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Title: Inclusion of Industry and Occupation as Core Demographic Variables in Public Health Surveillance

Area: Environmental/Occupational Health

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**Description of Issue**

According to the World Health Organization (WHO), ‘the most important factors shaping people’s social position include employment and working conditions’. Work has an enormous impact on the health of the United States (U.S.) population as more than 167 million U.S. workers spend approximately 50% of their waking hours at work. While employment can provide substantial benefits to personal health and to society, it can also directly impact workers’ ability to secure basic needs that provide the foundation for health and well-being, such as income and healthcare access. Work may also pose substantial exposure risks – physical, chemical, radiological, biological, ergonomic, and psychological – which can result in injury and illness that interfere with productivity and quality of life.

Industry and occupation (I&O) are core socioeconomic variables that are useful for describing the burden and distribution of various health outcomes and health-related behaviors among current and former workers and their families. Yet, I&O are often overlooked in public health surveillance efforts. As a result, information on the prevalence of injuries and illnesses, workers’ health status, and behavior risk factors for all working populations, particularly for workers in high-risk jobs, is lacking. Public health data may be generated from many sources including birth and death records, surveys, case reports and notifications, and disease and exposure registries, all of which could benefit from the addition of I&O collected as routine demographic variables using standard questions and coded using standard algorithms. The addition of I&O more widely to public health surveillance efforts would provide critically needed national population-based estimates of the health of U.S. workers.

**Background and Justification of Importance to CSTE Membership**

Occupation is a person’s job, and industry is the type of business in which a person works (or what the employer does). In public health practice, I&O variables, when collected, are commonly used as surrogate measures for workplace exposures and hazards to better understand the potential contribution of work to health and wellness outcomes. For instance, during the COVID-19 pandemic, the addition of I&O questions to state, tribal, local, and territorial jurisdictions’ infectious disease surveillance systems helped jurisdictions identify outbreaks of the SARS-CoV-2 virus among workers in food production, correctional institutions, in healthcare, etc., which were likely due to overcrowding and more exposure to potentially sick individuals. This information was used to draft guidance for workers in critical infrastructure sectors. Similarly, since 2019, the California Department of Public Health has used I&O data to investigate the occurrence of silicosis among workers who inhale crystalline silica dust while cutting and finishing countertops and to encourage additional surveillance from healthcare providers.

Many other social, economic, or environmental factors impact worker health and work-related disease occurrence. Examples of these factors include demographics (e.g., household income, access to healthcare), current health status (e.g., asthma and other chronic conditions, body mass index), behaviors (e.g., tobacco use, alcohol consumption), among others. These factors disparately affect individual workers, even those working in the same job or industry, and cause inequities. The reduction of these health disparities is core to the strategic goals of the Centers for Disease Control and Prevention (CDC) National Institute for Occupational Safety and Health (NIOSH) and other health jurisdictions.

Awareness of the prevalence of health outcomes and health-related behaviors by I&O can assist jurisdictions in identifying disease clusters, determining the magnitude of a problem, and targeting high risk groups for interventions to prevent injury and illness, as well as promote healthy behaviors. For example, the New Hampshire (NH) Occupational Health Surveillance Program’s Comprehensive Cancer Collaboration and Equity Task Force examined preventive cancer screening rates among vulnerable workers in the NH Behavioral Risk Factor Surveillance System (BRFSS) survey. The findings demonstrated disparities in screening rates and relatively high prevalence of social diversity in the restaurant and food service industry group, which was subsequently targeted for intervention to better meet U.S. Preventive Services Task Force Pap Test recommendations. Some additional examples of
health promotion activities that could be targeted based on I&O include cancer screenings, influenza and COVID-19 vaccine uptake, and better control of conditions like asthma or diabetes. Jurisdictions can disseminate data to engage employers, who bear a large share of health care costs, as active partners for health promotion.

For several decades, non-governmental advisory and professional practice organizations have promoted the routine collection of I&O in public health surveillance systems. In Healthy People 2030, many other organizations, including the Department of Health and Human Services (HHS), the CDC, the American Academy of Family Physicians (AAFP), and the Robert Wood Johnson Foundation, noted that work is a social determinant of health (SDOH). The Community Preventive Services Task Force prioritized Employment and Job Characteristics as an SDOH domain. In 2018, the National Academy of Science, Engineering and Medicine (NASEM) strongly recommended that HHS designate I&O as core demographic variables in federal surveys and in other relevant public health surveillance systems. Similarly, the Council of State and Territorial Epidemiologists (CSTE) has recognized the importance of work as an SDOH and produced two position statements on the need to include work information (e.g., I&O) in CDC and state, tribal, local, and territorial public health surveillance systems. The systematic collection of these data also aligns with key portions of CSTE’s mission, including promoting the effective use of epidemiologic data to guide public health practice and improve health, as well as developing standards for practice.

The largest effort to collect I&O in public health surveillance systems began in 2013 when NIOSH provided the required programmatic funding to the CDC BRFSS program for jurisdictions to administer an optional I&O module. NIOSH additionally established standardized questions, translated all free-text I&O responses to standard U.S. I&O codes using the well-established web-based autocoder, NIOCCS (the NIOSH Industry and Occupation Computerized Coding System), and provided jurisdictions with training on how to improve text entries and analyze BRFSS I&O data. More than half of jurisdictions participating in BRFSS opted to administer this module in their annual surveys to over 870,000 employed or recently employed respondents. These jurisdictions have reported extensively on the association between health behaviors and outcomes and work (i.e., industry and/or occupation), and used those data in collaboration with other health department programs to create innovative interventions.

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**NIOSH Standardized Questions**

**Occupation**

What kind of work do you do? Or what is your job title? (e.g., registered nurse, janitor, cashier, auto mechanic, etc.)

Response: [Description of work]

**Industry**

What kind of business or industry do you work in? Or what does your employer make or do? (e.g., hospital, elementary school, clothing manufacturing, restaurant, etc.)

Response: [Description of kind of business]

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The effort to collect standard and coded I&O variables in other surveillance systems is also underway. Standard I&O free-text questions have been included on official U.S. death certificates since the early 1900s, and NIOSH codes these data for inclusion in the National Vital Statistics Surveillance System. All state jurisdictions and two city jurisdictions have participated in NIOSH’s I&O coding program, as of 2022. These data have been used to comment on, for example, COVID-19 mortality by occupation and law enforcement worker suicide. Related to disease reporting systems, in recent years, there was funding provided through the Coronavirus Aid, Relief, and Economic Security (CARES) Act and subsequent appropriations to help jurisdictions collect I&O data for COVID-19 and other respiratory conditions. This funding has led to several jurisdictions codifying the collection of work-related
information, adding I&O to infectious conditions under surveillance, incorporating coding of work-related information into standard protocols, and implementing processes to automatically code industry and occupation data during case interviews.\textsuperscript{22}

Despite this progress, more expansive efforts to collect and standardize I&O are still needed. For example, I&O questions are not part of the core component of the BRFSS questionnaire, and state-level funding and resource limits often preclude expansion of the BRFSS with optional or state-added questions. Therefore, information about I&O are not collected on every eligible BRFSS respondent, and though the results for each state collecting I&O information are representative of the adult population within each state (given the sampling frame of the BRFSS), the results are not representative of the U.S. adult population. There has also not been widespread adoption of the I&O variables and the associated coding system into existing public health vital statistics and disease surveillance systems. COVID-19 funding was used to enhance I&O surveillance for COVID-19 but not for any of the other infectious and non-infectious diseases that are likewise impacted by work. These variables are also not consistently collected in electronic medical records\textsuperscript{22} and would therefore not be transmitted to public health in electronic case reports, which is a critical gap as public health jurisdictions look to modernize data infrastructure. The gaps in these systems can diminish our understanding of the impact of work on specific diseases and conditions and general morbidity and mortality.

\section*{Options for Consideration and Next Steps}

CSTE recommends the inclusion of standard I&O demographic variables or questions in public health surveillance systems and tools where other important demographic information is currently captured (e.g., reportable disease surveillance systems, population-based surveys, vital statistics, disease, and exposure registries). Surveillance leaders within jurisdictions should advocate to their leadership teams, informatics partners, BRFSS coordinators, and others for the inclusion of these variables within all public health data systems.

There were several previous proposals to move I&O variables to the core component section of the BRFSS questionnaire, which failed to achieve the required 80 percent of approval votes from BRFSS coordinators and CDC Staff at the Annual BRFSS Meeting for inclusion in the core. However, given that I&O received the highest percent of affirmative votes each year the proposal was considered by the BRFSS coordinators and CDC BRFSS staff, core BRFSS inclusion may represent the most immediately feasible option and could therefore be a good place to focus continued efforts. NIOSH has submitted another proposal for the inclusion of I&O on the core component of the 2025 BRFSS questionnaire. Continued advocacy for the importance of these variables and promotion of existing standardization could encourage more BRFSS coordinators and CDC staff to vote to approve the I&O inclusion proposal in coming years.

Standardization of the I&O variables and other variables within the same data class can encourage all jurisdictions to include them in existing data systems. NIOSH has already made progress here: NIOCCS allows for real-time bidirectional data transmission between the user and NIOCCS through an API (application programming interface) web-call system\textsuperscript{23} that can be incorporated in jurisdictions’ system backends for automatic translation of free-text to standard industry and occupation names and codes. CSTE’s Data Standardization Workgroup (DSWG) has also begun discussions on how I&O variables are represented in message mapping guides, which indicate how jurisdictions would send information to CDC within a case notification message for a nationally notifiable condition. This workgroup utilizes the expert knowledge of its practicing epidemiology and informatics membership, as well as representatives from NIOSH, to develop and apply consensus definitions for core data elements. This effort is intended to allow for standard collection and analysis of I&O within a particular jurisdiction and uniformity when communicating I&O data across jurisdictions. The standardization process should make it easier for jurisdictions to include I&O as routinely collected variables during case investigations.
Inclusion of these I&O variables in the United States Core Data for Interoperability (USCDI) should also bolster adoption of these variables. USCDI is a standardized set of health data classes and constituent data elements for nationwide, interoperable health information exchange. At the time of publication of this Brief, USCDI version 4 had been published (July 2023), and the comment window for version 5 had closed (September 2023), with version 5 publication expected in July 2024. Two I&O variables (occupation and occupation industry) were included in USCDI version 4. Additional I&O data elements deemed important can be proposed for future iterations of USCDI or inclusion in USCDI+, an extension to the existing USCDI that will support the identification and establishment of domain- or program-specific datasets, including public health.

In closing, this Brief advocates for the inclusion of I&O variables and questions in public health surveillance, while acknowledging that many national surveys and jurisdiction-specific surveillance systems have their own processes for directly proposing additional or changed core variables. CSTE continues to support NIOSH partners’ and others’ efforts to implement these recommendations.
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References


