BEYOND THE NUMBERS

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Understanding latency in fatal occupational injuries

By Ellen G. Galantucci and Kristen A. Monaco

In 2019, 5,333 people died as a result of injuries that occurred at work. The U.S. Bureau of Labor Statistics (BLS) Census of Fatal Occupational Injuries (CFOI) collects information on these fatalities, including information on the circumstances surrounding the fatality and the characteristics of the workers killed. BLS collects and publishes the data annually.

Although some fatal injuries result in death on the same day, there are a substantial number of cases that have some latency, or delay between the date of injury and the date of death. This **Beyond the Numbers** article

presents information on these latent cases. It also highlights the key differences between latent and nonlatent cases, with a focus on case event, occupation, and age of the deceased.

How many latent cases are there?

The data for this analysis are obtained by using CFOI data for reference years 2010–19. To ensure accuracy of data regarding latency, we rely on the following information: date of birth, date of injury, date of death, and age at death. Fewer than 10 cases appear to have an error for the date of birth or date of injury—most often this error results from someone coding a date of birth and a date of injury that are identical or close in proximity. We are left with 49,166 total cases from 2010–19. Across all cases, the median number of days of latency is zero (table 1). In fact, 10,270 cases (21 percent) have 1 or more days of latency between injury and death and 79 percent of fatal injuries are characterized by death on the same day. Restricting the data to the subset of cases with at least 1 day of latency, we continue to see a skewed distribution with a median of 7 days and 10 percent of cases with 2,030 days or more.

Table 1. Distribution of days of latency for occupational fatalities, 2010–19

Percentile	All cases	Cases with at least 1 day of latency
10th percentile	0	1
25th percentile	0	2
50th percentile (median)	0	7
75th percentile	7	29
90th percentile	32	2030

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

Chart 1 presents a count of latent cases by year. In 2010, latent cases made up roughly 19 percent of the total case count; in 2019, latent cases accounted for roughly 21 percent. This increase in latent cases likely does not reflect a change in the characteristics of fatal injuries and may reflect an increased ability to identify latent cases through the availability of more information in the source documents or increased scrutiny by data analysts. As evidenced from table 1, some of these cases have a very long latency, meaning that the death occurs in a different year (and sometimes different decade) than the injury.

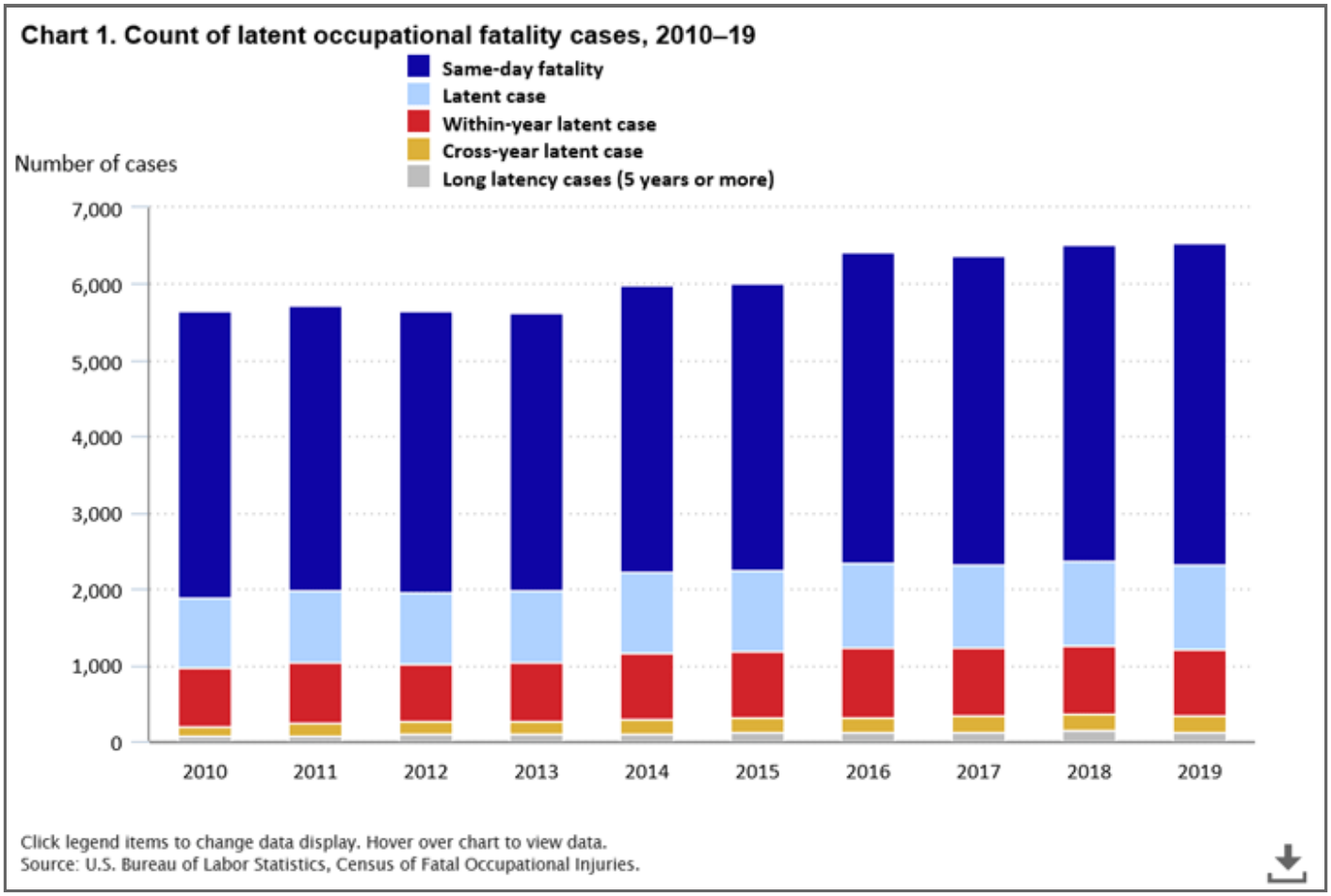

Chart 1 shows that, among all cases between 2010 and 2019, 1,854 fatalities occurred in a different year (or cross year) than the occupational injury. We can also see an increase in cross-year latent cases between 2010, when 13 percent of all latent cases involved deaths that occurred in a different calendar year than the injury, and 2019, when 19 percent of all latent cases crossed years. Again, this points to a likely increase in the ability to identify cross-year latent cases, as opposed to a structural change in the types of occupational fatalities. This is further supported by the increase in cases with 5 or more years of latency which roughly doubled over the time period.

Events

Table 2 presents information on the types of events leading to the occupational fatality. This analysis uses data from 2011–19, due to coding changes that make comparison of 2010 data difficult. Data from 2010 were coded under a prior system and are therefore excluded from this analysis.[1]

Table 2. Distribution of event by case latency for fatal occupational injuries, 2011–19

Event	Same-day fatality		Latent case		Cross-year latent case		Long (5 or more years) latent case	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Violence	6,242	17.78	933	10.00	153	8.96	97	9.97
Transportation incidents	15,740	44.84	2,383	25.55	425	24.88	238	24.46
Fires, explosions	702	2.00	396	4.25	57	3.34	23	2.36

See footnotes at end of table.

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Event	Same-day fatality		Latent case		Cross-year latent case		Long (5 or more years) latent case	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Falls, slips, trips	3,461	9.86	3,673	39.38	714	41.80	386	39.67
Exposure to harmful substance, environment	3,493	9.95	726	7.78	66	3.86	43	4.42
Contact with objects, equipment	5,454	15.54	1,110	11.90	245	14.34	163	16.75
Overexertion, bodily reaction	8	0.02	105	1.13	48	2.81	23	2.36
Total	35,100	100.00	9,326	100.00	1,708	100.00	973	100.00

Note: Shares and counts do not include cases for which event is unknown.
Source: U.S. Bureau of Labor Statistics, Census of Fatal Occupational Injuries.

There is a substantial difference in the distribution of events between cases resulting in same-day death versus latent cases. Nearly half (45 percent) of same-day cases resulted from transportation incidents, whereas roughly 10 percent of same-day cases resulted from falls, slips, or trips. Among latent cases, falls, slips, and trips were the most common event (39 percent); followed by transportation incidents (26 percent); and contact with objects or equipment (12 percent). This same general distribution of events holds regardless of whether the fatality occurred in the calendar year following the injury or 5 or more years after the injury.

Occupation

Table 3 presents information on fatalities from 2011 to 2019. Again, there is a different distribution in the occupations of those workers involved in same-day fatalities versus latent cases. Most notably, among cases with latency of 5 or more years, 9 percent involve protective service occupations and 28 percent involve construction occupations. The same-day fatality shares for these occupational groups are 5 percent for protective service occupations and 18 percent for construction occupations.

Table 3. Distribution of fatalities by occupation group and latency, 2011–19

Occupational Group	Same-day fatality		Latent case		Cross-year latent case		Long (5 or more years) latent case	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Management occupations	3,035	8.64	643	6.88	83	4.82	37	3.76
Business and financial operations occupations	196	0.56	65	0.70	11	0.64	6	0.61
Computer and mathematical occupations	85	0.24	20	0.21	5	0.29	3	0.31
Architecture and engineering occupations	261	0.74	61	0.65	14	0.81	8	0.81
Life, physical, and social science occupations	133	0.38	27	0.29	7	0.41	6	0.61
Community and social services occupations	196	0.56	65	0.70	11	0.64	2	0.20
Legal occupations	89	0.25	18	0.19	4	0.23	4	0.41
Education, training, and library occupations	155	0.44	86	0.92	20	1.16	7	0.71
Arts, design, entertainment, sports, and media occupations	347	0.99	139	1.49	23	1.34	16	1.63
Healthcare practitioners and technical occupations	424	1.21	110	1.18	23	1.34	18	1.83
Healthcare support occupations	157	0.45	64	0.68	13	0.76	7	0.71
Protective service occupations	1,721	4.90	528	5.65	131	7.61	88	8.95

See footnotes at end of table.

Table 3. Distribution of fatalities by occupation group and latency, 2011–19

Occupational Group	Same-day fatality		Latent case		Cross-year latent case		Long (5 or more years) latent case	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Food preparation and serving related occupations	455	1.30	211	2.26	26	1.51	12	1.22
Building and grounds cleaning and maintenance occupations	2,023	5.76	629	6.73	79	4.59	40	4.07
Personal care and service occupations	429	1.22	117	1.25	16	0.93	9	0.92
Sales and related occupations	1,618	4.61	500	5.35	93	5.40	44	4.48
Office and administrative support occupations	559	1.59	225	2.41	55	3.20	22	2.24
Farming, fishing, and forestry occupations	2,062	5.87	341	3.65	68	3.95	43	4.37
Construction and extraction occupations	6,176	17.59	2,169	23.21	438	25.45	272	27.67
Installation, maintenance, and repair occupations	2,838	8.08	804	8.60	147	8.54	84	8.55
Production occupations	1,502	4.28	524	5.61	96	5.58	57	5.80
Transportation and material moving occupations	10,303	29.35	1,928	20.63	329	19.12	170	17.29
Military specific occupations	344	0.98	71	0.76	29	1.69	28	2.85
Total	35,108	100.00	9,345	100.00	1,721	100.00	983	100.00

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

Conversely, transportation occupations account for 29 percent of all same-day fatalities and only 17 percent of cases with latency of 5 or more years. This is expected, given that we know transportation incidents account for a relatively large share of same-day fatalities and a smaller share of latent ones.

Although not seen in the table, there are many occupations within an occupational category. For example, within the protective service occupations, police and sheriff's patrol officers make up the majority of long-latency (5 or more years) cases within this occupational group (53 percent of cases) but constitute 41 percent of same-day cases in this group. Similarly, firefighters account for 16 percent of the long-latency cases in protective service versus 12 percent of same-day fatalities.

Among construction and extraction occupations, first-line supervisors constitute 14 percent of same-day cases and roughly 10 percent of long-latency cases. The detailed occupation within the construction and extraction group with the highest frequency of same day cases is construction laborers, who form roughly one-quarter of same-day fatal injuries within the group and a comparable share (24 percent) of long-latency cases. Roofers and carpenters, on the other hand, each account for roughly 8 percent of same-day fatalities within this occupational group, but 11 percent each (23 percent total) of long-latency cases among construction and extraction workers.

Age distribution

Given that latency in occupational fatalities results from a gap between an injury and death, it is unsurprising that the age of death for all cases is different than the age of death for latent cases. Although BLS publishes information on the age at death for CFOI cases, there is no routine publication of age at injury. Table 4 presents both age at injury and age at death.

Table 4. Age distribution of fatal occupational injuries, 2010–19

Percentile	All cases		Latent cases		Cross-year latent cases	
	Age at injury	Age at death	Age at injury	Age at death	Age at injury	Age at death
10th percentile	26	26	28	29	25	39
25th percentile	35	35	38	40	33	50
50th percentile (median)	48	48	51	53	45	58
75th percentile	59	59	62	63	56	67
90th percentile	67	67	71	73	65	75

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

We know that the age at injury and age at death are identical for the vast majority of cases and this is reflected in table 4. The median age at injury is 48 years old. Twenty-five percent of fatalities happen to workers 35 and younger and another quarter of fatalities occurs to workers age 59 years and older.

Considering all latent cases (table 4), we see the difference between age at injury and age at death. Among latent cases, the median age at injury is 51, and the median age at death is roughly 2 years higher than this, at 53 years old.

The difference is largest for latent cases that cross calendar years. For these cases, the median age at injury is 45 years old, substantially lower than the median age at death, which is 58 years old. Table 4 shows that age 67 is the 75th percentile. This means that 75 percent of all fatalities occur to a person age 67 or younger, and 25 percent of those that die are 67 years or older. However, the corresponding statistic for age at injury is 11 years less—56 years or older. We focus on this end of the distribution as there has been an increase in fatal injuries among workers age 65 and older over the 2010–19 decade.

Including cases with long latency in counts of fatalities among older workers can be problematic, because the age of the worker at the time of the injury may be far different than the age of worker at death. At a minimum, it is important to report the number of latent cases, particularly among cases involving those 65 and older, as that group contains the largest share of such cases.

Latency-adjusted count

Table 5 presents counts of occupational fatalities per year for those age 55 and older and 65 and older. The number of work-related fatal injuries experienced by older individuals increased between 2010 and 2019. It is also the case that the number of cross-year latent cases for older individuals increased. As calculated from table 5, the bulk of cross-year latent cases involve those 55 years of age and older—71 percent of cases in 2010 and 66 percent in 2019.

Table 5. Adjusted fatal injury counts for older workers, 2010–19

Reference year	Number of fatalities among those 55 and older	Cross-year latent cases among those 55 and older	Adjusted count for those 55 and older	Number of fatalities among those 65 and older	Cross-year latent cases among those 65 and older	Adjusted count for those 65 and older
2010	1,530	70	1,460	582	28	554
2011	1,505	85	1,420	569	39	530
2012	1,524	105	1,419	588	53	535

See footnotes at end of table.

Table 5. Adjusted fatal injury counts for older workers, 2010–19

Reference year	Number of fatalities among those 55 and older	Cross-year latent cases among those 55 and older	Adjusted count for those 55 and older	Number of fatalities among those 65 and older	Cross-year latent cases among those 65 and older	Adjusted count for those 65 and older
2013	1,490	102	1,388	557	43	514
2014	1,691	120	1,571	684	66	618
2015	1,681	120	1,561	650	61	589
2016	1,848	121	1,727	688	55	633
2017	1,930	139	1,791	775	75	700
2018	1,863	145	1,718	759	83	676
2019	2,005	135	1,870	793	71	722

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

Table 5 presents adjusted counts of fatalities among workers 55 and older and 65 and older who died in the same year in which they were injured.[2] If we adjust the case count to include only those fatalities that occur in the same year as the injury, the counts among those 55 and older decrease at a range of 4 percent to 8 percent. And because the number of latent cases for older workers has increased over time, the growth rate of cases among older workers is similarly muted by removing cross-year latent cases. Across all cases, the growth rate in fatalities among workers 65 years of age and older increased 36 percent between 2010 and 2019, however, when one excludes cross-year latent cases, the change is 30 percent.

Conclusion

Latent fatal occupational injuries cases occur when the date of injury differs from the date of death. These cases make up roughly one-fifth of all fatal occupational injuries. In addition to providing data on all latent fatal occupational injury cases, this article focused on cross-year latent cases, with 5 or more years between the date of injury and the date of death.

Latent fatal injuries have different characteristics than those where the death occurs on the same date as the injury. The majority of latent cases involve falls, slips, trips (39.4 percent) and transportation incidents (25.6 percent). Nearly one-quarter of latent fatal injuries involve construction and extraction workers and one-fifth involve people who are working in transportation and material moving jobs.

The age distribution of latent cases is also very different. Ten percent of all occupation fatalities occur to those 67 and older (90 percent of fatalities occur to those younger than 67), however among latent cases, 10 percent of fatalities occur to those 73 and older. Presenting information on these cases is important from a public health perspective, as it provides additional context for understanding work-related deaths among older workers.

This **Beyond the Numbers** article was prepared by Ellen G. Galantucci, a research mathematical statistician in the Office of Compensation and Working Conditions, U.S. Bureau of Labor Statistics. For more information, contact Ellen Galantucci galantucci.ellen@bls.gov (202) 691-6341.

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NOTES

[1] Characteristics of fatal injuries are coded using the Occupational Injury and Illness Classification System. Information on this system is available at www.bls.gov/iif/oshoiics.htm.

[2] We take this approach rather than adjusting the CFOI count for the year of injury because we are fairly confident that CFOI captures a true census of all occupational fatalities that result from injuries that occur within the same year. It is unlikely that the latent cases collected represent a true census, especially among cases with very long latency (5 years or more), as it is difficult for analysts to identify all such cases as minimal supporting documentation is likely to exist.

SUGGESTED CITATION

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