitals demonstrate, there was a steep decline in patient contacts in both the inpatient and outpatient settings in the early pandemic period. In addition, these data do not capture the widespread prohibition on visitors that hospitals implemented due to COVID-19 restrictions. Overall, there were fewer non-employees in all hospital settings as a result of the pandemic, a significant consideration given that the vast majority of WV incidents reported through the WVIRS describe patients or their family members as the assailant.

There was a substantial decline in total outpatient visits between the first and second quarters of 2020, a change which reflects the drop in elective and other non-urgent procedures that occurred early in 2020. EDs also experienced dramatic decreases in patient visits, particularly during the early pandemic. According to the HCAI, ED visits dropped from close to 1.2 million in January of 2020 to 542,000 in April 2020 (California Department of Health Care Access and Information, 2021). For this study, we used total outpatient visits to approximate hospital utilization for EDs over the study period, and these monthly reported data from HCAI support the fact that the drop in patient visits occurred both in EDs and other outpatient settings.

Taking these findings together, it is notable that workers in California EDs did not report substantially fewer WV incidents in the early part of the pandemic than in the pre-pandemic period. Considering the drop in patient volume due to the COVID-19 shutdown, it appears that there were proportionally more encounters resulting in WV during the pandemic than pre-pandemic periods. While we were unable to calculate incident rates for WV incidents due to the lack of an available denominator that captured weekly change in patient contacts, based on the quarterly data we used, we would assume that the actual *rate* of WV incidents per patient-day increased during the early pandemic period. Presumably, WV incident reporting may have also dropped due to competing demands and the global disruption in hospital functioning that characterized the early stage of the pandemic. As hospital staff were faced with considerable changes in infection control procedures and an influx of patients with COVID-19, minor incidents without a physical injury may have gone unreported.

For WV incidents reported in hospital units or locations outside the ED, weekly reported incidents appeared to drop in close parallel to the decline in inpatient volume in California hospitals that occurred in April–June 2020. However, WV incidents have continued in the period following the COVID-19 shutdown at a pace similar to what was reported in the pre-pandemic period. Moreover, because inpatient volumes have not returned to their pre-pandemic levels, it is likely that, similar to the findings for EDs, proportionally more encounters result in WV incidents than what healthcare workers

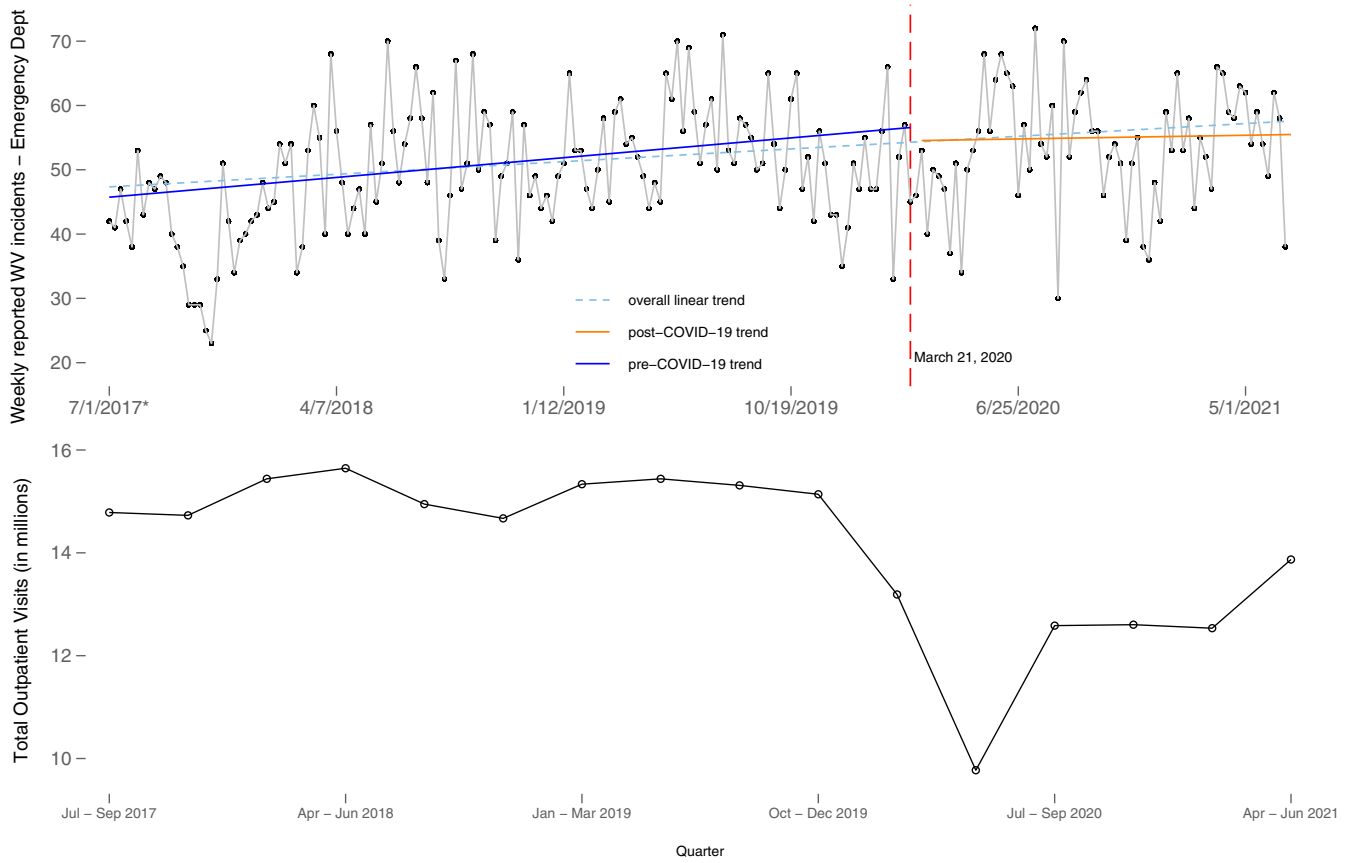

FIGURE 2 Trend of workplace violence incidents reported per week in California emergency departments and total outpatient visits by quarter, July 1, 2017–June 30, 2021. Legend: *indicates the first day of the week during which incidents were reported.

experienced before the pandemic. It is also worth noting that due to the depletion of the healthcare workforce, individual workers may be experiencing increases in WV even if the total, facility-level numbers of WV incidents stay the same.

Another consideration for interpreting these findings is the decreasing number of hospitals reporting through the WVIRS over the study period. It is likely that this decrease can be attributed to one or more of the following factors: hospital closure or merger, absence of WV incidents and failure to report WV incidents. While analysis of these considerations is beyond the scope of this investigation, it is notable that, given the broad definition of reportability in CalOSHA's standard, only 65% of eligible hospitals reported an incident in the final year of the study period. This finding bears further investigation and determining which factor is driving the reduction could provide insight into the ongoing implementation of the WVIRS.

The Bureau of Labor Statistics (BLS) reports annual occupational health and safety data based on reports submitted through the Survey of Occupational Injuries and Illnesses by employers (U.S. Bureau of Labor Statistics, n.d.). For RNs, BLS reported an increase from 14 to 18.3 incidents of WV per 10,000 full-time workers from 2019 to 2020, a 31% increase (U.S. Bureau of Labor Statistics, 2020b, 2021). These estimates include only those workers in private industry, and violence is defined as both intentional and non-intentional violence that occurs on the job. While the change was less profound, the already high rate of injuries and illnesses also increased for nursing assistants and psychiatric assistants, from 48.3 to 55 incidents per 10,000 workers, a 14% jump (U.S. Bureau of Labor Statistics, 2020b, 2021). While data collection procedures for BLS data vary considerably for what is required for the WVIRS, and data are only reported on an annual basis, these findings provide a useful comparison particularly because they seem to support media reports and survey findings.

New Joint Commission requirements (The Joint Commission, 2022) for hospitals throughout the U.S., as well as proposed federal legislation to enhance WV prevention nationally, are adding to the greater industry-wide focus (American Hospital Association, n.d.) on addressing this longstanding problem. Importantly, these new initiatives account for the fact that reporting is an essential component of any adequate mitigation strategy, and employers are required to continue improving reporting infrastructure and engage frontline staff to develop consistent organizational practices and standards. Federal OSHA's guidelines for WV prevention in the healthcare sector further support this recommendation (Occupational Safety and Health Administration, 2016).

This study raises familiar questions surrounding the underreporting of WV incidents through official channels (Byon

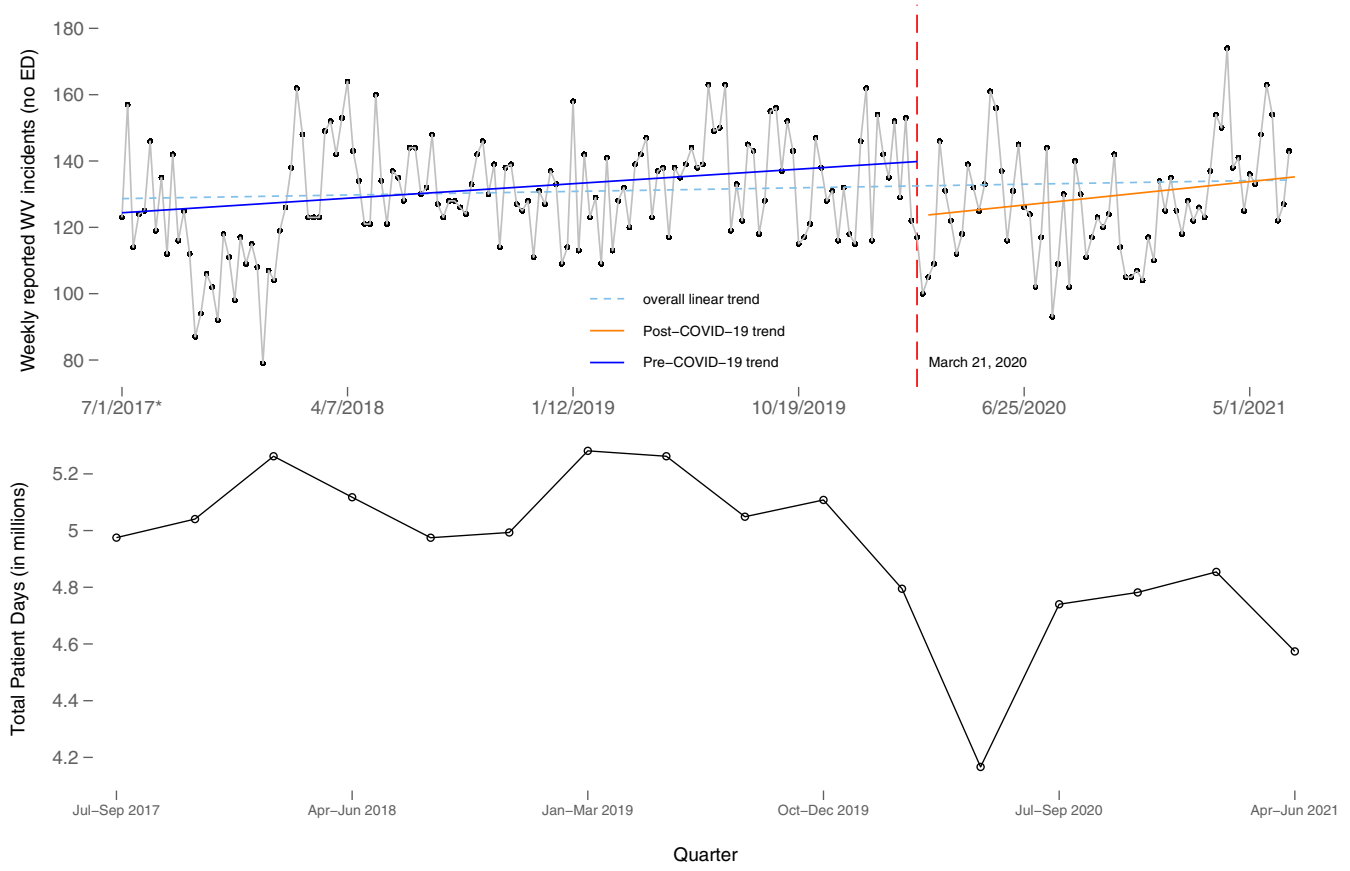

FIGURE 3 Trend of workplace violence incidents reported per week and total patient days by quarter, July 1, 2017–June 30, 2021; all hospital units excluding emergency department. Legend: *indicates the first day of the week during which incidents were reported.

et al., 2021; Findorff et al., 2005; Morphet et al., 2019). California's WVIRS has the potential to yield unique insights because it relies on each hospital to report incidents directly to CalOSHA in 72 h of the event. Most other state or national-level data collection efforts happen much more slowly and rely on sampling procedures which have been shown to undercount incidents (Wuellner et al., 2016; Wuellner & Bonauto, 2014). In addition, no other states require reporting of all incidents where force was used as California does. The ANA's issue brief on WV reporting describes the ways that WV reporting practices vary across the country, pointing out that organizational culture and other logistical barriers are often an impediment to capturing description of WV incidents fully and accurately (American Nurses Association, 2019). The ANA has supported the enactment of a federal WV prevention standard as a way to standardize and improve data collection and mitigation efforts in the U.S. (American Nurses Association, 2018).

Despite the difficulties of capturing incidents at the unit, hospital, or statewide-level, accurate data collection remains a necessity for evaluating the effect of WV prevention efforts and engaging with the reality of working conditions for this essential worker population. California's WVIRS shows the potential for building a national data collection system which can inform best practices in WV prevention. To make this system useful, it is essential that hospitals integrate data collection into their WV training protocols and encourage staff to report incidents. In addition, as federal WV prevention legislation is discussed, the example of California's WVIRS should be considered, including whether the requirement to report in 72 h demonstrates any practical applications for short-term mitigation strategies. California's experience supports the need to provide clear, consistent guidance for hospitals' data collection efforts in the language of any new standard, and findings (including practical implications of reported data) should be communicated to stakeholders.

5.1 | Limitations

This study has several limitations. CalOSHA has described some of its challenges related to enforcement of the WVIRS reporting requirement on its website (California Occupational Safety and Health Administration (CalOSHA), 2021). Some of the potential implications of inconsistent reporting practices, particularly the possibility that some hospitals are only reporting the most serious WV incidents, have been reported elsewhere (Odes et al., 2022). While CalOSHA's standard requires that hospitals devote resources to ensuring accurate and complete WV incident reporting and train all

staff in data collection procedures, competing priorities may lead to de-emphasizing the time-consuming and labour-intensive work required for full and accurate data collection.

In addition, the above analysis does not represent a true rate of WV incidence because the total number of incidents is not tied to a specific number of patients on the unit or workers' hours on the job. Future analyses utilizing the WVIRS could incorporate other approaches for exposure calculation to better compare findings to other estimates of WV exposure (along the lines of what is provided by BLS).

An additional limitation is that the WVIRS does not provide demographic data or work characteristics (such as job title/classification or shift) for the healthcare workers who reported the WV incident. While other research has indicated that healthcare workers with more direct care roles may be exposed to greater risk for WV (Nachreiner et al., 2007), there is no way to explore this important consideration with WVIRS incident data.

Finally, hospital utilization data from OSHPD reflect quarterly visits instead of weekly visits. Because of these less granular data, there is the potential to miss some of the changes in hospital utilization that occurred during the volatile period during the COVID-19 pandemic. Despite the fact that the periods considered for each database were not equivalent, quarterly data still provide useful context for understanding the major reductions in patient contact that occurred for most of the state's healthcare workers during the pandemic.

6 | CONCLUSION

This study shows that WV incidents in California hospitals have persisted at a pace of 150–160 per week over the past several years. During the COVID-19 pandemic, reported incidents for inpatient units were temporarily reduced, mirroring substantial decreases in inpatient volume. In EDs, which saw major decreases in patient volume early in 2020, incidents dropped only slightly, indicating that proportionally more patient encounters resulted in WV incidents for those workers.

For healthcare workers who weathered the unprecedented crises of 2020–2021, the landscape of the workplace has been irreparably changed. The concept of moral distress has been explored to describe the related phenomena of burnout, difficulty in interpersonal function and symptoms of Post-Traumatic Stress Disorder that those caring for patients in the early days of the pandemic endured (Norman et al., 2021). When these experiences are layered on top of confrontations with patients that result in WV, the strain can become unbearable.

Taking stock of the unprecedented exodus of healthcare providers from their professions, particularly in hospitals, many healthcare organizations are investing in new approaches to maintain their workforces and bring a new generation of workers to the bedside. These approaches include increased access to counselling, peer support and updated facilities. While these gestures are laudable, it is important for leadership in healthcare organizations to understand the severity of the fallout from the pandemic and to acknowledge the persistent safety concerns workers faced before Spring 2020. For this reason, as healthcare leaders offer new services and amenities to the workforce, support for WV prevention and reporting should be prioritized as well.

AUTHOR CONTRIBUTIONS

All authors have agreed on the final version and meet at least one of the following criteria (recommended by the ICMJE):

1. substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data;
2. drafting the article or revising it critically for important intellectual content.

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The data that support the findings of this study are publicly available from the State of California. More information can be found at https://www.dir.ca.gov/.

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