

# Workplace hazards facing line installers and repairers

*Line installers and repairers face dangerous working conditions. In severe cases, these conditions could lead to fatal injuries. This article provides details about the work-related injuries and illnesses suffered by line installers and repairers during the 2011–15 period.*

Electricity and telecommunications are essential parts of our daily lives. In the last two decades of the 19th century, electricity became commercially viable, with electric streetcar lines and street lights installed in various cities around the world. The electrification of American households began early in the 20th century, mainly in major cities and places served by electric railways, and spread rapidly until about 1930, when two-thirds of American households were electrified.<sup>1</sup> At the end of World War II, four-fifths of American households were electrified, and by 1970, the electrification of homes and businesses had become virtually universal.<sup>2</sup> In 1876, Alexander Graham Bell patented the telephone, the first device enabling people to talk directly with one another over large distances. Today, more than 40 percent of American homes use landline telephones.<sup>3</sup>

Both electrical and telecommunication technologies rely on lines installed atop a vast infrastructure of utility poles, although underground lines are becoming more prevalent. Line installers and repairers are on the front lines of that infrastructure, building, maintaining, and repairing the nation's electrical and telecommunication grids. When we lose power, cable television, or Internet services, our daily routines are disrupted, and we become anxious to have those services restored. When everything works, however, we often give little thought to the work line workers do or the dangers they face in performing it. This article provides details about the work-related injuries and illnesses suffered by line installers and repairers during the 2011–15 period.



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## Data and methodology

The U.S. Bureau of Labor Statistics (BLS) collects and reports data on occupational injuries, illnesses, and fatalities through the Occupational Safety and Health Statistics program, which includes both the Census of Fatal Occupational Injuries (CFOI) and the Survey of Occupational Injuries and Illnesses (SOII). The CFOI reports a complete count of fatal workplace injuries, including details about worker demographics, injury characteristics, and circumstances associated with each fatality. The SOII is a survey of establishments that estimates nonfatal workplace injuries and illnesses on the basis of employer-provided data.<sup>4</sup> The SOII captures additional detail for nonfatal cases requiring at least 1 day away from work.<sup>5</sup> All nonfatal occupational injury and illness data presented in this article are from the SOII.<sup>6</sup> Fatality data from the CFOI are also referenced in the analysis.<sup>7</sup>

The characteristics and case circumstances of fatal and nonfatal work-related injuries and illnesses are based on the BLS Occupational Injury and Illness Classification System (OIICS) and include the following: “nature” of injury or illness; “event or exposure”; “part of body affected”; and “primary or secondary source” (e.g., machinery, equipment, or other factors that precipitated the event or exposure).<sup>8</sup> Data used to measure employment are annualized from the BLS Quarterly Census of Employment and Wages (QCEW) program, which publishes wages and a count of employment reported quarterly by employers.<sup>9</sup> QCEW data are available by industry and geographical area (county, Metropolitan Statistical Area, and state and national levels).

## Line installers and repairers in the electrical power and telecommunications sectors

BLS uses the 2010 Standard Occupational Classification (SOC) system to classify workers into occupational categories for the purposes of collecting, calculating, and disseminating data.<sup>10</sup> Line installers and repairers (SOC 49-9050) in the electrical and telecommunications sectors fall under two distinct, but related, occupations. The first occupation, electrical power-line installers and repairers (SOC 49-9051), involves installing or repairing high-voltage cables and related equipment that operate on up to hundreds of thousands of volts. These cables and equipment are used in electrical power transmission or distribution systems for both aboveground and underground electrical grids. Workers in this occupation perform tasks ranging from erecting poles and light- or heavy-duty transmission towers to replacing fuses or entire transformers. The second occupation, telecommunications line installers and repairers (SOC 49-9052), involves installing and repairing the telecommunication cables used to provide cable, Internet, and telephone services. Such work requires familiarity with various types of cable, including fiber-optic, coaxial, and telephone lines. Workers in both occupations are required to inspect and test the lines they install or repair and to follow established safety standards and procedures.<sup>11</sup>

The hazards encountered in the two occupations exhibit both similarities and differences. Although telecommunications line installers and repairers do not work with high-voltage cables, they must be able, just like electrical power-line installers and repairers, to reach and work with wiring and equipment attached to utility poles. In both occupations, this work is performed with vehicles such as pole and bucket trucks.

During the 2011–15 period, line installers and repairers suffered 201 fatal occupational injuries, about 40 per year, with little year-to-year variation. (See table 1.) The number of fatal injuries for electrical power-line installers and repairers (131) was approximately twice that for telecommunications line installers and repairers (70). The fatal

injuries of workers in the latter occupation showed greater year-to-year variation, ranging from 10 in 2012 to 19 in 2014.

**Table 1. Number of fatal work injuries and nonfatal occupational injuries and illnesses involving days away from work, by selected occupation, 2011–15**

Occupation	Fatal injuries					Nonfatal injuries and illnesses				
	2011	2012	2013	2014	2015	2011	2012	2013	2014	2015
Line installers and repairers	38	37	42	44	40	5,540	5,000	6,640	6,260	6,250
Electrical power-line installers and repairers	26	27	27	25	26	2,500	2,090	2,310	2,510	2,240
Telecommunications line installers and repairers	12	10	15	19	14	3,040	2,910	4,330	3,750	4,010

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

Each year, BLS lists 10 civilian occupations with high fatal-work-injury rates.<sup>12</sup> Electrical power-line installers and repairers were included in this list for all years between 2011 and 2015. Their rates of fatal work injuries per 100,000 full-time equivalent workers were 19.5 in 2011, 23.9 in 2012, 21.5 in 2013, 19.2 in 2014, and 20.5 in 2015. Although not listed among the 10 civilian occupations with high fatal-work-injury rates during 2011–15, telecommunications line installers and repairers had published rates of 7.9 in 2013 and 10.0 in 2014. In comparison, the rates for all workers in 2011–15 ranged from 3.3 to 3.5.

During the same period, the rates of nonfatal occupational injuries (per 10,000 full-time equivalent workers) for electrical power-line installers and repairers were considerably higher than the rates for all occupations. In addition, the nonfatal rates for telecommunications line installers and repairers were higher than both the rates for all occupations and the rates for electrical power-line installers and repairers. (See table 2.)

**Table 2. Incidence rates of nonfatal occupational injuries and illnesses involving days away from work, by selected occupation, private industry, 2011–15**

Occupation	2011	2012	2013	2014	2015
All occupations	104.3	101.9	99.9	97.8	93.9
Electrical power-line installers and repairers	211.3	167.5	202.9	182.2	173.9
Telecommunications line installers and repairers	217.2	227.5	386.9	350.1	411.3

Note: Incidence rates represent the number of injuries and illnesses per 10,000 full-time equivalent workers.

Source: U.S. Bureau of Labor Statistics, Survey of Occupational Injuries and Illnesses.

The fatal and nonfatal injury and illness cases for line installers and repairers were concentrated in a few industries that employ these workers. (See table 3.) Three industries—electric power generation, transmission, and distribution; power and communication line and related structures construction; and electrical contractors—accounted for over 95 percent of fatal injuries for electrical power-line installers and repairers. Four industries—electrical contractors, power and communication line and related structures construction, wired

telecommunications carriers, and broadcasting (except Internet)— accounted for 87 percent of fatal injuries for telecommunications line installers and repairers.

**Table 3. Number of fatal work injuries and nonfatal occupational injuries and illnesses for line installers and repairers, by selected industries, 2011–15**

Industry	NAICS code	Fatal work injuries, all ownerships	Nonfatal injuries and illnesses involving at least 1 day away from work				
		Total, 2011–15	2011	2012	2013	2014	2015
All industries		201	4,930	4,440	6,210	5,520	5,650
Wired telecommunications carriers	517100	33	1,670	2,160	2,460	2,940	3,470
Electric power generation, transmission and distribution	221100	59	1,380	1,110	650	1,180	1,100
Power and communication line and related structures construction	237130	59	430	200	—	490	380
Electrical contractors	238210	28	270	190	480	180	370
Broadcasting (except Internet)	515000	6	240	160	590	50	70

Note: NAICS = North American Industry Classification System.

Source: U.S. Bureau of Labor Statistics, Survey of Occupational Injuries and Illnesses.

There are two notable differences between the injury and illness experiences of workers in the two occupations of line installers and repairers. Between 2011 and 2015, electrical power-line installers and repairers suffered a higher number of fatal work injuries than did telecommunication line installers and repairers. However, telecommunication line installers and repairers suffered a higher number of nonfatal injuries and illnesses than did electrical power-line installers and repairers, although employment was similar for both occupations.<sup>13</sup>

The number of days away from work can be used to compare the severity of occupational injuries between line installers and repairers and all occupations combined. (See table 4.) For both electrical power-line installers and repairers and telecommunications line installers and repairers, the largest fraction of nonfatal injury and illness cases involved 31 or more days away from work: 44.3 percent for electrical power-line installers and repairers and 55.3 percent for telecommunications line installers and repairers. These percentages are higher than the 28.6 percent for all occupations.

**Table 4. Distribution of nonfatal occupational injuries and illnesses by degree of severity for selected private industry occupations, 2015 (percent of total cases)**

Days away from work	All occupations	Electrical power-line installers and repairers	Telecommunications line installers and repairers
Total number of cases	902,160	1,670	3,980
1 day away from work	14.1	9.0	5.3
2 days away from work	11.1	3.6	5.8

See footnotes at end of table.

**Table 4. Distribution of nonfatal occupational injuries and illnesses by degree of severity for selected private industry occupations, 2015 (percent of total cases)**

Days away from work	All occupations	Electrical power-line installers and repairers	Telecommunications line installers and repairers
3–5 days away from work	17.3	21.0	9.6
6–10 days away from work	11.6	6.6	11.3
11–20 days away from work	10.7	10.8	7.5
21–30 days away from work	6.4	6.0	5.3
31 or more days away from work	28.6	44.3	55.3
Median days away from work	8	20	42

Source: U.S. Bureau of Labor Statistics, Survey of Occupational Injuries and Illnesses.

In 2015, the median days away from work for electrical power-line installers and repairers (20 days) and telecommunications line installers and repairers (42 days) were considerably higher than the median for all occupations (8 days). (See table 4.) This suggests that line installers and repairers sustained injuries and illnesses that were more severe than those for all occupations.

## Demographics of the workers affected

The CFOI collects detailed data on the demographics of fatally injured workers. Of the 201 line installers and repairers who were fatally injured between 2011 and 2015, all but 3 were wage-and-salary workers, all but 2 were men, and 175 were non-Hispanic Whites. (See table 5.)

**Table 5. Fatal occupational injuries by selected worker characteristics for line installers and repairers, all ownerships, 2011–15**

Characteristic	Total	Percent
Total	201	100
Age		
18–19 years	3	1
20–24 years	22	11
25–34 years	51	25
35–44 years	46	23
45–54 years	42	21
55–64 years	30	15
65 years and older	7	3
Birthplace		
Native born	193	96
Foreign birthplace	8	4
Mexico	4	2

See footnotes at end of table.

**Table 5. Fatal occupational injuries by selected worker characteristics for line installers and repairers, all ownerships, 2011–15**

Characteristic	Total	Percent
Employee status		
Wage and salary workers	198	99
Self-employed	3	1
Gender		
Men	199	99
Race or ethnic origin		
White (non-Hispanic)	175	87
Black or African American (non-Hispanic)	11	5
Hispanic or Latino	11	5
American Indian or Alaskan Native (non-Hispanic)	4	2

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

Among line installers and repairers whose race and ethnicity were reported, non-Hispanic Whites had the highest number of injuries and illnesses requiring at least 1 day away from work.<sup>14</sup> (See table 6.)

**Table 6. Number of nonfatal occupational injuries and illnesses involving days away from work, by selected worker and case characteristics and selected occupation, private industry, 2011–15**

Characteristic	All occupations	Line installers and repairers				
	2015	2011	2012	2013	2014	2015
Total	902,160	4,930	4,440	6,210	5,520	5,650
Gender						
Men	556,370	4,820	4,220	6,090	5,240	5,300
Women	341,130	110	220	100	270	350
Age						
Under 14	—	—	—	—	—	—
14 to 15	130	—	—	—	—	—
16 to 19	23,560	—	—	—	—	—
20 to 24	86,590	190	150	380	380	270
25 to 34	190,500	1,060	1,020	810	980	850
35 to 44	187,950	1,640	1,360	2,230	1,600	1,730
45 to 54	210,200	1,450	1,190	1,820	1,750	1,810
55 to 64	152,590	540	490	780	510	800
65 and over	33,850	30	—	30	—	100
Length of service with employer						
Less than 3 months	103,010	210	130	230	160	160
3 months to 11 months	183,470	290	330	550	870	360
1 year to 5 years	293,100	1,460	810	840	1,180	1,140
More than 5 years	306,050	2,950	3,090	3,890	3,210	3,890
Race or ethnic origin						
White (non-Hispanic)	347,200	1,280	1,330	890	1,560	1,190
Black or African American (non-Hispanic)	73,590	80	130	120	370	40
Hispanic or Latino only	125,360	180	110	110	120	140

See footnotes at end of table.



**Table 6. Number of nonfatal occupational injuries and illnesses involving days away from work, by selected worker and case characteristics and selected occupation, private industry, 2011–15**

Characteristic	All occupations	Line installers and repairers				
	2015	2011	2012	2013	2014	2015
Asian	14,530	—	—	—	—	—
Native Hawaiian or other Pacific Islander	2,490	—	—	20	—	—
American Indian or Alaska Native	4,040	30	—	—	90	30
Hispanic and other	460	—	—	—	—	—
Multirace	1,130	—	—	—	—	—
Not reported	333,370	3,350	2,860	5,060	3,360	4,250

Source: U.S. Bureau of Labor Statistics, Survey of Occupational Injuries and Illnesses.

## Injury characteristics of the workers affected

The principal physical characteristics of the injuries suffered by line installers and repairers differ considerably between fatal and nonfatal cases.

In 2011–15, electrocutions accounted for only 3 percent of fatal occupational injuries overall, but they caused nearly one-half of the fatal injuries to electrical power-line installers and repairers. This occupation typically involves working directly with high-voltage lines. Although telecommunications line installers and repairers usually work with low-voltage lines, they often work in proximity to high-voltage lines. While multiple injuries accounted for over two-fifths of the fatal cases among telecommunications line installers and repairers, electrocutions accounted for another one-sixth. The 72 fatal electrocutions suffered by the two occupations of line installers and repairers represented one-tenth of the overall fatal electrocutions for all workers.

As with all occupations during 2011–15, most nonfatal injury and illness cases for line installers and repairers were the result of sprains, strains, and tears. (See table 7.)

**Table 7. Number of nonfatal occupational injuries and illnesses involving days away from work, by nature of injury or illness and selected occupation, private industry, 2011–15**

Nature of injury or illness	All occupations	Line installers and repairers				
	2015	2011	2012	2013	2014	2015
Total	902,160	4,930	4,440	6,210	5,520	5,650
Fractures	81,180	380	240	510	330	340
Sprains, strains, tears	324,700	2,300	2,260	2,490	2,400	2,710
Amputations	5,360	—	—	—	—	—
Cuts, lacerations, punctures	93,090	330	300	160	390	160
Cuts, lacerations	78,790	230	230	120	300	120
Punctures (except gunshot wounds)	14,300	100	70	50	100	50
Bruises, contusions	76,290	250	200	430	330	200
Chemical burns and corrosions	3,200	—	—	—	—	—
Heat (thermal) burns	15,010	30	20	—	—	—
Multiple traumatic injuries	22,800	220	110	190	180	130

See footnotes at end of table.

**Table 7. Number of nonfatal occupational injuries and illnesses involving days away from work, by nature of injury or illness and selected occupation, private industry, 2011–15**

Nature of injury or illness	All occupations	Line installers and repairers				
	2015	2011	2012	2013	2014	2015
With sprains and other injuries	10,110	150	20	80	70	100
With fractures and other injuries	3,970	30	40	40	—	—
Soreness, pain	136,300	510	410	1,000	490	1,000
Carpal tunnel syndrome	4,920	20	30	—	80	—
Tendonitis	2,470	20	—	—	—	—
All other	136,840	860	850	1,430	1,300	1,090

Source: U.S. Bureau of Labor Statistics, Survey of Occupational Injuries and Illnesses.

## Circumstances associated with fatal incidents

Although exposure to electricity accounted for only 3 percent of overall fatal injuries from 2011 to 2015, it is the leading cause of fatal injuries among electrical power-line installers and repairers, accounting for nearly one-half of the fatalities in this occupation (62 of 131). Exposure to electricity was the main difference between the fatal injury experiences of the two kinds of line workers, accounting for just under one-fifth of the fatalities among telecommunications line installers and repairers (13 of 70).<sup>15</sup>

Line installation and repair involve travelling to and from worksites, climbing poles, and working out of bucket trucks. Although the number of fatal falls to a lower level was similar for the two line-worker occupations, such falls were more prevalent for telecommunications line installers and repairers (31 percent) than for electrical power-line installers and repairers (16 percent). Table 8 shows the objects from which these fatally injured workers fell.

**Table 8. Fatal occupational injuries to line installers and repairers resulting from falls, by object from which worker fell, all ownerships, 2011–15**

Object	Total	Percent
Total falls to lower level	43	100
Towers, poles	14	33
Telecommunications and cell phone towers	5	12
Utility and telephone poles	7	16
Ladders	15	35
Boom truck bucket or basket hoist truck	4	9
Other	10	23

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

Transportation incidents accounted for over one-quarter of line-worker fatalities (58), and falls to a lower level accounted for one-fifth of line-worker fatalities (43). (See tables 8 and 9.) Transportation incidents were about equally prevalent for both electrical power-line installers and repairers (30 percent) and telecommunications line installers and repairers (27 percent). These shares were smaller than the share of transportation incidents among the fatal cases for all workers (41 percent).



**Table 9. Fatal occupational injuries to line installers and repairers resulting from transportation incidents, all ownerships, 2011–15**

Incident characteristic	Total	Percent
Total transportation-incident fatalities	58	100
Air crashes	6	10
Pedestrians struck by vehicle in transport	15	26
Roadway incidents involving motorized land vehicles	35	60
Roadway collisions with other vehicle	20	34
Roadway collisions with objects other than vehicles	8	14
Roadway noncollision incidents	7	12
Jack-knifed or overturned roadway	4	7
Vehicles workers were driving or riding in or which directly struck pedestrian workers	58	100
Helicopters	6	10
Motorized highway vehicles	49	84
Passenger vehicles	14	24
Automobiles	9	16
Passenger vans	4	7
Motorized trucks—freight hauling and utility	21	36
Boom trucks, bucket or basket hoist trucks	10	17
Delivery trucks or vans	4	7
Multipurpose highway vehicles	13	22
Pickup trucks	11	19
Vehicles indirectly involved in the transportation incident	26	45
Motorized trucks—freight hauling and utility	15	26
Semi tractor-trailers, tanker trucks	12	21
Multipurpose highway vehicles	5	9
Pickup trucks	5	9

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

In all, at least 84 vehicles of various kinds were involved in the 58 transportation-incident fatalities among line installers and repairers. This is because a second vehicle was involved in almost half of the fatal transportation incidents, including 20 roadway collisions with another vehicle. In 33 fatal cases, the fatally injured worker was driving the vehicle, and in 9 cases he or she was a passenger. In 5 cases, the fatally injured worker was walking or standing in or near the roadway area. One-fifth of line workers killed in transportation incidents in 2011–15 perished in multiple-fatality incidents that led to the death of two or more workers. By comparison, one-eighth of all workers fatally injured in transportation incidents were involved in multiple-fatality incidents.

In 2011, when the CFOI began to capture the height of falls, about one-fifth of all fatal falls to a lower level for occupations overall were from heights of 30 feet (9¼ meters) or more. However, more than two-fifths of line-worker fatal falls to a lower level were from 30 feet or more.

Fatal injuries in both line-worker occupations were concentrated in the summer and autumn months during 2011–15. (See table 10.)

**Table 10. Fatal occupational injuries for selected occupations, by month of incident, all ownerships, 2011–15**

Timing of incident	Electrical power-line installers and repairers	Telecommunications line installers and repairers	Total
Winter ( December–February)	24	13	37
Spring (March–May)	25	15	40
Summer (June–August)	47	22	69
Autumn ( September–November)	35	20	55

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

## Circumstances associated with nonfatal incidents

The leading event or exposure resulting in nonfatal injuries among line workers in 2015 was overexertion and bodily reaction, accounting for 52 percent of cases with days away from work. (See table 11.) From 2011 to 2015, the number of cases in this category increased from 1,930 to 2,960. The number of cases was 2,110 in 2012, 2,470 in 2013, and 2,450 in 2014. Falls, slips, and trips accounted for 25 percent of days-away-from-work cases. While no fatalities resulted from falls on the same level, there were 630 such falls that resulted in days away from work in 2015.

**Table 11. Number of nonfatal occupational injuries and illnesses involving days away from work, by event or exposure and selected occupation, private industry, 2011–15**

Event or exposure	All occupations	Line installers and repairers				
	2015	2011	2012	2013	2014	2015
Total	902,160	4,930	4,440	6,210	5,520	5,650
Violence and other injuries by persons or animal	38,440	70	150	110	130	50
Intentional injury by other person	16,160	—	—	—	—	—
Injury by person—unintentional or intent unknown	9,930	—	—	—	—	—
Animal- and insect-related incidents	12,020	70	140	60	110	50
Transportation incidents	46,360	360	380	530	540	310
Roadway incidents involving motorized land vehicles	31,130	260	340	510	490	270
Fires, explosions	1,270	—	20	—	—	—
Falls, slips, trips	238,610	1,320	920	1,410	1,130	1,440
Slips, trips without fall	34,140	290	200	610	200	350
Fall on same level	149,180	340	340	350	510	630
Fall to lower level	50,490	570	330	440	380	440
Exposure to harmful substances or environments	40,250	240	130	300	280	190
Contact with object, equipment	232,120	960	720	1,390	920	590
Struck by object	135,280	530	440	1,090	530	320
Struck against object	50,160	340	200	170	210	170
Caught in object, equipment, material	33,400	80	50	90	120	30
Overexertion and bodily reaction	300,600	1,930	2,110	2,470	2,450	2,960
Overexertion in lifting or lowering	94,420	330	580	370	640	280

See footnotes at end of table.

**Table 11. Number of nonfatal occupational injuries and illnesses involving days away from work, by event or exposure and selected occupation, private industry, 2011–15**

Event or exposure	All occupations	Line installers and repairers				
	2015	2011	2012	2013	2014	2015
Repetitive motion involving microtasks	21,230	90	40	90	100	140
All other	4,520	40	20	—	70	110

Source: U.S. Bureau of Labor Statistics, Survey of Occupational Injuries and Illnesses.

## Conclusion

The data presented in this article show that working with electrical power and telecommunications lines can be dangerous or even fatal. Line installers and repairers face a litany of workplace hazards—exposure to electricity, transportation incidents, falls, etc.—in ensuring that our lights stay on, that our appliances work, and that our landline telephone and Internet services are available when we need them.

The characteristics of the injuries and illnesses for this occupation differ between fatal and nonfatal cases. Exposure to electricity is the leading fatal event, whereas overexertion and bodily reaction is the leading nonfatal event. However, falls are near the top of the list for both fatal and nonfatal cases.

The increasing use of underground utility lines and the waning popularity of landlines may ultimately reduce the number of falls. However, since many line installers and repairers continue to work in conditions similar to those of the past, the data presented here can inform the measures employers and safety and health professionals might take to mitigate hazards and reduce injuries, illnesses, and fatalities in the occupation.

### SUGGESTED CITATION

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### NOTES

<sup>1</sup> S. Mintz and S. McNeil, "The consumer economy and mass entertainment," *Digital History*, 2016, [http://www.digitalhistory.uh.edu/disp\\_textbook.cfm?smtid=2&psid=3396](http://www.digitalhistory.uh.edu/disp_textbook.cfm?smtid=2&psid=3396).

<sup>2</sup> *Historical statistics of the United States*, Series S-109 and S-116; and *Statistical abstract of the United States: 1998* (U.S. Census Bureau, 1998), table 959.

<sup>3</sup> Stephen J. Blumberg and Julian V. Luke, "Wireless substitution: early release of estimates from the National Health Interview Survey, July–December 2016" (National Center for Health Statistics, May 2017), <https://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless201705.pdf>.

<sup>4</sup> Definitions of recordable injury and illness cases for the SOII conform to guidelines set by the U.S. Occupational Safety and Health Administration (OSHA). See "OSHA injury and illness recordkeeping and reporting requirements" (U.S. Department of Labor, Occupational Safety and Health Administration), <https://www.osha.gov/recordkeeping/index.html>. OSHA differentiates between (1) cases involving days away from work or days of restricted work activity or transfer to another job beyond the day of injury or onset of illness and (2) other recordable cases that do not result in lost work time.

- 5 “Nonfatal occupational injuries and illnesses by case circumstances and worker characteristics,” *Injuries, Illnesses, and Fatalities* (U.S. Bureau of Labor Statistics), <https://www.bls.gov/iif/oshcase1.htm>.
- 6 “Nonfatal occupational injuries and illnesses by industry,” *Injuries, Illnesses, and Fatalities* (U.S. Bureau of Labor Statistics), <https://www.bls.gov/iif/oshsum1.htm>.
- 7 “Census of Fatal Occupational Injuries (CFOI),” *Injuries, Illnesses, and Fatalities* (U.S. Bureau of Labor Statistics), <https://www.bls.gov/iif/oshfat1.htm>. The scope of the CFOI differs from that of the SOII. For further information on methodology and scope, see *Handbook of methods* (U.S. Bureau of Labor Statistics), chapter 9, “Occupational safety and health statistics,” <https://www.bls.gov/opub/hom/pdf/homch9.pdf>.
- 8 “Occupational Injury and Illness Classification System, version 2.01,” *Injuries, Illnesses, and Fatalities* (U.S. Bureau of Labor Statistics), <https://www.bls.gov/iif/oshciics.htm>.
- 9 *Quarterly Census of Employment and Wages* (U.S. Bureau of Labor Statistics), <https://www.bls.gov/cew/>.
- 10 *Standard Occupational Classification manual, 2010* (Office of Management and Budget, 2010). For a definition of electrical power-line installers and repairers, see [www.bls.gov/soc/2010/](http://www.bls.gov/soc/2010/). For a definition of telecommunications line installers and repairers, see [www.bls.gov/soc/2010/](http://www.bls.gov/soc/2010/).
- 11 “Line installers and repairers,” *Occupational Outlook Handbook* (U.S. Bureau of Labor Statistics, 2016–17), <https://www.bls.gov/ooh/installation-maintenance-and-repair/line-installers-and-repairers.htm>.
- 12 Fatal injury rates exclude workers under age 16, volunteers, and the resident military. For additional information on the methodology used to calculate fatal-work-injury rates, see [www.bls.gov/iif/oshnotice10.htm](http://www.bls.gov/iif/oshnotice10.htm).
- 13 *Quarterly Census of Employment and Wages* (U.S. Bureau of Labor Statistics), <https://www.bls.gov/cew/>.
- 14 During 2011–15, race was not reported in over half of the nonfatal injury and illness cases involving line installers and repairers. Given this limitation, data by race should be interpreted with caution.
- 15 Although, under the OIICS, electrocutions (a nature of injury) typically result from exposure to electricity (an event or exposure), there is no one-to-one correspondence between these two categories. Other natures of injury, such as electrical burns, may also result from exposure to electricity.

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