WORKPLACE SAFETY AND HEALTH

OSHA Should Take Steps to Better Identify and Address Ergonomic Hazards at Warehouses and Delivery Companies

Report to the Ranking Member, Committee on Education and the Workforce, House of Representatives

September 2024
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GAO Highlights

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Highlights of GAO-24-106413, a report to the Ranking Member, Committee on Education and the Workforce, House of Representatives
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Why GAO Did This Study

To quickly fill orders, e-commerce warehouses and companies that deliver these orders to consumers (last-mile delivery), use technology to increase productivity and monitor worker performance. Worker safety advocates, employees, and researchers have raised questions about whether employers' use of technology, along with performance expectations, may increase the risk of injuries in this rapidly growing sector.

GAO was asked to review how technology affects worker safety at e-commerce warehouses and last-mile delivery companies. This report examines the types and causes of injuries at these workplaces, and the extent to which OSHA identifies and addresses ergonomic hazards, among other objectives.

GAO reviewed relevant federal laws, regulations, and guidance. GAO analyzed BLS data from 2018 through 2022 on injuries (the most recent available). GAO also analyzed OSHA inspection data and interviewed headquarters officials and staff (compliance officers and managers) at six area offices. GAO conducted nongeneralizable surveys of workers and interviewed 15 stakeholder groups and five employers knowledgeable about safety issues and technology in these industries.

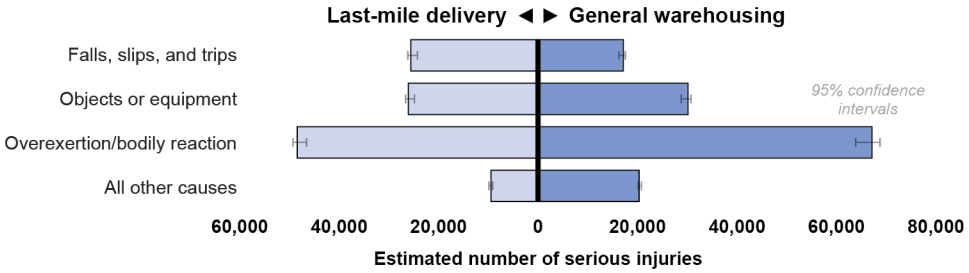
What GAO Recommends

GAO is making five recommendations, including that OSHA improve its injury data, training, and guidance on ergonomic hazards, and evaluate its inspection program. OSHA generally agreed but raised some concerns discussed in the report.

What GAO Found

Three major hazards caused most of the injuries and illnesses in general warehousing (which includes e-commerce warehouses) and the companies that deliver these orders to consumers ("last-mile delivery"), according to Bureau of Statistics (BLS) data. Overexertion and bodily reaction, the most common hazard (see figure), can cause musculoskeletal disorders, such as tendonitis or back pain. The transportation and warehousing sector (which includes e-commerce warehouses and last-mile delivery) had the highest serious injury and illness rate of all 19 sectors in 2022, with an estimated 3.8 cases per 100 workers, according to BLS data.

Estimated Serious Injuries and Illnesses by Cause, 2021 and 2022



Source: GAO analysis of Bureau of Labor Statistics (BLS) data. | GAO-24-106413

Accessible Data for Estimated Serious Injuries and Illnesses by Cause, 2021 and 2022

	Last-mile delivery lower bound at 95% confidence	Last-mile delivery estimate	Last-mile delivery upper bound at 95% confidence	General warehousing lower bound at 95% confidence	General warehousing estimate	General warehousing upper bound at 95% confidence
Falls, slips, and trips	24135	25590	26332	16089	17130	17661
Objects or equipment	24719	26100	26805	28644	30120	30873
Overexertion/ bodily reaction	46437	48430	49447	63719	67140	68886
All other causes	9000	9450	10050	20000	20300	20900

Source: GAO analysis of Bureau of Labor Statistics (BLS) data. | GAO-24-106413

Although the Occupational Safety and Health Administration (OSHA) cited warehouse and last-mile delivery employers for more than 2,500 workplace violations from fiscal years 2018 through 2023, 11 included ergonomic hazards, according to OSHA data. Because OSHA does not have an ergonomic standard it must use the general duty clause of the Occupational Safety and Health Act of 1970 to cite these hazards. General duty clause citations require a high level of evidence that can make issuing them a challenge, according to OSHA officials. OSHA staff described other challenges to identifying, assessing, and addressing ergonomic hazards, including compliance officers (1) having difficulty determining if ergonomic hazards caused injuries reported on forms, (2) receiving little training on ergonomic hazards, and (3) relying on unclear ergonomic guidance. By addressing these issues OSHA may be better able to identify and address ergonomic hazards and more fully protect workers from harm.

In fiscal year 2024, OSHA implemented an inspection program to better protect workers from hazards at warehouses and other worksites, including general warehouses and last-mile delivery companies. The program requires compliance officers to determine if ergonomic hazards exist and, if so, to take appropriate enforcement action. According to officials, OSHA will review this program annually, focusing on quantitative outcomes like the number of establishments inspected and hazards identified. Once OSHA has taken steps to improve how it identifies and addresses ergonomic hazards, it should evaluate if this program is more fully protecting workers from such hazards. Such an evaluation will allow OSHA to assess: (1) the efficacy of its efforts in identifying and addressing ergonomic hazards and (2) if and how it may improve these efforts to better protect warehouse and delivery workers from ergonomic hazards.

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Figures

Abbreviations

BLS	Bureau of Labor Statistics
DART	Days away from work, job restriction, or transfer
DOL	U.S. Department of Labor
Evidence Act	Foundations for Evidence-Based Policymaking Act of 2018

NAICS	North American Industry Classification System
NIOSH	National Institute for Occupational Safety and Health
OIS	OSHA Information System
OMB	Office of Management and Budget
OSHA	Occupational Safety and Health Administration
OSH Act	Occupational Safety and Health Act of 1970
SOII	Survey of Occupational Injuries and Illnesses

U.S. GOVERNMENT ACCOUNTABILITY OFFICE
441 G St. N.W.
Washington, DC 20548

September 18, 2024

The Honorable Robert C. “Bobby” Scott
Ranking Member
Committee on Education and the Workforce
House of Representatives

Dear Mr. Scott:

E-commerce retail sales have become a sizable part of the U.S. economy, nearly doubling from an estimated $438.5 billion in 2018 to an estimated $870.5 billion in 2022.[1] Over this same 5-year period, the number of employees in the warehouse subsector grew by about 60 percent and the number of employees in the local delivery subsector grew by about 41 percent.[2] These changes reflect a retail economy that is increasingly focused on filling small, individual online orders and meeting consumer demand to receive these orders within 1 or 2 days.

To fill and deliver online orders to consumers quickly, warehouse and delivery companies use various technologies to increase productivity. For example, companies may use handheld scanners to track the movement of products workers handle and monitor workers’ efforts toward meeting employer performance expectations. Worker safety advocates, employees, and researchers have raised questions about whether employers’ use of technologies that increase productivity, coupled with their performance expectations, may also lead to an increased pace of work for warehouse and delivery workers and, as a result, increased risk of workers developing musculoskeletal disorders or being injured in an accident.

The Occupational Safety and Health Administration (OSHA) is the federal agency charged with assuring safe and healthful working conditions for the workforce. Compliance officers at OSHA offices, known as area offices, inspect workplace establishments to ensure that employers are complying with the Occupational Safety and Health Act of 1970, as amended (the OSH Act) and applicable workplace safety and health standards.[3] Also, OSHA generally requires employers to record and maintain information on work-related fatalities, injuries, and illnesses that involve more than first aid, and for some employers to electronically report these data annually to OSHA.[4]

[1]See U. S. Census Bureau, table *Estimated Annual U.S. Retail Trade Sales - Total and E-commerce: 1998-2022* at Annual Retail Trade Survey: 2022 (census.gov). E-commerce retail sales (electronic shopping and mail order houses) are online sales sold directly to consumers, according to the Bureau.

[2]See Industries at a Glance: NAICS Code Index: U.S. Bureau of Labor Statistics (bls.gov). Data on the number of employees in the warehouse subsector is from the North American Industry Classification System (NAICS) code for warehousing and storage (493). Data on the number of employees in local delivery is from the NAICS code for couriers and messengers (492). Employees in the warehouse subsector increased from nearly 1.2 million at the end of 2018 to nearly 1.9 million at the end of 2022. Employees in the local delivery subsector increased from nearly 758,000 at the end of 2018 to more than 1 million at the end of 2022.

[3]Pub. L. No. 91-596, 84 Stat. 1590 (codified as amended at 29 U.S.C. §§ 651 *et seq.*).

[4]See generally 29 C.F.R. pt. 1904.

You asked us to review issues related to how technology affects worker safety at e-commerce warehouses and delivery companies that deliver packages from a final delivery depot to the customer's front door (referred to as last-mile delivery). This report addresses (1) the types of injuries and illnesses that occur at these workplaces and the hazards that cause them; (2) how employers' use of technologies that increase productivity might affect worker safety and health at these workplaces; and (3) the extent to which OSHA identifies and addresses ergonomic hazards at these workplaces, and the challenges it faces in doing so.

To address all objectives, we interviewed knowledgeable representatives from 15 stakeholder groups, including researchers, worker safety advocates, and safety consultants. We also interviewed representatives from five companies—two companies that had e-commerce warehouses (visiting one warehouse) and three delivery companies.[5]

For our first objective we:

- Reviewed OSHA's recordkeeping regulations and guidance for employer reporting of injuries and illnesses.
- Analyzed publicly available Bureau of Labor Statistics (BLS) data on nonfatal workplace injuries and illnesses from 2018 through 2022 (the most recent data available at the time of our work).[6] We determined the level of serious injury and illness in general warehousing and last-mile delivery, comparing it to other sectors and all private industry.[7] We also analyzed the types and causes of these injuries and illnesses.
- Conducted two non-generalizable surveys—one of warehouse workers and one of delivery drivers. We used this survey to, among other things, obtain worker perspectives on reporting their workplace injuries to employers.[8]
- Interviewed OSHA headquarters officials who were knowledgeable about conducting inspections and about ensuring employer compliance with OSHA's recordkeeping rules. We also held discussion groups at six of OSHA's more than 85 area offices with compliance officers who inspect

[5]We selected stakeholders who were knowledgeable about warehousing, last-mile delivery, or both and who understood both worker-safety issues and technologies that increase productivity. We identified stakeholders by conducting internet searches, a literature search, and asking those we interviewed who else we should speak with. We selected the warehouse to visit because it used a variety of technologies to increase productivity. The results of our interviews are non-generalizable.

[6]BLS data is from the Survey of Occupational Injuries and Illnesses (SOII). SOII data are generalizable, nationwide estimates of the number and rates of nonfatal workplace injuries and illnesses and can be broken out by different levels of NAICS codes. We used all 19 private-industry sector NAICS codes and several levels of codes for warehousing and storage and local delivery. To assess the reliability of these data, we interviewed knowledgeable BLS officials, and reviewed data documentation. We determined that these data were sufficiently reliable for our purposes. See appendix I for our full methodology.

[7]BLS officials told us that general warehousing and storage (493110) was the most appropriate NAICS code to use to capture e-commerce warehouses. They also told us that couriers and express delivery services (492110) and local messengers and local delivery (492210) were the two most appropriate NAICS codes to use to capture last-mile delivery. Since data from these two delivery codes are combined at the three-digit NAICS level, we used this three-digit code, couriers and messengers (492), for our analysis.

[8]We generally recruited survey respondents by working with advocacy organizations that had direct contact with warehouse and delivery workers. We received 62 usable warehouse worker survey responses and 437 useable delivery worker survey responses. Seventy-seven percent of warehouse respondents worked for a single company and 93 percent of delivery respondents worked for another company. Because these surveys were nongeneralizable, these results do not represent the views and experiences of warehouse and delivery workers across the country. See appendix I for more information on our worker surveys.

warehouses and delivery companies and interviewed the managers of those offices.[9] Our results are not generalizable to all OSHA area offices.

For our second objective, we reviewed 27 scholarly or peer-reviewed journal articles and studies published from 2018 through 2023 that we identified through a literature search.[10] We also used our nongeneralizable survey to obtain worker perspectives on employer performance expectations and use of technologies that increase productivity.

For our third objective, we reviewed federal laws and regulations. We also reviewed and assessed OSHA's actions against its internal guidance and directives, standards for internal control in the federal government, and Office of Management and Budget guidance pertaining to the Foundations for Evidence-Based Policymaking Act of 2018 (Evidence Act).[11] We also analyzed OSHA inspection data for fiscal years 2018 through 2023 for warehouse and delivery companies. We determined the number of inspections OSHA conducted at these companies and the outcomes of these inspections.[12] We also used our OSHA interviews and discussion groups to understand (1) how OSHA identifies and addresses ergonomic workplace hazards at warehouses and delivery companies and the challenges it may face in doing so, and (2) the emphasis program under which OSHA began to inspect warehouses and delivery companies in fiscal year 2024.[13]

See appendix I for more information on our objectives, scope, and methodology.

We conducted this performance audit from November 2022 to September 2024 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

[9]We selected area offices that were geographically diverse and had conducted both warehouse and delivery inspections from fiscal years 2021 through 2023.

[10]Where appropriate, we reviewed the methods and analytical steps of these materials for quality. We also reviewed studies that stakeholders we interviewed recommended or were referenced in studies we initially reviewed from our literature search.

[11]GAO, *Standards for Internal Control in the Federal Government,* GAO-14-704G (Washington, D.C.: Sept. 10, 2014). We used three internal control components —control environment, information and communication, and monitoring. Office of Management and Budget, *Phase 4 Implementation of the Foundations for Evidence-Based Policymaking Act of 2018: Program Evaluation Standards and Practices,* M-20-12 (Mar. 10, 2020). The Foundations for Evidence-Based Policymaking Act of 2018 is Pub. L. No. 115-435, 132 Stat. 5529 (2019).

[12]OSHA maintains inspection data in its OSHA Information System (OIS). We analyzed these data for the NAICS code general warehousing and storage (493110), electronic shopping and mail houses (4541); and local couriers and messengers (492). See appendix I for our full methodology. To assess the reliability of these data, we reviewed data documentation, interviewed knowledgeable OSHA officials, and conducted electronic testing on specific data elements. We determined that these data were sufficiently reliable for our purposes.

[13]We conducted work at three different levels of OSHA: (1) discussion groups with compliance officers in six area offices, (2) interviews with area office managers in the same offices, and (3) interviews with OSHA headquarters officials. We use "OSHA officials" as shorthand when all three groups shared similar perspectives and in footnotes to report details for each group.

Background

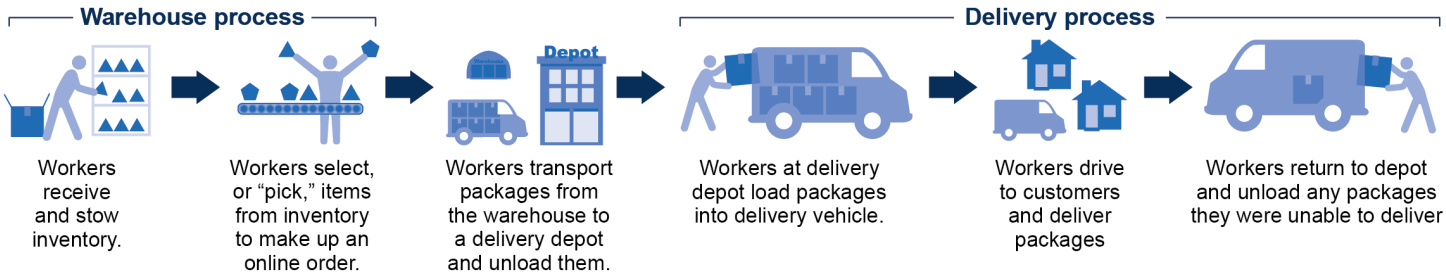
E-commerce Warehouses and Last-Mile Delivery Defined

With the rise of online shopping, warehousing has changed. Traditionally, warehouses stored products and filled large orders for businesses, such as pallets containing multiple cases of products that businesses would then sell to consumers in stores. While warehouses still perform this function, they now also directly fulfill orders individual consumers place online. These orders typically contain one to several products, and each may be unique. Warehouses that fulfill these small, individual consumer orders are called e-commerce warehouses. Some warehouses may have both an e-commerce component and a business component, while others may have one of the two components.

Online shopping has also changed parcel delivery, with consumers expecting companies to deliver their orders within a day or two. Delivery involves moving products from one warehouse or delivery carrier depot to the next via, for example, freight trucks, ships, or planes. It also involves a final stage, which is from the last delivery depot to the consumer's front door. This report focuses on this final stage of local delivery, which researchers and those working in the delivery industry refer to as last-mile delivery. Large delivery companies tend to provide various types of delivery services, including long-haul and last-mile delivery and smaller companies may specialize in last-mile delivery services.

Warehouse workers typically receive and stow inventory; from this inventory, workers select (or pick) the exact products that make up an online order; place these products into boxes; and label the boxes for delivery. Drivers and other workers involved with last-mile delivery typically load vans or small trucks with packages to be delivered; drive and drop the packages off at consumers' front doors; and at the end of the day, return undelivered packages to the delivery depot (see fig. 1).

Figure 1: Warehouse and Last-Mile Delivery Work Processes



Source: GAO observations of warehouse and delivery processes; GAO (icons). | GAO-24-106413

Accessible Data for Figure 1: Warehouse and Last-Mile Delivery Work Processes

Warehouse process

1. Workers receive and stow inventory.
2. Workers select, or "pick," items from inventory to make up an online order.
3. Workers transport packages from the warehouse to a delivery depot and unload them.

Delivery process

4. Workers at delivery depot load packages into delivery vehicle.
5. Workers drive to customers and deliver packages
6. Workers return to depot and unload any packages they were unable to deliver

Source: GAO observations of warehouse and delivery processes; GAO (icons). | GAO-24-106413

Workplace Safety and Health Oversight

OSHA, within the U.S. Department of Labor (DOL), is responsible for carrying out the OSH Act to protect the safety and health of the workforce. OSHA sets and enforces workplace safety and health standards to address hazards that can result in injury, illness, or death.[14] For example, OSHA has standards for safe workplace practices to prevent employees' injuries, such as from falling or getting hit by forklifts.

OSHA sets and enforces workplace safety and health standards for private-sector workplaces in 29 states, the District of Columbia, and four territories. The remaining 21 states and Puerto Rico set and enforce their own safety and health standards for private-sector workplaces under OSHA-approved state plans. The OSH Act requires that state plan standards and their enforcement be "at least as effective" as the federal standards.[15]

OSHA Recordkeeping Regulations

OSHA has also issued recordkeeping regulations that require employers to record certain types of injuries, illnesses, and fatalities and to make these records available to OSHA compliance officers during inspections.[16] These regulations generally require employers to record all work-related injuries and illnesses that result in death, loss of consciousness, days away from work, restricted work or job transfer, or medical treatment beyond first aid, or a significant injury or illness diagnosed by a licensed health care professional, and to maintain these records for 5 years.[17] Employers are required to use the following OSHA forms (or equivalent) to record this information:

- **Log of Work-Related Injuries and Illnesses (Form 300 log):** A log that employers use to list each workplace injury or illness that occurred at their establishments during the year.
- **Injury and Illness Incident Report (Form 301 report):** An incident report that employers use to describe in more detail each workplace injury and illness that they list on the OSHA log.
- **Summary of Work-Related Injuries and Illnesses (Form 300A Summary):** A Summary form that employers use at the end of the year to total up all injuries, illnesses, and fatalities that they listed on the OSHA log.

[14]See generally 29 C.F.R. pt. 1910. In addition, OSHA has issued separate standards for certain industries, such as construction (29 C.F.R. pt. 1926) and agriculture (29 C.F.R. pt. 1928).

[15]In practice, most OSHA federal standards are adopted as written in state plan states, according to OSHA officials.

[16]See 29 C.F.R. pt. 1904.

[17]29 C.F.R. §§ 1904.4, .7, and .33. OSHA requires employers to record this information for each location where business is conducted or where services or industrial operations are performed. 29 C.F.R. §§ 1904.30 and .46. Certain employers, such as those with 10 or fewer employees are exempt from OSHA recordkeeping requirements. 29 C.F.R. § 1904.1.

OSHA recordkeeping regulations also require employers with a minimum number of employees or that are in certain industries to submit the information contained in one or all these forms electronically to OSHA once per year.[18]

OSHA Inspections

Types of OSHA Inspections

Unprogrammed versus Programmed Inspections

- **Unprogrammed.** OSHA conducts unprogrammed inspections when it learns about potentially hazardous working conditions at a specific worksite. These inspections tend to be in response to (1) an imminent danger, a fatality, or serious accident or (2) an employee complaint or outside referral about alleged hazardous working conditions. According to OSHA guidance on prioritizing inspections, unprogrammed inspections take precedence over programmed inspections.
- **Programmed.** OSHA selects establishments for programmed inspections based on objective criteria, such as the establishment being part of a high-hazard industry for which OSHA has a national inspection program. OSHA refers to these inspection programs as emphasis programs. As of July 13, 2023, OSHA had 13 national emphasis programs, including one under which it inspects warehouses and distribution centers. These inspections began in fiscal year 2024.

Safety versus Health Inspections

- **Safety.** These inspections primarily identify safety hazards, such as unsafe operation of powered industrial trucks, unsafe guardrails, or unguarded machinery.
- **Health.** These inspections primarily identify health hazards, such as poor air quality, excessive heat or cold, or work processes that put workers at risk for musculoskeletal disorders.

Source: GAO analysis of OSHA's Field Operations Manual, selected OSHA national emphasis program directives, OSHA summary document of its national emphasis programs and enforcement actions, OSHA interviews, and GAO-21-122. | GAO-24-106413

OSHA enforces its standards by inspecting workplace establishments. OSHA estimates that, as of January 2021, approximately 8 million establishments nationwide fell under its inspection jurisdiction. In fiscal year 2023, OSHA compliance officers inspected 34,249 workplace establishments.

OSHA categorizes inspections as unprogrammed or programmed and as health or safety. Programmed versus unprogrammed inspections refer to what initiated the inspection. Safety versus health inspections refer to the types of hazards that may exist at the workplace under inspection (see sidebar).

In fiscal year 2023, 82 percent of OSHA inspections were safety inspections. (see table 1).

Table 1: Number and Type of OSHA Inspections in Fiscal Year 2023

Category	Programmed inspections	Unprogrammed inspections	Total (Health vs safety inspections)
Health inspections	2,093 (13 percent)	4,048 (22 percent)	6,141 (18 percent)
Safety inspections	13,751 (87 percent)	14,329 (78 percent)	28,080 (82 percent)

[18]29 C.F.R. § 1904.41.

Category	Programmed inspections	Unprogrammed inspections	Total (Health vs safety inspections)
Total (Programmed vs unprogrammed inspections)	15,844 (100 percent)	18,377 (100 percent)	34,221(100 percent)

Source: GAO analysis of OSHA Information System Inspection Summary Report, April 17, 2024. | GAO-24-106413

Compliance officers are typically classified as either a “safety” or “health/industrial hygienist” compliance officer and conduct either safety or health inspections based on that designation, according to OSHA officials. Officials also said that such designations often reflect a compliance officer’s education or prior professional background. During fiscal year 2023, OSHA had an average of 878 compliance officers, of whom 628 were safety officers and 250 were health officers.

Musculoskeletal Disorders and Conducting Inspections to Identify Ergonomic Hazards

BLS’s website defines musculoskeletal disorders as injuries that occur when the body uses muscles, tendons, and ligaments to perform tasks, often in awkward positions or repetitively, which over time can create pain and injury.[19] These injuries may be specific (such as tendonitis in the wrist) or non-specific (such as back pain). The causes of musculoskeletal injuries may be due to poorly designed ergonomics, such as a job process that requires a worker to awkwardly bend and lift heavy items multiple times a day, resulting in back pain.

OSHA may conduct health inspections when it learns of alleged hazards that are causing or contributing to musculoskeletal disorders. The agency may open a health inspection to investigate potential ergonomic hazards after it receives a complaint from an employee or other individual about this alleged hazard, or a referral from another government agency, according to OSHA’s Field Operations Manual. It also may open such an inspection if a compliance officer identifies a potential ergonomic hazard during an inspection and makes a referral for the area office to open a separate health inspection.

When conducting health inspections to identify potential ergonomic hazards, area offices rely on ergonomic specialists in OSHA’s regional and national offices, according to OSHA headquarters officials. This support includes Regional Ergonomics Coordinators, OSHA ergonomists, and medical assistance from the Office of Occupational Medicine and Nursing.[20] At the National Office, it includes an Ergonomic Response Team and Health Response Team that provide feedback and resources to help the area offices assess and address these hazards.[21] Additionally, when necessary, OSHA will use outside ergonomic or medical experts to support enforcement actions for ergonomics.

Compliance officers work closely with ergonomic specialists in OSHA’s regional and national offices when assessing the severity of potential ergonomic hazards during inspections, according to OSHA headquarters officials. Officials also told us that officers work closely with specialists when determining what enforcement action should be taken to address these hazards.

[19]See Occupational injuries and illnesses resulting in musculoskeletal disorders (MSDs): U.S. Bureau of Labor Statistics (bls.gov).

[20]Each of OSHA’s 10 regional offices has a Regional Ergonomics Coordinator.

[21]OSHA’s Ergonomic Response Team includes representatives from OSHA’s Directorate of Enforcement Programs, the Directorate of Technical Support and Emergency Management, and its Office of the Solicitor.

OSHA Enforcement Actions

If compliance officers identify hazards during OSHA inspections that impact worker safety or health and violate an OSHA standard, OSHA may cite the employers. Citations describe the hazards and identify the specific standards violated. Citations may also specify that the employer correct the hazards and may propose the employer pay a civil money penalty.

If compliance officers identify workplace hazards for which OSHA does not have a standard, OSHA has two enforcement options. First, the agency could issue a citation under the general duty clause of the OSH Act.[22] This statutory provision establishes a general duty for employers to operate worksites free from recognized safety and health hazards that are causing or likely to cause death or serious physical harm to their employees.[23] Second, if OSHA finds it does not have sufficient evidence to justify issuing a general duty clause citation, it may issue a hazard alert letter. These letters describe ways the employer can reduce the hazard and resources available to them to assist in this process. For example, OSHA does not have a specific standard related to ergonomic hazards, so OSHA addresses ergonomic hazards by citing employers for violating the general duty clause of the OSH Act or by issuing alert letters.[24]

BLS Data Indicate that General Warehousing and Last-Mile Delivery Have High Injury Rates, with Musculoskeletal Disorders Being Most Common

General Warehousing and Last-Mile Delivery Are among the Industries with the Highest Rates of Serious Worker Injuries

North American Industry Classification System

The North American Industry Classification System (NAICS) is a standard system used by federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy. NAICS is a 2- through 6-digit hierarchical classification system that offers five levels of detail. Each digit in the code is part of a series of progressively narrower categories, with more digits signifying greater classification detail.

The first two digits designate the sector, which represents general categories of economic activities. For example, the transportation and warehousing sector (NAICS Code 48-49) includes

[22]29 U.S.C § 654(a)(1).

[23]Issuing a general duty clause citation involves establishing elements beyond what is required for citations of standards, according to OSHA headquarters officials. In order to issue a citation for a violation of the general duty clause, OSHA must establish that the employer failed to keep the workplace free of a hazard to which employees were exposed, that the hazard was recognized, that the hazard was causing or likely to cause death or serious physical harm, and that there was a feasible and useful method to correct the hazard.

[24]OSHA issued a final rule establishing an ergonomics standard in November 2000. Ergonomics Program, 65 Fed. Reg. 68,262 (Nov. 14, 2000). However, a joint resolution of disapproval was enacted on March 20, 2001, which invalidated the rule. Pub. L. No. 107-5, 115 Stat. 7 (2001). Under the Congressional Review Act, if a joint resolution of disapproval of a rule is enacted in accordance with certain procedures set forth in the Act, the rule shall not take effect (or shall not continue in effect). Further, the rule may not be reissued in substantially the same form, and a new rule that is substantially the same as such a rule may not be issued, unless specifically authorized by subsequent law. See 5 U.S.C. §§ 801-802.

industries that provide transportation of passengers and cargo, warehousing and storage of goods, scenic and sightseeing transportation, and industries that support those activities. Other private industry sectors include construction, manufacturing, and educational services.

As there are no single NAICS codes that capture either e-commerce warehouses or last-mile delivery companies, our analysis includes companies that are neither e-commerce warehouses nor last-mile delivery companies. BLS officials recommended that we use general warehousing and storage (493110) to approximate e-commerce warehouses and two NAICS codes—couriers and express delivery services (492110) and local messengers and local delivery (492210)—to approximate last-mile delivery. At the three-digit NAICS level, data from the two delivery codes are combined as couriers and messengers (492). As a result, we used data from couriers and messengers (492) to analyze data for last-mile delivery. Unless otherwise specified, we use the term general warehousing to refer to general warehousing and storage, and we use the term last-mile delivery to refer to couriers and messengers.

Source: GAO analysis of U.S. Census Bureau information and interviews with BLS officials. | GAO-24-106413

The transportation and warehousing private industry sector, which includes general warehousing and last-mile delivery, had the highest estimated serious injury rate of all 19 sectors in 2022, according to our analysis of BLS data.[25] The transportation and warehousing sector had an estimated serious injury rate of 3.8 cases per 100 full-time workers in 2022, which means for every 100 workers, an average of almost four experienced a serious injury during the year.[26]

The next highest sector in 2022 was health care and social assistance, with an estimated rate of 2.7 cases per 100 full-time workers (see fig. 2).[27] OSHA uses the serious injury rate across all private industry as a baseline to identify high hazard industries.[28]

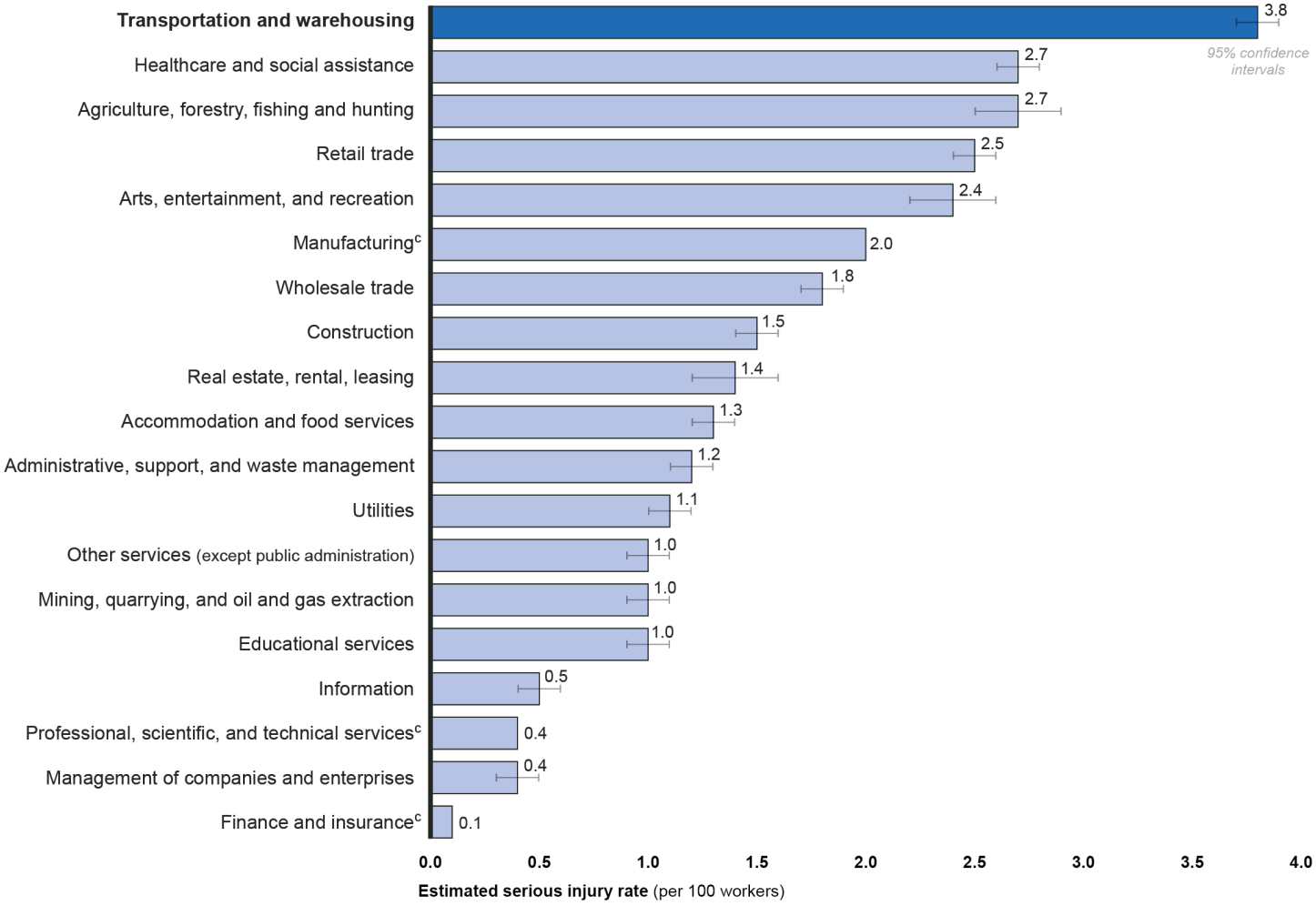
[25]We use “serious injuries” to describe non-fatal injuries and illnesses that resulted in either (1) days away from work (i.e., time off work) or (2) days of job transfers or restrictions (i.e., modified job duty). Lifting restrictions is a common modified job duty for injured workers in these industries. Together, these two types of injuries and illnesses are commonly known as Days Away, Restrictions, or Transfers (DART). Last-mile delivery refers to the NAICS code couriers and messengers (492). BLS officials told us that last-mile delivery can be approximated by two NAICS codes—couriers and express delivery services (492110) and local messengers and local delivery (492210). At the three-digit NAICS level, data from these two more detailed codes are combined as couriers and messengers (492). See sidebar “North American Industry Classification System” for more information.

[26]Estimates of serious injuries presented in this report are based on BLS statistical data and have 95 percent confidence intervals associated with them. The 95 percent confidence interval for this estimate is (3.7, 3.9).

[27]The 95 percent confidence interval for this estimate is (2.63, 2.77).

[28]In its recently enacted amendments to its recordkeeping rule, OSHA used 1.5 times the serious injury rate for all private industry as criteria to identify “higher hazard” industries. 88 Fed. Reg. 47,254, 47,274 (Jul. 21, 2023).

Figure 2: Estimated Serious Injury Rate[a] by Private Industry Sector[b], 2022



Source: GAO analysis of Bureau of Labor Statistics (BLS) data. | GAO-24-106413

Accessible Data for Figure 2: Estimated Serious Injury Ratea by Private Industry Sectorb, 2022

Estimated serious injury rate (per 100 workers)

	Lower bound at 95% confidence	Estimate	Upper bound at 95% confidence
Transportation and warehousing	3.7	3.8	3.9
Healthcare and social assistance	2.6	2.7	2.8
Agriculture, forestry, fishing and hunting	2.5	2.7	2.9
Retail trade	2.4	2.5	2.6
Arts, entertainment, and recreation	2.2	2.4	2.6
Manufacturing[c]	2	2	2
Wholesale trade	1.7	1.8	1.9

	Lower bound at 95% confidence	Estimate	Upper bound at 95% confidence
Construction	1.4	1.5	1.6
Real estate, rental, leasing	1.2	1.4	1.6
Accommodation and food services	1.2	1.3	1.4
Administrative, support, and waste management	1.1	1.2	1.3
Utilities	1	1.1	1.2
Other services (except public administration)	0.9	1	1.1
Mining, quarrying, and oil and gas extraction	0.9	1	1.1
Educational services	0.9	1	1.1
Information	0.4	0.5	0.6
Professional, scientific, and technical services[c]	0.4	0.4	0.4
Management of companies and enterprises	0.3	0.4	0.5
Finance and insurance[c]	0.1	0.1	0.1

Source: GAO analysis of Bureau of Labor Statistics (BLS) data. | GAO-24-106413

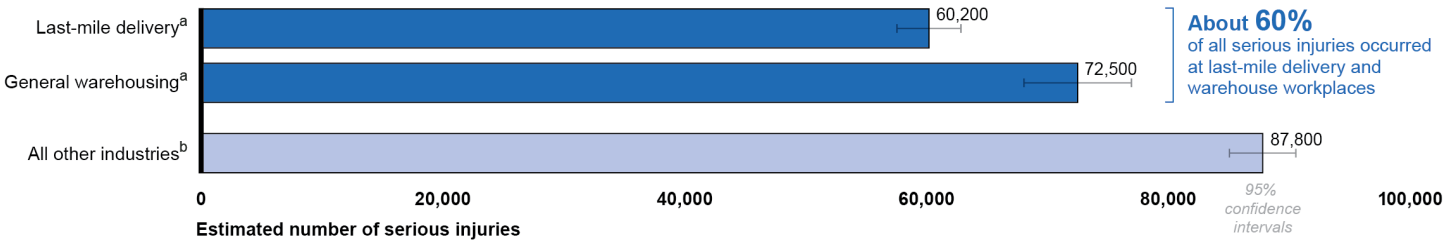
[a]The serious injury rate refers to the rate of non-fatal injuries and illnesses that resulted in either (1) days away from work or (2) days of job transfers or restrictions. This rate is known as Days Away Restricted or Transferred (DART).

[b]Private industry sectors are from the North American Industry Classification System (NAICS) and represent general categories of economic activity.

[c]Confidence interval for this bar is too narrow to visually represent in the figure. The 95% confidence interval for manufacturing is (1.96, 2.04). The 95% confidence interval for professional, scientific, and technical services is (0.35, 0.45). The 95% confidence interval for finance and insurance is (0.08, 0.12).

Serious injuries to workers in general warehousing and last-mile delivery accounted for an estimated 60 percent of the 220,400 total serious injuries in the transportation and warehousing sector in 2022 (see fig. 3).[29]

Figure 3: Estimated Number of Serious Injuries in General Warehousing and Last-Mile Delivery Compared to the Rest of the Transportation and Warehousing Sector, 2022



Source: GAO analysis of Bureau of Labor Statistics (BLS) data. | GAO-24-106413

Accessible Data for Figure 3: Estimated Number of Serious Injuries in General Warehousing and Last-Mile Delivery Compared to the Rest of the Transportation and Warehousing Sector, 2022

Estimated number of serious injuries

[29]The 95 percent confidence interval for the estimated ratio is (57 percent, 63 percent). The 95 percent confidence interval for estimated number of injuries is (214,400, 226,400).

	Lower bound at 95% confidence	Estimate	Upper bound at 95% confidence
Last-mile delivery[a]	57500	60200	62900
General warehousing[a]	68000	72500	77000
All other industries[a]	85000	87800	90600

About 60% of all serious injuries occurred at last-mile delivery and warehouse workplaces

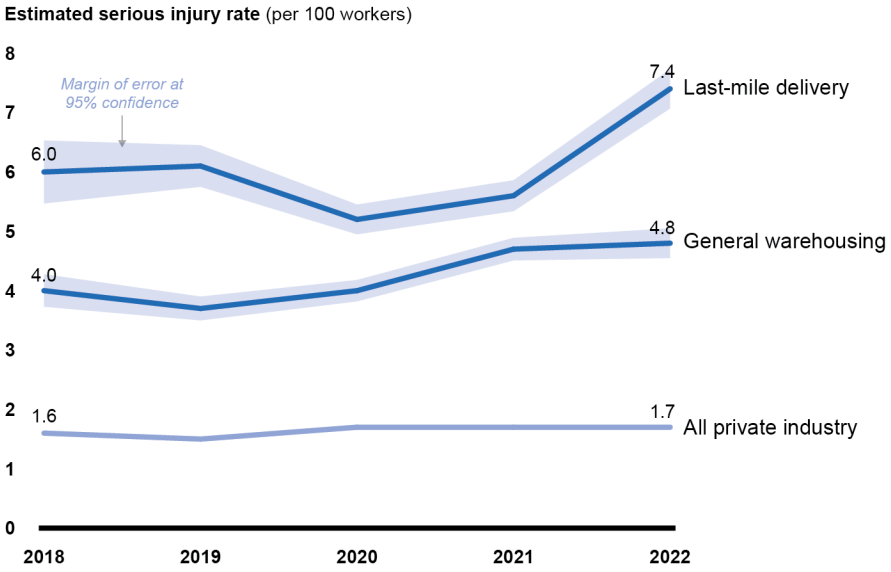
Source: GAO analysis of Bureau of Labor Statistics (BLS) data. | GAO-24-106413

[a]General warehousing refers to the North American Industry Classification System (NAICS) code general warehousing and storage (493110) which, according to Bureau of Labor Statistics (BLS) officials, includes e-commerce warehouses. Last-mile delivery refers to the NAICS code couriers and messengers (492). BLS officials told us that last-mile delivery can be approximated by two NAICS codes—couriers and express delivery services (492110) and local messengers and local delivery (492210). At the three-digit NAICS level, data from these two more detailed codes are combined as couriers and messengers (492).

[b]All other industries include truck transportation, air transportation, and rail transportation, among others.

From 2018 through 2022, the estimated serious injury rates in general warehousing and last-mile delivery increased significantly faster than the estimated rate for all private industry, according to our analysis of BLS data. During that period, the serious injury rate for general warehousing rose by 20 percent (from an estimated 4.0 to 4.8 cases per 100 full-time workers), and the serious injury rate for last-mile delivery rose by 23 percent (from an estimated 6.0 to 7.4 cases per 100 full-time workers).[30] Meanwhile, the all serious injury rate for all private industry increased from an estimated 1.6 cases to 1.7 cases per 100 full-time workers (see fig. 4).[31]

Figure 4: Estimated Injury Rates in General Warehousing and Last-Mile Delivery Industries, Compared to Rates in All U.S. Private Industry, 2018-2022[a]



Source: GAO analysis of Bureau of Labor Statistics (BLS) data. | GAO-24-106413

[30]The 95 percent confidence interval for these estimates for general warehousing are (3.7, 4.3) [2018 estimate] and (4.5, 5.1) [2022 estimate]. The 95 percent confidence interval for these estimates for last-mile delivery are (5.5, 6.5) [2018 estimate] and (7.1, 7.7) [2022 estimate].

[31]The 95 percent confidence interval for these estimates are (1.58, 1.62) [2018 estimate] and (1.68, 1.72) [2022 estimate].

Accessible Data for Figure 4: Estimated Injury Rates in General Warehousing and Last-Mile Delivery Industries, Compared to Rates in All U.S. Private Industry, 2018-2022[a]

Estimated serious injury rate (per 100 workers)

	2018	2019	2020	2021	2022
Last-mile delivery estimate	6	6.1	5.2	5.6	7.4
Last-mile delivery lower bound at 95% confidence	5.47	5.75	4.95	5.34	7.07
Last-mile delivery upper bound at 95% confidence	6.53	6.45	5.45	5.86	7.73
General warehousing estimate	4	3.7	4	4.7	4.8
General warehousing lower bound at 95% confidence	3.73	3.5	3.82	4.51	4.55
General warehousing upper bound at 95% confidence	4.27	3.9	4.18	4.89	5.05
All private industry estimate	1.6	1.5	1.7	1.7	1.7
All private industry lower bound at 95% confidence	1.58	1.48	1.68	1.68	1.68
All private industry upper bound at 95% confidence	1.62	1.52	1.72	1.72	1.72

Source: GAO analysis of Bureau of Labor Statistics (BLS) data. | GAO-24-106413

[a]General warehousing refers to North American Industry Classification System (NAICS) code general warehousing and storage (493110) which, according to Bureau of Labor Statistics (BLS) officials, includes e-commerce warehouses. Last-mile delivery refers to the NAICS code couriers and messengers (492). BLS officials told us that last-mile delivery can be approximated by two NAICS codes—couriers and express delivery services (492110) and local messengers and local delivery (492210). At the three-digit NAICS level, data from these two more detailed codes are combined as couriers and messengers (492).

BLS Data Indicate that General Warehousing and Last-Mile Delivery Workers Face Similar Hazards, with the Most Prevalent Causing Musculoskeletal Disorders

Three Most Common Hazards that Caused Injuries in General Warehousing and Last-Mile Delivery in 2021-2022

Overexertion and bodily reaction. Incidents in this category were the most common cause of serious injuries in both general warehousing and last-mile delivery. “Overexertion and bodily reaction” is the term BLS uses to capture injuries and illnesses resulting from activities such as excessive physical effort, repetitive motion, and awkward or unnatural postures. The vast majority of these injuries are musculoskeletal disorders, such as back strains that resulted from a worker lifting a package that was too heavy or repeatedly bending while performing job duties. However, a few injuries in this category are not musculoskeletal disorders. For example, a dislocated shoulder that resulted from lifting an item that was too heavy is not categorized as a musculoskeletal disorder by BLS.

Contact with objects and equipment. Incidents in this category were the second most common cause of serious injuries in both industries. This category describes injuries that resulted from the injured worker making physical contact with the source of the injury. For example, this category would include workers who were injured because they were hit by a forklift or a falling box. Notably, this category does not include injuries from contact that occurred because of a fall or a transportation incident, such as a vehicle collision.

Falls, slips, and trips. Incidents in this category were the third major cause of serious injuries in both industries. This category describes injuries that result from falls (either on the same level or to a lower level) or from slips and trips that do not result in a fall. For example, this would include an injury resulting from a worker tripping over a box or slipping on a wet surface.

Source: GAO analysis of BLS’s Occupational Injury and Illness Classification Manual. | GAO-24-106413

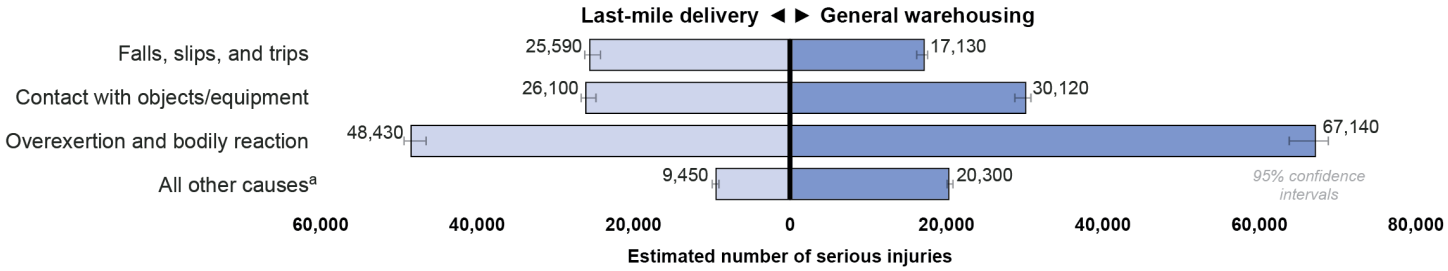
Workers in general warehousing and last-mile delivery encounter similar hazards, and three hazards caused most of the serious injuries. These were: (1) overexertion and bodily reaction; (2) contact with objects and

equipment; and (3) falls, slips, and trips (see sidebar).[32] According to 2021-22 BLS data, these hazards caused an estimated 85 percent of serious injuries reported in general warehousing and an estimated 91 percent of serious injuries reported in last-mile delivery.[33]

Overexertion and bodily reaction is the primary cause of musculoskeletal disorders, according to BLS.[34] Overexertion incidents caused an estimated 50 percent of the serious injuries for general warehousing workers and an estimated 44 percent of injuries for last-mile delivery workers in the 2021-22 reporting period, according to our analysis of BLS data (see fig. 5).[35] Similarly, musculoskeletal disorders, which are specific conditions primarily caused by overexertion, accounted for an estimated 49 percent of serious injuries in general warehousing and an estimated 43 percent of serious injuries in last-mile delivery during this period.[36]

The second leading cause of injuries for these workers—contact with objects and equipment—occurred at roughly one-half the rate of overexertion injuries (see fig. 5). In other words, warehouse and delivery workers were nearly twice as likely to be seriously injured on the job by overexertion as they were to be injured by contact with objects and equipment.

Figure 5: Estimated Serious Injury and Illnesses in General Warehousing and Last-Mile Delivery Industries by Hazard, 2021-2022[a]



Source: GAO analysis of Bureau of Labor Statistics (BLS) data. | GAO-24-106413

[32]BLS uses the Occupational Injury and Illness Classification Manual to code the case characteristics of injuries and illnesses. This manual defines “event” or “exposure” as the manner in which injuries and illnesses were produced or inflicted. These events or exposures approximate hazards in the workplace that can cause injuries. We refer to the event or exposure of an injury as the cause of an injury.

[33]The 95 percent confidence interval for these estimates are (81 percent, 89 percent) for general warehousing and (87 percent, 96 percent) for last-mile delivery.

[34]We use the term “overexertion” to refer to “Overexertion and Bodily Reaction.”

[35]The 95 percent confidence interval for these estimates are (47 percent, 53 percent) for general warehousing and (42 percent, 47 percent) for last-mile delivery.

[36]The 95 percent confidence interval for these estimates are (46 percent, 53 percent) for general warehousing and (41 percent, 46 percent) for last-mile delivery. A small portion of injuries caused by overexertion are not musculoskeletal disorders, which explains the small difference in percentages between serious injuries caused by overexertion and serious injuries that are musculoskeletal disorders. The first reporting period for which BLS data were available for all types of serious injuries was 2021-2022 and includes musculoskeletal disorders. Prior to this period, BLS published data on injuries that resulted in days away from work.

Accessible Data for Figure 5: Estimated Serious Injury and Illnesses in General Warehousing and Last-Mile Delivery Industries by Hazard, 2021-2022a

Estimated number of serious injuries

	Last-mile delivery lower bound at 95% confidence	Last-mile delivery estimate	Last-mile delivery upper bound at 95% confidence	General warehousing lower bound at 95% confidence	General warehousing estimate	General warehousing upper bound at 95% confidence
Falls, slips, and trips	24135	25590	26332	16089	17130	17661
Objects or equipment	24719	26100	26805	28644	30120	30873
Overexertion/ Bodily reaction	46437	48430	49447	63719	67140	68886
All other causes	9000	9450	10050	20000	20300	20900

Source: GAO analysis of Bureau of Labor Statistics (BLS) data. | GAO-24-106413

Note: All other cases include the remaining event codes violence and other injuries by persons or animals, transportation incidents, fires and explosions, exposure to harmful substances or environments, and non-classifiable.

[a]General warehousing refers to the North American Industry Classification System (NAICS) code general warehousing and storage (493110) which, according to Bureau of Labor Statistics (BLS) officials, includes e-commerce warehouses. Last-mile delivery refers to the NAICS code couriers and messengers (492). BLS officials told us that last-mile delivery can be approximated by two NAICS codes—couriers and express delivery services (492110) and local messengers and local delivery (492210). At the three-digit NAICS level, data from these two more detailed codes are combined as couriers and messengers (492).

Workers in general warehousing and last-mile delivery experienced work-related musculoskeletal disorders at a significantly higher rate when compared to both the broader transportation and warehousing sector and the rate for all private industry, according to BLS data (see table 2).

Table 2: Estimated Rates of Serious Musculoskeletal Disorders in All Private Industry and Transportation and Warehouse Sector Compared to General Warehousing and Last-Mile Delivery, 2021-2022

Industry	Estimated musculoskeletal disorder rate (per 100 full-time workers)
All private industry	0.49[a]
Transportation and warehousing sector	1.56[b]
General warehousing	2.36[c]
Last-mile delivery	2.79[d]

Source: GAO analysis of Bureau of Labor Statistics injury and illness data. | GAO-24-106413

Note: The rates in this table are associated with musculoskeletal disorders that resulted in either (1) days away from work or (2) days of job transfers or restrictions and are calculated per 100 full-time workers.

[a]The 95 percent confidence interval for this estimate is (0.49, 0.50).

[b]The 95 percent confidence interval for this estimate is (1.52, 1.60).

[c]General warehousing refers to the North American Industry Classification System (NAICS) code general warehousing and storage (493110) which, according to Bureau of Labor Statistics (BLS) officials, includes e-commerce warehouses. The 95 percent confidence interval for this estimate is (2.24, 2.48).

[d]Last-mile delivery refers to the NAICS code couriers and messengers (492). BLS officials told us that last-mile delivery can be approximated by two NAICS codes—couriers and express delivery services (492110) and local messengers and local delivery (492210). At the three-digit NAICS level, data from these two more detailed codes are combined as couriers and messengers (492). The 95 percent confidence interval for this estimate is (2.67, 2.90).

Injuries and Illnesses, Including Musculoskeletal Disorders, May Be Underreported by Employers and Workers

Generally, workplace injuries and illnesses may be underreported for two reasons: (1) employers may not record all incidents that they know about on OSHA recordkeeping forms or may not record them properly on these forms and (2) workers may not always tell their employers when they are injured or ill. Accurate reporting of workplace injuries and illnesses is essential in helping OSHA, employers, and workplace safety experts identify and address hazards that cause unsafe working conditions.

Researchers, OSHA and BLS officials, worker safety advocates, and other stakeholders have long recognized that employers underreport work-related injuries and illnesses for a variety of intentional and unintentional reasons.[37] Furthermore, BLS-sponsored research suggests that many companies are potentially underreporting serious injuries that resulted in missed work time when responding to BLS surveys on occupational injuries and illnesses.[38] Our prior work found that although underreporting of workplace injuries and illnesses occurs for a variety of reasons, its extent is unknown on both OSHA recordkeeping forms and BLS surveys.[39]

Employers may not report workplace injuries and illnesses for the following reasons.

- **Avoid scrutiny and payments.** Employers may purposely not report known injuries and illnesses on OSHA forms to avoid regulatory scrutiny or to keep workers' compensation insurance premiums low, according to OSHA officials, federal officials we interviewed and representatives of worker advocacy groups from our prior work, and a 2018 National Academy of Sciences report.[40] For example, some companies will not report injuries to OSHA because they want to avoid an OSHA inspection or the consequences of an inspection, such as being required to abate identified hazards or pay a fine, according to a compliance officer in one of our six discussion groups and a manager from a different area office.

  Employers may also manage musculoskeletal disorders with only first aid for reasons such as to avoid reporting them on OSHA recordkeeping forms or to avoid workers' compensation claims, according to

[37]We conducted work at three different levels of OSHA: (1) discussion groups with compliance officers in six area offices, (2) interviews with area office managers in the same offices, and (3) interviews with OSHA headquarters officials. We use "OSHA officials" as shorthand when all three groups shared similar perspectives and in footnotes report details for each group. In this instance, OSHA officials includes managers in four of the six area offices, compliance officers from five discussion groups, and OSHA headquarters officials.

[38]Sara Wuellner and Polly Phipps, *Employer-based Work Injury Recordkeeping: Data from Four States*, March 2017. Researchers asked BLS survey participants in four states a series of hypothetical recordkeeping questions and concluded, based on those responses, that many respondents are potentially over-reporting minor cases (those limited to diagnostic services) and underreporting cases involving days of missed work and the duration of missed work.

[39]GAO, *Workplace Safety and Health: Actions Needed to Improve Reporting of Summary Injury and Illness Data,* GAO-21-122 (Washington, D.C.: Jan. 27, 2021); and *Workplace Safety and Health: Additional Data Needed to Address Continued Hazards in the Meat and Poultry Industry,* GAO-16-337 (Washington, D.C.: Apr. 25, 2016).

[40]GAO-21-122, GAO-16-377, and National Academies of Sciences, Engineering, and Medicine 2018. *A Smarter National Surveillance System for Occupational Safety and Health in the 21st Century*. Washington, DC: The National Academies Press. OSHA officials include managers in one area office, compliance officers from one discussion group, and OSHA headquarters officials.

OSHA officials.[41] OSHA headquarters officials said that this approach can reflect medical mismanagement if these injuries require medical treatment or time off work. For example, in 2023, OSHA cited a warehouse company because it found that the company's on-site clinic did not refer injured workers to an outside physician when warranted, and instead, sent injured workers back to their regular jobs, which further aggravated their injuries.[42]

- **Determining if musculoskeletal disorders are work-related.** Employers may not always record musculoskeletal disorders as injuries on OSHA recordkeeping forms because these injuries can sometimes be difficult to identify as work-related, according to OSHA officials, interviews with experts and worker advocacy groups from our prior work, and the 2018 National Academy of Sciences report.[43] There are two interrelated reasons for this: (1) musculoskeletal disorders often result from repetitive motion or overexertion over time and (2) they can be caused by both physical activities outside of work (such as playing sports) and physical activities performed at work (such as continuous lifting and bending). Compliance officers from three discussion groups said that musculoskeletal disorders may be more susceptible to underreporting, citing both reasons.
- **Improper recording of injuries and illnesses.** Underreporting of injuries and illnesses may occur if employers do not record injuries and illnesses properly on OSHA forms, according to compliance officers from four discussion groups and managers in three area offices. One possible source of confusion for employers is that OSHA's recordkeeping requirements differ from workers' compensation requirements, which vary across states. For example, one compliance officer said that some companies use their workers' compensation data to complete their OSHA recordkeeping forms, which may result in not recording injuries on these forms.

Workers who do not report their injuries and illnesses to their employers also contribute to underreporting because employers cannot record injuries and illnesses on OSHA recordkeeping forms that they do not know about, according to OSHA officials.[44]

Our surveys of warehouse and delivery workers asked workers to tell us about up to three work-related injuries they may have experienced over the previous 2 years and whether they reported each of these injuries to management. While these results cannot be projected to all warehouse and delivery workers, it is notable that

[41]OSHA officials includes managers in three area offices, compliance officers from two discussion groups, and OSHA headquarters officials. Musculoskeletal disorders are associated with high costs to employers such as increased healthcare, disability, and worker's compensation costs, according to the Centers for Disease Control and Prevention. Some warehouses have onsite medical clinics where workers can receive first aid treatment (such as ice packs and over-the-counter pain medication), according to representatives from one employer we spoke to. If warranted, clinic personnel can also refer workers to a doctor for treatment. Per OSHA recordkeeping guidance, employers should not include injuries on OSHA recordkeeping forms that are treated with only first aid, but should include injuries that require medical treatment, days away from work or modified job duties, among other criteria.

[42]U.S. Department of Labor, OSHA National News Release, *US Department of Labor Finds Amazon Failed to Provide Injured Employees Proper Medical Treatment at Castleton, New York, Fulfillment Facility,* 23-785-NAT (April 28, 2023) https://www.osha.gov/news/newsreleases/national/04282023.

[43]GAO-16-337 and National Academies of Sciences, Engineering, and Medicine, "A Smarter National Surveillance System." In general, an injury or illness is considered work-related and must be recorded on OSHA recordkeeping forms if an event or exposure at work caused or contributed to the injury or illness or significantly aggravated a pre-existing injury or illness. 29 C.F.R. § 1904.5. OSHA officials include managers in one area office, compliance officers from four discussion groups, and OSHA headquarters officials.

[44]These officials include managers in three area offices, compliance officers from three discussion groups, and OSHA headquarters officials.

respondents to our surveys did not report a sizable number of their injuries and illnesses to their employers (see tables 3 and 4).[45]

Table 3: Types of Injuries that Warehouse Workers We Surveyed Said They Reported to Employers

Type of injury	Reported injuries	Non-reported injuries	Total injuries
Pain and soreness during regular job duties *(includes musculoskeletal disorders)*	21	1	34
Injury to muscles, ligaments, tendons because of event or accident *(includes musculoskeletal disorders)*	9	1	10
Cuts, bruises, burns or other injury to skin	7	1	8
Respiratory illness	5	3	8
Heat stroke, frostbite, nausea, and other injuries related to temperature or environment	1	0	1
All other injury categories	14	3	17
Totals	57	21	78

Source: Non-generalizable GAO survey of warehouse workers. | GAO-24-106413

Note: A total of 62 warehouse workers responded to our survey. Of these, 51 warehouse workers described between one and three work-related injuries that they experienced within the past 2 years.

Table 4: Types of Injuries that Delivery Workers We Surveyed Said They Reported to Employers

Type of injury	Reported injuries	Non-reported injuries	Total injuries
Pain and soreness during regular job duties (*includes musculoskeletal disorders)*	123	12	249
Injury to muscles, ligaments, tendons because of event or accident *(includes musculoskeletal disorders)*	81	15	96
Cuts, bruises, burns or other injury to skin	28	42	70
Respiratory illness	55	7	62
Heat stroke, frostbite, nausea, and other injuries related to temperature or environment	46	20	66
All other injury categories	47	4	51
Totals	380	214	594

Source: Non-generalizable GAO survey of delivery workers. | GAO-24-106413

[45]Our nongeneralizable surveys of workers received 62 responses from warehouse workers and 437 responses from delivery workers. We generally recruited survey respondents by working with advocacy organizations that had direct contact with warehouse and delivery workers. Because these surveys were nongeneralizable, these results do not represent the views and experiences of warehouse and delivery workers across the country. See appendix I for more information on our worker surveys,

Note: A total of 437 delivery workers responded to our survey. Of these, 399 described between one and three work-related injuries that they experienced within the past 2 years.

The results of our worker survey also shed light on the types of injuries and illnesses that respondents to our survey said they did and did not report to their employers. Notably, most nonreported injuries were "pain and soreness during regular job duties", which may lead to more severe musculoskeletal disorders developing over time, according to OSHA guidance. Also, respondents to our survey reported musculoskeletal injuries to their employers more often if they could point to an event as their cause.[46]

Employees may not report their injuries and illnesses to employers for the following reasons.

- **Injury was not severe enough.** Overall, the most common reason that warehouse and delivery workers who responded to our survey cited for not reporting their injuries or illnesses to employers was that they did not believe that their injuries or illnesses were serious enough to warrant such reporting (see table 5). While some injuries are caused by a "flashy" or memorable incident, like a pallet rack collapse, musculoskeletal disorders that develop over time are difficult to recognize as injuries. One compliance officer said, for example, that because warehouse and delivery jobs are physically demanding, workers may expect to experience some level of discomfort. As such, they may typically work through this pain and soreness instead of reporting it to their employer. One survey respondent said, "Muscle aches and soreness is considered 'part of the job' in our workplace."
- **Belief that employers will not address the injury.** Our nongeneralizable surveys of workers found that the second most common reason that workers did not report injuries and illnesses to employers was that they did not think the employer would do anything to address them (see table 5).
- **Fear of retaliation.** Workers may not report their injuries or illnesses because they fear that their employer will retaliate against them if they do, according to interviews with federal officials, worker advocacy groups, and workers from our prior work; the 2018 National Academy of Sciences report; OSHA officials; and stakeholders.[47] Our nongeneralizable surveys of workers also found that fear of retaliation was a common reason why workers did not report injuries to their employers (see table 5). For example, one worker who did not report their injury said that "management makes it known they'll fire [you] if you report [an] injury."
- **Injury may not seem work-related or appropriate to report.** Like their employers, workers may not immediately recognize that they developed a work-related injury, according to compliance officers from three discussion groups. Our nongeneralizable surveys found that sometimes workers did not report their injuries and illnesses to employers because they did not know if they should (see table 5). For example, a worker said that he did not consider the back pain he experienced while working, which required heat treatment during every shift, a work-related injury because he initially hurt his back outside of work. However, according to OSHA's definition, generally an injury or illness is work-related when something in the work environment causes, contributes to, or aggravates the injury.[48]

[46]As stated previously, musculoskeletal disorders can occur slowly over time (such as tendonitis due to overuse of a tendon) or can be brought on by an event (such as a back sprain due to lifting something heavy).

[47]GAO-16-337 and National Academies of Sciences, Engineering, and Medicine, "A Smarter National Surveillance System". OSHA officials includes managers in two area offices, compliance officers from one discussion group, and OSHA headquarters officials.

[48]Occupational Safety and Health Administration, *Recordkeeping Policies and Procedures Manual,* CPL 02-00-135, (Dec 30, 2004).

Table 5: Reasons Respondents to Our Surveys Cited for Not Reporting Injuries or Illnesses to Their Employers

Our survey asked respondents whether they had reported each injury described in the survey to their employer and, for **each** that they did not report, to select **all** reasons why they did not report them.

Warehouse workers did not report 21 of 78 injuries to their employers[a]

Reason	Number of times selected
Injury was not severe enough	14 times
Belief that the employer would not address it	9 times
Feared retaliation	6 times
Did not know if I should report it	10 times

Delivery workers did not report 214 of 594 injuries to their employers[b]

Reason	Number of times selected
Injury was not severe enough	121 times
Belief that employer would not address it	80 times
Feared retaliation	73 times
Did not know if I should report it	30 times

Source: Non-generalizable GAO survey of warehouse workers and delivery drivers . | GAO-24-106413

[a]62 warehouse workers completed this survey and told us about a total of 78 injuries over a 2-year period.

[b]437 delivery workers completed this survey and told us about a total of 594 injuries over a 2-year period.

Technology that Increases Productivity May Both Improve Safety and Have Unintended Safety Consequences for Workers

Technologies that increase productivity may improve worker safety and, depending on how employers use them, have unintended safety consequences. The National Institute for Occupational Safety and Health (NIOSH) and other organizations and researchers are studying how these technologies affect worker safety, including how employers can safely implement them.[49]

[49]NIOSH was established by the Occupational Safety and Health Act of 1970 as a federal research institute focused on the study of worker safety and health. NIOSH is part of the Centers for Disease Control and Prevention under the Department of Health and Human Services.

Various Technologies Increase Productivity in Warehouses and Delivery Companies

Table 6: Examples of Technologies that Increase Productivity in Warehousing and Last-Mile Delivery

Example
Technologically enhanced order picking One of the most manual aspects of warehouse work is “order picking,” in which workers select products that customers have ordered and place them into boxes. When filling orders, technologically enhanced order picking systems guide warehouse workers to the specific products that they need to select. Technologically enhanced picking systems, for example, may use voice commands over a headset to guide the worker to the right location or to light up an area on a shelf or bin, highlighting the location of the product.
Mobile robots and automated guided vehicles Mobile robots work alongside humans. They may transport a shelf of products to workers and workers then pick the specific products to fill orders. Robots also maytable assist workers in the picking process, selecting the products that do not require much dexterity, while workers pick the more difficult or fragile ones. Automated guided vehicles, such as self-driving forklifts, can move pallets of products around warehouses with limited or no worker involvement.
Handheld scanning devices When stowing inventory or picking products to fill orders, warehouse workers may use handheld devices, such as scanners or smart phones, to scan the barcodes of the products they are handling, which both tracks the location of these products and how fast workers are working. Delivery workers use these devices to scan the barcodes on packages when loading them into vans and again upon delivering them to customers. The device may also track the location of the package and how long it takes the driver to deliver it.
Wearable monitoring devices Wearable devices that track products and monitor worker movements are worn on the body and have embedded sensors that collect, exchange, and analyze data. Wearables used in warehouses and delivery companies include wearable scanners to automatically scan the barcodes on products or packages; armbands or wristbands that monitor worker movement or fatigue; and smart watches, headsets or glasses used in technologically enhanced order picking systems.
Cameras and sensors in delivery vans Delivery vans can be equipped with inward-facing and outward-facing cameras and sensors. Inward-facing cameras and sensors can monitor driver activity inside the van such as whether the driver is looking straight ahead or is distracted. Outward-facing cameras and sensors can detect motion and show activity outside the van such as how closely the van is following other vehicles; how long the van is stopped; and whether the van is traveling within the speed limit. Companies also may use cameras and sensors to monitor and coach drivers on their performance, according to employers we interviewed.

Source: GAO analysis of journal articles, studies, technology websites, and employer interviews; stock.adobe.com (images). | GAO-24-106413

Technologies that Increase Productivity Can Help Prevent and Detect Unsafe Movements, Overexertion, and Unsafe Driving

Employers' use of technologies that increase productivity can also improve warehouse and delivery worker safety in three ways.

- **Preventing injuries.** Employers use various technologies to automate processes, which may also prevent workers from developing musculoskeletal disorders and other injuries. For example, mobile robots or automated vehicles move products and packages around warehouses and delivery companies and reduce walking and lifting for workers, according to five stakeholder and employer interviews and journal articles we reviewed.[50] A representative from a company that provides equipment to warehouses said that autonomous robots retrieve batches of products faster than workers can retrieve specific products while walking through a warehouse. This representative further explained that robot retrieval prevents workers from becoming fatigued due to excessive walking, which in turn decreases the risk of musculoskeletal disorders and injuries from accidents. Moreover, autonomous robots can be programmed to adjust the pace at which they transport batches of products to workers so that workers can more safely and comfortably pick products to fill orders, according to three journal articles we reviewed.[51]

  Employers also may prevent workplace musculoskeletal disorders and injuries by using technologically enhanced picking and delivery processes, according to three employers and one stakeholder we interviewed. For example, two representatives—one from a warehouse and one from a delivery company—said that their companies are experimenting with replacing handheld scanners with newer technologies such as gloves or tags with embedded sensors, which can reduce musculoskeletal disorders to the hand caused by holding scanners. One of these representatives also said that this new technology may prevent drivers from falling or tripping when delivering packages, which can occur when drivers are looking down at the scanner they are holding while walking to a door to drop off a package. The other company's representative told us that guided picking systems, such as pick-by-voice, can reduce musculoskeletal injuries because these systems identify which area within a bin of products to pick from, thus reducing repetitive movements for each pick. These systems also tilt the bins in specific ways to improve workers access to products, according to this representative.

- **Detecting unsafe movement and overexertion.** Wearable technologies can detect workers moving unsafely or let workers know when they are overexerting themselves. Devices, such as heart rate monitors or waist bands, can detect worker fatigue or awkward posture when bending, twisting, or lifting, according

[50]See, for example: Joo Ae Lee, Yoon Seok Chang, and Young Hun Choe, "Assessment and Comparison of Human-Robot Co-Work Order Picking Systems Focused on Ergonomic Factors," *Advances in Safety Management and Human Factors*, ed. Pedro Arezes (Springer, Cham, vol. 604,2017); Sven Winkelhaus and Eric H. Grosse, "Smart Warehouses-A Sociotechnical Perspective," *The Digital Supply Chain*, (Elsevier Inc., 2022).

[51]See, for example, Yaxu Niu and Frederik Schulte, "Human Aspects in Collaborative Order Picking - What if Robots Learned How to Give Humans a Break?," *Advances in Production Management Systems*. *Artificial Intelligence for Sustainable and Resilient Systems,* eds. Alexandre Dolgui, Alain Bernard, David Lemoine, Gregor von Cieminski, David Romero (Springer, Cham, vol. 632, 2021); Jiuh-Biing Sheu and Tsan-Ming Choi, "Can We Work More Safely and Healthily with Robot Partners? A Human-Friendly Robot-Human-Coordinated Order Fulfillment Scheme," *Production and Operations Management* (vol. 32, issue 3, March 2023).

to journal articles we reviewed and four employer and stakeholder interviews.[52] Devices that detect awkward posture, for example, provide vibrational or other immediate feedback each time a worker moves unsafely, letting the worker know they should correct their posture.

A representative from a company that markets safety technology to warehouses said they offer employers a two-pronged ergonomics safety program. First, using wearable devices, they coach employees on how to move safely when performing job tasks. Second, they collaborate with management to identify and re-design hazardous processes using data generated from the wearable devices.

- **Detecting and preventing unsafe driving.** Employers use cameras and sensors on vehicles to detect delivery drivers driving unsafely and to minimize the risk of accidents, according to journal articles we reviewed and five employer and stakeholder interviews.[53] One employer and one stakeholder said that cameras monitoring how delivery drivers are driving can help exonerate them from accidents that are not their fault. The employer also said that his company uses video tapes from cameras to coach drivers on how to drive more safely, but not as the sole source of information to discipline drivers. The stakeholder described how some delivery drivers were initially resistant to constant monitoring while driving, but eventually saw its benefit because they were not blamed for accidents that were not their fault.

Employers' Use of Technologies that Increase Productivity May Harm Workers Due to Reduced Task Variety and Performance Monitoring

Employers' use of technology that increases productivity may harm workers by encouraging worker overexertion and unsafe movements. This may occur if the use of technology results in reduced task variety or continuous monitoring of worker performance.

- **Reduced task variety.** Although automating tasks can reduce injury risk associated with the manual tasks that employers' automated, this decrease may be offset by other injury risks associated with workers performing the remaining, manual tasks more often, according to research we reviewed.[54] For example, when mobile robots transport batches of products to workers standing at workstations, injuries that are associated with excessive walking to retrieve products may decrease. However, at the same time injuries associated with continuously standing in one place picking individual products to fill orders may increase. Our interviews with four stakeholders corroborated this perspective. One stakeholder knowledgeable about warehouse worker safety said that workers feel that automation has made their jobs less safe because

[52]See, for example Vishal Patel et al, "Trends in Workplace Wearable Technologies and Connected-Worker Solutions for Next-Generation Occupational Safety, Health, and Productivity," *Advanced Intelligent Systems,* vol. 4, issue 1 (January 2022); and Eric H. Grosse, "Application of Supportive and Substitutive Technologies in Manual Warehouse Order Picking: A Content Analysis," *International Journal of Production Research*, vol 62, issue 3 (January 2023).

[53]See, for example: Vinod Kumar Shukla, Leena Wanganoo, and Nibhrita Tiwari., "Real-Time Alert System for Delivery Operators Through Artificial Intelligence in Last-Mile Delivery," *Healthcare Informatics for Fighting COVID-19 and Future Epidemics,* (Springer International Publishing, 2022) and Moritz Altenried, "On the Last-Mile: Logistical Urbanism and the Transformation of Labour," *Work Organisation, Labour and Globalisation,* vol. 13, no. 1 (Spring 2019).

[54]See, for example, Hendrik Lager, Alfredo Virgillito, and Tom-Philipp Buchberger, "Digitalization of Logistics Work: Ergonomic Improvements Versus Work Intensification," *Digital Supply Chains and the Human Factor,* ed. Matthias Klumpp and Caroline Ruiner (Springer Cham, January 2021); Beth Gutelius and Nik Theodore, *The Future of Warehouse Work: Technological Change in the U.S. Logistics Industry,* (University of California, Berkeley Center for Labor Research and Education and Working Partnerships USA, 2019); and Winkelhaus and Grosse, *Smart Warehouses*.

they (1) must keep pace with machines and (2) have fewer opportunities for informal breaks because automation means that they are no longer performing different types of tasks.

Our surveys of warehouse and delivery workers asked respondents how often, if at all, automated equipment or processes made it harder for them to work safely. More than half of warehouse workers said that automation usually made it harder for them to work safely (35 out of 57 responses), whereas more than half of delivery drivers said that automation never or hardly affected their ability to work safely (196 out of 354 responses). The differing responses about automation from warehouse workers and delivery workers may reflect that the main tasks associated with delivering packages (driving and walking to drop off packages) are not as automated as tasks associated with handling and packaging products in warehouses.

- **Monitoring worker performance.** Technologies that track the movement of products and packages, coupled with algorithms that automatically measure how quickly workers are working against employer-developed performance expectations may cause workers to overexert themselves, according to researchers.[55] Workers may overexert themselves out of fear that employers will discipline or dismiss them if they fail to meet employer expectations.

  Stakeholders said that employers' use of monitoring tools may harm worker safety in nine of our 15 interviews. According to a representative from a company that consults with employers on worker safety issues, the risk of worker injury has increased at warehouses due to employers pushing workers to work faster. This representative further explained that the cause is twofold, employers raising their performance expectations and using new technologies to automate processes and monitor employees. On the delivery side, the technologies that monitor delivery driving and pace of deliveries may increase safety risks, according to one stakeholder and one company representative we interviewed. The stakeholder said that driver concerns about remaining on schedule per automated delivery instructions may cause them to drive unsafely because they feel rushed. The company representative said that drivers may become distracted while driving and having remote conversations with their supervisors about something the monitoring technology detected.

Our surveys asked warehouse and delivery workers how often, if at all, employers' expectations of performance made it harder for them to work safely.

- 44 out of the 57 warehouse workers who answered this question selected most of the time to all the time; and
- 298 out of the 416 delivery workers who answered this question also selected most of the time to all the time.

Our surveys also asked warehouse and delivery workers how often, if at all, monitoring technologies made it harder for them to work safely.

[55]These technologies include handheld and other types of automatic scanning (such as sensors in gloves and labels with embedded radio-frequency waves), cameras and sensors in vans, and portions of enhanced order picking systems. See Gutelius and Theodore, *The Future of Warehouse Work*; Aiha Nguyen, *The Constant Boss: Labor Under Digital Surveillance,* (Data & Society Research Institute, 2021); and Phoebe V. Moore, "OSH and the Future of Work: Benefits and Risks of Artificial Intelligence Tools in Workplaces," *Digital Human Modeling and Applications in Health, Safety, Ergonomics and Risk Management*, ed. Vincent G. Duffy (Springer, Cham, vol 11581, June 2019).

- 48 out of 54 warehouse workers who answered this question selected most of the time to all the time; and
- 286 out of 405 delivery workers who answered this question also selected most of the time to all the time.

One warehouse worker said that the rate at which their employer expects employees to work is extremely stressful—physically stressful because the pace of work wears their body down and mentally stressful because they fear getting fired if they do not work at the required rate. One delivery driver said that supervisors' productivity demands do not consider real-world variables when drivers are out on the route doing the job. They said this puts continual pressure on drivers to drive faster, even when it is unsafe to do so.

Researchers continue to investigate how technologies that increase productivity may affect worker safety. Several researchers pointed out, for example, that research in this area is ongoing and some also indicated that it has increased in recent years.[56] These articles also stated that more research is needed into the effectiveness of wearables in reducing musculoskeletal injuries, or in how the interaction between humans and robots may affect worker safety.

One research objective of the National Institute for Occupational Safety and Health (NIOSH) is to investigate how musculoskeletal disorders can be reduced in the warehouse and transportation sector and, according to NIOSH officials, this includes researching technologies that increase productivity. Officials also said that NIOSH is researching whether exoskeletons can decrease musculoskeletal disorders among older warehouse workers.[57] In a separate study, NIOSH officials are conducting research on human and robot interaction, with the aim of providing robotic manufacturers with guidelines to reduce human-robot collisions and human worker workloads, and increase human trust in robots.[58]

OSHA Rarely Identifies and Addresses Ergonomic Hazards at Warehouse and Last-Mile Delivery Companies and Faces Challenges Doing So

OSHA Issues Citations for Hazards that Cause Many Injuries, but Rarely Issues Citations for Ergonomic Hazards

OSHA frequently issues citations to employers during its inspections of general warehouses and last-mile delivery companies. However, these citations rarely address ergonomic hazards, the primary cause of

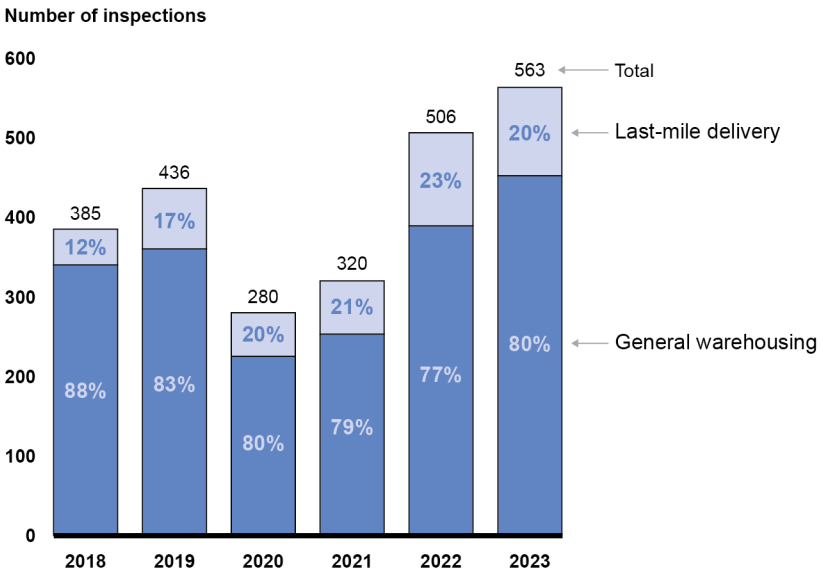
[56]See, for example, Ci-Jyun Liang and Marvin H. Cheng, "Trends in Robotics Research in Occupational Safety and Health: A Scientometric Analysis and Review," *International Journal of Environmental Research and Public Health*, vol. 20, issue 10 (2023); Grosse, "Application of Supportive and Substitutive Technologies;" and Patel et al, *"Trends in Workplace Wearable Technologies*".

[57]In May 2024, NIOSH officials said they had prepared a service contract for preliminary test subjects for this study, which was under internal review. An exoskeleton is a wearable device that can strengthen posture. For example, an exoskeleton worn on the back may help a person lift heavy objects safely.

[58]In May 2024, NIOSH officials said that they had developed a protocol for this study, which was under internal and Office of Management and Budget review.

musculoskeletal disorders. From fiscal years 2018 through 2023, OSHA conducted 2,490 inspections of general warehouses and last-mile delivery workplaces, mostly of general warehouses (see fig. 6).

Figure 6: Number of OSHA Inspections of General Warehouses[a] and Last-Mile Delivery Establishments[b], Fiscal Years 2018-2023



Source: GAO analysis of Occupational Safety and Health Administration (OSHA) Inspection data for selected North American Industry Classification System (NAICS) codes. | GAO-24-106413

Accessible Data for Figure 6: Number of OSHA Inspections of General Warehousesa and Last-Mile Delivery Establishmentsb, Fiscal Years 2018-2023

Number of inspections

	General warehousing number	General warehousing %	Last-mile delivery number	Last-mile delivery %	Total
2018	340	88%	45	12%	385
2019	360	83%	76	17%	436
2020	225	80%	55	20%	280
2021	253	79%	67	21%	320
2022	389	77%	117	23%	506
2023	452	80%	111	20%	563

Source: GAO analysis of Occupational Safety and Health Administration (OSHA) Inspection data for selected North American Industry Classification System (NAICS) codes. | GAO-24-106413

Note: Overall, OSHA conducted fewer inspections in 2020 and 2021, which was during the first 2 years of the COVID-19 national emergency. Because there are no specific NAICS codes for e-commerce warehouses or last-mile delivery companies, our analysis includes companies that are neither e-commerce warehouse nor last-mile delivery companies.

[a]General warehousing includes inspections of 1,927 workplaces in the general warehousing and storage NAICS code (493110) and 92 workplaces in the electronic shopping and mail order houses NAICS code (4541).

[b]Last-mile delivery includes inspections of 471 workplaces in the couriers and messengers NAICS code (492). BLS officials told us that last-mile delivery can be approximated by two NAICS Codes—couriers and express delivery services (492110) and local messengers and local delivery (492210). At the three-digit NAICS level, data from these two more detailed codes are combined as couriers and messengers (492).

OSHA headquarters officials told us that a primary reason OSHA conducts fewer inspections of last-mile delivery companies than general warehouses is because it does not always have jurisdiction to do so. Since

the Department of Transportation may regulate some last-mile delivery vehicles while on the road, those vehicles may not be subject to OSHA's oversight during that time.[59] OSHA headquarters officials said that area offices must work closely with OSHA's solicitor's office to determine whether an incident that occurs while a vehicle is stopped, and a worker is making a delivery, is within OSHA's jurisdiction.

From fiscal years 2018 through 2023, OSHA issued citations to companies in general warehousing and last-mile delivery that included a total of 2,506 violations.[60] Although many of these citations addressed the causes of common injuries identified in BLS data, few addressed hazards associated with musculoskeletal disorders.[61] For example, during this period, OSHA issued citations for violations that included:[62]

- 761 violations of its material handling and storage standard. This standard addresses hazards associated with contact with objects and equipment, such as forklifts, among other things.
- 185 violations of its walking-working surfaces standard. This standard addresses hazards associated with slips and falls as well as falling objects, among other things.[63]
- 11 ergonomic-related general duty clause violations. OSHA issued citations for all 11 of these violations during fiscal year 2023 and none in any of the 5 prior fiscal years.[64]

According to OSHA headquarters officials, the most significant challenge they face in citing ergonomic hazards in general warehouses and last-mile delivery companies is the lack of an ergonomic standard.[65] Without an applicable standard for ergonomics, OSHA must use the general duty clause of the Occupational Safety and Health Act of 1970 to cite a company for exposing its employees to ergonomic hazards, according to OSHA policy.[66] To issue a citation for violating the general duty clause, OSHA guidance requires the following four

[59]See generally 49 C.F.R. pt. 390. The OSH Act does not give OSHA regulatory authority to oversee working conditions that are regulated by other federal agencies. 29 U.S.C. § 653(b)(1).

[60]According to OSHA's Field Operations Manual, OSHA can group multiple violations of individual standards into a single violation if the violations are so closely related that they might constitute a single hazardous workplace condition.

[61]Musculoskeletal disorders, which are primarily caused by ergonomic hazards, accounted for an estimated 49 percent of serious injuries in general warehousing and an estimated 43 percent of serious injuries in last-mile delivery during the 2021/22 reporting period, according to BLS data.

[62]From fiscal years 2018 through 2023, OSHA also issued citations to employers in these industries for other violations of its standards. These included, for example, violations to its electrical standard, exit route and emergency planning standard, and personal protective equipment standard.

[63]We identified three instances in which a grouped violation included violations of both OSHA's material handling and storage standard and OSHA's walking-working surfaces standard.

[64]The employers contested all 11 cited violations, and proceedings for all 11 of the citations were ongoing as of June 2024, according to OSHA headquarters officials. We did not identify any instances of grouped violations related to the general duty clause citations for ergonomic hazards.

[65]Due to the high serious injury and illness rates at warehouses and distribution centers, OSHA implemented a new national emphasis program. This program requires compliance officers to consider if ergonomic hazards exist at any worksite they inspect under it.

[66]OSHA issued a final rule establishing an ergonomics standard in November 2000. Ergonomics Program, 65 Fed. Reg. 68,262 (Nov. 14, 2000). However, a joint resolution of disapproval was enacted on March 20, 2001, which invalidated the rule. Pub. L. No. 107-5, 115 Stat. 7 (2001). Under the Congressional Review Act, if a joint resolution of disapproval of a rule is enacted in accordance with certain procedures set forth in the Act, the rule shall not take effect (or shall not continue in effect). Further, the rule may not be reissued in substantially the same form, and a new rule that is substantially the same as such a rule may not be issued, unless specifically authorized by subsequent law. See 5 U.S.C. §§ 801-802.

elements: (1) the employer failed to keep the workplace free of a hazard to which its employees were exposed; (2) the hazard was recognized; (3) the hazard was causing or was likely to cause death or serious physical harm (including musculoskeletal disorders); and (4) there was a feasible and useful method to correct the hazard—also known as feasible abatement.[67]

OSHA officials told us it is challenging to issue citations under the general duty clause, including for ergonomic hazards, for the following reasons.

- **Evidentiary burden.** The evidence required to support violations under the general duty clause is greater than for violations of existing OSHA standards, according to OSHA officials, because all four elements of the general duty clause must be proven.[68] Feasible abatement is particularly challenging to meet, according to OSHA officials.[69] Feasible abatement means the abatement OSHA proposes will (1) likely correct the hazard and (2) be feasible for the employer to implement.[70] OSHA managers in one area office and compliance officers from three discussion groups told us that it can be difficult when citing ergonomic hazards to determine abatements that meet these criteria. Regarding the first point of correcting hazards, one area office manager said that it can be difficult to find feasible abatements that would correct ergonomic hazards stemming from pace of work. Regarding the second point of feasible implementation, one compliance officer said that redesigning workstations may eliminate ergonomic hazards, such as those associated with bending. However, such an abatement may not be economically feasible for an employer to implement. Area offices often seek assistance from the Regional Ergonomics Coordinator or Ergonomic Response Team for feasible abatements, according to OSHA headquarters officials.
- **Time and resource intensive.** Citing an ergonomics hazard under the general duty clause can also be challenging for OSHA area offices because it requires significant agency resources to document the four elements required to prove the violation, according to OSHA officials and findings from our prior work.[71] While documentation varies by case, OSHA may compile this documentation by analyzing injury data, observing work processes, gathering witness statements, recording videos, and taking measurements of worker movements, according to OSHA's Field Operations Manual.

  Since OSHA must issue citations within 6 months from the date of a violation, it has a relatively short span of time to develop this documentation, according to OSHA headquarters officials.[72] Managers in four area offices said that citing ergonomic hazards can reduce the resources an office has available to conduct other inspections. For example, a manager in one area office said that issuing even as few as two ergonomic citations would represent a busy year for the area office because the compliance officer on the

[67]U.S. Department of Labor, Occupational Safety and Health Administration, *Field Operations Manual*, CPL 02-00-164 (Washington, D.C.: Apr. 14, 2020), Chapter 4, Section III.A.

[68]OSHA officials include managers in six area offices, compliance officers from four discussion groups, and OSHA headquarters officials.

[69]OSHA officials include managers in one area office, compliance officers from three discussion groups, and OSHA headquarters officials.

[70]U.S. Department of Labor, OSHA, *Field Operations Manual*, Chapter 4, Section III.B.

[71]These officials include managers in five areas offices, compliance officers from one discussion group, and OSHA headquarters officials. See also GAO, *Workplace Safety and Health: Multiple Challenges Lengthen OSHA's Standard Setting,* GAO-12-330 (Washington, D.C.: Apr. 2, 2012) and *Workplace Safety and Health: Data and Enforcement Challenges Limit OSHA's Ability to Protect Workers during a Crisis,* GAO-22-105711 (Washington, D.C.: May 25, 2022).

[72]See 29 U.S.C. § 658(c).

case could be removed for a significant amount of time from the pool of compliance officers who are available to conduct inspections. Ergonomic experts and attorneys in OSHA's regional and national offices would also spend time on these cases because they are heavily involved in developing and reviewing ergonomic citations, according to OSHA guidance. Given the time and resource intensive nature of these cases, OSHA headquarters officials told us that the agency must consider the strength of the facts and circumstances of each specific case when deciding whether to pursue a citation for an ergonomic hazard.

In situations where OSHA does not have a standard, such as for ergonomic hazards, OSHA can issue a hazard alert letter instead of a citation under the general duty clause. This can occur if all four elements of a general duty clause violation cannot be established, yet the Area Director determines that the hazard warrants some type of notification, according to OSHA headquarters officials and OSHA's Field Operations Manual. These letters describe the hazard that exists and suggest corrective actions to address the hazard, according to OSHA's Field Operations Manual. While employers have no legal obligation to correct the hazard, OSHA may use the hazard alert letter as evidence when considering a subsequent general duty clause violation, according to OSHA headquarters officials.

Compliance officers from four discussion groups said that it can be easier to issue a hazard alert letter for ergonomic hazards than to issue a citation under the general duty clause. OSHA issued 28 hazard alert letters between fiscal years 2018 and 2023 to companies in general warehousing and last-mile delivery for ergonomic hazards, according to OSHA inspection data.[73] Although an alert letter does not have the same evidentiary burden as a general duty clause citation, managers in two area offices said that the process can be time and resource intensive because compliance officers must develop and gather similar evidence to determine if an ergonomic hazard exists.

Identifying Ergonomic Hazards Can Be Challenging Due to Limited Injury Data and Training

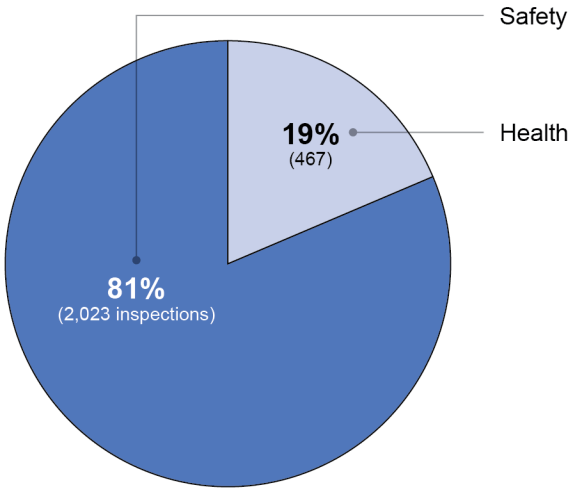
Managers in five area offices and compliance officers from four of our six discussion groups said that compliance officers would benefit from having additional data on musculoskeletal injuries that occurred in workplaces. Also, managers in all six area offices and compliance officers from five discussion groups said compliance officers would benefit from additional training on how to identify and assess the severity of these hazards during inspections.

Because it is not possible to address ergonomic hazards without first identifying them, it is important that OSHA's safety and health compliance officers have sufficient injury data and training to be able to do so. The majority of OSHA's warehouse and last-mile delivery inspections from fiscal years 2018 through 2023 were safety inspections (see fig. 7). OSHA safety compliance officers may identify potential ergonomic hazards during safety inspections and seek to open a health inspection that can fully assess and address them. As such, it is important that safety compliance officers have both sufficient injury data and training to effectively

[73]Ten of the 28 ergonomic hazard alert letters were issued to workplace establishments that also received an ergonomic citation under the general duty clause. OSHA headquarters officials explained that this can occur when multiple ergonomic hazards exist at an establishment, some that warrant a general duty clause citation and others that warrant an alert letter.

recognize when a potential ergonomic hazard exists.[74] It is also important that health compliance officers have sufficient injury data and training because they—with the help of OSHA experts, as necessary—may be tasked with (1) substantiating the potential ergonomic hazards identified during safety inspections and (2) determining the severity of these hazards and, if warranted, how to address them.

Figure 7: Type of OSHA Inspections of General Warehouses[a] and Last-Mile Delivery[b] Workplaces, Fiscal Years 2018-2023



Source: GAO analysis of Occupational Safety and Health Administration (OSHA) inspection data for selected North American Industry Classification System (NAICS) codes. | GAO-24-106413

Accessible Data for Figure 7: Type of OSHA Inspections of General Warehousesa and Last-Mile Deliveryb Workplaces, Fiscal Years 2018-2023

	Number of inspections	Percentage of total
Safety	467	19%
Health	2,023	81%

Source: GAO analysis of Occupational Safety and Health Administration (OSHA) inspection data for selected North American Industry Classification System (NAICS) codes. | GAO-24-106413

Note: Because there are no specific NAICS codes for e-commerce warehouses or last-mile delivery companies, our analysis may include companies that are neither e-commerce warehouse nor last-mile delivery companies.

[a]General warehousing includes inspections of 1,927 establishments in the general warehousing and storage NAICS code (493110) and 92 establishments in the electronic shopping and mail order houses NAICS code (4541).

[b]Last-mile delivery includes inspections of 471 establishments in the couriers and messengers NAICS code (492). BLS officials told us that last-mile delivery can be approximated by two NAICS codes—couriers and express delivery services (492110) and local messengers and local delivery (492210). At the three-digit NAICS level, data from these two more detailed codes are combined as couriers and messengers (492).

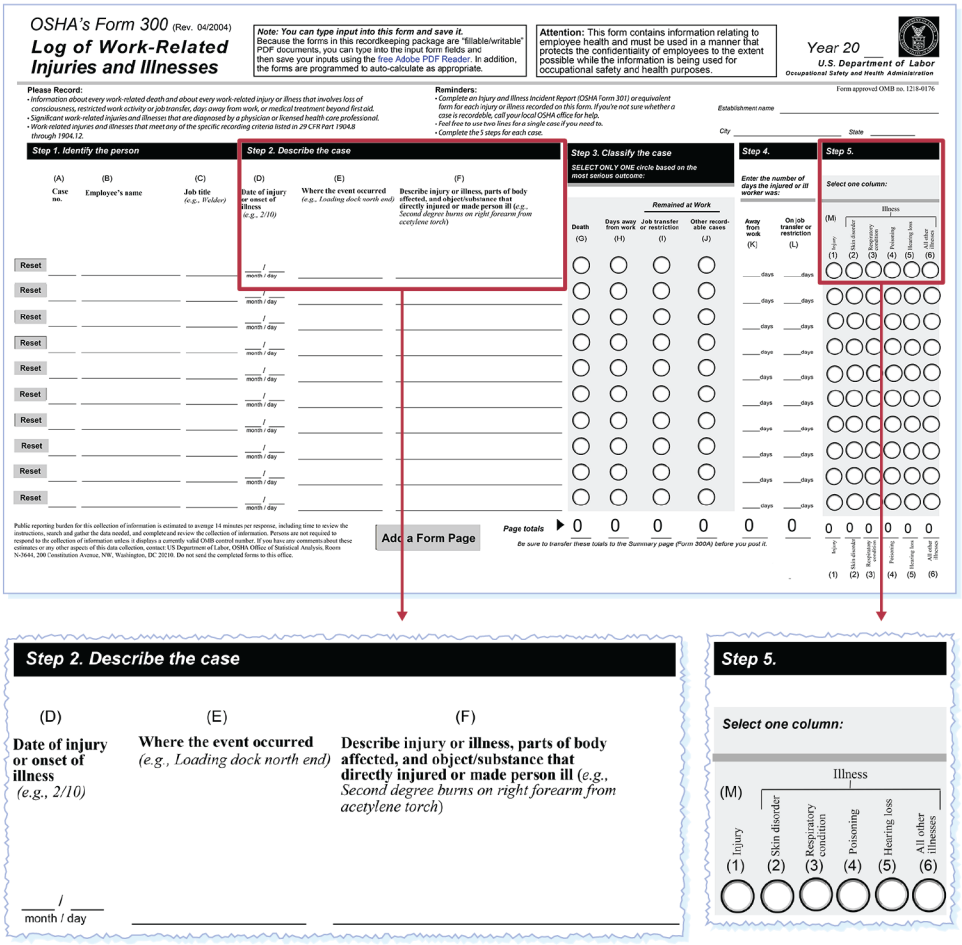
According to OSHA's Field Operations Manual, compliance officers use several methods to identify hazards during inspections including: (1) reviewing OSHA recordkeeping forms that employers maintain on-site, (2) interviewing workers, and (3) conducting a walkaround inspection.

Review employer-maintained OSHA recordkeeping forms. At the start of each inspection, compliance officers should review an employer's recordkeeping forms—the OSHA Form 300 logs, Form 300A summaries,

[74]To open a separate health inspection, safety compliance officers make a referral to their Area Director based on the evidence they developed of the potential ergonomic hazard during the safety inspection. The Area Director will consult the Regional Solicitor's Office to obtain a warrant because employers may contest OSHA opening this new inspection on grounds that it is unwarranted. See U.S. Department of Labor, OSHA, *Field Operations Manual*, Chapter 15, Section III.A.

and Form 301 incident reports—for the last 3 calendar years to determine what, if any, injuries have occurred in the establishment as well as their reported causes.[75] Compliance officers from three discussion groups told us that knowing the cause of an injury is important because it can help identify trends indicating that hazards may exist. Compliance officers from all six discussion groups said that among OSHA's recordkeeping forms, it was most useful to review the Form 300 log because it should reflect all injuries and illnesses that meet OSHA's definition of a work-related injury, and it briefly describes what caused each injury or illness (see fig. 8).

Figure 8: OSHA's Form 300 Log of Work-Related Injuries and Illnesses



Source: GAO analysis of Occupational Safety and Health Administration (OSHA) Form 300. | GAO-24-106413

Accessible Data for Figure 8: OSHA's Form 300 Log of Work-Related Injuries and Illnesses

GAO graphic shows a highlighted portion of OSHA's Form 300

Step 2. Describe the case

- D) Date of injury or onset of illness

[75]U.S. Department of Labor, OSHA, *Field Operations Manual*, Chapter 3, Section VI.A.

- E) Where the event occurred (e.g., Loading dock north end)
- F) Describe injury or illness, parts of body affected, and object/substance that directly injured or made person ill (e.g., Second degree burns on right forearm from acetylene torch)

Step 5. Select one column

1. Injury
2. Skin disorder
3. Respiratory condition
4. Poisoning
5. Hearing loss
6. All other illnesses

Source: GAO analysis of Occupational Safety and Health Administration (OSHA) Form 300. | GAO-24-106413

On the Form 300 log, employers complete the open-ended description column for each injury and illness. These brief descriptions often lack sufficient details, making it challenging for compliance officers to identify the hazard contributing to the injury, such as if an injury was caused by poor ergonomics, according to compliance officers from four discussion groups and managers in two interviews. One group of compliance officers said that some companies use software with drop-down options to complete the description section. Although these options tend to describe the injury, they do not always sufficiently describe what caused it. For example, one compliance officer explained that an injury, such as a sprained wrist, could be caused by poor ergonomics or by a cause unrelated to ergonomics, such as a fall.[76]

Compliance officers from three discussion groups also said that they can request a Form 301 incident report to learn about the cause of a specific injury. Compliance officers use their discretion when requesting these forms, according to compliance officers from three discussion groups and area office managers in five interviews. An area office manager said, for example, that compliance officers typically only pull incident reports if they see the same injury reported multiple times on the Form 300 log. Because, as BLS data shows, musculoskeletal disorders can occur throughout the body, compliance officers may not discern a trend if the log simply lists injuries to various body parts but does not describe what caused them. If a compliance officer cannot identify a musculoskeletal injury trend, then they may miss potential ergonomic hazards in a workplace.

As shown in Figure 8 above, the OSHA Form 300 log has one column for all injuries and five columns for various illnesses. Adding a column to this form specifically for musculoskeletal injuries would help compliance officers identify this type of injury and whether a trend exists, according to OSHA officials.[77]

OSHA revised the Form 300 log to include a column for musculoskeletal disorders in 2001 but the revision has not gone into effect.[78] Our prior work found that since 2010, OSHA has attempted to restore this column.[79]

[76]If employers fail to adequately complete the OSHA Form 300 log, OSHA may issue a citation. See 29 C.F.R. § 1903.14.

[77]Managers in five area offices, compliance officers from four discussion groups, and OSHA headquarters officials shared this opinion with us.

[78]In 2003, OSHA deleted the column after determining the column was not necessary or supported by the record. 68 Fed. Reg. 38,601, 38,603 (June 30, 2003).

[79]See GAO-16-337.

However, restoring this column remains on the agency's long-term regulatory agenda. OSHA headquarters officials said competing priorities have prevented progress on restoring this column.

Federal internal control standards call for agencies to use quality information that is complete, accurate, and accessible.[80] Improving the accessibility of the information available to compliance officers about these injuries, by either adding a column to OSHA recordkeeping forms or in some other way that OSHA deems appropriate, can potentially help the agency better identify and address when this hazard occurs.[81]

Interviews with workers. Interviews provide an opportunity for compliance officers to gather information from workers about hazardous workplace conditions and underreported injuries, according to OSHA's Field Operations Manual and Recordkeeping Policies and Procedures Manual. Typical questions compliance officers may ask include whether and how: (1) the worker became injured, (2) the employer addressed the worker's injury, and (3) the employer addressed the workplace hazard that caused the injury.

Compliance officers from three discussion groups and managers in six area offices said that worker interviews can provide useful information about ergonomic and other hazards because workers can provide information beyond what is on the recordkeeping forms, such as first aid incidents or unreported injuries. Some also said that sometimes these interviews may produce only limited information about hazards. For example, managers in two area offices said that some workers may not be forthcoming during interviews because they are uncomfortable speaking with representatives of the government. One compliance officer also told us that she does not necessarily ask about ergonomic hazards during worker interviews when musculoskeletal injuries are not listed on the Form 300. However, as previously noted, musculoskeletal disorders may be underreported on OSHA forms for a variety of reasons.

Conduct a walkaround inspection. When walking around an establishment, compliance officers may determine if ergonomic hazards exist by talking to workers and observing how they perform their job tasks and taking videos and measurements of worker movements.

OSHA Training Courses that Include Ergonomics

As part of new hire training

Health compliance officers are required to take a course on OSHA's health standards, which contains a one-hour overview lesson on musculoskeletal disorders, physical stressors, repetitive work tasks that lead to musculoskeletal disorders, and ergonomic controls, according to OSHA headquarters officials.

Safety compliance officers are required to take one course from another area of expertise (i.e., health or construction) within their first 3 years in the role. From the health discipline, compliance officers have two courses to choose from. The first option is a course on identifying health hazards during safety inspections. This course mentions ergonomic hazards in the introduction but does not have a lesson on them, according to OSHA headquarters officials. The second option is the course on OSHA's health standards that is mandatory for health compliance officers. As noted above, this course contains a one-hour lesson on ergonomics. OSHA headquarters officials said that safety compliance officers are more likely to take the first course. However, Area Office

[80]GAO-14-704G.

[81]OSHA recordkeeping regulations generally requires employers with a minimum number of employees or that are in certain industries to submit the information contained in one or all recordkeeping forms electronically to OSHA once per year. See C.F.R. § 1904.41. Officials told us that they were still determining how they will be able to use the injury data on these forms for enforcement purposes, including whether they would analyze it to determine the prevalence of specific types of injuries.

supervisors can opt to have safety compliance officers take the health standards course based on the needs of the office.

The OSHA Training Institute offers an in-person, 3-day elective course on ergonomics and musculoskeletal disorders. This course covers the use of ergonomic principles to recognize, evaluate, and control hazards that cause or contribute to musculoskeletal and nerve disorders. This course is open to all compliance officers and is generally offered once per year, according to OSHA headquarters officials.

The annual safety and health training that compliance officers take to protect themselves and others during inspections includes ergonomics. OSHA headquarters officials said that compliance officers can apply the ergonomic principles from this training to their inspections.

Source: GAO analysis of OSHA Instruction TED 01-00-019, Mandatory Training Program for OSHA Compliance Personnel and OSHA interviews. | GAO-24-106413

OSHA provides compliance officers with ergonomic training and access to experts to help them carry out these functions. OSHA headquarters officials told us that its goal is to ensure that both safety and health compliance officers receive sufficient training to identify potential ergonomic hazards during inspections (see sidebar). If compliance officers develop credible evidence of a potential ergonomic hazard, OSHA guidance directs them to consult with ergonomic experts located in OSHA regional offices or headquarters. Many Regional Ergonomics Coordinators are experienced in conducting ergonomics investigations, according to OSHA headquarters officials. Additionally, they can serve as liaisons to the national office to help compliance officers access resources and expertise from ergonomists, medical professionals, and solicitors, according to OSHA headquarters officials. These experts help the area office determine if and how OSHA should address the potential hazard, which compliance officers from three discussion groups and managers in three area offices said is valuable assistance.

Compliance officers from four discussion groups also said it can be challenging to identify and assess the severity of potential ergonomic hazards during walkaround inspections because they received insufficient training on ergonomics. Managers in four interviews agreed.

OSHA conducts training on identifying and assessing ergonomic hazards (see sidebar). However, the agency generally does not require compliance officers to take these trainings. Moreover, our work at area offices indicates that many compliance officers may not take these trainings either because OSHA prioritizes other courses for compliance officers, or the existing ergonomics training is inaccessible.[82]

- During interviews, managers in five area offices told us that some compliance officers may have limited or no training in detecting and assessing ergonomic hazards. Managers in three area offices said that they have many safety compliance officers who were recently hired and lack OSHA training about how to recognize ergonomic hazards.[83] Managers from two of those area offices said that new compliance officers must complete their initial training courses before they can take the more specialized ergonomics course as an elective. Additionally, managers in two area offices said that they each have only one health compliance officer who has taken an OSHA elective ergonomic course, and they would like others to take this course in the future. Last, one manager said their area office does not have any compliance officers

[82]Health compliance officers are required to take one course that includes a lesson on ergonomics. Safety compliance officers are not required to take that course. See the sidebar for more information.

[83]Newly hired compliance officers must complete a minimum of eight OSHA courses within their first 3 years in the role. These courses include a one-hour required ergonomics lesson for health compliance officers and only a brief mention of ergonomics in the introduction of one of the classes for safety compliance officers. See sidebar for more information on OSHA courses on ergonomics.

with ergonomic expertise because OSHA has not emphasized ergonomics since the ergonomic standard was withdrawn in the early 2000s.

- Similarly, compliance officers from three discussion groups told us that they received little training on how to identify ergonomic hazards when walking around establishments. One safety compliance officer who had completed her initial, required OSHA training courses more than a decade ago, said that it would be challenging for her to determine during a walkaround inspection whether warehouse workers were exposed to ergonomic hazards because some ergonomic risk factors, such as repetitive motion, are not obvious. A health officer said that she would like to receive formal ergonomics training but to date has not. This officer also said that she can access her colleagues' expertise on ergonomics if she conducts a health inspection to determine if ergonomic hazards exist, but three area office managers said that such expertise may not exist in all offices. A compliance officer from another discussion group said that it can be difficult to attend elective in-person training courses because of funding constraints. OSHA's 3-day course on ergonomics is an elective, in-person course.

OSHA headquarters officials told us that there is low demand from area offices to attend its 3-day course on ergonomics and musculoskeletal disorders. However, managers from five area offices and compliance officers from five discussion groups said additional training would be beneficial. This suggests that there may be more interest in ergonomics training that is more accessible to compliance officers.

According to federal internal control standards, agencies should demonstrate a commitment to recruit, develop, and retain competent individuals to achieve agency objectives.[84] Providing compliance officers with additional training to help them identify and assess ergonomic hazards, which can cause nearly half of all serious injuries in warehouses and last-mile delivery companies, may enhance OSHA's ability to achieve its objective of assuring safe and healthful working conditions.

Addressing Ergonomic Hazards Can Be Challenging Due to Limited Guidance and Follow-Up on Enforcement Actions

OSHA provides compliance officers and employers with guidance to help them identify, assess, and address ergonomic hazards.[85] We identified examples of ergonomic guidance that OSHA could improve, based on our reviews of the guidance and our discussion groups with compliance officers, interviews with employers, industry stakeholders, and OSHA area office managers. Unclear guidance can be challenging to use because it may be difficult to apply, and outdated guidance can be challenging to use because it may no longer be relevant.

Unclear guidance. Compliance officers from two of our six discussion groups and two employers said that they would like OSHA's guidance about ergonomic hazards to be more straightforward.

- A compliance officer in one discussion group said that an illustrated guide that shows the correct and improper ways to move would be helpful. One employer would like to have scenario-based guidance about common ergonomic hazards that includes specific measures an employer could take that would reduce or

[84]GAO-14-704G.

[85]When evaluating ergonomics, compliance officers consult both OSHA internal guidance and publicly available guidance directed to employers, according to OSHA officials.

eliminate hazards. Another employer suggested that OSHA revise its guidance into shorter, more engaging formats with simple wording and a few key points.

- The OSHA Technical Manual directs compliance officers to investigate potential ergonomic hazards when the employer's rate of back or other musculoskeletal disorders appears excessive.[86] Since excessiveness is relative, the guidance directs compliance officers to look for trends that show increases in either the number of back injuries or the severity of back injuries. However, this guidance focuses exclusively on back disorders and injuries while musculoskeletal disorders can occur throughout the body. Additionally, compliance officers from three discussion groups said that it can be difficult to determine what is needed by OSHA's Solicitor's Office to pursue a citation. One safety compliance officer said it would be helpful to have clear guidance on when to issue a referral for an ergonomic assessment. Without this guidance, the compliance officer said they generally do not make a referral unless their supervisor specifically asked them to.

Limited industry-specific and outdated guidance. OSHA has specific ergonomic guidance for some industries (such as poultry processing and nursing homes); limited guidance specific to warehousing; and no guidance specific to last-mile delivery.[87] OSHA headquarters officials said that other existing guidance, such as its material handling guidelines, can generally be applied to many industries by compliance officers and employers.[88] OSHA headquarters officials also told us the agency prioritizes industry-specific ergonomic guidance for industries with unique hazards or high rates of injury, such as healthcare which includes jobs that requires workers to lift patients. However, both general warehousing and last-mile delivery have significantly higher rates of musculoskeletal injuries compared to all private industry. This suggests that these workplaces could also be a priority for developing specific ergonomic guidance. Moreover, two employers, two stakeholders, and managers from one area office told us that industry-specific ergonomic guidance would be helpful for general warehousing and last-mile delivery.

We also found that most of OSHA's ergonomic guidance was published in the 1990s or 2000s. As a result, two stakeholders and one employer said that OSHA's existing ergonomic guidance is outdated and does not reflect the current general warehousing and last-mile delivery environments. For example, OSHA's guidance does not reflect advances in technology that may impact workers. OSHA headquarters officials told us that technology changes may be relevant when conducting ergonomic inspections. Additionally, while employers' production expectations combined with technology may lead to employees working at unsafe speeds, compliance officers from three discussion groups said they are unable to address unsafe pace of work in these industries.[89]

[86]U.S. Department of Labor, Occupational Safety and Health Administration, *OSHA Technical Manual,* TED 01-00-015, Section VII: Chapter 1.

[87]U.S. Department of Labor, Occupational Safety and Health Administration, *Grocery Warehousing eTool*, accessed June 5, 2024. https://www.osha.gov/etools/grocery-warehousing.

[88]Department of Health and Human Services, National Institute for Occupational Safety and Health, *Ergonomic Guidelines for Manual Material Handling,* DHHS (NIOSH) Publication No. 2007-131 (April 2007). This document was developed for managers and supervisors in industries that involve the manual handling of containers. It offers suggestions to improve the handling of rectangular, square, and cylindrical containers, sacks, and bags.

[89]The remaining three discussion groups of compliance officers did not discuss guidance related to addressing pace of work. Additionally, OSHA headquarters officials told us that when assessing the severity of ergonomic hazards, compliance officers focus primarily on physical risks (the combination of weight, posture, and repetition), while pace is considered a secondary contributor to ergonomic hazards.

According to federal internal control standards, agencies should communicate quality information to internal stakeholders to achieve agency objectives. Providing compliance officers with improved, updated guidance on ergonomic hazards may help them better identify, assess the severity of, and address these hazards. These standards also say that agencies should communicate quality information to external stakeholders to achieve agency objectives.[90] Providing employers with updated, industry-specific guidance on ergonomic hazards may help them better design their work processes and thereby reduce musculoskeletal injuries. By providing improved guidance to both compliance officers and employers OSHA may enhance its ability to achieve its objective of assuring safe and healthful conditions for the nation's workforce.

Limited follow-up on ergonomic alert letters. OSHA's policies on issuing Ergonomic Hazard Alert Letters require (1) area offices to follow-up with employers a year after issuing these letters to determine whether employers have corrected ergonomic hazards and (2) regional offices to track follow-up actions conducted by the area office. However, OSHA has not conducted all the required tracking and follow-up. As of February 2024, we found that OSHA should have followed up on and tracked 13 of the 28 ergonomic alert letters OSHA issued from fiscal year 2018 through 2023.[91]

- Nine letters were not tracked by regional offices. Seven of the 10 OSHA regional offices do not have formal procedures to track follow-up, according to OSHA headquarters officials. As a result, we were unable to determine if area offices conducted follow-up with the employer on those nine letters.
- Three letters were tracked by regional offices, but the area offices did not follow up with the employer.
- One letter was tracked by the regional office and the area office followed up with the employer, as required.

Follow-up actions by area offices are important because OSHA can use these alert letters as evidence to help support a citation if these hazards are not addressed, according to OSHA officials and OSHA's Field Operations Manual.[92] According to federal internal controls, agencies should remediate deficiencies in the implementation of their policies and procedures on a timely basis.[93] By ensuring that regional and area offices follow-up on hazard alert letters, as OSHA policy requires, the agency will be in a better position to ensure the safety and health of the nation's workforce.

OSHA Has a New Warehouse and Distribution Center Inspection Program but Has Limited Plans to Evaluate It

In October 2023, OSHA began a nationwide emphasis program on warehouses and distribution centers that requires compliance officers to consider whether ergonomic hazards exist at establishments they inspect under

[90]GAO-14-704G.

[91]OSHA has not yet required follow-up on these 15 hazard alert letters because (1) at the time of our review, it had been less than a year since these letters were issued or (2) in addition to the letter, OSHA had also issued citations during these inspections and employers were contesting those citations. According to OSHA officials, area offices are not required to follow-up on hazard alert letters until litigation about those citations is completed.

[92]OSHA officials include two area office managers, compliance officers from two discussion groups, and OSHA headquarters officials.

[93]GAO-14-704G.

this program.[94] (See sidebar for a description of this program.) Prior to this program, OSHA did not explicitly require compliance officers to look for ergonomic hazards during every inspection.[95]

OSHA's National Emphasis Program on Warehousing and Distribution Center Operations

OSHA began its National Emphasis Program on Warehousing and Distribution Center Operations, an inspection program, in October 2023 because of high serious injury rates in the warehousing, postal, and local delivery industries, among others. The program is scheduled to expire in July 2026 unless OSHA decides to extend it.

All inspections OSHA initially conducts under this program will be safety inspections, focusing on common hazards, such as unsafe operation of forklifts and other powered industrial vehicles, unsafe walking surfaces, and hazards related to poor ergonomics or excessive heat. Because these inspections are safety inspections, if compliance officers identify potential ergonomic or heat hazards during the inspection, OSHA must open a separate health inspection to substantiate the hazard and if warranted, address it by issuing a hazard alert letter or a citation under the general duty clause to the employer.

To implement this Emphasis Program, OSHA identified 1,806 general warehousing and last mile delivery establishments for potential inspection. If area offices inspect all of these establishments, OSHA will have inspected more than three times as many general warehousing and last-mile delivery establishments in fiscal year 2024 as in fiscal year 2023.[1] The actual number of inspections that area offices will conduct during this period will depend on area offices' available resources and the number of inspections area offices are expected to complete under all inspection programs.

[1]As shown in figure 6, OSHA conducted 563 inspections of general warehouses and last mile delivery companies in fiscal year 2023. These data include 21 inspections under the North American Industry Classification System (NAICS) code electronic shopping and mail order houses (4541). OSHA's warehouse and distribution center emphasis program does not include establishments under this NAICS code.

Source: GAO analysis of OSHA Directive CPL 03 00-026 and related documentation provided by OSHA. | GAO-24-106413

To prepare compliance officers for these inspections, OSHA headquarters officials told us that it provided compliance officers with training on how to identify potential ergonomic hazards and the types of ergonomic hazards found in these industries. However, managers from four area offices told us their compliance officers needed more training to conduct these inspections. For example, managers from two area offices said this training simply described the key elements of the directive and did not provide enough detail about ergonomic hazards. Further, compliance officers from four discussion groups said that they felt comfortable identifying potential health hazards related to heat, as required by the program, but not ergonomic hazards. Because compliance officers face challenges identifying and assessing the severity of ergonomic hazards due to insufficient training and guidance, requiring compliance officers to look for ergonomic hazards during inspections without providing them with the knowledge and resources for doing so may not be sufficient.

[94]National emphasis programs focus OSHA inspection resources on certain hazards (such as heat or combustible dust) or high-hazard industries (such as trenching and excavation, shipbreaking, and now warehousing and distribution centers). Under these programs, OSHA inspects a number of workplaces each year that meet the program's criteria.

[95]Compliance officers from three discussion groups told us that because OSHA initiated most warehouse and delivery company inspections in response to worker complaints, a fatality, or catastrophic event, it would limit the scope of the inspection to work processes associated with that specific complaint, fatality, or event. Compliance officers may obtain a warrant to broaden the scope of the inspection if they have a reasonable belief, based on specific evidence, that violative conditions can be found in other areas of the workplace, according to OSHA's Field Operations Manual.

OSHA officials told us that OSHA plans to conduct annual reviews of this emphasis program but does not plan to evaluate the extent to which the program is helping area offices better identify and assess the severity of ergonomic hazards. The annual reviews will focus on specific quantitative outcomes such as the number of: (1) establishments OSHA inspected; (2) hazards OSHA identified; and (3) abatements employers implemented, according to the program's instructions and OSHA headquarters officials. OSHA headquarters officials told us that the annual reviews will allow the agency to determine the effectiveness of the program and, as necessary, modify how it selects establishments for inspection. OSHA headquarters officials also said that they will use these annual reviews to determine whether to continue the program past its expiration date of 2026.

While these reviews may provide useful data to OSHA, they may not help it determine whether compliance officers are effectively identifying, assessing, and addressing ergonomic hazards in these industries. This is because OSHA's reviews do not include assessing the injury data, training, and guidance compliance officers rely on when making these determinations nor how compliance officers use these tools. An evaluation study of its new warehouse and distribution center program, conducted after OSHA has taken steps to improve its injury data, training, and guidance, would allow the agency to determine if it is better protecting warehouse and delivery workers from ergonomic hazards.

According to federal internal control standards, management should both conduct ongoing monitoring of programs and separate evaluation studies.[96] Moreover, evaluation studies should identify deficiencies in policies and procedures and recommend and document appropriate corrective actions. In addition, OMB Memorandum M-20-12 identifies practices agencies should use for program evaluation, which includes engaging key stakeholders and including qualitative approaches in addition to quantitative approaches when evaluating programs.[97] By conducting a full evaluation of the program that engages compliance officers and area office managers about how well they identify and address ergonomic hazards, OSHA will be better positioned to determine the efficacy of its existing efforts to identify and address ergonomic hazards and if and how it may improve those efforts in order to better protect warehouse and delivery workers from ergonomic hazards.

Conclusions

OSHA has increased its' efforts to prevent hazards in the warehouse and last-mile delivery industries. However, the agency faces challenges identifying and addressing ergonomic hazards, which cause the most common worker injury in both industries—musculoskeletal disorders. Resolving these challenges is especially important because the technologies that employers rely on to enhance productivity may also unintentionally increase the risk of ergonomic hazards. By improving data on OSHA recordkeeping forms, increasing ergonomic training, and updating ergonomic guidance and follow-up on enforcement actions, OSHA may be better able to identify and address these hazards at warehouses and delivery companies and more fully protect workers from serious physical harm.

Once OSHA takes steps to improve injury data, training, and guidance, it is critical that the agency evaluate its new warehouse and distribution center emphasis program to determine if it has sufficiently addressed the challenges identified in this report. If this evaluation shows that OSHA continues to face challenges protecting

[96]GAO-14-704G.

[97]Office of Management and Budget, *Program Evaluation Standards and Practices.*

warehouse and delivery workers from ergonomic hazards, the agency should determine and document additional steps it will take to resolve them. By conducting a full evaluation of the program that engages compliance officers and area office managers, OSHA can better determine the efficacy of its existing efforts to identify and address ergonomic hazards and how it can improve those efforts.

Recommendations for Executive Action

We are making five recommendations to the U.S. Department of Labor.

- The Secretary of Labor should ensure that the Assistant Secretary of Labor for Occupational Safety and Health ensures that OSHA compliance officers can easily obtain data during inspections on when musculoskeletal disorders occurred. This could include adding a column for musculoskeletal injuries to OSHA recordkeeping forms. (Recommendation 1)
- The Secretary of Labor should ensure that the Assistant Secretary of Labor for Occupational Safety and Health increases training on identifying and assessing ergonomic hazards for compliance officers who inspect worksites under OSHA's National Warehouse and Distribution Center Emphasis Program. This may include making elective ergonomic courses required courses for some officers; adding new courses or ergonomic components to existing courses; or making existing courses more accessible, for example, by increasing their frequency or offering them online. (Recommendation 2)
- The Secretary of Labor should ensure that the Assistant Secretary of Labor for Occupational Safety and Health review and make needed changes to OSHA's internal and publicly available guidance that compliance officers and employers use to identify, assess, and address ergonomic hazards. This may include clarifying existing guidance and providing more current, industry-specific guidance. (Recommendation 3)
- The Secretary of Labor should ensure that the Assistant Secretary of Labor for Occupational Safety and Health conducts timely follow-up with establishments that were issued an ergonomic hazard alert letter, as required by OSHA policy, to determine if establishments have taken corrective actions. This may include regional offices developing formal procedures for tracking ergonomic hazard alert letters. (Recommendation 4)
- The Secretary of Labor should ensure that the Assistant Secretary of Labor for Occupational Safety and Health: (1) formally evaluates how well OSHA's national emphasis program for warehouses and distribution centers helps compliance officers identify, assess, and address ergonomic hazards; and (2) determines and documents next steps to correct any deficiencies detected. (Recommendation 5)

Agency Comments

We provided a draft of this report to the Department of Labor (DOL) and the Department of Health and Human Services (HHS) for review and comment. The Occupational Safety and Health Administration (OSHA) provided comments for DOL, which are reproduced in appendix II. HHS provided technical comments, which we incorporated as appropriate.

In its written comments, OSHA said that some of the recommendations, if implemented, may help better protect warehouse and delivery workers from ergonomic hazards. OSHA also expressed concerns that parts of our recommendations may not be practical to implement due to resource constraints and may not have a

significant impact on worker protection. OSHA provided specific comments on two of the five recommendations:

Our first recommendation stated that OSHA should ensure compliance officers can easily obtain musculoskeletal injury data during inspections. We included a suggestion that OSHA insert a column for these injuries on its recordkeeping forms as one way to easily obtain musculoskeletal injury data. In its comments OSHA stated that inserting this column remains on its long-term regulatory agenda. However, OSHA also stated that completing the regulatory actions necessary to add such a column would divert resources from other current regulatory priorities. OSHA also commented that it expects to receive more information on musculoskeletal and other injuries from certain employers who have been required to report case-level injury data electronically to OSHA headquarters since March 2024. Although OSHA did not indicate if or how it will use this additional information during inspections, it stated that it will describe the specific actions it will take to implement all of our recommendations in its Statement of Executive Action (which it is required to submit within 180 days of this report's publication).

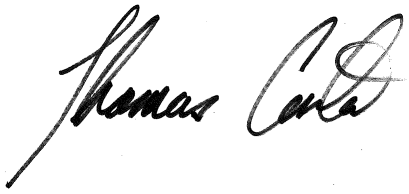
Our third recommendation stated that OSHA should review and make needed changes to its internal and publicly available guidance that compliance officers and employers use to identify, assess, and address ergonomic hazards. We included suggestions for possible ways to do this, including clarifying existing guidance and providing more current, industry-specific guidance. In its comments, OSHA stated that it plans to review its publicly available ergonomic guidance in fiscal year 2025, updating it when warranted and when resources are available to do so.

OSHA disagreed that there is a need for industry-specific ergonomic guidance for warehousing and delivery work, stating that the agency prioritizes industry-specific ergonomic guidance for industries with unique hazards. Nevertheless, our recommendation included issuing industry-specific guidance as one potential approach OSHA could take to address the challenges we identified. As OSHA reviews its publicly available ergonomic guidance, it may wish to consider other approaches to ensure that compliance officers and employers have access to improved, updated guidance that allows them to identify, assess, and address ergonomic hazards.

Finally, OSHA objected to our characterization of existing ergonomic inspection guidance being unclear. This report does not state that all ergonomic inspection guidance is unclear. Rather, it offers examples of unclear guidance. OSHA also stated that it has made resources available to its offices to help determine if ergonomic hazards exist, including Regional Ergonomics Coordinators and OSHA ergonomists. The report mentions these resources and says that compliance officers find them helpful. Based on our review of certain guidance and comments that compliance officers made in discussion groups, however, we continue to believe that some ergonomic inspection guidance could be clarified, such as the guidance about the type of evidence needed to support a citation under the general duty clause for an ergonomic hazard. Because of the limited training compliance officers receive on identifying and assessing ergonomic hazards, clear guidance is needed to help compliance officers make determinations as to whether ergonomic hazards exist.

As agreed with your offices, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. At that time, we will send copies to appropriate congressional committees, the Secretary of Labor, and the Secretary of Health and Human Services. In addition, the report will be available at no charge on the GAO website at http://www.gao.gov. If you or your staff have any questions about this report, please contact me at (202) 512-4769 or CostaT@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs are on the last page of this report. GAO staff who made key contributions to this report are listed in appendix III.

Sincerely,



Thomas Costa, Director
Education, Workforce, and Income Security Issues

Appendix I: Objectives, Scope, and Methodology

This report examines (1) the types of injuries and illnesses that occur at e-commerce warehouses and last-mile delivery companies and the hazards that cause them; (2) how technologies that increase productivity might affect worker safety and health at these workplaces; and (3) the extent to which the Occupational Safety and Health Administration (OSHA) identifies and addresses ergonomic hazards at these workplaces, and the challenges OSHA faces in doing so.

Generally, to address all objectives, we interviewed representatives from 15 stakeholder groups, including four researcher groups, seven worker safety advocate groups, and four safety consultant groups. We selected stakeholders with experience in (1) warehousing, last-mile delivery, or both and (2) worker-safety issues and the technologies that these industries may use to increase productivity. We identified stakeholders by conducting internet searches, a literature search, and asking those we interviewed who else we should speak with. We also interviewed representatives from five companies—two companies that operated e-commerce warehouses (visiting one warehouse) and three delivery companies. Because larger companies may be more likely to adopt technologies, we selected four companies that had a large e-commerce warehouse or a last-mile delivery component.[1] We also selected one company that worked as a contractor to one of these four companies.

During interviews we asked questions about (1) the types of injuries and illnesses warehouse and last-mile deliver workers experience and what causes them, (2) the extent to which these incidents may go unreported by either workers or employers and the reasons why, (3) the types of technologies employers use at warehouses and last-mile delivery companies to increase productivity and how their use may affect safety, (4) how OSHA monitors worker-safety at these companies and any challenges it may face when doing so, and (5) the usefulness of OSHA's guidance on creating ergonomically safe work environments and if and how this guidance could be improved.

In addition, we used the following methodologies to conduct our analysis.

Analyzed Bureau of Labor Statistics (BLS) injury data. To describe what is known about the types of injuries and illnesses that occur at e-commerce warehouses and last-mile delivery companies (objective 1), we analyzed data from BLS's Survey of Occupational Injuries and Illnesses (SOII) for calendar years 2018 through 2022 (the most recent year for which data were available). SOII estimates the number (case counts) and frequency (incidence rates) of nonfatal workplace injuries and illnesses by sector and industry for injuries that resulted in either workers experiencing days away from work or days of job transfers and restrictions (commonly known as DART). In the report, we refer to these incidents as "serious injuries and illnesses" to limit technical jargon.[2] SOII data also provides data on the types of injuries and illnesses that occurred (which SOII

[1]To identify large companies, we used the number of employees in OSHA's 2021 Injury Tracking Application (ITA) data in North American Industry Classification System (NAICS) codes that include e-commerce warehouses and last-mile delivery companies. These were general warehousing and storage (493110), couriers and express delivery services (492110), and local messengers and local delivery (492210).

[2]Beginning with reference period 2021-2022, BLS began publishing case circumstance data biennially to include estimates of injuries and illnesses that resulted in either days away from work or days of job transfers and restrictions. Prior to this period, BLS published annual estimates for case circumstance data for days away from work cases and did not publish estimates for days of job transfer and restriction cases.

terms the 'nature') and the causes of those injuries and illnesses (which SOII terms the 'event'). SOII data are generally based on recordkeeping logs that private industry employers and state and local government agencies keep.[3]

For our analysis of SOII data we used the North American Industry Classification System (NAICS) codes for: (1) all 19 private-industry sectors, (2) general warehousing and storage (493110), and (3) couriers and messengers (492). General warehousing and storage was the most appropriate code to use to capture e-commerce warehouses, according to BLS officials.[4] BLS officials also told us that couriers and express delivery services (492110) and local messengers and local delivery (492210) were the most appropriate NAICS codes to use to capture last-mile delivery. At the three-digit NAICS level, data from these two codes are combined as couriers and messengers (492). As a result, we used couriers and messengers (492) to analyze data for last-mile delivery. When possible, we used estimates for summary-level data published on BLS's SOII website.[5] For detailed data not included on this website, BLS provided us with estimates of injuries, including by type of injury and cause of injury.

All estimates produced from the SOII are subject to sampling errors. We express our confidence in the results as a 95 percent confidence interval. This interval would contain the actual population value for 95 percent of the samples the BLS could have drawn. For all estimates, we used the agency-provided relative standard errors to calculate the associated confidence intervals.

To assess the reliability of BLS's SOII data, we reviewed documents related to the data sources, such as the SOII's Handbook of Methods, and we interviewed BLS officials knowledgeable about these data. We found that SOII data was sufficiently reliable for our purposes of reporting the estimated number and incidence rates of injuries and illnesses in the general warehousing and last-mile delivery industries.

Conducted surveys of warehouse and delivery workers. To obtain worker input about whether and how they report workplace injuries to their employers (objective 1) and employers' performance expectations of workers and use of technologies that increase productivity (objective 2), we administered two web-based, non-generalizable surveys of workers—one for warehouse workers and one for delivery workers.

We developed the warehouse and delivery surveys in tandem and asked respondents the same questions, with only slight modifications tailored to each industry. After we drafted the surveys, we asked for input from knowledgeable academic researchers, worker safety advocates, and an independent GAO survey expert. We then conducted pretests to check that (1) the surveys were clear and unambiguous, (2) we used terminology correctly, and (3) the surveys did not place an undue burden on respondents. We revised the surveys after the expert review process and after three of the four pretests. We determined that no changes were necessary as a result of the fourth pretest.

[3]Survey respondents generally provide summary information on the number of injuries and illnesses incurred by employees and the type of injuries and illness cases based on the OSHA Form 300A. Survey respondents also provide detailed information on the worker and the circumstances for a subset of cases that resulted in at least one day away from work or a job transfer or restriction.

[4]BLS reports certain SOII data by NAICS code. NAICS is a standard system used by federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy. For more information, see the sidebar "North American Industry Classification System" in the report.

[5]See *Survey of Occupational Injuries and Illnesses Data: U.S. Bureau of Labor Statistics (bls.gov)*.

To distribute our survey to current and recently employed warehouses workers, we contacted nine organizations across the U.S. that had direct contact with warehouse workers.[6] Ultimately, two of these organizations helped us distribute this survey to warehouse workers. On September 11, 2023, we emailed the link to the web-based survey to these two organizations, who then texted the link to warehouse workers on their distribution lists. We also posted the link to the survey on GAO's Facebook and X (formerly Twitter) pages on September 29, 2023. We closed the survey on February 21, 2024.

The warehouse survey received a total of 102 responses, and we considered 62 valid responses. We determined the remaining 40 responses to be invalid for the following reasons:

- We found 28 responses were incomplete. For respondents who were not injured, the survey respondent must have provided a sufficiently complete response stating that they did not experience any work-related injuries in the last 2 years. For injured respondents, the respondent must have answered all questions in the survey about at least one injury that they experienced at their workplace.
- Our survey software flagged six responses as duplicates, and we removed them. [7]
- We determined that five responses were out of scope because the respondents answered that they were not a current or recent warehouse worker.
- We removed one response because the respondent completed it in preview mode, which may indicate a nonvalid response.

Of note, 48 out of the 62 valid survey responses (77 percent) indicated that the respondents worked for the same large company that operates multiple warehouses.

To distribute our survey to current and recently employed delivery workers, we worked with one organization that has direct contact with delivery workers. On November 21, 2023, we emailed the link of the web-based survey to that organization, which then texted that link to its members who are last-mile delivery drivers. We sent one follow-up message to a representative of this organization asking them to send a reminder message to its network. We also posted the link to the survey on GAO's Facebook page in December 2023 and shared that Facebook post with moderators of six private Facebook groups that were likely to have a significant number of last-mile delivery workers as members. We closed the survey in February 2024.

The delivery survey received a total of 637 responses, and we considered 437 valid responses. We determined the remaining 200 responses to be invalid for the following reasons:

- 189 responses were incomplete. For respondents who were not injured, the survey respondent must have provided a sufficiently complete response stating that they did not experience any work-related injuries in the last 2 years. For injured respondents, the respondent must have answered all questions in the survey about at least one injury that they experienced at their workplace.
- We determined that nine responses were out of scope because the respondents answered that they were not a current or recent delivery worker.

[6]The survey defined recently employed warehouse workers as individuals who worked in a warehouse within the past 2 years.

[7]Two GAO analysts reviewed another eight surveys and determined that they were not duplicative. These surveys were filled out by one of the groups administrating the survey to help respondents answer the questions.

- Our survey software flagged one response as a duplicate and we removed it.
- We removed one response because the respondent recorded their responses before the organization sent the survey to delivery workers.

Of note, 406 out of the 437 valid survey responses (93 percent) indicated that respondents worked for the same delivery company, which operates from multiple locations.

Because our surveys are non-generalizable, they do not represent the experiences of warehouse and delivery workers nationwide. The advocacy organizations we worked with to recruit respondents maintained contact information for warehouse and delivery workers for various reasons, including that the workers (1) belonged to these organizations or (2) reached out to them for support with a safety or other work-related issue. As a result, workers who received an invitation to fill out our surveys may have experienced significant work-related challenges. For this reason, we only used our survey results to describe respondents' experiences about whether and how they reported workplace injuries to their employers and their perceptions about safety at their place of work.

Conducted a literature search on technologies that increase productivity. We conducted a literature search to better understand the effect that technologies that increase productivity may have on worker safety (objective 2). A GAO librarian searched the Scopus and Google Scholar databases for scholarly and peer-reviewed studies, conference papers, books, and reports published between 2018 and 2023. The search covered the following topics (1) how automation and surveillance technology is used in warehouses and last-mile delivery companies, and (2) how robotic and surveillance technology can affect worker safety in general or warehouse and last-mile delivery workers in particular. We reviewed 27 relevant journal articles and studies this search identified. These reviews informed our understanding of the role of technology in warehouses and last-mile delivery companies and how employers' use of it may enhance or harm worker safety. Where appropriate, we reviewed the methods and analytical steps of these materials for quality and appropriateness. These materials also helped us identify stakeholders to interview and informed the questions we asked them. Last, we identified other relevant studies when interviewing stakeholders and reviewing applicable studies identified through our initial literature search.

Reviewed laws, regulations, guidance, and federal internal controls. To describe the actions OSHA has taken to monitor worker safety in e-commerce warehouses and last-mile delivery (objective 3), we reviewed relevant federal laws and regulations. We also reviewed and assessed OSHA's actions against its internal guidance, Office of Management and Budget (OMB) implementation guidance to the Foundations for Evidence-Based Policymaking Act of 2018, and federal internal controls.[8] Our review of OSHA guidance included relevant directives, and its field operations manual. The OMB guidance we used was Memorandum M-20-12, which identifies practices agencies should use for program evaluation.[9] From federal internal controls, we used the following standards.

[8]Pub. L. No. 115-435, 132 Stat. 5529 (2019). For objective 1, we also reviewed relevant OSHA recordkeeping regulations and guidance for employer reporting of injuries and illnesses. For internal controls, see GAO, *Standards for Internal Control in the Federal Government,* GAO-14-704G (Washington, D.C.: Sept. 10, 2014).

[9]See Office of Management and Budget, *Phase 4 Implementation of the Foundations for Evidence-Based Policymaking Act of 2018: Program Evaluation Standards and Practices,* M-20-12 (Mar. 10, 2020).

- Control environment standard, along with the underlying principle that states agencies should demonstrate a commitment to recruit, develop, and retain competent individuals (principle 4).
- Information and communication standard, along with the underlying principles that state (1) agencies should use quality information that is complete, accurate, and accessible (principle 13) and (2) agencies should communicate quality information internally and externally to achieve agency objectives (principles 14 and 15).
- Monitoring standard, along with the underlying principles that state (1) agencies should monitor their policies and procedures and conduct separate evaluation studies to determine the effectiveness of these policies and procedures (principle 16), and (2) agencies should remediate identified internal control deficiencies on a timely basis (principle 17).

Analyzed OSHA Information System (OIS) data. For objective 3, we also analyzed OSHA's inspection data for fiscal years 2018 through 2023 maintained in its OSHA Information System (OIS). This system contains detailed information on the workplace inspections OSHA conducted and violations identified during inspections. We determined the number and type of inspections OSHA conducted at e-commerce warehouses and last-mile companies and the enforcement actions taken as a result of these inspections.

Through interviews with OSHA officials and researching publicly available information on companies that OSHA inspected, we determined the NAICS codes that were within the scope of this engagement. For e-commerce warehouses, we included the general warehousing and storage NAICS code (493110) and the electronic shopping and mail order houses NAICS code (4541). For last-mile delivery, we included the couriers and messengers NAICS code (492).

To assess the reliability of OSHA's OIS data, we reviewed related documentation, interviewed and obtained written responses from knowledgeable OSHA officials, conducted electronic data testing on specific data elements, and reviewed previous data reliability assessments on these data. We determined that the data were sufficiently reliable for our purposes.

Interviewed OSHA officials and conducted discussion groups. To obtain information on underreporting of injuries (objective 1) and how OSHA monitors e-commerce warehouses and last-mile delivery companies (objective 3), we interviewed OSHA headquarters officials and conducted audit work at six of OSHA's more than 85 area offices. The area office audit work consisted of holding discussion groups with compliance officers and interviewing the managers of those offices. During all discussion groups and interviews we discussed: (1) how compliance officers use the injury data that employers provide on OSHA recordkeeping forms to identify possible workplace hazards during inspections and the challenges they may face in detecting underreported injuries on these forms; (2) how compliance officers identify, assess, and address ergonomic hazards at warehouses and last-mile delivery companies during inspections and any challenges they may face in doing so; (3) if and how OSHA's warehouse and distribution center emphasis program may change OSHA's monitoring of these workplaces; and (4) the types of training compliance officers receive, guidance they use, and expertise they access when identifying, assessing, and addressing ergonomic hazards and if and how these tools could be improved.

We used two criteria to select the six OSHA area offices in which we conducted work—geographic dispersion and whether the area office had conducted recent inspections of both e-commerce warehouses and last-mile

delivery companies.[10] To ensure that we selected area offices from across the country and obtained diverse perspectives on how these offices monitor warehouses and last-mile delivery companies, we selected one area office from six different OSHA regions.[11] To ensure that these area offices conducted inspections of e-commerce warehouses and last mile delivery companies, we selected area offices that inspected workplaces under the NAICS codes that OSHA commonly used when inspecting these types of establishments. We conducted work in OSHA's Allentown, Avenel, Birmingham, Chicago North, Dallas, and Denver area offices.[12] Each of these offices conducted between three and 10 last-mile delivery inspections and between seven and 71 warehouse inspections between October 1, 2021 and April 30, 2023.

A total of 14 managers participated in our interviews, with each interview consisting of between one and three managers. For our discussion groups, we invited health and safety compliance officers who conducted inspections of warehouses, last-mile delivery companies, or both to participate. A total of 15 compliance officers participated in these groups, with each group consisting of between two and six officers. The results of our interviews and discussion groups cannot be generalized to other OSHA area offices. They do, however, provide insight into how OSHA area office staff identify, assess, and address ergonomic hazards at warehouses and last-mile delivery companies.[13]

We conducted this performance audit from November 2022 to September 2024 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

[10]To apply both criteria we used data on inspections from the OSHA Information System (OIS).

[11]OSHA has 10 regional offices and carries out its enforcement activities through these offices and its more than 85 area offices.

[12]We held one discussion group for both the Dallas and Denver offices because only one compliance officer participated from each office. We ensured that compliance officers in both offices responded to all questions, and we analyzed responses separately for each office.

[13]We conducted work at three different levels of OSHA: (1) discussion groups with compliance officers in six area offices, (2) interviews with area office managers in the same offices, and (3) interviews with OSHA headquarters officials. We use "OSHA officials" as shorthand when all three groups shared similar perspectives and in footnotes report details for each group.

Appendix II: Comments from the Department of Labor

U.S. Department of Labor

Occupational Safety and Health Administration
Washington, D.C. 20210

August 9, 2024

Thomas Costa
Director, Education, Workforce, Income Security Team
United States General Accountability Office
444 G Street., NW
Washington D.C. 20548

Dear Mr. Costa:

Thank you for the opportunity to review and provide comment on the Government Accountability Office (GAO) draft report *Workplace Safety and Health: OSHA Should Take Steps to Better Identify and Address Ergonomic Hazards at Warehouses and Delivery Companies*.

The Occupational Safety and Health Administration (OSHA) is committed to protecting the health and safety of America's workers. Warehousing and delivery operations present a variety of serious safety and health hazards. OSHA appreciates your detailing of the hazards faced by these industries. As the draft GAO report notes, OSHA has recently implemented a National Emphasis Program on Warehousing and Distribution Center Operations to address the prevalence of these hazards (CPL 03-00-026). As you also recognize, there is no OSHA standard for ergonomic hazards. In the absence of a specific standard, OSHA can cite an employer under the general duty clause of the OSH Act (section 5(a)(1)) for failing to keep their workplace free from recognized serious hazards, including ergonomic hazards. To issue a general duty clause citation alleging an ergonomics hazard, OSHA must establish the hazard exists, that it is recognized, that it is causing or likely to cause serious physical harm to employees, and that a feasible means exists to reduce or eliminate the hazard. We appreciate your acknowledgement that such cases are often resource intensive.

The draft report includes five recommendations to DOL. OSHA agrees some of these recommendations, if implemented, may help OSHA better protect workers in these industries from ergonomic hazards and will provide specific actions in our Statement of Executive Action. However, OSHA also has concerns that some of these recommendations may not be practical to implement due to resource constraints, and that some of the recommendations may not have a significant impact on worker protection. Our comments in response to two specific recommendations are detailed below.

Recommendation 1
The Secretary of Labor should ensure that the Assistant Secretary of Labor for Occupational Safety and Health ensures that OSHA compliance officers can easily obtain data during inspections on when musculoskeletal disorders occurred. This could include adding a column for musculoskeletal injuries to OSHA recordkeeping forms.

Adding a column for musculoskeletal injuries to OSHA recordkeeping forms would require OSHA to engage in notice and comment rulemaking. As noted in the draft report, OSHA has an existing rulemaking on this issue in progress, which is on OSHA's long term rulemaking agenda

(RIN 1218-AC45). OSHA published a Notice of Proposed Rulemaking and held a public meeting in 2010, and Small Business Stakeholder meetings in 2011. The comment period closed in 2011. OSHA is currently engaged in rulemaking to address worker exposure to heat, infectious disease, and emergency preparedness and response, among other regulatory priorities. Since more than a decade has passed, completing this regulatory action would likely entail reopening the rulemaking record, which would divert needed resources from other priorities. OSHA also recently completed the Improve Tracking of Workplace Injuries and Illnesses Final Rule (published in July 2023), which requires certain covered employers to submit information electronically to OSHA front their OSHA 300, 300A, and 301 forms. As a result of these newly-implemented requirements, OSHA expects to receive more information on the prevalence of workplace injuries, including musculoskeletal disorders (MSDs).

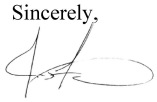
Recommendation 3
The Secretary of Labor should ensure that the Assistant Secretary of Labor for Occupational Safety and Health review and make needed changes to OSHA's internal and publicly available guidance that compliance officers and employers use to identify, assess, and address ergonomic hazards. This may include clarifying existing guidance and providing more current, industry-specific guidance.

OSHA regularly reviews and updates as needed its internal and external ergonomic electronic resources. OSHA will continue to ensure that the review is done on a routine basis and guidance is revised where available resources and new information warrant the changes. OSHA is planning a review of its publicly available ergonomics guidance in FY 2025.

However, OSHA disagrees that there is a need for industry-specific guidance for warehousing and delivery drivers. As noted by the draft GAO report, OSHA has prioritized industry specific ergonomic guidance for industries where there are unique hazards, and OSHA does have industry-specific guidance for several such industries with specialized ergonomic issues, such as healthcare (i.e., patient lifting) and meat/poultry plants. OSHA believes that its more general existing ergonomic guidance adequately addresses ergonomic hazards encountered by employees in warehousing and delivery services. OSHA also objects to GAO's characterization of OSHA's existing ergonomics inspection guidance as unclear. Whether an ergonomic hazard is present is often a fact-specific determination, and while OSHA agrees that applying this guidance may require complex analysis in some cases, OSHA has made resources available to its regional offices, including Regional Ergonomics Coordinators, OSHA ergonomists, and medical assistance from OSHA's Office of Medicine and Nursing.

Thank you for this opportunity to review your draft report.

Sincerely,



James Frederick
Deputy Assistant Secretary, OSHA

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Accessible Text for Appendix II: Comments from the Department of Labor

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Director, Education, Workforce, Income Security Team
United States General Accountability Office
444 G Street., NW
Washington D.C. 20548

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Thank you for this opportunity to review your draft report.

Sincerely,

James Frederick
Deputy Assistant Secretary, OSHA

Appendix III: GAO Contact and Staff Acknowledgments

GAO Contact

Thomas Costa, (202) 512-4769, costat@gao.gov

Staff Acknowledgements

In addition to the contact named above, Blake Ainsworth (Assistant Director), Nancy Cosentino (Analyst in Charge), William Beichner, Elizabeth Escobar Michalewicz, and Kirsten Lauber made significant contributions to this report. Also contributing to this report were Carl Barden, James Bennett, Hayden Huang, Melissa Jaynes, Avani Locke, Ying Long, Aaron Olszewski, and Meg Sommerfeld.

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