Monthly Labor Review

BLS

February 2019

Collecting union status for the Census of Fatal Occupational Injuries: a Massachusetts case study

The U.S. Bureau of Labor Statistics Census of Fatal Occupational Injuries (CFOI) collects information on union status for workers fatally injured on the job. Understanding how unions and collective bargaining agreements may affect workplace safety is an important area of research for policymakers, public health officials, employers, workers, and unions. This article provides background on the CFOI program and describes how the program collected union information from 2011 to 2013. It further describes the methods used as part of a special effort in Massachusetts to determine what union information was available in administrative documents. In addition, the article describes methods that may enable other CFOI state agents to generate more robust data and presents Massachusetts data by union and nonunion status for 2011–13.

Understanding how unions and collective bargaining agreements may affect workplace safety is an important area of research for policymakers, public health officials, employers, workers, and unions. Starting with 2011 data, the U.S. Department of Labor's Bureau of Labor Statistics (BLS) began the optional collection of the union status of workers fatally injured on the job. Implementing this data element in the national Census of Fatal Occupational Injuries (CFOI) is an important step in creating a data source to learn how union membership can affect the safety and health of workers. This article reports on how the CFOI collected this variable, for the entire United States, for 2011 through 2013 data. It also presents findings from a Massachusetts study designed to determine if union status was available in the documents typically collected to substantiate work-related deaths in Massachusetts. If union

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status was not available, the study also determined what additional resources could be used to collect this variable.

When the National Academy of Sciences assessed the National Institute for Occupational Safety and Health (NIOSH) Construction Safety and Health Research Program from 2005 to 2008, one noted limitation was the absence of a union status variable in the primary occupational safety and health statistical datasets: the BLS CFOI and Survey of Occupational Injuries and Illnesses (SOII).[1] Limited research is available on the direct impact of unionization on workplace health and safety across industries in the United States. Thus, including this information in these national systems could be very useful. Specific research into construction sector unionization in the United States has shown higher rates of workplace hazard identification and training provided to union workers, with presumed improved health and safety outcomes.[2] Knowing more about the union status of workers fatally injured at work can help data users measure the effect of unionization on workplace health and safety. Research on union status of workers might identify priorities and partners for intervention and prevention of future injuries and deaths of union and nonunion workers alike.

We need to consider many facets when defining union status. A single establishment can include a mix of union and nonunion workers, and the job function of each worker may be what dictates their union eligibility. A union establishment may also include workers who choose not to join the union but are covered by the same policies as the union members. In addition, one must recognize that the meaning of union membership or affiliation varies across industries. In general, unions strive to protect workers who speak up about health and safety concerns. However, the implications for workplace policies and practices related to health and safety may vary widely. For example, in construction, union affiliation can indicate more structured and consistent training programs, whereas in other industries, this may not be the case.[3]

Overview of CFOI data collection

CFOI is a federal–state cooperative program that uses multiple sources of data to identify and describe fatal work injuries. The CFOI program uses multiple source documents to code and corroborate information for over 35 data elements for each workplace fatality. Over 20,000 individual source documents, comprising over 30 different document types, are used to code CFOI cases in given years. Death certificates, news media reports, medical examiner reports, and police reports are a few examples.[4] Multiple source documents are used because each source document has specific information on the case, but none has all the data elements needed. For example, 95 percent of cases each year have a death certificate associated with them, the most of any source document. Death certificates contain excellent information on the decedent's demographic characteristics, such as age, race, and gender, but may not have detailed information about the fatal incident itself. Occupational Safety and Health Administration (OSHA) reports, in contrast, may have less specific demographic data but contain very detailed information on the incident, such as location, time of day, work task, equipment used, and a description of how the

fatality occurred. By piecing together information from multiple source documents, the CFOI program captures the most detailed and accurate information available and ensures high-quality data are available to data users.

CFOI collects information on a standard set of data elements and on a number of optional exploratory variables. Optional fields are those for which the data to complete the variable may be available in some states but not in others, depending on the source documents to which the states have access. BLS does not publish data from optional fields because the data do not reflect a true census and cannot be standardized across the nation. BLS tracks the usage of these optional variables over time as a useful exploratory analysis to determine if they could become viable variables for the nation in the future.

Starting with reference year 2011, the union status variable was implemented as an optional exploratory field in the CFOI program. Instructions in this first year of data collection read as follows: “Use this field to indicate the union status of the decedent.” Because this was a new and optional variable, a more formal definition was not developed. Rather, the definition was left open to interpretation because the intent was to explore the viability of collecting information on this data element. When several states demonstrated that they could collect at least some information on union status, BLS provided guidance that was more detailed. In 2012, revised guidance was issued, further defining the variable to include union workers, workers covered by collective bargaining, or any workers who may be covered by such an agreement but choose not to be full members of the union. This change was intended to help states more easily identify union affiliation in the cases in which union affiliation of the victim is unknown but information about the presence of a union at the worksite is available. Further instruction to the CFOI agents included marking cases that had no union status information as either “no” or “unknown.”

In 2013, according to the BLS Current Population Survey (CPS), an estimated 14.5 million wage and salary workers belonged to unions, accounting for 11 percent of employed wage and salary workers.[5] The CPS data are consistent with the CFOI guidance provided for reference year 2011 regarding union status. In 2012, CFOI expanded the new guidance to add employees whose workplace was covered by collective bargaining or, in CPS terms, represented by a union. In 2013, 16 million (12 percent) wage and salary workers fell into either category. Thus, the change in definition resulted in an estimated 1-percent difference in the total wage and salary workforce that met the revised CFOI union status definition, according to CPS. We do not consider this percent change a substantial difference.[6]

In the national CFOI data for 2011–13, the union status variable for most (81 percent, or 8,819 of 10,848) wage and salary worker cases was left blank. Only 740 (7 percent) of the 10,848 fatalities among wage and salary workers had union status marked “yes” or “no,” and 1,289 (12 percent) cases were marked “unknown.” Looking at the 3 years, we found that the cases marked “yes” or “no” for union status were 5 percent, 8 percent, and 8 percent of the total file for 2011, 2012, and 2013, respectively. Per the guidance laid out, BLS can only be sure that the “yes” answers (212 of the 740 cases marked “yes” or “no”) were substantiated by documents. As required by BLS guidance, CFOI programs reported documentation only for the “yes” answers. However, the BLS CFOI program assumed that if union status was known to be “no,” versus truly “unknown,” coders would select “no” and “unknown” accordingly.

Identifying union status in CFOI data varied by state, in part, because of differential access to the source documents needed to determine the status. Thus, looking at union status by state can clarify which states may be collecting union status information at a higher rate than the nation as a whole. During 2011 to 2013, 17 states and the District of Columbia filled out union status for at least 25 percent of their cases. This completion rate calculation

includes filling in “yes,” “no,” or “unknown.” Of these states, only eight states filled out union status more than half the time. Six states marked a definitive “yes” or “no” for at least 25 percent of cases, and only Massachusetts marked over half of its cases with a definitive “yes” or “no.” Thus, Massachusetts was the state with the most complete data on union status reported to CFOI.

Massachusetts: a case study

The Massachusetts Department of Public Health (MDPH) conducts the CFOI in Massachusetts. MDPH also tracks workplace deaths and conducts indepth investigations of certain deaths through its Massachusetts Fatality Assessment and Control Evaluation (MA FACE) project.[7] MA CFOI and FACE collaborated in conducting a Massachusetts case study to determine if union information was in the documents typically collected to substantiate a work-related death in Massachusetts and, if not, what additional resources could be used to collect this variable. Determining the union status of workers fatally injured on the job in Massachusetts from 2011 to 2013 was an involved process. During this period, Massachusetts had 169 fatal work injuries. When originally collected for the CFOI data, 54 percent of these cases had union status filled out. To inform other CFOI agents, this study aimed to further research the union status of all 169 cases. The processes and sources used in determining union status for the 2011–13 CFOI cases and the set of resources available in Massachusetts are presented in the sections that follow.

For this study, union status was determined by whether or not the victim was a member of a union, in accordance with the initial guidance for reference year 2011 from BLS. When the definition changed to include workers who were also covered by collective bargaining but were not members of a union, we made sure to record any information that described this scenario. Similarly, any evidence that other workforces at the establishment or site met the updated union status definition was recorded in the case file.

Documenting union status was extensive for each of the 169 Massachusetts worker deaths from 2011 to 2013. In some cases, union status was determined only after intensive followup or once sources that would not have otherwise been accessed were checked. Some of this work was done after the formal close of each data year, resulting in additional data on union status not included in the data formally entered in the CFOI data system. All followup was conducted according to CFOI data collection privacy and confidentiality standards and established procedures for surveillance of workplace fatalities as conducted by MDPH.

The Massachusetts workforce: where are the unions?

To get a better sense of where union workers are employed in Massachusetts, we used the CPS to characterize the percentage of unionization (union density) by industry and occupation. We were particularly interested in learning more about the presence of unions in those industries in which fatalities often occur such as construction; the public sector; and agriculture, forestry, fishing, and hunting.

Table 1 presents the percentages of union affiliation in Massachusetts by industry sector and occupation group for 2011–13, stratified by public and private sectors. Of the public and private sector workforces, 59 percent and 6 percent, respectively, were unionized, with an overall statewide average of 13 percent. In the public sector, industries with the highest union density were

- transportation and utilities (72 percent),

- educational and health services (67 percent),
- manufacturing (64 percent),
- construction (53 percent), and
- public administration (50 percent).

In the private sector, they were

- transportation and utilities (25 percent);
- mining, quarrying, and oil and gas extraction (17 percent);
- information (16 percent);
- construction (11 percent); and
- educational and health services (11 percent).

Table 1. Union representation by major industry and occupation, Massachusetts, 2011–13, annual average

Characteristic	Public sector workforce	Percent union	Private sector workforce	Percent union
Total	400,638	59	2,845,082	6
Industry sector				
Agriculture, forestry, fishing, and hunting	0	0	10,023	0
Mining, quarrying, and oil and gas extraction	0	0	2,667	17
Construction	5,036	53	196,256	11
Manufacturing	1,150	64	269,758	5
Wholesale and retail trade	609	0	397,183	4
Transportation and utilities	28,163	72	77,596	25
Information	3,071	42	70,663	16
Financial activities	7,109	22	222,138	1
Professional and business services	5,042	22	459,178	1
Educational and health services	202,923	67	712,373	11
Leisure and hospitality	7,278	34	263,490	2
Other services	386	0	163,755	4
Public administration	139,870	50	0	0
Occupation group				
Management, business, and financial occupations	42,139	36	519,756	2
Professional and related occupations	190,005	68	747,922	8
Service occupations	77,098	57	477,840	5
Sales and related occupations	3,256	31	318,348	2
Office and administrative support occupations	66,578	52	317,342	6
Farming, fishing, and forestry occupations	0	0	6,177	0
Construction and extraction occupations	5,387	59	149,125	15

See footnotes at end of table.

Table 1. Union representation by major industry and occupation, Massachusetts, 2011–13, annual average

Characteristic	Public sector workforce	Percent union	Private sector workforce	Percent union
Installation, maintenance, and repair occupations	4,754	54	65,139	16
Production occupations	2,981	31	127,403	10
Transportation and material moving occupations	8,439	46	116,030	12
Statewide total	3,245,720		13	

Notes: Survey question: “On this job, are you a member of a labor union or of an employee association similar to a union?” Workforce totals include the active labor force and self-employed and volunteer workers. Union members: Data refer to members of a labor union or an employee association similar to a union.

Sources: U.S. Census Bureau; DataFerrett; and U.S. Bureau of Labor Statistics, Current Population Survey (January 2011 to December 2013).

Of public sector workers, unionization was highest among municipal workers (66 percent), followed by state and federal workers at 54 percent and 38 percent, respectively. Although union density was lower in the private sector, elevated union density was found in some private occupation groups (data not shown). These groups include healthcare practitioner and technical occupations (16 percent, a subgroup of professional and related occupations) and protective service occupations (13 percent, a subgroup of service occupations).

An additional element that can be gleaned from the CPS is the prevalence of workers who fall under collective bargaining but are not union members.[8] Statewide, an estimated 1 percent of all workers for 2011–13 were working in this situation, similar to nationwide findings. In both the private and public sectors, the highest numbers of these workers were in educational and health services industries, sectors which have higher union density.

The CPS provides important contextual information about the probability of union membership by industry and occupation in the state. However, the CPS data alone cannot be used to confirm the union status *of individuals*. Other sources need to be used to document union status.

Standard source documents and beyond

For the 169 occupational fatal injury cases between 2011 and 2013 in Massachusetts, we documented the sources we used to determine union status. We developed a process of looking at source documents and gathering more documents until we had a source that explicitly indicated whether the victim was in a union. The process is summarized here and depicted in a flowchart, figure A-1, in the appendix.

We determined the union status of some workers solely on the basis of their employee status (self-employed, owner, or volunteer), occupation, or industry.[9] For example, self-employed workers and owners and operators of incorporated businesses are nonunion, and no commercial fishing unions exist in Massachusetts. In several instances, MDPH staff had local knowledge about union status of specific employers or workforces. We were able to identify confirmatory union information in standard source documents for a very small number of cases (affirmative information in the obituary or police report). Affirmative information was also found on the employer’s website for a small number of cases.

Apart from an overt claim of union membership or a union logo on the employer’s main page, job postings on the employer websites were checked for details on union membership, dues, pay rates, or a collective bargaining

agreement. When these sources did not provide enough evidence, the next step was to search information available from the health and safety enforcement agencies.

Massachusetts is a federal OSHA state and does not have a state plan to enforce OSHA regulations in the public sector.[10] The Massachusetts Department of Labor Standards (DLS) in the state Executive Office of Labor and Workforce Development investigates workplace deaths in the public sector.

Although the employers in most work-related fatality cases in Massachusetts fall under OSHA jurisdiction, OSHA did not investigate several of the 169 fatalities because of the type of event or other factors, such as delay in identifying the death. For incidents in which OSHA opens an investigation, the public inspection data posted on its website lists union status. We accessed these data using the public search tool and the establishment name or activity number found in the OSHA 170 report.[11]

MDPH works closely with the OSHA Region I office, which manages OSHA activity in New England and the three area offices in Massachusetts. OSHA provides MDPH records of all death investigations conducted in Massachusetts. For 2011–13, OSHA provided MDPH with information on 47 of the 169 study victims. Seven of the inspection summaries indicated the fatal victim was union. By reviewing additional source documents, we were able to confirm that the OSHA union data for Massachusetts fatalities were accurate.[12]

For state and local public sector deaths, we found information about union status of the victims in other sources and we did not need to contact DLS separately. For example, after completing joint investigations, the MA FACE project and DLS confirmed three fatally injured municipal workers as being union members.

OSHA may investigate work-related fatalities of federal workers. In some cases, OSHA will not investigate and the federal agency employing the victim will investigate and generate a detailed incident report. Another exception for OSHA is private sector mining cases, which the Mine Safety and Health Administration (MSHA) has jurisdiction over. The MSHA fatality reporting forms include a field for union.[13]

In other cases, however, neither OSHA nor DLS will investigate the death.[14] In these instances, in which no OSHA Integrated Management Information System history of the establishment was available, MDPH sought insight from health and safety partners in the state.[15] Foremost on this list of partners were the Coalition for Occupational Safety and Health (COSH) groups and, specifically, the training and outreach coordinator from the larger COSH in Massachusetts, known as MassCOSH.[16]

In addition, we contacted larger labor organizations with broad membership if we suspected that the victim was affiliated with these organizations. When the victim worked in an occupation or industry that was known as having some level of unionization and a specific union was known to cover the geographic area, we contacted that union. The union locals who were contacted were responsive to requests for confirmation.

When the previous steps did not provide enough information, the employer was contacted. This approach follows the CFOI model of looking at public and administrative source documents before contacting the employer. We contacted management or human resources at the site or corporate level, depending on the size of the company. In the case of town government employers, we contacted the town manager or human resource department of the municipality.

Results

We determined the union status of 97 percent of the 169 cases of workers fatally injured in Massachusetts during 2011 to 2013. This percentage represents a substantial increase over the 54 percent collected formally for CFOI. Of the 169 cases, 29 (17 percent) were confirmed union. These included 17 public sector workers, 59 percent of all identified union deaths. Of the 12 private sector workers who were union members, the largest portion worked in construction (4 workers or 33 percent of union cases). Of the 135 cases (80 percent) determined to be nonunion, no evidence was found that these workers had opted out of a union or were otherwise covered by collective bargaining.

The union status for five (3 percent) of the cases could not be determined. Either the company name of these cases was not known or the employer did not know if the workers were union members.

Table 2 shows the number and percentage of cases identified as either union or nonunion by each source type. The table includes the data that were entered into the official CFOI dataset and what additional union information was generated by this study. The top section of the table lists standard sources that BLS agents would typically consult when investigating other required variables during CFOI collection. These sources are readily available in Massachusetts and many other states. Data of the official CFOI research file include completed union information for 91 of the 169 cases (54 percent). Of the 73 cases for which additional union information was obtained during the study, the largest share was first substantiated by OSHA inspection data (24 cases in total). We substantiated an additional 16 cases with the use of the victims' employee status (self-employed, owner, or volunteer).

Table 2. Select types of data sources used to confirm union status for workers fatally injured on the job in Massachusetts, 2011–13 (N = 169)

Sources	Number union (CFOI)	Number union (study addition)	Number nonunion (CFOI)	Number nonunion (study)	Study additions	Percent confirmed by source (study)
Standard sources						
Known based on industry, employer, or employee status [1]	4	6	45	65	22	42
Obituary	4	4	—	—	—	2
Employer's website	3	4	—	—	—	2
OSHA inspection data	—	6	9	39	36	27
Total confirmed by standard sources [2]	13	18	56	103	52	72
Additional sources						
Indepth web search	4	4	8	16	8	12
FACE	—	3	4	8	6	7
MassCOSH	5	8	—	6	7	8
Employer or HR division	—	—	—	7	5	5
Total confirmed by additional sources [2]	8	11	14	32	21	25
Total confirmed [3]	21	29	70	135	73	97

[1] Known union status is based on Current Population Survey union density or local knowledge of employers in Massachusetts.

[2] Some cases are confirmed by more than one source. Sums may exceed subtotals and grand total because of the removal of these secondary sources.

See footnotes at end of table.

(3) The original data collected for the Census of Fatal Occupational Injuries (CFOI) included 78 cases with an unknown union status. After the study was completed, union status was unknown for only five cases.

Source: U.S. Department of Labor, U.S. Bureau of Labor Statistics, Census of Fatal Occupational Injuries.

We found that about one-fifth of cases on the basis of their employee status were nonunion. After we researched the industry union density using the CPS and we confirmed through followup that some industries in Massachusetts have no unions, we were immediately able to identify some additional cases as nonunion. Together, these deaths made up 42 percent of cases covered in this study.

Although the OSHA inspection data are not routinely collected for required variables, these data are easy to access and are therefore included in this set. The OSHA inspection data were an important source of information on union status, providing information on 27 percent of the 169 cases. Altogether, union status was determined for 72 percent of the 169 cases with the use of these standard sources.

For 28 percent of cases (48 cases), conclusive union status information was not available from standard sources. An indepth web search was conducted for most of these 48 cases and resulted in confirming union status for 20 additional cases, 12 percent of all cases.[17] Two nonstandard sources available in Massachusetts, MA FACE and MassCOSH, helped confirm 14 percent of cases. Comparable sources are not universally present in every state.[18]

Table 3 presents union status by select demographic, case, and employment, both as formally entered in the CFOI during the collection cycle and after additional research was conducted for this study. The findings of this Massachusetts case study show that more data are needed to explore the implications of union status on workplace health and safety. Given variability in the impact of union status across industries, within-industry comparisons will likely be most informative. Compiling additional Massachusetts data from future years or aggregating data across states that are able to fill in the variable could provide a dataset that enables a more thorough analysis.

Table 3. Fatal occupational injuries by union status of worker, by select characteristics, Massachusetts, 2011–13 (N = 169)

Characteristic	Total fatal injuries	Study data (5 unknown)				CFOI research dataset (78 unknown or blank)					
		Number union	Percent	Number nonunion	Percent	Number union	Percent	Number nonunion	Percent	Number unknown or blank	Percent
Total (1)	169	29	17	135	80	21	12	70	41	78	46
Employee status											
Wage and salary workers (2)	138	29	21	104	75	21	15	49	36	68	51
Self-employed (3)	31	—	—	31	100	—	—	21	65	10	23
Gender											
Women	14	3	21	9	64	—	—	5	36	7	50
Men	155	26	17	126	81	19	12	65	42	71	46
Age (years)											
20 to 24	5	—	—	4	80	—	—	—	—	—	—

See footnotes at end of table.

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		Number union	Percent	Number nonunion	Percent	Number union	Percent	Number nonunion	Percent	Number unknown or blank	Percent
25 to 34	28	5	18	22	79	4	14	9	32	15	54
35 to 44	26	6	23	20	77	5	19	8	31	13	50
45 to 54	47	6	13	38	81	5	11	25	53	17	36
55 to 64	43	8	19	35	81	4	9	15	35	24	56
65 and over	18	3	17	14	78	—	—	9	50	7	39
Race or ethnic origin (4)											
White (non-Hispanic)	125	26	21	96	77	20	16	54	43	51	41
Black or African American (non-Hispanic)	14	—	—	12	86	—	—	4	29	10	71
Hispanic or Latino	17	3	18	14	82	—	—	4	24	12	71
Asian (non-Hispanic)	10	—	—	10	100	—	—	5	50	5	50
Event or exposure 2011 (5)											
Violence and other injuries by persons or animals	51	8	16	43	84	6	12	25	49	20	39
Transportation incidents	46	11	24	33	72	9	20	16	35	21	46
Fire or explosion	4	—	—	3	75	—	—	—	—	3	75
Fall, slip, trip	41	5	12	34	83	4	10	15	37	22	54
Exposure to harmful substances or environments	10	—	—	9	90	—	—	6	60	3	30
Contact with objects and equipment	16	3	19	13	81	—	—	7	44	8	50
Primary source 2011 (6)											
Chemicals and chemical products	4	—	—	4	100	—	—	3	75	—	—
Containers, furniture, and fixtures	3	—	—	3	100	—	—	—	—	—	—
Machinery	7	—	—	5	71	—	—	—	—	4	57
Parts and materials	4	—	—	4	100	—	—	—	—	4	100
Persons, plants, animals, and minerals	55	8	15	47	85	6	11	28	51	21	38
Structures and surfaces	22	4	18	17	77	—	—	8	36	12	55
Tools, instruments, and equipment	18	—	—	16	89	—	—	8	44	8	44
Vehicle	52	12	23	38	73	9	17	19	37	24	46
Secondary source 2011 (7)											
Chemicals and chemical products	6	—	—	6	100	—	—	5	83	—	—
Parts and materials	28	—	—	26	93	—	—	16	57	11	39

See footnotes at end of table.

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Characteristic	Total fatal injuries	Study data (5 unknown)				CFOI research dataset (78 unknown or blank)					
		Number union	Percent	Number nonunion	Percent	Number union	Percent	Number nonunion	Percent	Number unknown or blank	Percent
Persons, plants, animals, and minerals	9	—	—	9	100	—	—	4	44	5	56
Structures and surfaces	7	—	—	4	57	—	—	4	57	—	—
Tools, instruments, and equipment	22	5	23	17	77	5	23	8	36	9	41
Vehicle	13	5	38	8	62	3	23	3	23	7	54
Nature 2011 (5)											
Traumatic injuries and disorders	169	29	17	135	80	21	12	70	41	78	46
Open wounds	17	4	24	13	76	4	24	5	29	8	47
Gunshot wounds	12	4	33	8	67	4	33	5	42	3	25
Intracranial injuries	27	7	26	19	70	4	15	9	33	14	52
Multiple traumatic injuries and disorders	45	10	22	33	73	8	18	14	31	23	51
Other traumatic injuries and disorders	71	5	7	66	93	—	—	40	56	29	41
Asphyxiations, strangulations, suffocations	30	4	13	26	87	—	—	16	53	12	40
Drownings	14	—	—	14	100	—	—	8	57	6	43
Electrocutions, electric shocks	4	—	—	4	100	—	—	—	—	—	—
Internal injuries to organs and blood vessels of the trunk	12	—	—	11	92	—	—	6	50	6	50
Poisoning, toxic, noxious, or allergenic effect	10	—	—	10	100	—	—	8	80	—	—
Part of body 2011 (5)											
Head	38	10	26	27	71	7	18	12	32	19	50
Neck, except internal location of diseases or disorders	36	4	11	30	83	3	8	17	47	16	44
Trunk	16	—	—	14	88	—	—	8	50	7	44
Body systems	31	—	—	29	94	—	—	19	61	11	35
Multiple body parts	45	10	22	33	73	8	18	14	31	23	51
Occupation (SOC) (8)											
Management, business, and financial occupations	14	—	—	14	100	—	—	9	64	5	36
Professional and related occupations	14	—	—	12	86	—	—	5	36	8	57
Service occupations	27	11	41	16	59	7	26	10	37	10	37

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Characteristic	Total fatal injuries	Study data (5 unknown)				CFOI research dataset (78 unknown or blank)					
		Number union	Percent	Number nonunion	Percent	Number union	Percent	Number nonunion	Percent	Number unknown or blank	Percent
Protective service occupations	12	10	83	—	—	7	58	—	—	3	25
Building and grounds cleaning and maintenance occupations	13	—	—	12	92	—	—	8	62	5	38
Sales and related occupations	6	—	—	6	100	—	—	—	—	—	—
Office and administrative support occupations	3	—	—	—	—	—	—	—	—	—	—
Farming, fishing, and forestry occupations	12	—	—	12	100	—	—	9	75	3	25
Fishing and hunting workers	11	—	—	11	100	—	—	8	73	3	27
Construction and extraction occupations	39	4	10	34	87	4	10	17	44	18	46
Installation, maintenance, and repair occupations	11	4	36	7	64	3	27	—	—	7	64
Production occupations	5	—	—	4	80	—	—	3	60	—	—
Transportation and material moving occupations	34	5	15	27	79	4	12	10	29	20	59
Motor vehicle operators	19	—	—	15	79	—	—	5	26	12	63
Industry (NAICS) (9)											
Private industry (NAICS) (10)	147	12	8	130	88	11	7	67	46	69	47
Agriculture, forestry, fishing and hunting	16	—	—	16	100	0	0	13	81	3	19
Construction	41	4	10	36	88	4	10	18	44	19	46
Construction of buildings	8	—	—	8	100	0	0	3	38	5	63
Heavy and civil engineering construction	5	—	—	4	80	—	—	—	—	—	—
Specialty trade contractors	28	3	11	24	86	3	11	13	46	12	43
Manufacturing	9	—	—	7	78	—	—	5	56	3	33
Wholesale trade	6	3	50	—	—	3	50	—	—	—	—
Retail trade	8	—	—	8	100	—	—	6	75	—	—
Transportation and warehousing	20	—	—	17	85	—	—	7	35	12	60

See footnotes at end of table.

Table 3. Fatal occupational injuries by union status of worker, by select characteristics, Massachusetts, 2011–13 (N = 169)

Characteristic	Total fatal injuries	Study data (5 unknown)				CFOI research dataset (78 unknown or blank)					
		Number union	Percent	Number nonunion	Percent	Number union	Percent	Number nonunion	Percent	Number unknown or blank	Percent
Truck transportation	9	—	—	7	78	—	—	3	33	6	67
Transit and ground passenger transportation	4	—	—	4	100	—	—	—	—	3	75
Information	4	—	—	4	100	—	—	—	—	3	75
Real estate and rental and leasing	6	—	—	6	100	—	—	—	—	4	67
Administrative and support and waste management and remediation services	13	—	—	13	100	—	—	7	54	6	46
Educational and health services	6	—	—	5	83	—	—	—	—	3	50
Educational services	4	—	—	3	75	—	—	—	—	—	—
Leisure and hospitality	8	—	—	8	100	—	—	—	—	7	88
Arts, entertainment, and recreation	4	—	—	4	100	—	—	—	—	4	100
Accommodation and food services	4	—	—	4	100	—	—	—	—	3	75
Other services, except public administration	7	—	—	6	86	—	—	—	—	4	57
Government (NAICS) (11)	22	17	77	5	23	10	45	3	14	9	41
Federal government (10)	4	—	—	—	—	—	—	—	—	—	—
Local government (10)	16	13	81	3	19	8	50	—	—	6	38

(1) The Census of Fatal Occupational Injuries (CFOI) has published data on fatal occupational injuries for the United States since 1992. During this time, the classification systems and definitions of many data elements have changed. See the CFOI definitions page at https://www.bls.gov/iif/oshcfdef.htm for a more detailed description of data elements and their definitions.

(2) May include volunteers and workers receiving other types of compensation.

(3) Includes self-employed workers, owners of unincorporated businesses and farms, and paid and unpaid family workers, and may include some owners of incorporated businesses or members of partnerships.

(4) Persons identified as Hispanic or Latino may be of any race. The race categories shown exclude data for Hispanics and Latinos.

(5) Based on the U.S. Bureau of Labor Statistics (BLS) Occupational Injury and Illness Classification System (OIICS) 2.01 implemented for 2011 data forward.

(6) Based on the BLS OIICS 2.01 implemented for 2011 data forward. The primary source of a fatal occupational injury is the object, substance, person, bodily motion, or exposure that most directly led to, produced, or inflicted the injury or illness.

(7) Based on the BLS OIICS 2.01 implemented for 2011 data forward. The secondary source of a fatal occupational injury is the object, substance, person, or exposure, other than the source, if any, that most actively generated the source or contributed to the injury or illness.

(8) Occupation data are based on the Standard Occupational Classification system (SOC), 2010.

(9) Industry data are based on the North American Industry Classification System (NAICS), 2007.

(10) Includes all fatal occupational injuries meeting this ownership criterion across all specified years, regardless of industry classification system.

(11) Includes fatal injuries to workers employed by governmental organizations, regardless of industry. Includes all fatal occupational injuries meeting this ownership criterion across all specified years, regardless of industry classification system.

See footnotes at end of table.

Notes: Totals for major categories may include subcategories not shown separately. Dashes indicate no data reported or data that do not meet publication criteria. CFOI fatal injury counts exclude illness-related deaths unless precipitated by an injury event.
Source: U.S. Department of Labor, U.S. Bureau of Labor Statistics, Census of Fatal Occupational Injuries.

Conclusion

The Massachusetts study found that, for most of the 169 cases, union status could be determined with the use of information about either employee status or unionization available in standard sources used by CFOI, including the OSHA inspection data. However, collecting this information for the remainder of the cases was complex and involved additional effort and information sources that may not be available in all states. Going forward, Massachusetts CFOI program anticipates completing the review of both standard and additional data sources by the close of each year and achieving a higher completion rate for the union status variable. In the 4 years after this study was completed (2014–2017), Massachusetts coded union status in an average of 92 percent of its cases. The extent to which this outcome is possible in other states will depend on the industrial makeup of the workforce and availability of additional data sources. The application of a similar approach in other states could increase standardized data collection across the nation. For instance, all states could look at CPS data or consistently input available union data found in OSHA records. Further defining CFOI coding rules for union status to better distinguish between “no” and “unknown” would also be important for comparing the data across states.

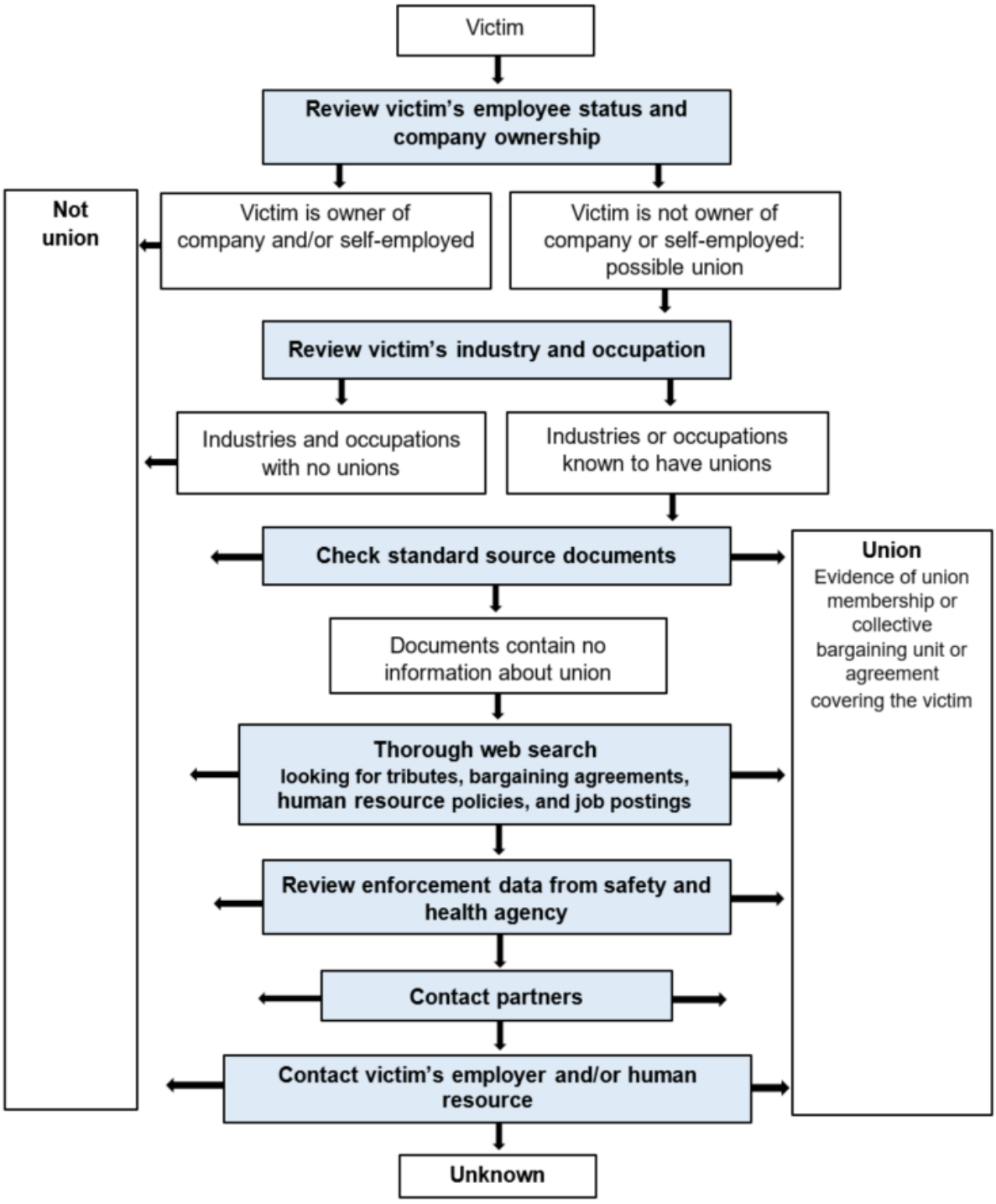
Based on CPS data at both the national and Massachusetts levels, the change in the CFOI union definition in 2012 to include both union members and individuals covered by collective bargaining resulted in a 1-percent difference in the estimated total wage and salary workforce. This difference is not substantial. However, the difference might vary by state.

Because unionization can be viewed differently across industries, we need to consider what aspects of unionization could affect worker safety. For example, the union status variable in the CFOI does not capture information about the presence of the multiple components of a health and safety management system in the workplace.[19] Special studies would be necessary to collect information about the status of health and safety management programs, the influence of unionization on these programs, and the impact on fatality risks. A better understanding of these factors might help researchers identify additional indicators of union presence.

The CFOI program recognizes that union status may affect worker safety. However, without standardized access to information across the nation, union status will likely remain a state-specific endeavor and research topic.

Appendix

Figure A-1. Process for determining union status for workers fatally injured (victim) at work in Massachusetts, 2011–13



Source: Massachusetts Department of Public Health.

James Laing, Jill Janocha Redmond, Michael Fiore, and Letitia Davis, "Collecting union status for the Census of Fatal Occupational Injuries: a Massachusetts case study," *Monthly Labor Review,* U.S. Bureau of Labor Statistics, February 2019, https://doi.org/10.21916/mlr.2019.4

NOTES

1 Centers for Disease Control and Prevention, NIOSH Research Programs, "National Academies evaluation of NIOSH programs, https://web.archive.org/web/20150427054728/http:/www.cdc.gov/niosh/nas/.

2 See Marion Gillen, Davis Baltz, Margy Gassel, Luz Kirsch, and Diane Vaccaroe, "Perceived safety climate, job demands, and coworker support among union and nonunion injured construction workers," *Journal of Safety Research*, vol. 33, no. 1, Spring 2002, pp. 33–51; David Weil, "Building safety: the role of construction unions in the enforcement of OSHA," *Journal of Labor Research*, vol. 13, no. 1, March 1992, pp. 121–132; and Benjamin C. Amick III, Sheilah Hogg-Johnson, Desiree Latour-Villamil, and Ron Saunders, "Protecting construction worker health and safety in Ontario, Canada: identifying a union safety effect," *Journal of Occupational and Environmental Medicine*, vol. 57, no. 12, December 2015, pp. 1,337–1,342.

3 Xuanwen Wang, Rebecca Katz, and Xiuwen Sue Dong, "Union effects on safety management and safety culture in the construction industry," *CPWR Quarterly Data Report*, 2018, https://www.cpwr.com/wp-content/uploads/2018/05/Quarter1-QDR-2018.pdf; Gillen et al., "Perceived safety climate, job demands, and coworker support among union and nonunion injured construction workers"; Weil, "Building safety: the role of construction unions in the enforcement of OSHA"; and Amick III et al., Protecting construction worker health and safety in Ontario, Canada: identifying a union safety effect."

4 For more on the data sources used, see the CFOI *Handbook of methods*, "Census of fatal occupational injuries: data sources," U.S. Bureau of Labor Statistics, November 2017, https://www.bls.gov/opub/hom/cfoi/data.htm.

5 See the CPS release, "UNION MEMBERS—2013," USDL-14-0095 (U.S. Bureau of Labor Statistics, January 24, 2014), https://www.bls.gov/news.release/archives/union2_01242014.pdf.

6 Ibid.

7 Massachusetts was one of nine states funded by the NIOSH to run a FACE program during the period of this study. Two other states, New Jersey and New York, also had their CFOI and FACE programs housed together in the occupational health section of their state health departments during this time.

8 This information is collected in the CPS in a followup question to those who respond that they are not a member of a union or similar affiliation. The survey question is, "On this job are you covered by a union or employee association contract?"

9 For example, self-employed workers and owners and/or operators of incorporated businesses are nonunion. Massachusetts has no commercial fishing unions.

10 New legislation effective March 2015 extended OSHA protections to some state executive office workforces. Additional legislation signed in March 2018 extended coverage to all state, county, and municipal workplaces.

11 For additional information, see U.S. Department of Labor, OSHA, "Establishment search" and "Inspection information," https://www.osha.gov/pls/imis/establishment.html and https://www.osha.gov/pls/imis/InspectionNr.html, respectively. During routine contact with the OSHA Region I office, additional guidance was received on how to interpret this variable. The union–nonunion value applies to the specific inspection. For a fatality investigation, the value would reflect the union status of the victim and can be trusted as accurate. However, in cases in which more than one employer is operating at a site, such as a case in which a general contractor is responsible for overall site safety and is investigated after the death of a subcontractor, this field may not be specific to the victim.

12 In cases in which contradictory information was found in different source documents, contacting the OSHA area office for clarification was necessary.

13 For the 2011–13 cases, union information was available from other sources for the federal cases, so we did not directly contact federal agencies. In addition, this period had no mine-related fatalities.

14 Neither OSHA nor DLS will investigate the death if the U.S. Coast Guard or another agency such as the National Transportation Safety Board has jurisdiction. In addition, these agencies (OSHA and DLS) typically do not investigate certain types of events such as motor vehicle crashes, homicides, and suicides. Recently, OSHA has investigated some workplace homicides in Massachusetts. For more information go to https://www.osha.gov/SLTC/workplaceviolence/.

15 MDPH was careful to share only publicly available data when communicating with stakeholders. Massachusetts death certificates are public documents.

16 For more information regarding COSH groups, see National Council for Occupational Safety and Health, "Local COSH groups," http://www.coshnetwork.org/COSHGroupsList. MassCOSH knowledge of industries and independent tracking of fatal injuries and illnesses in the state helped us identify details that we would not have been able to identify otherwise.

17 All states could conduct an indepth web search to collect other variables. However, because additional time is needed to search specifically for union information, the indepth search is categorized as an additional source. Although the extra web-research step was not overly burdensome, it may not be feasible for a state with a larger number of deaths.

18 Note that directly contacting the employer as a first step may be the most efficient way to collect this variable, although the CFOI model suggests exhausting available public and administrative data sources before contacting the employer.

19 The major elements of an effective health and safety management program are management leadership, worker participation, hazard identification and assessment, hazard prevention and control, education and training, and program evaluation and improvement. See OSHA Recommended Practices for Safety and Health Programs, Core elements, https://www.osha.gov/shpguidelines.

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