**ID: 73213000**
**Injury - Host Site Description**
**Wisconsin Department of Health Services**

**Assignment Location**: Madison, US-WI
Wisconsin Department of Health Services
Division of Public Health/Office of Preparedness and Emergency Health Care

**Primary Mentor:** Pamela Imm, Master of Science degree in Sociology
Injury and Violence Prevention Epidemiologist
Wisconsin Department of Health Services

**Secondary Mentor:** William Koehne, Masters of Public Health in Global Epidemiology
Preparedness and Emergency Health Care Epidemiologist
Wisconsin Department of Health Services

**Work Environment**
100% Virtual

**Assignment Description**

The fellow will be placed in the Data and Systems section of the Office of Preparedness and Emergency Health Care (OPEHC) but will also work with State Injury Prevention Program epidemiologists in the Bureau of Community Health Promotion. OPEHC's Data and Systems Section manages the Wisconsin Ambulance Run Data System (WARDS), the Wisconsin Trauma Registry, the state's hospital capacity database and also uses statewide hospital discharge data, death data from Vital Records, and syndromic surveillance from ESSENCE as needed. While the main projects the fellow would engage in would focus on injury, there are many opportunities to use other data sources or engage in emergency preparedness and response work. Throughout this fellowship, the fellow would work closely with the current Preparedness and Emergency Health Care Epidemiologist in OPEHC.

The fellow's day-to-day activities would include analysis and presentation of data, participating in program planning meetings for the trauma system, emergency preparedness and response, and in data sharing projects with partners. There are a variety of data analysis projects using trauma, EMS, and hospital capacity data outlined but not yet completed. These include analysis of traumatic injury data to better assess data quality and to understand patterns of injury in Wisconsin, how a variety of social determinants of health impacts EMS use, and a geographical analysis of heat related illness. The fellow would also create public and partner-facing data dashboards using Tableau on injuries in Wisconsin or on other topics such as EMS ambulance runs or hospital capacity. Lastly the fellow would work directly with partner organizations such as hospitals, researchers, and injury prevention nonprofits to help plan and execute data sharing projects. During emergency responses or large events, the fellow will also be expected to participate in public health surveillance or response activities.

There are many options for injury-specific projects with the different data sources available to this fellow. There are also many options for additional projects and work using EMS data including overdose, stroke, or infectious disease depending on the fellow's interest.

OPEHC's offices are located at 1 West Wilson in downtown Madison with fellows having the option of being fully remote or hybrid. Madison is a vibrant city offering unique experiences and a welcoming culture with great natural beauty and plenty of hiking and biking trails nearby.

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**Describe Statistical and Data Analysis Support, Such as Databases, Software, and Surveillance Systems Available to the Fellow**

The fellow will have access to SAS, R, and Tableau for data analysis and visualization and have mentors and colleagues who are familiar with these systems. The fellow will mainly use three datasets: the Wisconsin Ambulance Run Data System (WARDS), the Trauma Registry, and the hospital capacity dataset. The fellow may also use other datasets available at WI DHS for various projects as needed, such as the statewide hospital discharge dataset (which includes both emergency department visits and admissions), vital records, and ESSENCE for syndromic surveillance data.

**Projects**

**Surveillance Activity Title: Trauma Registry**

*Surveillance Activity Description:*
The Wisconsin Trauma Patient Registry collects information on patients treated for traumatic injuries at trauma hospitals in Wisconsin. In order to maintain or obtain classification as a trauma center, hospitals are required to report every trauma injury to WI DHS. Each year, 38,000 traumatic injuries are reported by hospitals to the state. These injuries range from falls, motor vehicle crashes, to firearm discharges and include both accidental and intentional injuries. This data is used for a variety of reports to help WI DHS and partners such as hospitals or nonprofits understand trends and occurrence of injury to inform their prevention and treatment strategies. The data is used by individual hospitals and health systems for their own process improvement activities as well. It includes a variety of variables specific to the treatment of injuries as well as prehospital/EMS information as well. The fellow will use this surveillance system to monitor trends in injury in Wisconsin, cooperate with the Statewide Trauma Advisory Council (STAC) to provide process improvement analysis and resources to hospitals, and fulfil data requests from partners engaged in injury prevention activities. There will also be opportunities to link trauma data to EMS data to better understand the impact of pre-hospital care on trauma injury outcomes as well as to use syndromic surveillance for real-time injury surveillance.

The Trauma Registry data dictionary can be found at https://www.dhs.wisconsin.gov/publications/p01117.pdf

*Surveillance Activity Objectives:*
- Identify important trends in injuries and do reviews of specific injury areas such as falls or occupational injury
- Engage with STAC and other partners in injury treatment or prevention to identify data analysis priorities
- Publication of reports or data reflecting priorities and important trends
- Linkage to EMS data to understand the impact of prehospital care

*Surveillance Activity Impact:*
Hospital and injury prevention partners rely on trauma injury data for program improvement and prioritization of injury prevention activities. Reports and data requests that are shared with partners help improve the care that patients receive. Analysis of this data could also help impact other systems of care, such as EMS, and inform actions other partners should take on injuries they focus on, such as the Bureau of Occupational and Environmental Health and occupational injuries.

**Surveillance System Evaluation Title: Trauma Registry Surveillance System Evaluation**

*Surveillance System Evaluation Description:*
Trauma centers in Wisconsin treat over 38,000 traumatic injuries every year. These injuries range from falls, motor vehicle crashes, to firearm discharges and include both accidental and intentional injuries. Trauma centers play a vital role in not just the treatment of injuries in Wisconsin, but also engage in injury prevention activities.

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Hospitals with a trauma designation are required to report injuries they treat into the Wisconsin Trauma Registry. This data is used for analysis by WI DHS as well as individual hospitals to understand patterns and trends in injuries as well as for process improvement activities. Currently, WI DHS only does limited data quality checks and has not verified that all injuries that should be reported have been. This project would evaluate data quality of individual variables, use alternative data sources such as hospital discharge data or EMS data to evaluate expected versus actual injury counts by hospital, and link to hospital discharge data to identify missing incidents.

*Surveillance System Objectives:*

- Identification of most critical data elements and data quality analysis of each breaking down factors that influence data quality
- Statistical analysis of expected versus actual reported traumatic injuries based on hospital discharge data and EMS data
- Linking of trauma and hospital discharge data to identify missing cases
- Analysis of missing cases to understand association between missingness and injury details (such as, classification level, type of injury, recency of classification, region of state)
- Poster or presentation showing methodology and results to share with other states' trauma systems
- Creation of outreach plans to hospitals that appear to under-report traumatic injuries

*Surveillance System Impact:*
Improving the data quality of information in the Trauma Registry would be of great use for the state and for individual hospitals as they use the data for process improvement and to understand patterns of injury. Helping hospitals have higher quality data can help them identify gaps or areas for improvement for patient care. Additionally, data from the trauma registry is used to inform injury prevention activities. Higher quality data could highlight areas that are under-addressed when it comes to injury prevention activities.

**Major Project Title: EMS Responses and Social Determinants of Health Associations**

*Major Project Description:*
Over 700 EMS agencies in Wisconsin perform over 900,000 ambulance runs every year, all of which are reported into the Wisconsin Ambulance Run Data System (WARDS). EMS provides life-saving medical care and is often the first point of contact with the health care system for patients. A better understanding of how social determinants of health (SDoH) EMS use could help highlight underserved areas or populations and highlight the importance of EMS to these communities. SDoH measures such as income, housing, race, or health care access, have large impacts on individuals' health. This project would examine the association between SDoH measures and the total number of EMS responses and types of specific runs by using census-tract and other geographical measures of SDoH and EMS response frequency. This project would require the completion of a literature review of the impact of SDoH on EMS use, analysis of data to perform model and distribution selection, data analysis, and presentation of findings. This project could be completed through spatial or aspatial analysis of data.

*Major Project Objectives:*
A poster, white paper, or publication to share findings, presentation to Wisconsin EMS Advisory Board, local health departments, National Association of State Emergency Medical Services Officials (NASEMSO), and WI public health leadership.

*Major Project Impact:*
A greater understanding of the impacts of social determinants of health on EMS use would help us:

- Understand community-level risk factors of emergency health situations
- Target community intervention

- Highlight health disparities or health care access disparities which can drive EMS use

Additionally, this project could help highlight the importance of EMS in connecting underserved populations with health care.

**Additional Project #1 Title: Large Event Public Health Surveillance**
**Project #1 Type: Surveillance System Evaluation**

*Project #1 Description:*
Wisconsin has recently hosted multiple large events in the state, including the Republican National Convention in Milwaukee in 2024 and the NFL Draft in Green Bay in 2025. During each of these events, WI DHS epidemiologists worked alongside local health department epidemiologists to lead public health surveillance efforts. For the project, the fellow will help to organize surveillance efforts as well as conduct public health surveillance during the EAA AirVenture in Oshkosh as well as during any other large, planned events. The EAA AirVenture event brings hundreds of thousands of attendees to Oshkosh, Wisconsin. Last year's EAA AirVenture had an attendance of 700,000 people from 98 different countries over 7 days.

The fellow will work with the Winnebago County Health Department staff to conduct surveillance of the EAA, or with the local health department staff whose jurisdiction another large event is in, as well as surveillance staff at WI DHS including those who work with ESSENCE to do syndromic surveillance, Bureau of Communicable Diseases staff who receive reportable illness reports, and wastewater surveillance staff.

*Project #1 Objectives and Expected Deliverables:*
The fellow will craft an event plan, help lead meetings and discussions around surveillance activities, conduct public health surveillance during the event. If outbreaks or other events of public health importance are detected during the event, the fellow will assist in public health activities to support the local public health authorities. After the event is completed, the fellow may complete an after action report.

*Project #1 Impact:*
Public health surveillance during events is important as they are more likely have incidents of public health importance, and early detection of outbreaks or other issues can help protect the health of attendees and the surrounding community. These activities could help identification of an event of public health importance giving local public health and WI DHS more time to intervene and to prevent poor outcomes.

**Additional Project #2 Title: Extreme Heat and EMS responses**
**Project #2 Type: Surveillance System Evaluation**

*Project #2 Description:*
Extreme heat events are increasing in frequency and intensity over time putting Wisconsinites at a greater risk of heat-related illness. Other data sources have been used to understand the correlation between outdoor conditions and heat related illness on a county scale and day scale, but EMS data offers very specific geographical and time of occurrence data. This project seeks to better understand specific risk factors for heat related illness requiring an EMS response including time of day, temperature specific to the local area, and other geographic factors. Additionally, geospatial cluster analysis of heat-related EMS responses could be conducted to better inform local health departments and governments of vulnerable areas.

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*Project #2 Objectives and Expected Deliverables:*
The fellow will complete a short literature review on EMS responses to extreme heat events. Once this is completed, the fellow will determine incidence of EMS responses to heat-related illness and evaluate heat-related illness syndrome definitions. With this information, the fellow will perform use EMS data find specific risk factors associated with EMS responses for heat-related illness.

*Project #2 Impact:*
Having a better understanding of specific risk factors associated with heat-illness events could help target public health interventions to prevent and treat heat related illness. Cluster analysis could also highlight what places in communities would most benefit from education or interventions such as cooling shelters during warm weather.

**Additional Project #3 Title: Injury Dashboards**
**Project #3 Type: Surveillance Activity**

*Project #3 Description:*
Injuries are the leading cause of death for people aged 1-44, and Wisconsin fares worse than neighboring states on specific injury measures such as traumatic injury mortality in youth and fall injury mortality in older adults. While some injury incidence and outcome data are accessible through the WISH (Wisconsin Interactive Statistics on Health) Query system, creating interactive dashboards would make this information more accessible for a wider audience of data users and allow for more visual representation of data. These dashboards could focus on injury overall or target specific types of injuries such as traumatic brain injury or falls. A variety of data sources could be used such as hospital discharge data, Trauma Registry data, death data from vital records, or EMS data to provide a more complete picture of an injury topic.

WI DHS uses Tableau for interactive dashboards.

*Project #3 Objectives and Expected Deliverables:*
The fellow would familiarize themselves with Tableau and solicit input from partner organizations on data detail and display. Once this is done, the fellow would create the dashboard or dashboards with assistance from data visualization experts and create a protocol to keep the data updated annually.

*Project #3 Impact:*
Understanding the pattern of injuries and injury's impact on the public's health is critical to injury prevention efforts. This dashboard will be used by WI DHS and partner organizations to prioritize and target injury prevention activities and also help inform the public of the risk certain injuries pose.

**Please Describe the Fellow's Anticipated Role in Preparedness and Response Efforts – Include Activities and Time Allocation (Required Competency of Fellowship)**

The Office of Preparedness and Emergency Health Care's (OPEHC) priorities revolve around the emergency readiness, improvement of emergency health care systems, and injury prevention. OPEHC staff have assisted in the COVID-19 response and in emergency preparedness during large events like the Republican National Convention and NFL Draft. The fellow would be expected to participate in training and real-world emergency response work.

**Please Describe the Fellow's Anticipated Role in Cluster and Outbreak Investigations – Include Activities and Time Allocation (Required Competency of Fellowship)**

It is unlikely that the fellow would have a role in cluster and outbreak investigations.