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Employer Compliance with OSHA Requirements for Immediate Reporting of Severe Injuries

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Abstract

Objectives: In 2014, U.S. Occupational Safety and Health Administration (OSHA) updated a rule requiring employers to directly report all hospitalizations, amputations and eye enucleations to OSHA within 24 hours and within 8 hours for fatalities and multiple injury events. Past studies have shown that employers underreport injuries and illnesses for numerous reasons.

Methods: This study evaluated the completeness of required immediate reporting of severe injuries and illnesses by employers to OSHA by linking cases reported to OSHA with hospital data from January 1, 2017 to December 31, 2023. We evaluated factors associated with failure to report severe injuries or illnesses to OSHA using multivariable logistic regression.

Results: We identified 7,578 non-fatal occupational injuries and illnesses and an additional 160 fatalities treated in Illinois hospitals that were not reported to OSHA. The cumulative reporting rate for non-fatal injuries was 39.7%, while non-fatal illnesses (excluding COVID cases) was 25.1%. There was no significant change in reporting rates over the seven-year period for non-fatal injuries and illnesses. Failure to report serious injuries and illnesses was associated with hospitalizations involving acute illnesses (aOR=2.60), female workers (aOR=1.29), and incidents occurring on weekends (aOR=2.21) and holidays (aOR=1.98). We also identified factors associated with improperly reporting cases that did not meet the OSHA reporting criteria.

Conclusions: We estimate that failure to report these hospitalizations obscured up to 2,122 violations in Illinois workplaces that could have led to remediation to protect other workers from injury. This analysis informs compliance assistance programs that address reporting practices and recordkeeping policy.

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Keywords

occupational diseases; injury underreporting; recordkeeping; employer reporting; public health surveillance

Introduction

The U.S. Occupational Safety and Health Administration (OSHA) plays an integral role in occupational safety as both a source of surveillance data and as the primary U.S. agency to utilize these data for enforcement activities. In 2014, OSHA updated regulations (Rule 1904.39) requiring employers to directly report all hospitalizations, amputations, and enucleations of the eye to OSHA within 24 hours. Prior to the rule change, employers only had to report fatalities and incidents resulting in three or more workers being hospitalized within 8 hours.¹ Direct, real-time reporting is crucial for improving enforcement activities, as it leads to identifying and abating serious occupational hazards.¹

Internationally, research shows that there are both intentional and unintentional reasons that employers underreport injuries and illnesses.²⁻¹⁷ Since OSHA updated the reporting rule, only two studies have been published evaluating compliance with the rule.^{10,18} The two studies are from Michigan, which has a state-plan OSHA program (unlike Illinois and 23 other states); it found that 43.6% of work-related hospitalizations¹⁰ and 42.1% of amputations¹⁸ were reported by employers between 2016-2018. This is significant because Michigan is a unique state in that reporting of occupational injuries and illnesses by hospitals is mandated by state law, independent of the OSHA rule. To date, there is no research regarding employer compliance with the reporting rule in jurisdictions without supplemental mandatory reporting of work-related injuries and illnesses by medical personnel in states covered by federal OSHA - which is the majority of jurisdictions.¹⁹

This study aims to evaluate the completeness of immediate reporting of severe injuries and illnesses by linking cases reported to OSHA with Illinois hospital data. Illinois is a hybrid OSHA state. Federal OSHA covers all private sector and federal employees, and the state plan covers state and local public sector employees. In this analysis we (1) characterize the completeness of reporting by year, region, and worker demographics, (2) identify predictors of underreporting severe injuries and illnesses, and (3) assess factors associated with improperly reporting an injury or illness to OSHA that did not meet the reporting criteria.

Methods

OSHA Data

OSHA provided data on all reports made relating to Rule 1904.39 for 6,448 workers affected by injury or illness occurring in Illinois between January 1, 2017 through December 31, 2023 including information on any related inspections-citations. OSHA defines an injury as "any wound or damage to the body resulting from an event in the work environment". OSHA does not have a singular definition for illness, but include all conditions caused by, contributed to, or significantly aggravated by work (e.g. myocardial infarction, heat related

illness). All reports were included even if they were reported more than 24 hours following the incident. We excluded workers injured outside of Illinois because our hospital dataset may not capture them (n=48) and incidents occurring prior to 2017 where the inspection occurred in 2017 (n=11). The final OSHA dataset of 6,389 workers included information about the injured employee (age, gender, employment type), the employer and injury location (address, industry), narrative descriptions provided by the employer and OSHA inspector regarding the hazards, activities and contributing causes related to the incident, and information on fatalities, hospitalizations, nature and type of injury or illness, body part affected, and treating hospital.

Hospital Data

The hospital outpatient database includes all patients treated in emergency departments (ED) for less than 24 hours who were not admitted to the hospital. The hospital inpatient database includes all admitted patients treated for 24 hours or more in Illinois hospitals for any medical reason. Both datasets include information on patient demographics (age, race, sex), clinical outcomes (diagnoses, hospital procedures, and discharge status), and financial information (hospital charges and payer source).

To identify hospitalized workers that employers are required to report to OSHA, we included all acute injuries or illnesses admitted to a hospital and amputations/enucleations treated in the ED between January 1, 2017 through December 31, 2023 that had a primary workers' compensation payer. Per the reporting exemption, we excluded all injuries from motor vehicle crashes on roadways or public transportation (N=639), but included injuries occurring while (1) working on or near vehicles, (2) working with special vehicles used on industrial premises (e.g., forklifts), (3) off-road vehicles (non-public roadways), (4) watercraft, (5) cable cars, ski lifts, (7) construction vehicles, (8) agricultural vehicles, and (9) collisions in construction zones. In addition, we excluded cases that involved conditions that may not have occurred within 24 hours of the hospitalization. We excluded all ED visits and admissions coded for elective procedures. Elective cases are non-emergent conditions that allow the patient adequate time to schedule clinical procedures. We also excluded all secondary encounters following the initial treatment for an injury. Finally, we excluded all inpatient emergent hospitalizations involving renal failure (N=166), vertebral conditions (e.g., spondylopathies; n=222) and hernias (N=50; ICD-10 coding does not distinguish between direct and indirect hernias) in the absence of any other medical emergencies or traumatic injuries. These three conditions were consistently identified in the absence of a traumatic injury or well defined acute medical illness, and we are unable to determine if they occurred following an acute event. There were 11,795 work-related hospitalizations that met the OSHA reporting requirement.

Data Linkage

A detailed description of the linkage methods is provided in the online supplemental material. Because neither dataset has personal identifiers, we used a multi-stage data linkage procedure to link the OSHA data with the hospital data.^{20,21} In Illinois, there was an average of 2.5 reports per day made to OSHA and an average of 4.0 reportable cases per day treated in all Illinois hospitals. By linking within the incident day, we are able to reduce

the overall false match rate. We standardized the format of all the linkage variables in the datasets, ensuring that the variable types, lengths, and codes were equivalent. Next, we used a combination of SQL and SAS code to link the two data files on the following variables: gender, age, incident date, vital status (alive/dead), nature of the injury/illness, body part, cause of injury, and hospital name.

In the first linkage steps, 4,057 OSHA reports matched to the hospital data file of reportable cases (Online Supplemental Figure 1). However, past research demonstrates that employers frequently report cases that do not meet the reporting requirement,^{10,22} so we utilized a second data file that included all emergent ED cases with a workers' compensation payer, but excluded elective cases, amputations, enucleations and deaths. An additional 881 reports linked to these ED visits despite not meeting the OSHA reporting requirement. Finally, research also demonstrates that injured workers frequently use alternative insurance coverage instead of workers' compensation.^{6,10} To account for this, we utilized a third data file that included all (1) hospital admissions and (2) amputations/enucleations treated in the ED that did not have a workers' compensation payer, but we excluded all elective cases and patients under 16 or over 65 years old. In this final linkage set, 230 hospitalizations without a workers' compensation payer matched to the remaining OSHA reports.

Statistical Analysis

We used hospital data for reporting information on injured workers because this information was collected directly from the worker or was based on clinical information. For all unlinked cases, we used the data provided on the OSHA report. To assess underreporting of severe injuries and illnesses to OSHA, we defined the reporting rate as shown in the formula below. We excluded from the reporting rate 881 cases reported to OSHA that did not meet OSHA reporting criteria, because they were not admitted to a hospital and did not involve amputations or enucleations.

$$\frac{(TotalCasesReported - OSHA - CasesNotMeetingReportingCriteria)}{(TotalCases \in Linked, DeduplicatedDataset - CasesNotMeetingReportingCriteria)} = ReportingRate$$

We present reporting rates by total fatal and non-fatal cases, amputations, gender, age, OSHA area offices, Rural-Urban Continuum codes (RUCC),²³ and incidents occurring on weekends and on major U.S. holidays when administrative personnel responsible for reporting may not be working (New Years, Memorial Day, Independence Day, Labor Day, Thanksgiving and Christmas). We analyzed overall trends (increasing, decreasing) and changes in trend (joinpoints) of reporting rates (Joinpoint Regression Program v 4.9.1.0).²⁴

Because we did not have access to state vital records, we are unable to adequately evaluate the reporting rate for fatalities. For this reason, we exclude fatalities from the remaining descriptive analyses and modelling. We compare reported and unreported cases by worker demographics, injury location, incidents occurring on weekends, comorbidities of the worker,²⁵ injury severity as measured by the trauma mortality prediction model (TMPM),²⁶ course of hospital treatment and hospital charges. ICD-10 codes were used to characterize nature of injury/illness and cause of injury for all cases with hospital records,

and the narratives from the OSHA reports were used for all unlinked cases. We used SAS software for statistical testing and modelling (v.9.4; Cary, NC). The chi-squared test was used for comparing categorical variables and student's t-test for continuous variables.

Multivariable Models: We evaluated factors associated with failing to report severe injuries or illnesses to OSHA using a multivariable logistic regression model. Using only non-fatal cases, we modeled the odds of not reporting an injury or illness to OSHA as defined by hospital cases that did not link to the OSHA reports (N=7,578) compared to all cases reported to OSHA (n=5,116). In a second model, we evaluated factors associated with reporting an injury or illness to OSHA that did not meet the reporting criteria. Using only non-fatal cases, we modeled the odds of improperly reporting the 881 cases that were reported to OSHA, but were discharged from the ED and did not involve amputations or loss of an eye compared to all other cases that met the OSHA reporting requirement (N=11,813). For both regression models, we evaluated the following variables: age, gender, race-ethnicity, state of residency, rural-urban codes²³ based on where the event occurred or where the individual was treated, incident year, incidents occurring on weekends or national holidays, illness cases, admission status, surgical intervention, mechanical ventilation, serious comorbidities,²⁵ hospital ownership (e.g., for-profit), and specific nature or cause of injury as reported on the medical records.

For both sets of models, statistical evaluation of covariates, as well as a priori knowledge, was used to determine inclusion of covariates in the final models. A two-sided p-value less than 0.05 was considered statistically significant. Odds ratios in the adjusted models are presented, including the 95 percent confidence intervals (CI 95%). No evidence of multicollinearity among the final independent variables was indicated in any of the multivariable models based on evaluation of standard errors, and evaluation of variance of inflation and tolerance tests.

Results

Estimated Reporting Rates

Table 1 presents the distribution of fatal and non-fatal injuries and illnesses by OSHA reporting status. During the period of 2017-2023, a total of 6,389 injuries and illnesses were reported to the State and Federal OSHA plans in Illinois, of which 64.6% were made within 24 hours of the event and 91.5% were made during the first week. Reports were made via all modalities with 92.9% occurring online or by phone. Nearly all reports were made by the employer or employer representative (n=5,790 out of 6,389 reports; 90.6%) with the remainder made by an employee or employee representative (n=131; 2.1%), a government agency (n=310; 4.9%) or other source (n=158; 2.5%).

The cumulative reporting rate, including both fatal and non-fatal injuries and illnesses, was 41.6% (Table 2). The cumulative reporting rates increased between 2017-2020 from 40.3% to 47.9%, but there was a significant reversal in the trend in 2021 leading to a decline to 35.9% by 2023 (p=0.03). However, hospital data do not capture fatalities that occur at the scene or following discharge (within 30-days). Excluding fatalities, the cumulative reporting rate of non-fatal injuries was 39.7% with no significant change in trend over the seven

years (Table 2). Similarly, there was no significant change in trend between 2017-2023 for non-fatal illnesses when excluding COVID cases, but the cumulative reporting rate was substantially lower (25.1%). When stratified by demographic characteristics, cumulative reporting rates were lower among females (vs males; $p<0.01$), older workers (35 years and up vs under 35 years; $p<0.01$), non-fatal cases occurring in urban regions (vs. suburban and rural; $p<0.01$), and injuries and illnesses occurring on weekends (vs. weekdays; $p<0.01$) and holidays (vs. non-holidays; $p<0.01$). There was no significant change in trend over the seven years for any of these subgroups.

Fatal Cases

There was a total of 1,433 deaths identified in the final linked dataset, of which 1,273 (88.8%) were reported to OSHA. In total, 809 deaths had reports made to OSHA but did not link to a hospital record, 464 deaths were reported to OSHA and linked to hospital records, and 160 deaths occurred in the hospital but were not reported to OSHA. Of the deaths identified in the hospital records, 220 (42.2%) did not have a workers' compensation payer, but linked with an OSHA report.

Among the 160 fatalities that were not reported to OSHA (compared to all reported fatalities), these deaths disproportionately occurred on weekends (23.1% v. 16.6%; $p<0.01$) and 75.6% involved one the following medical emergencies (primary diagnoses only; independent counts): 43 acute myocardial infarctions and cardiac arrests, 28 cerebrovascular accidents, 7 pulmonary embolisms, 33 traumatic brain injuries, 4 severe internal injuries, and 6 exposures to toxic agents.

Non-Fatal Cases

Of the 12,694 non-fatal injuries and illnesses, 8,871 (69.9%) were acute injuries, and 5,116 were reported to OSHA, but 881 (6.4%) of the reports involved cases that did not meet the reporting criteria (Table 1). Table 3 presents the demographic characteristics of the non-fatal injuries and illnesses. Compared to cases reported to OSHA, the hospital cases not reported to OSHA disproportionately were female (21.9% vs 15.4%; $p<0.01$), Non-Hispanic White (59.9% vs 51.5%; $p<0.01$), Illinois residents (91.3% vs 82.7%; $p<0.01$), occurred in urban counties (43.7% vs 34.1%; $p<0.01$), and occurred on weekends (19.9% vs 10.4%; $p<0.01$).

Table 4 presents the most common illnesses and traumatic injuries, comorbidities, course of hospital treatment and discharge status by OSHA reporting status. Compared to cases reported to OSHA, the hospital cases not reported to OSHA were disproportionately illnesses (34.4% vs 19.3%; $p<0.01$), had higher mean number of comorbidities ($p<0.01$) and a greater proportion were admitted to a hospital (83.8% vs 69.8%; $p<0.01$).

Multivariable Models

Table 5 presents the odds ratios from the final multivariable models. In the model evaluating factors associated with not reporting an injury or illness to OSHA, female workers, older workers, non-Hispanic White workers, workers with serious comorbidities, illnesses resulting in acute medical emergencies (as opposed to traumatic injuries), cases occurring in large urban counties, cases occurring on weekends and holidays, and injuries caused by

animals were more likely to not be reported to OSHA. However, cases requiring surgical intervention or mechanical ventilation were more likely to be reported to OSHA.

In the second multivariable model (Table 5), factors associated with improperly reporting an injury or illness to OSHA that did not meet the reporting criteria included injuries and illnesses involving female workers, both Non-Hispanic White and Black workers (relative to Hispanic and Latino workers), illnesses, and those suffering open wounds, burns and sprains/strains. In addition, the odds of improperly reporting an injury or illness increased each year between 2017-2023 (aOR=1.14; CI95%: 1.10, 1.19). As the hospital charges increased, the odds of improperly reporting an injury or illness decreased (per \$1,000 USD hospital charges; aOR=0.88; CI95%: 0.87, 0.89). Evaluation of the OSHA reports showed that 50.4% of the amputations reported by employers were in fact open wounds without loss of a part of a limb and were treated in the ED. In addition, 18.8% of cases reported as fractures by the employer were later diagnosed as sprains or strains.

Inspections

Among the fatal and non-fatal reports to OSHA, OSHA initiated 2,376 inspections resulting in 2,603 violations for a total of \$19,265,445 in penalties (after appeals). None of the non-fatal cases reported to OSHA that did not link to the hospital data had an inspection. The average final penalty was \$16,466 for non-fatal incidents with a ratio of 0.28 violations per non-fatally injured worker (1,170 violations out of 4,235 non-fatal reports). We estimate that the failure to report the 7,578 non-fatal injuries and illnesses potentially obscured up to 2,122 violations ($7,578 \times 0.28$).

Discussion

During the period 2017-2023, we identified 7,578 non-fatal injuries and illnesses and an additional 160 fatalities treated in Illinois hospitals that were not reported to OSHA. The failure to report these serious hospitalizations obscured up to 2,122 violations in Illinois workplaces that could have been remediated to protect other workers from injury, although many of the illnesses would likely not be directly related to an unabated hazard. Over the seven-year period, the cumulative reporting rate for non-fatal injuries was 39.7% and 25.1% for non-fatal illnesses (excluding COVID cases). The reporting rate for amputations, which requires reporting of non-hospitalized cases too, was consistently slightly higher (42.1%). In this analysis, there was no significant change in reporting rates over the seven-year period for non-fatal injuries and illnesses. Failure to report was associated with hospitalizations involving acute illnesses, female workers, and incidents occurring on weekends and holidays.

Despite Illinois being a hybrid state, the observed reporting rates were very similar to those reported by Michigan which has a state OSHA program and a data system that captures work-related hospitalizations not paid by workers' compensation because of state-based mandatory reporting laws.^{10,18} In Illinois, if a patient did not have a workers' compensation payer or link to an OSHA report, we were unable to confirm work-relatedness and those using insurance coverage other than workers' compensation were missed.⁶ In Michigan, only 58.7% of the work-related injuries in their occupational health surveillance system

had a workers' compensation payer.¹⁰ It is likely that we are missing a large number of work-related cases (estimated number 20,124= 11,813/58.7%) and the true reporting rate may be as low as 21.0% (4,235/20,124). Another factor that likely inflates the estimated reporting rate is the exclusion of vertebral conditions and hernias. Because the hospital data does not have time of incident, we are unable to identify vertebral conditions and hernias that may have occurred within 24 hours of the hospitalization.

On the other hand, the reporting timeframe also results in improper reporting of cases, likely resulting from the requirement to report events within 24 hours, which does not provide an employer enough time to gather sufficient accurate information about the nature of injury and if the worker was admitted to a hospital to determine if the event met the reporting criteria. Admission status may not be known during the first 24 hours, and the employer does not have direct access to a worker's clinical information because of patient confidentiality laws, unless the worker provides the information or until the workers' compensation claim is initiated which could take days or weeks. The inaccuracy of clinical data provided by the employer was evident in 881 (13.8%) reports, particularly involving open wounds, burns and sprains/strains.

Limitations

This study has several limitations. First, some of the variables in the OSHA dataset had a high degree of missingness, particularly for age and gender, or had to be coded from narrative text. In addition, the information is primarily provided by persons without medical training who may not know the injured worker, which can contribute to reporting inaccuracies,²⁷ and false matches or poor linkage. However, the daily number of work-related cases meeting the reporting criteria is very small, which mitigated the risks introduced by data inaccuracies. After adjusting for cases expected to not link to hospital data (see online supplemental methods), the overall linkage rate was very high (95.6%). Second, we did not have access to state vital records to comprehensively assess reporting of fatalities. Despite missing most fatalities in the hospital data, we identified 160 deaths that met the reporting criteria but were not reported to OSHA. In fact, the combined number of deaths captured in the OSHA and hospital data for 2017-2023 was 1,433 (n=898 traumatic injuries) which is 23% higher than the 1,138 documented by the Census of Fatal Occupational Injuries during the same period (CFOI).²⁸ Even though the inclusion criteria for CFOI is more rigorous and restricted to injuries, this illustrates that similar OSHA underreporting studies evaluating fatalities should be done utilizing multiple data sources. Third, Illinois hospital records are missing information about the patient's industry and occupation which has been associated with underreporting.^{5,10,18} As a consequence, we are also unable to differentiate within hospital data between workers covered by the federal or state plans, or workers not covered by OSHA including the self-employed and those employed in mining, railroad, and energy sectors (comprise 0.5% of Illinois payroll employees annually).²⁹

Conclusions

We recommend leveraging state-level data sources to improve overall reporting of serious occupational injuries and illnesses, including (1) developing legislation to mandate reporting of work-related injuries by medical personnel as in Michigan, and (2) mandate reporting of workers' compensation data involving relevant hospitalizations directly to OSHA. The unreported hospital cases in this analysis had workers' compensation payers, and most are documented and reported through parallel but separate reporting mandates under state workers' compensation laws.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Data Statement:

We are restricted by our Data Use Agreements to provide direct access to the OSHA data files or the hospital data. However, a public version of the OSHA data can be accessed online at <https://www.osha.gov/severeinjury>. We can provide summary tables or SAS code upon request.

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Key Messages

What is already known on this topic –

In 2014, the U.S. Occupational Safety and Health Administration (OSHA) updated a rule requiring employers to directly report all hospitalizations, amputations and eye enucleations to OSHA within 24 hours and within 8 hours for fatalities and multiple injury events. Internationally, research shows that employers intentionally and unintentionally underreport injuries and illnesses for numerous reasons.

What this study adds –

The analysis confirms poor compliance by employers with the reporting rule between 2017-2023. Only 39.7% of non-fatal injuries and 25.1% of non-fatal illnesses were reported. There was no significant change in reporting rates over the seven-year period for non-fatal injuries and illnesses indicating that compliance remained deficient from the start of the updated rule. In addition, we identified 160 deaths that met the reporting criteria but were not reported to OSHA.

How this study might affect research, practice or policy –

To address significant underreporting, we recommend leveraging state-level data sources to improve overall reporting of serious occupational injuries and illnesses, including developing legislation to mandate reporting of work-related injuries by medical personnel, and data sharing of workers' compensation claims or First Reports of Injury involving hospitalizations directly to State/Federal enforcement agencies.

Table 1:
Distribution of Reporting of Amputations, Enucleations, Hospitalizations and Deaths in Compliance with Rule 1904.39, Illinois, 2017-2023

	Cases Reported to OSHA					Total Cases (column percent)
	Hospital Cases NOT Reported to OSHA	OSHA Reports that Linked to Hospital Data	OSHA Reports that Linked to Hospital Data without WC Payer	OSHA Reports that DID NOT Link to Hospital Data	OSHA Reports Treated in the ED that DID NOT Meet Reporting Criteria	
Total (row percent)	7738 (54.8%)	4057 (28.7%)	230 (1.6%)	1221 (8.6%)	881 (6.2%)	14127 (100.0%)
Fatal Injuries and Illnesses	160	244	220	809	0	1433 (10.1%)
Fatal Injuries	62	190	62	167	0	481 (3.4%)
Fatal Illnesses	98	54	158	642	0	952 (6.7%)
Non-Fatal Injuries and Illnesses	7578	3813	10	412	881	12694 (89.9%)
Non-Fatal Injuries	4971	3230	4	32	634	8871 (62.8%)
Non-Fatal Illnesses	2607	583	6	380	247	3823 (27.1%)

Table 2:
Trend in Reporting Rates of Hospitalizations and Deaths in Compliance with Rule 1904.39, Illinois, 2017-2023

	2017	2018	2019	2020	2021	2022	2023	Cumulative Reporting Rate
Annual Percent of Total Fatal and Non-Fatal Injuries and Illnesses Reported to OSHA	40.3%	41.2%	40.8%	47.9%	42.7%	43.8%	35.9%	41.6%
Non-Fatal Injuries and Illnesses	34.9%	36.4%	36.1%	39.1%	36.5%	37.4%	31.6%	35.9%
Non-Fatal Injuries	38.5%	41.3%	39.6%	40.5%	39.1%	41.4%	37.3%	39.7%
Amputations*	42.9%	44.8%	41.2%	41.3%	42.4%	43.4%	38.3%	42.1%
Non-Fatal Illnesses	26.3%	23.8%	26.3%	36.5%	30.2%	26.7%	22.0%	27.1%
Non-Fatal Illnesses - COVID Only	0.0%	0.0%	0.0%	49.3%	47.1%	42.1%	13.6%	46.0%
Non-Fatal Illnesses - Without COVID Cases	26.3%	23.9%	26.3%	27.5%	26.0%	25.9%	22.3%	25.1%
Reporting Rates of Non-Fatal Injuries and Illnesses Stratified by Demographics								
Gender								
Male	34.8%	36.7%	35.4%	37.1%	35.0%	36.5%	31.7%	35.2%
Female	25.3%	28.7%	30.4%	28.6%	29.2%	31.7%	24.6%	28.3%
Age								
Under 35 years	46.1%	44.0%	42.6%	53.1%	46.6%	44.8%	42.5%	45.5%
35 to 64 years	31.3%	34.1%	33.2%	34.5%	32.4%	36.5%	31.5%	33.3%
65 years and older	28.2%	32.0%	36.0%	26.7%	34.7%	25.9%	19.9%	27.4%
Federal OSHA Area Offices								
Chicago North	25.6%	32.0%	27.4%	32.5%	28.1%	26.2%	26.8%	28.3%
Chicago South	36.0%	38.2%	36.4%	45.2%	35.8%	36.4%	36.6%	37.8%
Fairview Heights District Office	44.4%	39.5%	43.4%	44.2%	47.7%	44.3%	56.8%	45.5%
Naperville Area Office	35.2%	34.6%	34.7%	37.6%	35.1%	40.1%	35.3%	36.0%
Peoria Area Office	44.9%	41.5%	44.7%	39.0%	45.8%	47.6%	23.8%	38.9%
USDA Rural-Urban Continuum Codes**								
Non-Fatal Cases Only - Urban Regions	27.0%	32.5%	28.8%	38.4%	28.9%	29.7%	28.5%	30.4%
Non-Fatal Cases Only - Suburban Regions	39.2%	36.0%	37.1%	37.5%	35.9%	40.1%	40.7%	38.1%
Non-Fatal Cases Only - Rural Regions	50.5%	53.4%	54.1%	46.2%	56.3%	52.0%	20.9%	43.9%
Day of Week of Injury/Illness Event								

	2017	2018	2019	2020	2021	2022	2023	Cumulative Reporting Rate
Weekday	37.1%	38.6%	39.2%	41.5%	39.1%	40.0%	34.7%	38.5%
Weekend	24.7%	24.5%	18.9%	28.0%	23.4%	24.5%	16.1%	22.7%
Holidays	26.1%	28.6%	26.3%	23.5%	31.3%	16.7%	20.0%	24.4%

* Enucleations of the eye are not shown because there were only seven cases across all seven years.

** USDA Rural-Urban Continuum Codes: Urban region is RUCC 1 which covers metro areas of 1 million population or more (Cook County; Chicago); Suburban regions are RUCC 2 and 3 (remainder of metro counties); Rural regions are RUCC 4-9 covering non-metro counties.

Table 3:
Demographics of Non-Fatal Hospitalizations and ED Visits in Illinois Hospitals During the Period 2017-2023, Stratified by Whether They Were Reported to OSHA in Compliance with Rule 1904.39, Illinois, 2017-2023

	Hospital Cases NOT Reported to OSHA (N=7,578)	Cases Reported to OSHA (N=4,235)	Not Reportable Cases Referred to OSHA (N=881)
Gender			
Male	5921 (78.1%)	3217 (76.0%)	548 (62.2%)
Female	1657 (21.9%)	654 (15.4%)	333 (37.8%)
Unknown	0 (0.0%)	364 (8.6%)	0 (0.0%)
Mean Age (sd)	48.1 (sd=15.5)	46.1 (sd=15.0)	42.5 (sd=15.0)
15 to 19 years	159 (2.1%)	83 (2.0%)	40 (4.5%)
20 to 24 years	427 (5.6%)	233 (5.5%)	87 (9.9%)
25 to 34 years	1125 (14.8%)	702 (16.6%)	166 (18.8%)
35 to 44 years	1314 (17.3%)	722 (17.0%)	188 (21.3%)
45 to 54 years	1723 (22.7%)	817 (19.3%)	178 (20.2%)
55 to 64 years	1808 (23.9%)	880 (20.8%)	164 (18.6%)
65 to 74 years	727 (9.6%)	293 (6.9%)	44 (5.0%)
75 years and older	295 (3.9%)	93 (2.2%)	14 (1.6%)
Unknown	0 (0.0%)	412 (9.7%)	0 (0.0%)
Race/Ethnicity			
Non-Hispanic White	4538 (59.9%)	2183 (51.5%)	569 (64.6%)
Hispanic or Latino	1735 (22.9%)	975 (23.0%)	146 (16.6%)
Non-Hispanic Black	734 (9.7%)	364 (8.6%)	103 (11.7%)
Other	530 (7.0%)	279 (6.6%)	63 (7.2%)
Unknown	41 (0.5%)	434 (10.2%)	0 (0.0%)
Illinois Resident	6921 (91.3%)	3501 (82.7%)	841 (95.5%)
OSHA Area Office			
Chicago North	2243 (29.6%)	886 (20.9%)	177 (20.1%)
Chicago South	1700 (22.4%)	1031 (24.3%)	213 (24.2%)
Fairview Heights District Office	493 (6.5%)	412 (9.7%)	110 (12.5%)
Naperville Area Office	1735 (22.9%)	978 (23.1%)	169 (19.2%)
Peoria Area Office	1407 (18.6%)	897 (21.2%)	208 (23.6%)
State Plan Public Sector	0 (0.0%)	31 (0.7%)	4 (0.5%)
USDA Rural-Urban Continuum Codes *			
Urban Regions	3310 (43.7%)	1446 (34.1%)	298 (33.8%)
Suburban Regions	3291 (43.4%)	2023 (47.8%)	421 (47.8%)
Rural Regions	977 (12.9%)	766 (18.1%)	162 (18.4%)
Occurred on a Weekend	1507 (19.9%)	442 (10.4%)	141 (16.0%)

* USDA Rural-Urban Continuum Codes: Urban region is RUCC 1 which covers metro areas of 1 million population or more (Cook County; Chicago); Suburban regions are RUCC 2 and 3 (remainder of metro counties); Rural regions are RUCC 4-9 covering non-metro counties.

Table 4:

Nature of Illness and Injury and Course of Hospital Care of Non-Fatal Hospitalizations and ED Visits in Illinois Hospitals During the Period 2017-2023, Stratified by Whether They Were Reported to OSHA in Compliance with Rule 1904.39, Illinois, 2017-2023

Nature	Hospital Cases NOT Reported to OSHA (N=7,578)	Cases Reported to OSHA (N=4,235)	Not Reportable Cases Referred to OSHA (N=881)
Non-Fatal Injury	4971 (65.6%)	3266 (77.1%)	634 (72.0%)
Non-Fatal Illness	2607 (34.4%)	817 (19.3%)	247 (28.0%)
Unspecified	0 (0.0%)	152 (3.6%)	0 (0.0%)
Illness (Primary Diagnosis Only)¹			
COVID	228 (3.0%)	178 (4.2%)	20 (2.3%)
Acute Myocardial Infarction / Cardiac Arrest	126 (1.7%)	87 (2.1%)	0 (0.0%)
Heat Related Illness	32 (0.4%)	24 (0.6%)	17 (1.9%)
Cerebrovascular Accident	276 (3.6%)	130 (3.1%)	2 (0.2%)
Seizure	125 (1.6%)	72 (1.7%)	7 (0.8%)
Pregnancy related complications	8 (0.1%)	6 (0.1%)	0 (0.0%)
Respiratory Failure	526 (6.9%)	224 (5.3%)	0 (0.0%)
Dehydration	134 (1.8%)	35 (0.8%)	5 (0.6%)
Pulmonary Embolism	160 (2.1%)	40 (0.9%)	0 (0.0%)
Allergic Reaction	231 (3.0%)	95 (2.2%)	14 (1.6%)
Angina Pectoris and Other Conditions Related to Acute Ischemic Heart Disease ²	166 (2.2%)	41 (1.0%)	32 (3.6%)
Other Arrhythmias	369 (4.9%)	125 (3.0%)	9 (1.0%)
Venous Embolism / Thrombosis	166 (2.2%)	39 (0.9%)	0 (0.0%)
COPD with Acute Exacerbation	154 (2.0%)	49 (1.2%)	11 (1.2%)
Asthma	216 (2.9%)	82 (1.9%)	14 (1.6%)
Pneumothorax	32 (0.4%)	19 (0.4%)	0 (0.0%)
Nature of Injury (initial cases only)¹			
Traumatic Brain Injury (including concussion)	690 (9.1%)	557 (13.2%)	89 (10.1%)
Fracture	2607 (34.4%)	1873 (44.2%)	241 (27.4%)
Amputation	1361 (18.0%)	970 (22.9%)	0 (0.0%)
Open Wound	1073 (14.2%)	725 (17.1%)	239 (27.1%)
Burns	303 (4.0%)	165 (3.9%)	49 (5.6%)
Crush	412 (5.4%)	324 (7.7%)	30 (3.4%)
Blood vessels	84 (1.1%)	80 (1.9%)	3 (0.3%)
Internal Injury (torso)	857 (11.3%)	686 (16.2%)	43 (4.9%)
Sprain or Strain	205 (2.7%)	131 (3.1%)	131 (14.9%)
Dislocation	167 (2.2%)	126 (3.0%)	12 (1.4%)
Poisoning or Toxic Effects	163 (2.2%)	85 (2.0%)	8 (0.9%)
Asphyxiation	1 (0.0%)	1 (0.0%)	0 (0.0%)
Enucleation of the Eye	4 (0.1%)	3 (0.1%)	0 (0.0%)
Cause of injury (Injuries Only)			

Nature	Hospital Cases NOT Reported to OSHA (N=7,578)	Cases Reported to OSHA (N=4,235)	Not Reportable Cases Referred to OSHA (N=881)
Falls - Slips, trips, at level, one level to another	1601 (21.1%)	1033 (31.6%)	223 (35.2%)
Struck by or against, or caught, crushed, jammed or pinched in or between objects	805 (10.6%)	750 (23.0%)	137 (21.6%)
Machinery	765 (10.1%)	786 (24.1%)	53 (8.4%)
Transportation incident - excluding motor vehicle collisions on public roadways and passengers on public transportation	308 (4.1%)	429 (13.1%)	53 (8.4%)
Cut or Piercing Instrument	207 (2.7%)	135 (4.1%)	70 (11.0%)
Poisoning or Toxic Effects	180 (2.4%)	92 (2.8%)	8 (1.3%)
Heat Sources	149 (2.0%)	110 (3.4%)	32 (5.0%)
Animals - contact with or bitten	113 (1.5%)	28 (0.9%)	12 (1.9%)
Assault or homicide (inc. firearms)	81 (1.1%)	37 (1.1%)	9 (1.4%)
Asphyxiation, Drowning, Suffocation	71 (0.9%)	49 (1.5%)	1 (0.2%)
Contact with non-powered hand tool	55 (0.7%)	30 (0.9%)	6 (0.9%)
Electric Current	41 (0.5%)	33 (1.0%)	6 (0.9%)
Ergonomic and motion related hazards	41 (0.5%)	21 (0.6%)	19 (3.0%)
Accidental explosion high pressure or explosive materials	40 (0.5%)	19 (0.6%)	5 (0.8%)
Firearm - Accidental and undetermined intent	18 (0.2%)	8 (0.2%)	0 (0.0%)
Heat or Cold Related Injury (inc. hypothermia, heat stroke)	3 (0.0%)	6 (0.2%)	1 (0.2%)
Suicide	2 (0.0%)	2 (0.1%)	0 (0.0%)
Nature or Environment - Cataclysmic storms, tornadoes, earthquakes, volcano, avalanche, floods	1 (0.0%)	2 (0.1%)	0 (0.0%)
Unspecified	490 (6.5%)	0 (0.0%)	0 (0.0%)
Elixhauser Comorbidity Index³			
Mean Comorbidities	1.6 (sd=1.8)	1.1 (sd=1.6)	0.4 (sd=0.8)
3 or More Comorbidities	1912 (25.2%)	677 (16.0%)	26 (3.0%)
Hospital Treatment and Measures of Severity			
Mean TMPM (injury cases only) ⁴	2.6 (sd=6.8)	2.9 (sd=7.1)	2.1 (sd=7.1)
Inpatient Cases (>24 hours at initial hospital)	6309 (83.3%)	2956 (69.8%)	0 (0.0%)
Mean Length of Hospitalization, Inpatient Cases (sd)	5.0 (sd=6.9)	5.6 (sd=7.4)	n/a
Required Care in Intensive Care Unit	1507 (19.9%)	882 (20.8%)	0 (0.0%)
Required Care in Coronary Care Unit	655 (8.6%)	251 (5.9%)	0 (0.0%)
Required Mechanical Ventilation	311 (4.1%)	200 (4.7%)	0 (0.0%)
Required Surgical Intervention	3351 (44.2%)	1923 (45.4%)	35 (4.0%)
Median Hospital Charges (\$USD)			
Outpatient Cases	3812	4260	3110
Inpatient Cases	43021	53240	n/a
Discharge Status			
Routine Discharge (Home)	5418 (71.5%)	2630 (62.1%)	819 (93.0%)
Home Health Care	975 (12.9%)	497 (11.7%)	6 (0.7%)
Discharge to Another Acute Care Facility	225 (3.0%)	149 (3.5%)	43 (4.9%)
Discharge to Intermediate or Long Term Care Facility (inc. Skilled Nursing Facilities and Rehabilitation Centers)	858 (11.3%)	509 (12.0%)	3 (0.3%)

Nature	Hospital Cases NOT Reported to OSHA (N=7,578)	Cases Reported to OSHA (N=4,235)	Not Reportable Cases Referred to OSHA (N=881)
Discharge to a Psychiatric Facility	6 (0.1%)	0 (0.0%)	1 (0.1%)
Discharged to Court / Law Enforcement	1 (0.0%)	3 (0.1%)	0 (0.0%)
Left Against Medical Advice	50 (0.7%)	21 (0.5%)	3 (0.3%)
Other/Unspecified	45 (0.6%)	426 (10.1%)	6 (0.7%)

¹ Not all illnesses and injuries are shown. Total cell counts in each column may add to more than total because counts are not independent. Each person may have more than one condition listed on medical records or OSHA report.

² Angina group includes angina pectoris, other acute ischemic heart diseases, atherosclerotic heart disease of native coronary artery with angina pectoris, aneurysm of heart, coronary artery aneurysm and dissection, ischemic cardiomyopathy, atherosclerosis of coronary artery bypass graft(s) and coronary artery of transplanted heart with angina pectoris, including chest pain r07

³ The Elixhauser Comorbidity Index was used to characterize severe comorbidities associated with increased length of hospitalization, hospital charges, and mortality when using administrative hospital data.¹⁹

⁴ Trauma Mortality Prediction Model scale for injury severity (scale 0-100; where 100 is equivalent to 100% probability of death)

Table 5:

Multivariable Logistic Regression Models Evaluating (1) Factors Associated with Not Reporting an Injury or Illness to OSHA and (2) Factors Associated with Improperly Reporting an Injury or Illness to OSHA that Did Not Meet the Reporting Criteria in Compliance with OSHA Rule 1904.39, Illinois, 2017-2023

	Adjusted Odds Ratio (CI95%) ¹	p-value
Model 1: Evaluating Factors Associated with Not Reporting an Injury or Illness to OSHA		
Female	1.29 (1.16, 1.44)	<.001
Age (per 10 years)	1.03 (1.00, 1.06)	0.037
Non-Hispanic White	1.10 (1.00, 1.20)	0.041
Elixhauser comorbidity index ²	1.04 (1.01, 1.07)	0.006
Illness Case	2.60 (2.34, 2.90)	<.001
Required Surgical Intervention	0.86 (0.79, 0.93)	<.001
Required mechanical ventilation	0.67 (0.55, 0.82)	<.001
Location of Injury: Urban County ³	1.31 (1.21, 1.43)	<.001
Injury or Illness Occurred on a Weekend	2.21 (1.95, 2.50)	<.001
Injury or Illness Occurred on a Holiday ⁴	1.98 (1.25, 3.26)	0.005
Animal-related injury	2.43 (1.61, 3.79)	<.001
Model 2: Evaluating Factors Associated with Improperly Reporting an Injury or Illness to OSHA that Did Not Meet the Reporting Criteria		
Female	2.23 (1.87, 2.65)	<.001
Race-Ethnicity		
Hispanic or Latino	REF	
Non-Hispanic White	1.63 (1.32, 2.02)	<.001
Non-Hispanic Black	1.62 (1.20, 2.20)	0.002
Non-Hispanic Other	1.31 (0.92, 1.87)	0.132
Year of Injury or Illness	1.14 (1.10, 1.19)	<.001
For-Profit Hospital Ownership	1.98 (1.11, 3.40)	0.017
Illness Case	3.27 (2.64, 4.05)	<.001
Open Wound	3.39 (2.75, 4.17)	<.001
Burns	4.59 (3.13, 6.63)	<.001
Sprain or Strain	19.63 (13.95, 27.79)	<.001
Total Hospital Charges (per \$1000 USD)	0.88 (0.87, 0.89)	<.001

¹Model fit for model 1, c-statistic=0.656; Model fit for model 2, c-statistic=0.912

²The Elixhauser Comorbidity Index was used to characterize severe comorbidities associated with increased length of hospitalization, hospital charges, and mortality when using administrative hospital data.¹⁹

³Based on USDA RUCC 1, counties in metro areas of 1 million population or more

⁴Holiday variable includes the following holidays if they occurred on a weekday: New Year's, Memorial Day, Independence Day, Labor Day, Thanksgiving and following Friday, and Christmas