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## A Smarter National Surveillance System for Occupational Safety and Health in the 21st Century

*Many threats to health and well-being occur in the workplace. Responsibilities for tracking work-related injuries and illnesses and to design policies and interventions to prevent them are spread across many federal, state, and local agencies, and other stakeholders. This report offers a vision for a more coordinated and cost-effective system for occupational safety and health surveillance in the United States for the 21st century.*

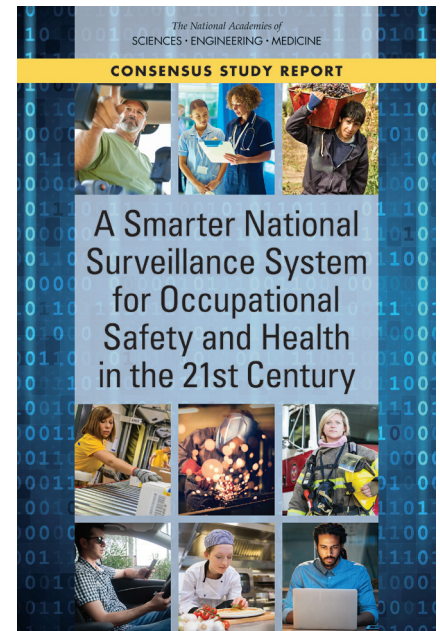
Worker safety and health is of paramount importance to thriving workplaces and the well-being of the 156 million adults in the U.S. workforce. Although some occupations pose more health and safety risks than others, workers in all occupations face some form of work-related safety and health concerns. Workplace hazards also are costly, with one study estimating the annual cost of occupational injuries, illnesses, and deaths in the United States to be \$250 billion (in 2007 dollars).

Occupational safety and health (OSH) surveillance systems provide the data and analyses needed to understand the relationships between work and injuries and illnesses with the goal of improving worker safety and health. In the United States, OSH surveillance is a collaborative effort of federal, state, and local agencies and stakeholders across employers, employee organizations, professional associations, and other organizations (see Box 1 on page 2).

### CHALLENGES FOR OSH SURVEILLANCE

Although progress has been made in recent decades, especially in injury surveillance (see Box 2 on page 3), OSH surveillance in the United States is challenged in several ways. Because it is spread across so many stakeholders, there is no single, comprehensive OSH surveillance system, but rather an evolving set of systems and data sources designed to meet different surveillance objectives, each with strengths and weaknesses. The major focus to date has been on collecting data on health outcomes (i.e., injuries and illnesses), with less emphasis on collection of data on hazards and exposures.

Another challenge is keeping up with the rapidly changing work landscape. The past few decades have witnessed major shifts in the geographic and proportional distribution of industries, the nature of work, the demographics of



the workforce, and employee-employment arrangements. Employment in manufacturing has declined, while there has been significant growth in employment in the service sector, including health care. Individuals are likely to be working more than one job over their working life, and may hold multiple jobs at the same time. The workforce is much more diverse, with many more women, racial and ethnic minorities, and immigrants employed. Growth has occurred in nonstandard work arrangements, such the use of independent contractors and “gig economy” workers (on-demand contractors and freelance workers).

Undercounting of occupational injuries and illnesses is also a challenge. For example, the Survey of Occupational Injuries and Illnesses is one of the major inputs to current surveillance, but it does not include the self-employed, household workers, federal workers, U.S. Postal Service workers, and workers on farms with fewer than 11 employees. Altogether, these excluded populations represent about 9 percent of the workforce, the majority of whom are self-employed. Work-related disease information (as opposed to injury) has been almost absent from occupational health surveillance.

## VISION FOR A “SMARTER” SYSTEM

This report envisions future OSH surveillance as a collaborative system of systems. Such a system can be achieved by strengthening the ongoing coordination and data sharing across federal agencies, between federal and state agencies, across state agencies (e.g., labor and health), and with employers and workers to result in the maximum possible engagement of all.

A system of systems approach to OSH surveillance would minimize the undercounting of occupational injuries and illnesses by gathering sufficient data that include nontraditional occupations and worker groups in a representative manner. It would expand outcomes to include chronic diseases and their causes and include leading indicators, primarily through adequately detailed exposure information. Further, this system would maximize appropriate use of technologies to facilitate all surveillance processes and create structures for disseminating information to levels where it can be acted upon.

Evolving health care systems, along with technology imbedded in the delivery system, can greatly facilitate enriched inputs of data on work that can be linked to health outcome data. Inclusion of

### Box 1 Key Players in the OSH Surveillance System

The principal U.S. federal agencies involved in OSH surveillance are the Bureau of Labor Statistics (BLS), the National Institute for Occupational Safety and Health (NIOSH, a division of the Centers for Disease Control and Prevention), and the Occupational Safety and Health Administration (OSHA), who jointly sponsored this study.

State agencies play a critical and complementary role in partnership with federal agencies. State agencies collect, analyze, and disseminate data from local sources to guide preventive action at the state, regional, and local levels; provide aggregated data to federal agencies for national surveillance; and fill in gaps in national surveillance data.

Workers and employers also play crucial roles in ensuring accurate and complete data and for using this information to implement workplace improvements.

occupational information in the electronic health record and advances in health care reporting structures can improve reports of work-related health conditions.

Fundamental to a successful smarter system is the sufficient and creative use of information technology capacity and resources. These include effective autocoding of occupational information in all appropriate records, electronic reporting wherever possible from all traditional and emerging reporting sources, and development of hardware and software for simplified, efficient, and real-time collection of information (e.g., exposure and compliance data).

## GETTING TO A SMARTER SYSTEM

OSH surveillance needs to become a priority if it is to serve the core function of providing the information essential to guide public health actions to improve worker safety and health. Surveillance often exists in the background of public health programs, rising to a level of importance only at times that call for emergency action. However, the system needs to seamlessly collect, collate, and assess information without interruption to support evidence-based actions, emergency or otherwise.

The Secretary of Health and Human Services, with the support of the Secretary of Labor, should direct NIOSH to form and lead a coordinating entity in partnership with OSHA, BLS, and other relevant agencies. The coordinating entity should:

- develop and regularly update a national occupational safety and health surveillance strategic plan that is based on well-articulated objectives;
- coordinate the design and evaluation of an evolving national system of systems for OSH

surveillance and for the dissemination of surveillance information provided by these systems;

- publish a report on progress toward the strategic plan's implementation at least every 5 years, documenting advances toward achieving a 21st Century Smarter Occupational Safety and Health (OSH) Surveillance System; and
- engage partners, including other federal health statistics agencies, state agencies with OSH responsibilities, and stakeholders.

In setting forth OHS surveillance as a national priority, the responsible agencies, most centrally NIOSH, will need to delineate a clear line of responsibility and authority over each agency's surveillance activities and personnel. Because coordination of federal and state systems offers immense advantages over their current independent operation, NIOSH should lead a collaborative effort with BLS, OSHA, the states, and other relevant federal agencies to establish and strengthen state-based OSH surveillance programs.

The most effective intervention activities will need to act on the causes and not only the consequences of OSH problems. Exposure and hazard surveillance points the way to primary prevention, particularly important for long-latency occupational diseases. NIOSH, in consultation with OSHA, should place priority on developing a comprehensive approach for exposure surveillance, one that builds on and updates a database of risks and exposures to predict and locate work-related acute and chronic health conditions.

Other things that NIOSH can do to increase the effectiveness of the overall system include: (1) maintaining expertise in biomedical informatics; (2) enabling OSH agencies to use advanced computational and analytical tools and to monitor

advances in information technology; (3) working with the National Library of Medicine to facilitate discovery of the importance of the connections between work and disease or injury in published research; and (4) promoting and supporting education and training of the surveillance workforce by identifying core competencies required for OSH surveillance (e.g., epidemiology, biomedical informatics, and biostatistics).

### **Data Collection and Processing**

As noted above, surveys and data collection systems need to be enhanced to fill data gaps and better represent underserved populations. BLS and OSHA should collaborate to improve the characterization of work-related injuries and illnesses in a manner that enhances usefulness at the worksite as well as at national and state levels. Incorporating information on race, ethnicity, and employment arrangements will allow for identification of vulnerable worker populations and risks that may be associated with different types of employment arrangements.

BLS should move forward with its plan to implement a Household Survey of Occupational Injuries and Illnesses (HSOII) to fill data gaps for populations of workers who are missing from employer-based injury reporting. Another largely untapped resource for injury surveillance data is the workers' compensation system. NIOSH, with assistance from OSHA, should explore and promote the expanded use of workers' compensation data for occupational injury and illness surveillance and the development of surveillance for consequences of injury and illness outcomes, including return to work and disability. To close gaps in work-related disease information (as opposed to injury), NIOSH, working with the state occupational safety and health surveillance programs and across divisions within the agency, should develop a methodology and coordinated system for surveillance of both fatal and nonfatal occupational disease using multiple data sources.

### **Data Analysis and Information Dissemination**

Successful collection and processing of surveillance data alone does not make a successful surveillance system. The system also requires thoughtful analysis, careful interpretation, and dissemination of results to engage in policy development or public health action for prevention. Attention to analysis and interpretation is essential when calling on partners to provide new or more data. Accordingly, a

#### **BOX 2 IMPROVEMENTS IN OCCUPATIONAL INJURY SURVEILLANCE**

In 1992, the Bureau of Labor Statistics (BLS, in the U.S. Department of Labor)—in response to recommendations in the 1987 National Research Council (NRC) report—established the Census of Fatal Occupational Injuries (CFOI), a nationwide surveillance system designed to produce a timely census of all fatal work injuries in the United States. A federal-state cooperative program implemented in all 50 states, CFOI uses multiple data sources, such as death certificates, police reports, federal agency administrative data, workers' compensation claim records, and news media, to identify, verify, and describe fatal work injuries.

program that provides for better reporting, such as the OSHA electronic reporting initiative, needs to be accompanied by a robust plan for analyzing, interpreting, and disseminating the information. OSHA, in conjunction with BLS, NIOSH, state agencies, and other stakeholders, should develop plans to maximize the effectiveness and utility of OSHA's new electronic reporting initiative for surveillance.

Of equal importance is the need to regularly disseminate surveillance findings and analyses in useful formats for informing and evaluating prevention. In support of this goal, NIOSH should coordinate with OSHA, BLS, and other relevant agencies to measure and report, on a regular basis, the economic and health burdens of occupational injury and disease at the national level.

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## COMMITTEE ON DEVELOPING A SMARTER NATIONAL SURVEILLANCE SYSTEM FOR OCCUPATIONAL SAFETY AND HEALTH IN THE 21ST CENTURY

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**For More Information . . .** This Consensus Study Report Highlights was prepared by the Board on Agriculture and Natural Resources, the Board on Health Sciences and Policy, and the Committee on National Statistics based on the Consensus Study Report *A Smarter National Surveillance System for Occupational Safety and Health in the 21st Century* (2018). The study was sponsored by the U.S. Department of Transportation. Any opinions, findings, conclusions, or recommendations expressed in this publication do not necessarily reflect the views of any organization or agency that provided support for the project. Copies of the Consensus Study Report are available from the National Academies Press, (800) 624-6242; <http://www.nap.edu>; or via the Board on Agriculture and Natural Resources web page at <http://www.nationalacademies.org>.

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# *A Smarter National Surveillance System for Occupational Safety and Health in the 21st Century*

## **Report Recommendations**

- A.** BLS and OSHA should collaborate to enhance injury and illness recording and the Survey of Occupational Injuries and Illnesses (SOII) to achieve more complete, accurate, and robust information on the extent, distribution, and characteristics of work-related injuries and illnesses, and affected workers, for use at the worksite and at national and state levels.
- B.** NIOSH, working with the state occupational safety and health surveillance programs and across divisions within the agency, should develop a methodology and coordinated system for surveillance of both fatal and nonfatal occupational disease using multiple data sources.
- C.** NIOSH should lead a collaborative effort with BLS, OSHA, the states, and other relevant federal agencies to establish and strengthen state-based OSH surveillance programs
- D.** BLS should place priority on implementing their plan for a household survey of occupational injuries and illnesses (HSOII).
- E.** OSHA, in conjunction with BLS, NIOSH, state agencies, and other stakeholders, should develop plans to maximize the effectiveness and utility of OSHA's new electronic reporting initiative for surveillance.
- F.** NIOSH, with assistance from OSHA, should explore and promote the expanded use of workers' compensation data for occupational injury and illness surveillance and the development of surveillance for consequences of injury and illness outcomes, including return to work and disability.
- G.** HHS should designate industry and occupation as core demographic variables collected in federal health surveys, as well as in other relevant public health surveillance systems, and foster collaboration between NIOSH and other CDC centers in maximizing the surveillance benefits of including industry and occupation in these surveys and surveillance systems.
- H.** NIOSH, in consultation with OSHA, should place priority on developing a comprehensive approach for exposure surveillance.
- I.** NIOSH should coordinate with OSHA, BLS, and other relevant agencies to measure and report, on a regular basis, the economic and health burdens of occupational injury and disease at the national level.
- J.** NIOSH should build and maintain a robust internal capacity in biomedical informatics applied to OSH surveillance.
- K.** NIOSH should work with the National Library of Medicine to incorporate core OSH surveillance terminologies, including those for industry and occupation, into the Unified Medical Language System (UMLS).
- L.** NIOSH should lead efforts to establish data standards and software tools for coding and using occupational data in electronic health records.
- M.** NIOSH and BLS, working with other relevant agencies, academic centers, and other stakeholders, should coordinate and consolidate, where possible, efforts to develop and evaluate state-of-the-art computational and analytical tools for processing free text data found in OSH surveillance records of all types.
- N.** To identify emerging and serious OSH injuries, illnesses, and exposures in a timely fashion, NIOSH (in coordination with OSHA, BLS, and the states) should develop and implement a plan for routine, coordinated, rapid analysis of case-level OSH data collected by different surveillance systems, followed by the timely sharing of the findings.
- O.** To promote and facilitate the use of surveillance information for prevention, and to present more comprehensive information on the extent, distribution, and characteristics of OSH injuries, illnesses, and exposures, NIOSH (in coordination with and input from OSHA, BLS, and the states) should establish a coordinated strategy and mechanism for timely dissemination of surveillance information.
- P.** NIOSH, OSHA, and BLS should work together to encourage education and training of the surveillance workforce in disciplines necessary for developing and using surveillance systems, including epidemiology, biomedical informatics, and biostatistics.
- Q. Recommendation Q (meta-recommendation): The Secretary of HHS, with the support of the Secretary of Labor, should direct NIOSH to form and lead a coordinating entity in partnership with OSHA, BLS, and other relevant agencies.** The coordinating entity should:
  - develop and regularly update a national occupational safety and health surveillance strategic plan that is based on well-articulated objectives;
  - coordinate the design and evaluation of an evolving national system of systems for OSH surveillance and for the dissemination of surveillance information provided by these systems;
  - publish a report on progress toward the strategic plan's implementation at least every 5 years, documenting advances toward achieving a 21st Century Smarter Occupational Safety and Health (OSH) Surveillance System; and
  - engage partners, including other federal health statistics agencies, state agencies with OSH responsibilities, and stakeholders.