

Technical Appendix

Dataset Construction

We construct a dataset describing, for each occupation: 1) projected changes in total employment between 2022 and 2032, 2) the incidence of occupational injuries, and 3) employee demographics, including gender and racial ethnic composition, and median income. Occupations are classified based on the 2018 Standard Occupational Classification (SOC) system.¹ Our dataset includes all minor occupational groups except the three groups representing military occupations (Military Officer Special and Tactical Operations Leaders; First-Line Enlisted Military Supervisors; and Military Enlisted Tactical Operations and Air/Weapons Specialists and Crew Members), which are not included in the BLS employment projections. The final dataset represents 95 total occupations.

Employment projections are produced by the Bureau of Labor Statistics (BLS) for the Occupational Outlook Handbook (OOH), which lists the total size of each occupation in the 2022 workforce and its projected size in 2032. The OOH also includes the 2022 median annual salary for each occupation, which we use in our analysis.

We supplement these data with occupational injury rates from the BLS Survey of Occupational Injuries and Illnesses (SOII), which estimates the prevalence of nonfatal occupational injuries and illnesses from 2021 to 2022. The SOII is a mandatory survey completed by approximately 200,000 employers per year.² While BLS distinguishes between illnesses and injuries in these data, we group the two under the general term “workplace injuries” for simplicity. Our primary outcome of interest is the rate of workplace injuries that require an employee to take at least one day away from work.

BLS also classifies each injury according to its cause, or the “manner in which the injury or illness was produced or inflicted.”³ We, therefore, have occupation-specific injury rates for the following categories of causes (examples of specific injury causes are provided for each category):

- **Contact with objects or equipment**
 - Struck by an object or equipment dropped by another person
 - Caught in running equipment or machinery
 - Compressed or pinched between shifting objects or equipment
- **Exposure to harmful substances or environments** (includes exposures to viruses and bacteria)
 - Direct exposure to electricity
 - Repeated exposure to noise
 - Inhalation of harmful substance
- **Falls, slips, and trips**

¹ U.S. Bureau of Labor Statistics. *Standard Occupational Classification (SOC) Manual*. Washington, D.C.: U.S. Department of Labor, 2018. https://www.bls.gov/soc/2018/soc_2018_manual.pdf.

² U.S. Bureau of Labor Statistics. “Frequently Asked Questions: Participation Requirements,” *Bureau of Labor Statistics*, <https://www.bls.gov/respondents/iif/faqs.htm>.

³ U.S. Bureau of Labor Statistics. “Survey of Occupational Injuries and Illnesses: Concepts,” *Bureau of Labor Statistics*, <https://www.bls.gov/opub/hom/soii/concepts.htm>.

- Trip over an object without a fall
- Fall on the same level while climbing stairs, steps, or curbs
- Fall through surface or existing opening
- **Fires and explosions**
 - Ignition of clothing from a controlled heat source
 - Explosion of pressure vessel, piping, or tire
 - Collapsing building, structure, or structural element during fire
- **Overexertion and bodily reaction**
 - Overexertion in lifting or lowering
 - Overexertion in throwing or catching
 - Repetitive use of tools or instruments
- **Transportation incidents**
 - Collision between two rail vehicles
 - Fall on aircraft during transport
 - Roadway collision with objects other than a vehicle
- **Violence and other injuries by persons or animal**
 - **Intentional injury by a person**
 - Hitting kicking, beating, or shoving
 - **Injury by person, unintentional or intent unknown**
 - Shooting by another person—unintentional
 - **Animal and insect related incidents**
 - Struck by an animal

Demographic data for each occupation is sourced from the 2022 American Community Survey (ACS). Respondent demographics are linked to minor occupations based on the occupation reported in the survey, crosswalked to 2018 SOC minor occupational groups. Key demographic variables include employee gender, race/ethnicity, disability, and health insurance status.

Missing Data

Occupational injury rates are suppressed for some occupations. This indicates that the number of cases was too small to report. In our analysis, we treat these suppressed injury rates as missing, because we cannot infer specific injury rates for these occupations. We conduct a robustness check to ensure that this will not affect the overall results. Assuming that any occupations with suppressed data would have very low injury rates, we replace all missing values with zero and rerun the analysis, finding no substantive changes to the key findings.

Injury Rate Projections

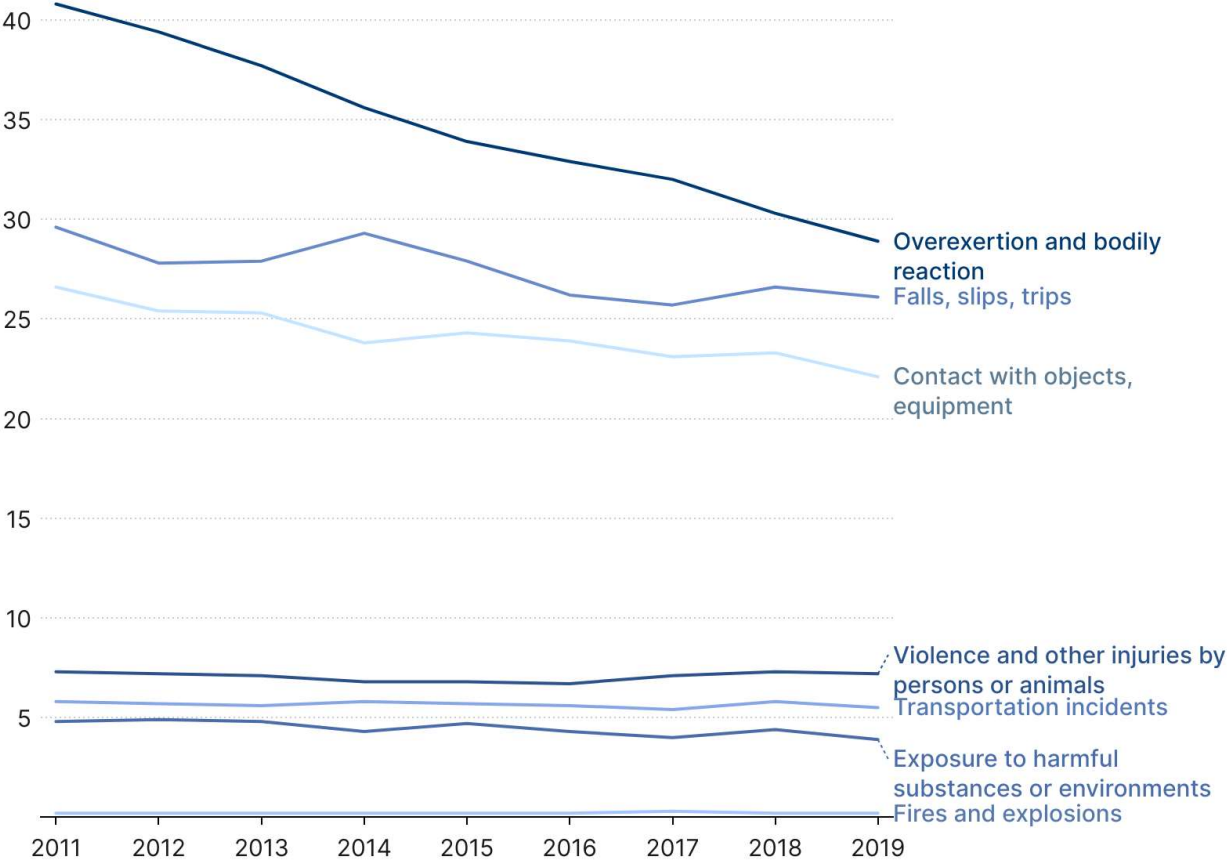
Our analysis assumes that each occupation's injury rate will not change between 2022 and 2032. We can use observed trends in injury rates by cause to evaluate whether this assumption is likely to bias our results. BLS data indicate that, between 2011 and 2019, there were declines in injury rates for the three most common injury types: overexertion and bodily reaction; falls, slips, and trips; and contact

with objects or equipment.⁴ While shifts in the U.S. occupational mix likely caused some of this change, it is also likely that there was a decline in the *within*-occupation risk for injuries of these types. If these downward trends continue until 2032, then holding 2022 injury rates constant in our calculations will lead us to overestimate the overall injury rates in 2032. Therefore, we could be overestimating the 2032 risk levels for these injury types (and potentially for the overall injury rate).

TABLE 1

Trends in injury rates vary by cause

Injury rates per 1,000 full-time employees by cause, 2011-2019



Source: BLS Survey of Occupational Illnesses and Injuries (2011-2019)

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Note: 2020 injury data are anomalous due to increased COVID-19 infections and reduced in-person work. They are therefore excluded from this analysis.

Between 2011 and 2019, injury rates remained stable for injuries due to violence by persons or animals; transportation incidents; and fires or explosions. Because prior trends are consistent, it is less likely that our estimated changes in violent injury risk are biased. This trend underscores the importance of understanding which factors may drive the increase in workplace violence between 2022 and 2032.

⁴ Bureau of Labor Statistics, *Current Employment Statistics - Time Series Data*, <https://download.bls.gov/pub/time.series/cs/>.