Division of Toxicology and Human Health Sciences

The Division of Toxicology and Human Health Sciences (DTHHS), part of the Agency for Toxic Substances and Disease Registry (ATSDR), plays a vital role in protecting people from toxic chemical exposures.Through our work, we:

- Identify and investigate **chemical exposures**;
- **Translate complex science** into information and actions that not only the public but also health professionals can use to **protect health**;
- Conduct research using **surveillance and health registries** to help scientists better understand certain exposures and diseases and how they may affect people's health;
- Create and apply a variety of **health education tools**; and
- Address health issues during **emergency events** and real or threatened releases of hazardous materials.

Learn more about the impactful work of DTHHS programs, activities, and projects in this At-A-Glance and at www.atsdr.cdc.gov.

Agency for Toxic Substances and Disease Registry
Division of Toxicology and Human Health Sciences

ATSDR

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Emergency Response

When exposure happens suddenly, the DTHHS Emergency Response Team (ERT) is available 24 hours a day.

- In January 2013, ERT worked with EPA's Region IV office when a mercury spill threatened the health of a family in a Dry Ridge, KY residence, including a pregnant mother in her first trimester and two children. Based on federal recommendations for limited mercury exposure, the family was moved out of the house until the home could be deemed safe again.
- In July 2012, ERT worked with EPA's Region V office when local officials became concerned that benzene trapped in a sunken vessel in the Great Lakes could be affecting air quality near the shore. ERT advised that the benzene level in diesel fuel was not high enough to affect air quality, and that air monitoring was not necessary. Based on ERT's recommendation, local residents were warned about possible health effects from skin exposure.
- When Hurricane Isaac threatened the Gulf Coast in late 2012, ERT staff deployed to Baton Rouge to assist in the response. While deployed, staff assisted local responders in addressing a variety of public health issues, including sanitation and safety inspections, vector surveillance and control, epidemiological support, and shelter surveillance and support.

In June 2011, after a chemical incident at a poultry processing facility, 600 workers were potentially exposed to chlorine, 170 of whom needed transportation to five area hospitals for medical evaluation. The state Department of Health asked ATSDR to assist in the investigation of the incident, including an evaluation of the emergency response. An Assessment of Chemical Exposures (ACE) team was deployed in response. The team discovered that the Department of Emergency Management was not required to notify the health department when the incident occurred. This resulted in missed opportunities for assistance, such as coordinating with local hospitals regarding where patients were transported for care or providing treatment protocols for chlorine gas.

After the ACE investigation identified the issue, the Department of Emergency Management modified their procedure for notification of the state health department to include any incident involving a biological, chemical, radiological, or nuclear substance. About two weeks after the procedures were modified, two different ammonia releases occurred in the same city as the previous release. Because of the new procedures, emergency management officials immediately notified the health department of the incidents, resulting in a more coordinated and effective response.

Registries

DTHHS maintains several registries, which are ongoing, systematic collections of information about people who have been exposed to a specific substance or have a certain disease. DTHHS registries include the World Trade Center Registry (2003-2009*), the Tremolite Asbestos Registry (2003-present), and the National Amyotrophic Lateral Sclerosis (ALS) Registry (2010-present).

Many people know ALS as **Lou Gehrig's disease**, named after the famous baseball player who had the disease and retired in 1939 because of its damaging health effects. Far too little is known about the cause of this disease.

The National ALS Registry is critical for understanding the potential environmental triggers for the disease. The Registry collects, manages, and analyzes data about people with ALS. It gathers data about who has the disease and where it occurs. Researchers can use Registry data to detect disease pattern changes over time and identify whether there are common risk factors among ALS patients. Patients and their families can turn to the Registry for updated links for patient resources such as ALS clinical trials.

By gathering information through the ALS Registry, we hope to be able to estimate the number of new cases of ALS each year, better understand who gets ALS and what factors affect the disease, and improve care for people with this disease.

* Created with the assistance of ATSDR.

In the wake of the 9/11 World Trade Center attacks, DTHHS partnered with the New York City Department of Health and Mental Hygiene and the Federal Emergency Management Agency (FEMA). This collaboration launched a registry to track long-term health effects among workers, residents, and schoolchildren exposed to smoke, dust, and debris from the disaster. When complex events occur, DTHHS brings its unique blend of expertise in public health, epidemiology, toxicology, and community involvement to help protect the future health of the people affected.

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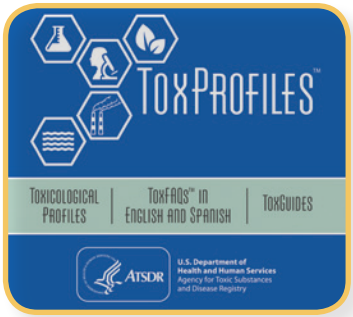

Surveillance

The National Toxic Substance Incidents Program (NTSIP) gathers information about harmful toxic substance spills into a central place. Emergency response experts and community members can use NTSIP information to help prevent or reduce the harm caused by toxic substance incidents. NTSIP is the only federal surveillance system that tracks the public health impacts of acute toxic releases. NTSIP information has been instrumental in the development of policies, regulations and laws.

Environmental Toxicology

ATSDR's *Toxicological Profiles* are an important source of information about toxic chemicals and health effects for physicians, scientists, and environmental health professionals, as well as people affected by exposures.

Over the past 20 years, more than 300 ToxProfiles have been developed and updated. Each ToxProfile summarizes important information about toxic chemicals and their health effects.

Robin Shapiro has been an academic librarian at Portland Community College in Oregon since 1997. She enjoys helping students learn how to use resources such as ATSDR's Toxic Substances Portal, where the Toxicological Profiles—ToxProfiles™—are offered.

"The Toxic Substances Portal allows students to quickly gain an understanding of the effects of a wide range of substances," Shapiro says. "It's reliable, which is essential for health information sources."

ATSDR's ToxProfiles™ provide detailed information about possible health effects from exposure to hazardous substances. Federal agency employees and doctors use the ToxProfiles™ to make decisions about cleaning up exposure sites, responding to emergencies, and treating patients exposed to hazardous substances. The ToxProfiles™ are the scientific foundation of ATSDR scientists' assessment work, resulting in action recommendations that are grounded in the most up-to-date science on toxic chemicals.

Shapiro read about the Toxic Substances Portal on Facebook. She says, "I took a look at it immediately, because it sounded like a resource that students could use, and I showed the site to an environmental health instructor as a resource for his classes. His students were just starting on a research project, and the Tox Portal makes good information easier to find."

Computational Toxicology

The Computational Toxicology and Methods Development Lab (**Comp Tox Lab**) allows scientists to use available data together with computer programs that help assess health risks in a relatively short amount of time. The Comp Tox Lab is used in a variety of ways, including research related to emergency response and bioterrorism, and children's health. By collaborating with other federal agencies and academic institutions, Comp Tox Lab research projects add to the development of model applications and expertise that aid assessment and help reduce the effects of exposure to chemicals found in communities served by ATSDR.

Environmental Medicine

Case Studies in Environmental Medicine (CSEM) are self-instructional, continuing-education modules designed to increase primary care providers' knowledge of hazardous substances and help them evaluate patients potentially exposed to hazardous substances.

Using CSEM enhances a primary care provider's professional practice. Over 92,000 CSEMs have been downloaded since 2009. "I have used the (CSEMs) as a core teaching tool in our curriculum." says Brent W. Morgan, MD, Director of the Emory/CDC/Georgia Poison Center Medical Toxicology Fellowship. "They are the most clinically useful resource on environmental toxins available. I feel strongly this is one of the reasons the medical toxicology board pass rate of our fellows is higher than the national average."

The **National Pediatric Environmental Health Specialty Units (PEHSU)** Program brings together environmental and pediatric professionals across the country. PEHSUs provide pediatric and environmental health consultation to health care professionals, parents and others regarding environmental health exposures in children as well as referrals to specialized medical resources when necessary. The program includes not only pediatricians but primary care providers such as family medicine physicians, nurses, and nurse practitioners. PEHSUs are located at leading academic medical centers and serve every region of the country.

The PEHSUs provide over 1,600 consultations and educate more than 30,000 health professional and 20,000 community members throughout the U.S. each year.

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Environmental Epidemiology

DTHHS also designs and conducts studies about the relationship between hazardous substances in the environment and impacts on human health, which are used to prevent harmful exposures and diseases related to toxic substances.

A Prospective Birth Cohort Study Involving Environmental Exposure to Uranium in the Navajo Nation:

Currently, a prospective cohort study is being conducted to determine the risk of exposure to environmental toxins and the development of adverse reproductive outcomes among a cohort of women in the Navajo Nation. A cohort is used to describe a designated group of persons, defined by their exposure status, who are followed or traced over a period of time to determine the risk of disease development given exposure to a possible risk factor. Cohort studies more clearly indicate the temporal sequence between exposure and outcome because the exposure is identified before development of the outcome.

The Navajo Nation encompasses 16 million acres of New Mexico, Utah and Arizona, and is the largest Alaska Native / American Indian Reservation in the United States. From 1948 to 1986, hundreds of uranium mining and milling operations were conducted in the Navajo Nation. These mining and processing operations have left a legacy of potential uranium exposure through abandoned uranium mines/mills, drinking water and soil contamination, and homes and structures built with mining waste.

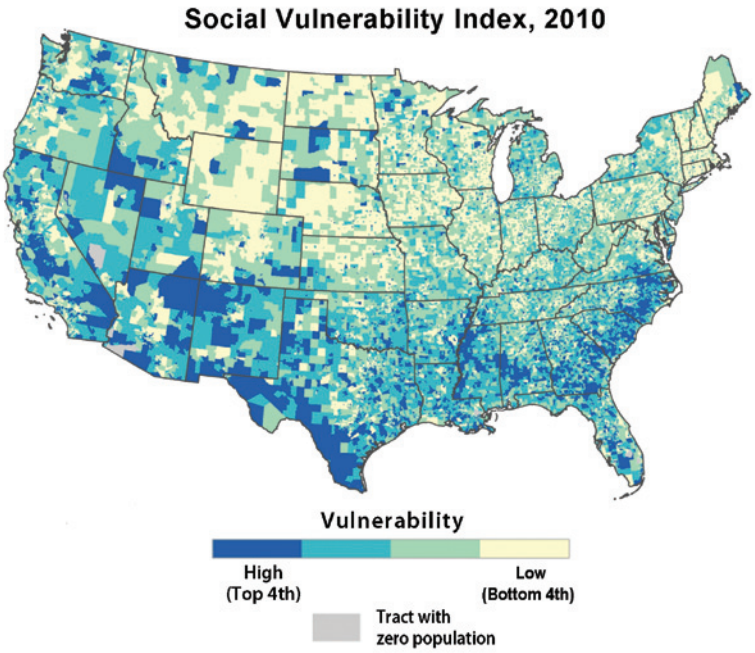
Our collaborating partners—the University of New Mexico, the Indian Health Service, and the Navajo Nation Division of Health—are conducting a prospective birth cohort study to estimate the possible association between environmental toxins (like uranium and other heavy metal exposures) and development of adverse reproductive birth outcomes. This study includes prospectively following Navajo mothers and assessing their uranium exposure at key developmental milestones, and then evaluating their children post-birth to determine any associations with birth defects or developmental delays. Exposures will be evaluated through biomonitoring, home assessments, and surveys. The study will also provide broad public health benefits for Navajo communities through outreach and education on the importance of seeking prenatal care early in pregnancy.

Geospatial Research and Analysis

DTHHS' **Geospatial Research, Analysis, and Services Program (GRASP)** has created a tool to help emergency response planners and public health officials identify and map the communities that will most likely need support before, during, and after a public health emergency. The ***Social Vulnerability Index (SVI)*** uses U.S. Census tract data to characterize the social vulnerability of every U.S. community. The SVI ranks each community on 15 social factors, including poverty, lack of vehicle access, and crowded housing.

The SVI enables public health officials to ensure that emergency planning and response is carried out more efficiently, and local planners may use the tool to develop community preparedness for events such as hurricanes, earthquakes, or exposure to dangerous chemicals. The SVI may be used to estimate the amount of supplies such as food, water, medicine, and bedding that will be needed, and identify areas that likely will need emergency shelters.

Currently, the North Carolina Preparedness and Emergency Response Research Center (NCPERRC) includes SVI data in materials it distributes to emergency preparedness and response planners throughout the state.



For more information, please contact:
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