Disaster Epidemiology

Disasters are sudden events that cause disruption, damage, disease, and sometimes loss of life. Recent natural disasters occurring in the United States include wildfires, hurricanes, and floods. Public health responses can reduce the impacts of a disaster.

Defining Disaster Epidemiology

According to the Centers for Disease Control and Prevention (CDC), disaster epidemiology is defined as the use of epidemiology to assess the short- and long-term adverse health effects of disasters and to predict consequences of future disasters. It brings together various topic areas of epidemiology including acute and communicable disease, environmental health, occupational health, chronic disease, injury, mental health, and behavioral health.

One of the primary goals of public health activities in a disaster is to use epidemiology to understand the health impacts of a disaster for the purpose of preventing and reducing disaster-related morbidity and mortality. Disaster epidemiology supports situational awareness, which means it provides information that helps us understand what the needs are, plan the response, and gather the appropriate resources.

The main objectives of disaster epidemiology are to:

- prevent or reduce the number of deaths, illnesses, and injuries caused by disasters,
- provide timely and accurate health information for decision-makers, and
- improve prevention and mitigation strategies for future disasters by collecting information for future response preparation.
The term all-hazards is commonly used in emergency management to describe natural disasters (i.e. biological, geological, or hydrometeorological) or man-made disasters (unintentional or intentional). According to the Department of Homeland Security, all-hazards means addressing probable threats or hazards, including hazards that could cause injury, property damage, business disruption or environmental impact to any community. Disaster epidemiology uses an all-hazards approach to provide actionable information for partners such as decision-makers, local health jurisdictions, policymakers, first responders, and affected community members.

**Methods and Tools**

Epidemiological methods have been developed to assess the scope of public health problems in communities before, during, and after a disaster. These methods provide information about the effects on people’s physical and mental health as well as social and community needs for life-saving or life-preserving decisions, such as managing risk communication, monitoring medical needs, and assessing impacts on healthcare systems.

In combination, these methods can contribute to a greater understanding of the public health consequences of the immediate event and beyond and can enhance planning, preparedness, and mitigation for future disasters. Disaster epidemiology includes the following methods and tools:

- Rapid needs assessment
- Health surveillance
- Registries
- Tracking systems
- Epidemiological investigation and studies

**Rapid needs assessment** methods are needed to collect reliable, objective information after an incident for decision making and/or resource allocation for an affected population. Collected information about health status and needs can prioritize public health interventions and serve as an important guide to emergency efforts.

One commonly used rapid needs assessment tool developed by the CDC is the Community Assessment for Public Health Emergency Response (CASPER). CASPER uses valid statistical methods to gather information about health and basic needs, allowing public health and emergency managers to prioritize their response and distribution of resources accurately. CASPER may also be used for conducting Health Impact Assessments (HIAs) or other community-level surveys during non-emergency situations.

**Health surveillance** in disaster settings is the systematic collection, analysis, interpretation, and dissemination of health data to characterize the burden of disaster-related morbidity and mortality in an affected community and among emergency responders. There are many types of public health surveillance; including syndromic surveillance, healthcare facility surveillance, shelter surveillance, and morbidity and mortality surveillance.
In Washington, the DOH Rapid Health Information NetwOrk (RHINO) program is responsible for syndromic surveillance data collection, analysis, and distribution. Syndromic surveillance data is collected in near real-time from hospitals and clinics from across the state. Key data elements reported include patient demographic information, chief complaint, and coded diagnoses. This robust system is one of only two sources of emergency department (ED) data for Washington and the only source for outpatient (primary, specialty, and urgent care) clinical data.

**Registries** employ structures and processes for documenting environmental hazards and exposures for longitudinal individual observation before or after epidemiological studies and investigations. Information from registries help to identify medium- to long-term health consequences, and needs for testing or care, and clarifies the link between exposures and health outcomes.

**Tracking systems** refer to the collection and integration of data from environmental monitoring, exposure, and health effects in people over time. Information is typically gathered during response and recovery phases, and helps identify needs for ongoing care or public health interventions and informs the development of health education and disease prevention measures. One of the essential public health services at the state level has been identified as the ability to diagnose and investigate health problems and health hazards in the community.

**Epidemiological investigations and studies** establish determinants for adverse health outcomes so that interventions may be designed and implemented to prevent further morbidity and mortality. In public health emergencies, epidemiological investigations and studies may also serve to do the following:

- Validate or refute specific behavioral responses and safety messages,
- Enhance communication strategies by identifying effective languages and media for promoting behavioral change during warning, response, and recovery phases, such as health advisories, and
- Aggregate information from multiple disasters to identify commonalities or patterns at a broader level.

**Epidemiological Response Team**

The Epidemiological Response Team (also referred to as the “Epi Response Team” or ERT) is a Department of Health (DOH) response team consisting of members trained in disaster epidemiology and public health emergency management. The Epi Response Team is deployed during all-hazards incidents that exceed local capacity or events with broad impacts requiring multi-jurisdictional coordination to effectively respond.
The original Epi Response Team (formerly titled Epi Strike Team) was established in 2014 during heightened response to the Ebola epidemic through the CDC’s Public Health Emergency Preparedness (PHEP) Cooperative Agreement and the Washington State Secretary of Health’s 2013 DOH directive to become an all-hazards, first-response agency. The Epi Response Team is maintained through collaboration between the DOH Office of Communicable Disease Epidemiology (OCDE) and the DOH Office of Emergency Preparedness and Response (OEPR), and is supported by membership of diverse staff from across DOH. As of 2018, the DOH Epi Response Team is the first statewide task force in the United States focused on operationalizing disaster epidemiology capacity and capability for all-hazards emergencies.

Starting January 2019, the new Epi Response Team will open member recruitment across the agency and welcomes all applicants. For more information about the Epi Response Team or disaster epidemiology, please contact Joanne Amlag at joanne.amlag@doh.wa.gov.

Resources

- CDC Disaster Epidemiology definition and FAQs: https://www.cdc.gov/nceh/hsb/disaster/epidemiology.htm
- CSTE Disaster Epidemiology resources: http://www.cste.org/members/group.aspx?id=87588

Source: DOH Public Health Emergency Planning Regions