Poison Center & Public Health Collaborations Community of Practice (PC PH CoP)

NEWSLETTER

SPRING 2019

Disaster Response: an Intersection of Poison Control And Public Health

LETTER FROM THE EDITOR

It is our goal to bring community members content that enriches knowledge and understanding of the roles and responsibilities of both poison control centers (PCCs) and public health personnel, and their intersections.

Across the United States (US), regional PCCs play a pivotal role in disaster responses. In addition to fielding information or guidance calls from both the general public and medical providers regarding on an array of harmful substances and exposures, the nation's 55 regional PCCs deliver a wide range of additional services during a disaster response.

The Centers for Disease Control and Prevention (CDC) has developed an assortment of disaster preparedness and recovery tools for public health professionals to use in addressing public health needs before, during, and following a disaster.

In this newsletter, we aim to:

- define and categorize disasters
- define disaster epidemiology and introduce the Disaster Epidemiology Response Team (DERT)
- provide examples of previous DERT disaster responses
- provide CDC tools for disaster response and response preparedness
- describe PCCs roles and capabilities in disaster response
- provide disaster response and preparedness tools
- highlight suggestions in the literature on PCCs preparation and utilization in disaster responses

We want to hear from you! If you have comments, questions, or concerns regarding the CoP, I can be reached using the contact information listed below. If you have questions regarding disaster emergency preparedness and response or trainings please contact Amy Helene Schnall at ASchnall@cdc.gov.

Sincerely,
Emily Glidden, MPH
Community Facilitator

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The findings and conclusions in this newsletter are those of the author(s) and do not necessarily represent the official position of the CDC/ATSDR.

WHAT IS A DISASTER?

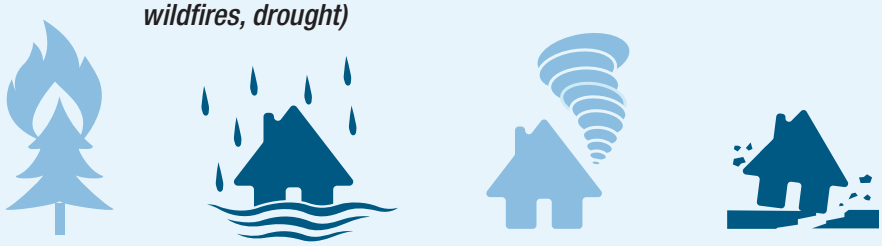
The **CDC** defines a disaster as a **serious disruption** of the functioning of society causing widespread human, material, and/or environmental losses that **exceed the capacity** of local entities to respond and **require external assistance.**[1]

Natural disasters- *acts of nature that create a catastrophic situation in which the day-to-day patterns of life are suddenly disrupted.*[1]

Hydro-meteorological – atmospheric disturbances involving water systems, supercells, or storm surges *(e.g. hurricanes, tornadoes)*

Geological – disturbances often due to the movement of tectonic plates and seismic activity *(e.g. earthquakes, tsunamis, volcanos)*

Extreme weather – hazardous conditions produced by a multitude of weather occurrences *(e.g. extreme heat, extreme cold, wildfires, drought)*



Human-induced disasters – *non-naturally occurring events, accidental or deliberate, that severely disrupt day-to-day life.*[1]

Chemical – release of toxic vapors, aerosols, liquids, and/or solids adversely affect surrounding animal and human life, and/or vegetation[2] *(e.g. chemical spills, oil spills)*

Radiological/Nuclear –release of dangerous levels of radiation and/or radioactive materials[2] *(e.g. nuclear power plant accidents)*

Transportation – vehicle-related events involving the carrying of goods and/or hazardous substances that damage the public and surrounding environment, directly or indirectly[3] *(e.g. plane crashes, train derailment, maritime accidents)*

Complex emergencies - *situations of disrupted livelihoods and threats to life produced by warfare, civil disturbance, and/or large-scale movements of people. Responses to these events are often conducted in uncertain and possibly unstable political environments (e.g. warzones).*[1]

Drought - deficiency of rainfall over an extended period (e.g. season, year, years) relative to regional annual rainfall averages and may result in[4]:

- famine, malnutrition, spreading of communicable diseases
- inadequate drinking water, food insecurity
- displacement or movement of populations

Bioterrorism – deliberate release of biological organisms and/or toxins to cause sickness or adversely affect life and/or surrounding environments[2] *(e.g. Anthrax, smallpox)*

Nuclear explosions – devices causing blast, heat, and radiation exposure and contamination leading to environmental and human devastation.[2] *(e.g. Improvised Nuclear Devices, Radiological Dispersal Devices)*

WHAT IS DISASTER EPIDEMIOLOGY?

Disaster epidemiology **assesses** both the short- and long-term adverse human health effects of disasters to **predict** the potential consequences of future disasters. It brings together a wide range of scientific areas of study, including acute and communicable disease, environmental health, occupational health, chronic disease, injury, mental health, and behavioral health. Disaster epidemiology activities focus on:

- **collecting** data that provide situational awareness during a response
- **gathering** and appropriating of resources in disaster responses
- **helping** plan for future responses based on needs identified in previous responses[5]

Who are the Disaster Epidemiology Response Team (DERT)?

DERT is a National Center for Environmental Health (NCEH) group that provides **expertise** in disaster epidemiology to state, tribal, local, territorial (STLT), and international partners in preparing for and responding to both natural and human-induced disasters. DERT activities include **health surveillance**, **rapid needs assessment**s, and **epidemiological studies**. DERT has developed trainings in these disaster epidemiology concepts for public health professionals (see additional resources).

Community Assessment for Public Health Emergency Response (CASPER)

CASPER is an epidemiological technique designed to provide household-based information about a community **quickly** and **cost-effectively**. CASPER assesses overall physical and behavioral health status of the community as well as response practices. Requests for CASPERs are received from local, regional, state, and federal partners.[6]

Natural Disaster Responses

Hurricane Irma – Virgin Islands, 2017 (ongoing)

On **September 6, 2017**, a category 5 hurricane called **Irma** made landfall on the **U.S. Virgin Islands** (USVI). Since the storms, the USVI Department of Public Health conducted multiple CASPERs to do the following:[7]

- **assess** residents' experience during the 2017 hurricanes
- **monitor** the communities' physical health and behavioral health and gauge the continuing recovery process
- **evaluate** preparedness for future disasters

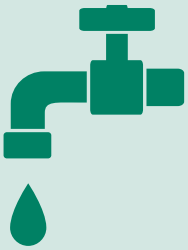
Flooding – West Virginia, 2016

In **July, 2016** West Virginia (WV) experienced extensive flooding that resulted in 23 deaths. In response, the WV Department of Health and Human Resources, Bureau of Public Health requested **technical assistance** from DERT to conduct two CASPERs. Findings indicated recovery efforts and resources should be allocated to the following interventions:[8]

- **promote** water preparedness supply for all households
- **identify** alternative water supplies in future emergencies
- **publicize** available health and mental health resources
- **increase** community **education** on safety

Human-Induced Disaster Responses

Flint Water Crisis – Michigan, 2016



On **April 25, 2014**, the City of Flint, Michigan changed its municipal water source from Detroit-supplied Lake Huron to the **Flint River**. Inadequate treatment of river water led to the corrosion of distribution pipes, leaching lead and other contaminants into municipal drinking water.

A CASPER collected community information on[9]

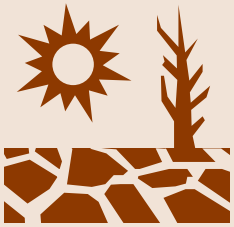
- household/individual physical and behavioral health concerns
- water sources, use, difficulties accessing drinking water
- best methods for public health messaging and communication

Results found the following:[9]

- **66**% reported one or more adult members experiencing at least one behavioral health issue "more than usual"
- **54**% reported that at least one child experienced at least one behavioral health issue "more than usual"
- **22.5**% reported difficulties getting access to behavioral health services
- **34**% and **29**% of individuals reported =-, respectively
- 51% felt the physical health of at least one member had worsened due to Flint water crisis

Complex Emergency Responses

Persistent Drought – California, 2017



Abnormal dryness or drought affects approximately **93**% of California's population. In **January 2014**, Governor Brown of California proclaimed the drought a **state of emergency** because of the persistence of record-low precipitation. County and state public health agencies conducted CASPERs in response to the ongoing drought cycle. Topic areas for the CASPER interviews were:

- communications
- water sources and quality
- drought mitigation and assistance behaviors
- drought knowledge, observations, and beliefs
- health and financial impact of drought

CASPER results indicated efforts should focus citizen-level drought preparedness through the following activities:

- **educate** them on water collection and use reduction measures
- **provide** behavioral health training to local community health workers
- **use** air quality notification systems based on preferred contact methods
- **develop** multi-lingual communication systems
- **consider** the possibility of developing relocation services

PCCs in Disaster Response

The nation's system of regional PCCs collects telephone call data and assists in monitoring exposures and poisonings in the event of a disaster. PCCs and PCC data are utilized disaster response by:

- identifying disaster-specific call through coding
- tracking and monitoring disaster- related exposures of interest
- informing pertinent public health messaging

PCCs are an invaluable resource during disaster-response because they have:

- are available 24/7
- have the ability to quickly disseminate health messaging to the public and medical providers
- provide surge capacity from affected-areas to neighboring PCCs

NPDS is use to monitor disaster-related calls through:

- continuously uploading call data from 55 regional PCCs, providing near-real time date
- defining and automating disaster-related anomalous exposure cluster detection
- providing situational awareness from within the affected-areas

Natural Disaster Responses

Hurricane Maria – Puerto Rico, 2017

On **September 20, 2017**, category 4 **Hurricane Mari**a made landfall in **Puerto Rico**, limiting data transmission from the island. During Maria's landfall, no other real-time source of data was available, making NPDS data critical for health surveillance. PCC data were used to:

- determine hurricane-related environmental exposures (e.g. CO, contaminated water, pharmaceuticals, etc.)
- provide leadership with situational awareness
- monitor ongoing public health concerns (e.g., reported suicides, environmental exposures, etc.)

Hurricanes Harvey and Irma – Texas and Florida, 2017

On **August 25, 2017** and **September 10, 2017**, Hurricanes Harvey and Irma made landfall on the **Texas** and **Florida** coasts, respectively. NPDS data were used to monitor:

- both environmental and toxic exposures (e.g. gasoline, CO, etc.)
- ongoing hurricane-related health surveillance

Analysis of NPDS data provided leadership with situational awareness, community health impacts, and helped inform public health messaging.

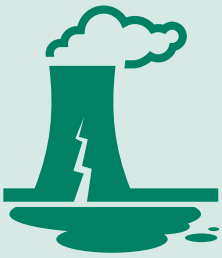
Hurricane Sandy – New Jersey, 2012

On **October 29, 2012**, Hurricane Sandy made landfall on the **northeastern** coast of the **United States**. In response, hurricane-related CO exposures in affected areas were monitored throughout the response. **Using NPDS data** CDC:[12]

- identified 263 CO exposures, including four fatalities, reported to PCCs from affected states
- produced an Morbidity and Mortality Weekly Report (MMWR) on the more than 5-fold increase in CO exposures from Hurricane Irene in 2011
- produced publications on the importance of public health messaging for preventing CO exposures in disaster events.

Human-induced Disaster Responses

Fukushima, Japan – United States, 2011



On **March 11, 2011**, Japan experienced the first **level 7 incident** on the International Nuclear Event Scale since the failure of the nuclear reactors at Chernobyl Ukraine. NPDS captured PCC calls, from within the United States, requesting information on possible radiation exposure from the Fukushima nuclear plant. PCC staff were able to provide callers with Fukushima-related information, including the unadvised use of potassium iodine (KI) and other iodine products.[13]

Much of the information disseminated was readily available on CDC's website, however messaging specific to the incident were crafted and disseminated to PCCs and federal, state and local public health entities. Public health messaging included:

- radiation,[14] potassium iodide (KI),[15] and **iodine**;
- proper **exposure countermeasures**; and
- how to properly use medical interventions.[16]

Deep Water Horizon – Gulf Coast, 2010

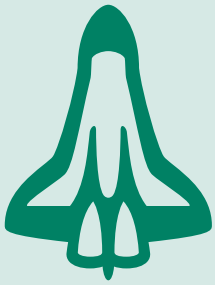
On **April 20, 2010**, an explosion on the **Deepwater Horizon** oil rig, located roughly 40 miles from the southern coast of **Louisiana**, resulted in 11 deaths, 17 injuries, and the release of more than **4.9 million** barrels of oil into the Gulf of Mexico.[17]

On **April 30th**, the American Association of Poison Control Centers (AAPCC) developed an oil spill-specific code and distributed among PCCs and CDC began monitoring incoming exposure and information calls. Between April 30th and July 31st, 2010, **1675 calls** were associated with the assigned oil-specific code; **1028** were deemed potential exposures. Call volume peaked the week of June 20th, declining steadily following June 26th. The most commonly reported clinical effects (CE) included headache, nausea, and coughing and choking.

Anomalies were identified through the NPDS using CE call volume definitions of the affected states, specifically **Alabama, Louisiana, Mississippi,** and **Florida**.

Of the **88** CE anomalies triggered between May 4th and July 31st, **44** were classified as oil-spill related; **16** of which were triggered by reports of headaches. Data analyses performed using NPDS data were shared with federal, state, and local partners to inform decision making and increase situational awareness.

Space Shuttle Disaster – Texas and Louisiana, 2003



On **February 1, 2003**, the National Aeronautics and Space Administration **(NASA)** announced:

- upon re-entry into the Earth's atmosphere, the **Columbia** space shuttle had broken apart, releasing toxic propellants and debris
- areas in the exposure range spanned from Dallas, **Texas**, to the border of **Louisiana**

Following the announcement, information request calls to PCCs increased in both states. PCCs acted as a direct source of information for the public, assisting in the timely dissemination of pertinent public health messages and answering public concerns. [19]

Evaluation Of Poison Centers Preparation And Utilization In Disaster Response

Disaster Preparedness of Poison Control Centers in the USA: A 15-year Follow-up Study

In 1996, the University of California, San Diego conducted a study to determine regional PCCs disaster response preparedness. Researchers distributed a questionnaire to PCC directors (76 of 96 responding [79.2%]) to measure actual and perceived disaster response readiness. Survey results found:[20]

- **54**% of responding PCCs had written disaster plans
- **49**% of managing directors felt their centers had the capacity to handle a disaster event with current resources

In 2013,researchers conducted a follow-up with the remaining PCCs (57 at the time) to determine whether disaster preparedness had changed. Survey findings indicated responding to responding PCC directors (40 of 57 responding [70%]):[21]

- All had a written disaster plan and **65**% reported holding regular drills to practice these plans
- **98**% reported backup coverage by surrounding PCCs
- **85**% reported PCC involvement in policy development
- **90**% reported comfort with current disaster response capacity based on current resources

Based on PCC director responses, over 15 years PCC disaster preparedness has improved on a number of levels, reports of:

- written disaster response plans rose from **54**% to **100**%
- regular drilling of disaster plan rose from **25**% to **65**%
- communication contingency plans increased from **67**% to **98**%
- capacity to handle a disaster response with current resources increased from **49**% to **90**%

In 1998, AAPCC began requiring a brief description of PCC disaster response plan; in 2005, description of services provided during natural and/or technological disasters became required for PCC certification. Additionally, at the time of publication, neither specific plan components nor drill frequency are delineated within accreditation criteria.[21]

Transportation-Related Hazardous Materials Incidents and the Role of Poison Control Centers

The Department of Transportation (DOT) legally requires reporting of serious incidents involving hazardous materials. In the event of hazardous material incidents, PCCs have the capacity to collect call data (e.g. exposures, demographics, clinical effects), provide clinical guidance, and assist health care facilities in capturing patient data; however, reporting of these incidents to PCCs is not required.

In 2010, NCEH conducted a retrospective study to evaluate the level of reported patient transport to PCCs following these incidents. Researchers aimed to match incidents involving hazardous material spills or releases reported to DOT with PCC data collected through NPDS, 2002-2006. Cases were included based on case definitions including exposure substance and and categorized by the time frame in which they were reported to PCCs following the incident. Researchers found:[22]

- **154** serious incidents reported through the DOT met case definitions
- of those incidents, **134** (87%) were not reported to PCCs

Analysis of these data revealed most serious incidents (87%) reported to the DOT were not captured in NPDS. Researchers suggest these findings indicate an opportunity for increased utilization of PCCs in these events.

PCCs have resources to collect data, provide medical guidance, and toxiciological expertise during such events.

Role of Poison Control Centers in Disaster Response Planning

According to Dr. Barbara Insley Crouch, director of the Utah Poison Control Center, PCCs are an invaluable resource in disaster response planning because of their ability to:

- quickly provide the public with crucial exposure information
- direct exposed patients to appropriate health care facilities
- provide pertinent toxicological information to health care providers

In addition to regional PCCs, disaster planning at local and state levels often already exist within:

- local and state hospitals
- local and state health departments
- community planning committees

Disaster plans should also consider resources available via federal initiatives, including:

- Metropolitan Medical Response System (Health and Human Services)
- Domestic Preparedness Program (Department of Justice)
- Chemical Stockpile Emergency Preparedness Program (Federal Emergency Management Agency)
- Health Alert Network (CDC)

PCCs' have the potential to be instrumental in local and state disaster response planning. Efforts should focus on:

- identifying resources already available at local, state, and federal levels
- establishing and building communications between local and state responding agencies
- implementing an all-hazards approaching to planning

Review Of Key Points

Three main classifications of disasters

1. **Natural**: earthly events considered catastrophic and disruptive to life
2. **Human-induced**: events not occurring in nature; can be both accidental and deliberate
3. **Complex emergencies**: compounding events that can disrupt and threaten lives, often involving difficult and unstable political environments

Disaster Epidemiology and DERT Activities

Disaster epidemiology is the:

- **assessment** of short- and long-term adverse health effects of disasters
- **analysis** of assessment to prediction of potential consequences of future disasters

DERT activities include:

- **providing expertise** in disaster epidemiology and disaster response preparation
- **conducting** health surveillance, epidemiological studies, rapid needs assessments
- **training** public health professionals in disaster epidemiology

PCCs role in Disaster Responses

In disaster events, PCCs are an invaluable resource because of their:

- 24/7 availability to health professionals and public
- capacity to reroute calls from affected-center to neighboring centers

NPDS Data and Disaster Response

Historically, NPDS data in disaster response help to:

- **collect** near-real time data
- automatically **detect** anomalous exposures of interest
- **track** and **monitor** disaster-related calls

Evaluating Use of PCCs in Disaster Response

According to the literature, PCCs are more prepared for disaster responses than previously reported. However, PCCs are still an under-used resource in disaster response efforts. To address the remaining shortfalls, PCCs can work with STLT and federal agencies, public health officials, and health care facilities in:

- **identifying** gaps in inter-agency disaster response preparedness
- **establishing** direct communication between PCCs and responding agencies
- **increasing** PCCs involvement in disseminate information to the public in disaster events
- **expanding** the use of PCC data in health surveillance during disasters

Investigations have revealed that PCCs could further improve disaster response preparedness. Study findings suggest that cultivating and strengthening relationships between PCCs and disaster response agencies can help increase disaster preparedness as well as response effectiveness.

ADDITIONAL RESOURCES

Disaster Response Tools

Community Assessment for Public Health Emergency Response (CASPER)

Disaster-Related Mortality Surveillance Form

Guidance for Disaster-Response Manager Preparedness

Natural Disaster Morbidity Surveillance – Individual Form

Natural Disaster Morbidity Surveillance – Tally Sheet

Primer for Understanding the Principles and Practices of Disaster Surveillance in the United States

Shelters Assessment Tool

Disaster Response Trainings

Disaster Epidemiology Training Request Form

CASPER Online Training Course

American Association of Poison Control Centers

Poison Center Resources and Contact Information

AAPCC Annual Reports

Getting Poison Center Help

Center for Disease Control and Prevention Resources

National Disasters and Severe Weather

Office of Public Health Preparedness and Response - Are you prepared?

Resources for Emergency Health Professionals

Information Resources

Interactive Map of CASPERs

Public Health Assessments during a Disaster

CDC Emergency Preparedness and Response

Radiation Emergencies

Disaster Epidemiology FAQ

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