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# Maryland Occupational Health and Safety Surveillance Project

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List of Terms and Abbreviations

BRFSS – Behavioral Risk Factor Surveillance Survey

CSTE – Council of State and Territorial Epidemiologists

DHMH –Department of Health and Mental Hygiene

EPHT – Environmental Public Health Tracking

NEDSS – National Electronic Disease Surveillance System

NIOSH – National Institute for Occupational Safety and Health

MACP – Maryland Asthma Control Program

MCR – Maryland Cancer Registry

MDE – Maryland Department of the Environment

MOSH – Maryland Occupational Safety and Health

MVDRS – Maryland Violent Death Reporting System

OHSSP – Occupational Health and Safety Surveillance Program

VIPP – Violence and Injury Prevention Program

Abstract

Maryland's Occupational Health and Safety Surveillance Project (OHSSP) was created in 2010 as a fundamental surveillance project, creating a permanent occupational disease surveillance structure within the Maryland Department of Health and Mental Hygiene (DHMH) to promote occupational health and safety surveillance generally and within targeted occupational sectors of the State. For one of the main objectives, OHSSP established an occupational injury and illness surveillance program, collecting data from primary provider reports and existing administrative databases to establish ongoing reporting and analysis of occupational disease prevalence within Maryland, including the set of occupational health indicators promulgated by the Council of State and Territorial Epidemiologists (CSTE). Concurrently, a technical advisory group was convened to provide feedback and guidance for determining the future direction and goals of the OHSSP. The key findings of the project were: (1) Priority health concerns identified by the data included asthma, falls; (2) epidemiologic and response capacity within DHMH was valuable in responding to both surveillance concerns and occupational exposure investigations; and (3) one of the most important findings was that the establishment of OHSSP was seen as valuable by other State agencies, employers, workers, and academic institutions.

Section 1

**Significant (Key) Findings**

In accordance with the original objectives of the NIOSH State Occupational Health Surveillance Cooperative Agreement, Maryland established a permanent Occupational Health and Safety Surveillance Program (OHSSP) within the Environmental Health Bureau of the Maryland Department of Health and Mental Hygiene (DHMH) that promotes the health and safety of the state's working population. This surveillance unit collects existing administrative data sets and hospitalization records used to generate occupational health indicators developed by the National Institutes of Occupational Safety and Health in collaboration with the Council of State and Territorial Epidemiologists (CSTE) and displayed publicly on the national CSTE occupational health website as well as the Environmental Health Bureau website. These indicators are useful for monitoring the health of Maryland's workforce over time and ascertaining potential problem areas that require further attention or intervention. For example, these indicators allow for the measurement of baseline health of workers, tracking trends and patterns of work-related injury, illness, and death, reduction in preventable workplace injuries, and overall improvement in the consistency and availability of occupational disease and injury surveillance. Data sources used to create the occupational indicators include the publicly available Bureau of Labor Statistics and additional sources that require specific Data Sharing Agreements with individual data stewards: the Health Services Cost Review Commission provides inpatient and outpatient hospitalization records; the Vital Statistics Administration forwards information on fatalities; the Cancer Registry prepares data on neoplasms; the Center for Chronic Disease Prevention and Control houses data from the Behavioral Risk Factor Surveillance System.

In the first round of submission, occupational health indicators were calculated for the years 2000 through 2010 and then subsequently submitted every year thereafter. Calculations for Indicator 5: *State Workers' Compensation Claims for Amputations with Lost Work-Time*, Indicator 8: *State Workers Compensation Claims for Carpal Tunnel Syndrome with Lost Work-Time*, Indicator 13: *Elevated Blood Lead Levels Among Adults*, and Indicator 20: *Hospitalizations for Work-Related Low Back Disorders*, were not possible given the data were unavailable for the state of Maryland. Beginning with 2011 data, Indicator 20, and the new Indicator 21: *Asthma Among Adults Caused or Made Worse by Work*, were added. In the 2015 data submission, the new Indicator 22: *Work-Related Severe Traumatic Injury Hospitalizations*, was also added. These data, and their corresponding charts and tables, are accessible to the general public on the DHMH Environmental Health Bureau website.

The demographic indicators demonstrate that over the twelve year time span, the percentage of unemployed has risen slightly, mirroring the national trend. The percentage of very young workers ages 16 to 17 decreased, while the over 65 age group increased. The Hispanic worker population increased steadily over this time period. In general, the rates of non-fatal work-related injuries, illnesses, and hospitalizations have declined over the twelve years of data. The rate of fatal work-related injuries have also decreased but fluctuated somewhat early on. The rates of the majority of other indicators showed overall decline or plateauing with the exception of: hospitalizations for work-related burns, other and unspecified pneumoconiosis, pesticide-associated poisonings, and malignant mesothelioma, which all rose slightly over this time period.

In order to obtain feedback and expertise from a variety of stakeholders regarding the development and objectives of the OHSSP, an Occupational Health Surveillance Advisory Board was assembled and convened annually to provide ongoing guidance. Representatives from a diverse range of backgrounds were selected and invited to join the group. Individuals with expertise in immigrant health, injury prevention, and industrial hygiene from other state departments, academia, and clinical settings were selected and invited to provide input.

An additional objective was to cement relationships and further develop coordination between the OHSSP and other environmental and disease surveillance programs within DHMH, including the Maryland Cancer Registry (MCR), Maryland Asthma Control Program (MACP), the Violence and Injury Prevention Program (VIPP), the Maryland Environmental Public Health Tracking (EPHT) program, and the Office of Infectious Disease Epidemiology and Outbreak Response.

Collaboration with the MCR helps to facilitate any potential investigation of cancers that may be related to workplace exposures. Additionally, occupational cancers were specifically addressed in the revision of the Maryland Comprehensive Cancer Control Plan in terms of creating state policies that address various levels of risk, disparities, and the precautionary principle when addressing environmental and occupational factors in cancer.

An important focus of the partnership with the MACP is to conduct outreach campaigns to health care providers around the issue of occupational asthma. Included in this effort is the distribution of informational pamphlets and brochures on work-related and work-exacerbated asthma.

Part of the goal of integrating occupational health issues with the larger VIPP is to improve sharing of relevant data such as information related to occupation in the MVDRS and to direct greater attention to injuries and fatalities related to occupational and workplace exposures.

The integration of environmental and occupational surveillance data is largely achieved through the presentation of the occupational health indicators on the EPHT portal.

OHSSP is also interested in examining the issue of occupationally-acquired infectious disease with the goal of improving surveillance efforts around workers and illnesses resulting from exposure to infectious agents.

In 2013, the Baltimore City Health Department (BCHD) and the Environmental Health Bureau at DHMH partnered together in an investigation of an office complex of a Maryland academic institution following a response by emergency personnel health complaints from building residents at the facility. The environmental health concern ranged from potential food poisoning to carbon monoxide poisoning to an unspecified airborne hazard. Therefore, food and water samples were collected and tested for possible chemicals and toxins. Results of the investigation revealed elevated levels of nitrites and nitrates in the potable hot water system, which led to the diagnosed elevated blood levels of methemoglobin. Recommendations were issued to the building's management to prevent future recurrences and included guidances such as: verifying the integrity of the potable water system by using a dye test to confirm that no cross-connections exist between the potable water system and the heating and cooling systems; verifying no cross-

connections exist between the hot water and cold water systems; conducting periodic testing for nitrates/nitrites.

**Translation of Findings**

The project had a few findings that could be translated in practice to reduce workplace disease or injuries. Based on the surveillance findings, DHMH OHSSP identified several priority areas: (1) asthma; (2) infectious disease; and (3) occupational cancer.

The OHSSP distributed brochures on work-related asthma to all pulmonologists across the State. These were widely distributed, and resulted in inquiries and referrals to the OHSSP. There were also contacts with some of the occupational safety and health professional societies including the Maryland chapter of the American College of Occupational and Environmental Medicine, the occupational medicine residency training programs, Maryland Occupational Safety and Health, and physician training programs. OHSSP personnel presented information and cases related to occupational medicine, and used these presentations to discuss occupational illness and injury surveillance and reporting requirements. Presentations were made to the Occupational Medicine Residency Program at Johns Hopkins Bloomberg School of Public Health on January 28, 2013, and OHSSP has served as a residency training site for some occupational medicine residents.

The new Maryland Cancer Plan, online at: http://fha.dhmh.maryland.gov/cancer/cancerplan/SitePages/environmental.aspx, contains an extensive discussion of the role of occupation. The plan recommended: (1) By 2015, identifying a limited set of up to five priority hazards; (2) Development and implementation of a coordinated approach to reducing the priority hazards; (3) Creation of state policies that address levels of

risk, disparities, community vulnerability, and the precautionary principle when addressing environmental and occupational factors in cancer. In 2013, the State Legislature considered a bill that would create a task force to look at the issue of environmental factors and cancer; while occupational factors were not part of the task force's charge, they did inform some of the deliberations of the task force.

**Outcomes/Impact**

The principal outcome for the project period was a reinvigoration of occupational disease surveillance in Maryland; an increasing awareness of the Department of Health and Mental Hygiene as a locus of capacity for occupational illness and injury surveillance on the part of other State agencies, employers, workers, and the general public; and improved integration of the Maryland OHSSP and its epidemiologic capacity with overall public health function.

A second main objective was to fortify partnerships and promote interdisciplinary cooperation to prevent workplace injuries and illnesses. The OHSSP initially focused on several priority areas that aided in strengthening collaborations across different offices and programs within DHMH and incorporating occupational issues into other important public health areas: an outreach campaign to health care providers around the issue of occupational asthma and indoor environments; a collaboration with the Maryland Cancer Control and Prevention program to address occupational cancer; and a collaboration with the Maryland Environmental Public Health Tracking project to use geographic information systems to better integrate occupational and environmental surveillance data.

One of the worker safety and health activities conducted was a 2013 workplace investigation of a potential chemical exposure at an academic institution in which the OHSSP partnered with the Baltimore City Health Department to collect samples, interview employees, identify the environmental contaminant, and develop recommendations to prevent any potential future recurrences. This successful collaboration was reflective of strong occupational health expertise and robust ties across different agencies.

Additional data sources were considered and explored for use in supplementing data on occupational health surveillance, including the Behavioral Risk Factor Surveillance Survey (BRFSS), the Maryland Violent Death Reporting System (MVDRS), and the National Electronic Disease Surveillance System (NEDSS) to try to capture a broader spectrum of occupational injuries and illnesses.

Significantly, OHSSP also identified a critical emerging gap in occupational disease surveillance capacity in Maryland, specifically related to the lack of industrial hygiene capacity in the Maryland Occupational Safety and Health (MOSH) program. This engendered a discussion with the MOSH Advisory Board, and was the source of considerable discussion in months to come.

Section 2

**Scientific Report**

*Background*

The Maryland Department of Health and Mental Hygiene (DHMH) Occupational Health and Safety Surveillance Project (OHSSP) was established within the Environmental Health Bureau

of DHMH. The Environmental Health Bureau is composed of units responsible for food protection, environmental epidemiology, occupational epidemiology, and injury epidemiology. The Environmental Health Bureau houses programs in injury prevention, rape prevention and education, the Violent Death Reporting System, asthma, lead poisoning prevention, and environmental/occupational response.

*Specific Aims and Results*

Specific Aim 1a. Establishment of the Occupational Health and Safety Surveillance Project: This specific aim was achieved. As discussed above, the OHSSP was established, successfully developed occupational health indicators, submitted these indicators, and used the indicators and the capacity of the OHSSP to respond to occupational health injury and illness areas of concern.

Specific Aim 1b. Collection of data from primary provider reports and pre-existing administrative data bases to establish ongoing analysis and reporting of occupational disease incidence within Maryland, including the 19 occupational health indicators promulgated by the Council of State and Territorial Epidemiologists (CSTE):

Specific Aim 1c. Convene a Surveillance Advisory Board: The Surveillance Advisory Board was successfully established and consulted on both the creation and operation of the OHSSP. The Surveillance Advisory Board was successfully recruited from academic centers, with somewhat less success in recruiting workers and employers. The Surveillance Advisory Board reviewed the occupational health indicators and made recommendations based on those reviews; the Board also recommended some outreach activities.

Specific Aim 2: To strengthen the pre-existing relationships of the occupational disease surveillance system with the State's asthma control program, cancer control program, and environmental public health tracking (EPHT) program: This aim was successful in one case, and not in the other. The OHSSP successfully used the EPHT platform to post indicators and maps related to occupational health indicators.

Specific Aim 2a: In partnership with the Maryland Asthma Control program, conduct an outreach campaign to health care providers around the issue of occupational asthma: This specific aim was somewhat successful. DHMH OHSSP did initially collaborate with the Maryland Asthma Control Program on distribution of materials to pulmonologists regarding occupational and work-related asthma. However, during the project period the Maryland Asthma Control Program was not renewed during a competitive application period.

Specific Aim 2b: In collaboration with the Maryland Cancer Control program, address the issue of occupational cancer in the revision of the Maryland Cancer Plan:
The plan recommended: (1) By 2015, identifying a limited set of up to five priority hazards; (2) Development and implementation of a coordinated approach to reducing the priority hazards; (3) Creation of state policies that address levels of risk, disparities, community vulnerability, and the precautionary principle when addressing environmental and occupational factors in cancer. In 2013, the State Legislature considered a bill that would create a task force to look at the issue of environmental factors and cancer; while occupational factors were not part of the task force's charge, they did inform some of the deliberations of the task force. The final Cancer Plan contained a robust discussion of these three factors.

Specific Aim 2c: In collaboration with the Maryland Environmental Public Health Tracking project, establish the occupational disease registry as an integral component of the Maryland Environmental Public Health Tracking network, allowing use of the geographic information system (GIS) and other network analysis tools, and allowing integration of occupational and environmental surveillance data,
and the reporting of occupational diseases as a component of the EPHT system.

Specific Aim 3: To integrate activities within DHMH, the Maryland Department of Environment, the Maryland Occupational Safety and Health program, and local health departments that address indoor air quality programs in workplaces. This activity had limited success. In large part, the lack of resources and personnel made it difficult to establish a formal indoor environmental quality/indoor air quality program.

Specific Aim 4. To link occupational disease surveillance activities with ongoing occupational disease prevention efforts of MOSH and the State. The OHSSP is now engaged with Maryland Occupational Safety and Health (MOSH) on a number of fronts. The most significant of these was a review by OHSSP of occupational descriptors in the Maryland National Electronic Disease Surveillance System (NEDSS) for *Campylobacter* and *Salmonella* infections (Figures 1, 2). The findings (Figure 3) showed that 9% (N=39) of 422 cases had no information on occupation, while 91% (N=383) had occupational information, though that information was not by itself sufficient to understand risk. Discussions about this work are continuing with the U.S. Occupational Safety and Health Administration (OSHA).

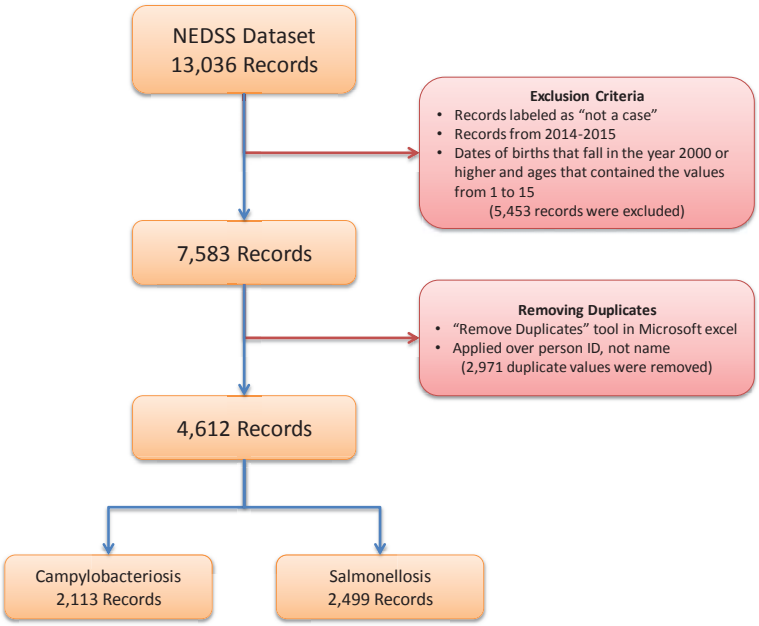


***Figure 1. Sampling frame for selection of cases of Salmonella and Campylobacter infections in Maryland Electronic Disease Surveillance System.***

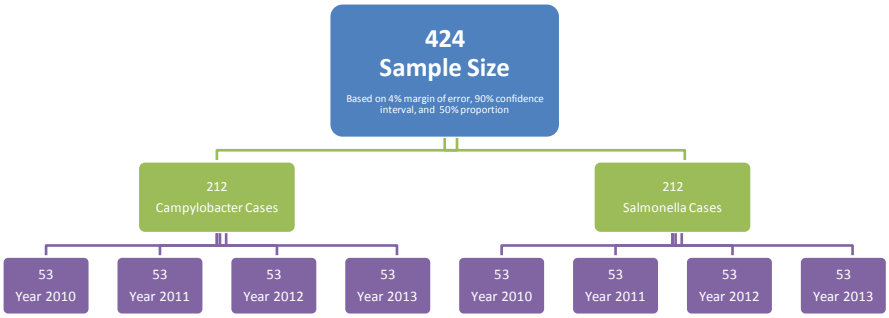


*Figure 2. Sampling cases of Salmonella and Campylobacter.*

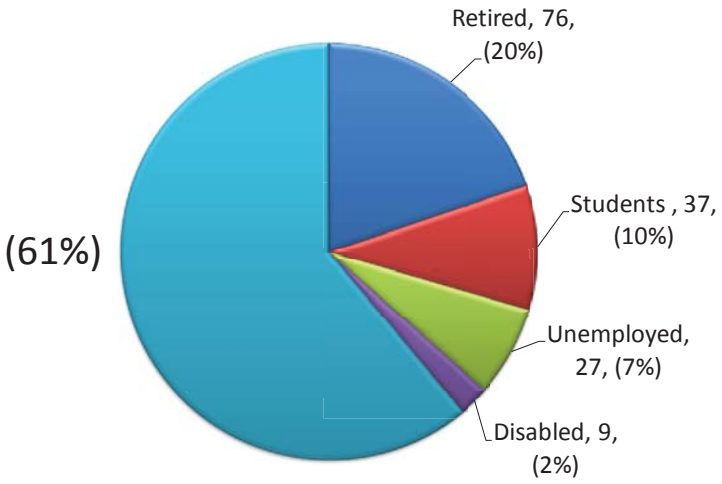


***Figure 3. Percentage of various occupations reported in Maryland Campylobacter and Salmonella cases in the Maryland Electronic Disease Surveillance System (N=383)***

**Publications**

Maryland OHSSP has contributed two documents to the clearinghouse, one on the potential health impacts (including a discussion of potential occupational health impacts) of developing the Marcellus Shale in western Maryland; the other on the OHSSP investigation of methemoglobinemia in an office building in Baltimore.

**Data Sets**

Data sets used by the DHMH OHSSP are contained with the Maryland Environmental Public Health Tracking program (EPHT). These data sets are available for research purposes by contacting the Maryland OHSSP or the Environmental Health Bureau at: dhmh.envhealth@maryland.gov.

**Other Materials available for other investigators**

Not applicable