LDHH SEET Participation in the ASTHO Environmental Public Health Tracking State-to-State Peer Fellowship Program

Kate Streva, MNS
Environmental Health Scientist
Louisiana Department of Health and Hospitals (LDHH)
Office of Public Health
Center for Environmental Health Services
Section of Environmental Epidemiology & Toxicology (SEET)

25th Annual Louisiana Remote Sensing & GIS Workshop, April 14-16, 2009
Evaluate and monitor health effects associated with environmental exposures

Perform public health risk assessments and track health outcomes

Incorporate findings into public health interventions and environmental risk management decisions

www.seet.dhh.la.gov

Statewide programs in Chemical Event Exposure Assessment • Disease Cluster Investigation • GIS Support Services • Health/Fish Consumption Advisory • Heavy Metal (Arsenic, Cadmium, Lead and Mercury) and Carbon Monoxide Surveillance • Indoor Air Quality (e.g., Mold, Formaldehyde in trailers, Chinese drywall) • Hazardous Substances Emergency Events Surveillance • Occupational Health Surveillance • Pesticide Surveillance • Public Health Assessment/Health Studies • Health Education/Community Outreach
The Association of State and Territorial Health Officials (ASTHO) - [http://www.astho.org/](http://www.astho.org/)

In line with CDC Launch of the National Environmental Public Health Tracking Network (Planned for 2009), ASTHO created a fellowship to enhance the capacity of state and territorial health agencies to conduct tracking related activities.

Engages unfunded states in tracking efforts, provides stipend for visit to a host CDC-funded tracking state to learn about their program, and provides funds for the development of state projects that would advance environmental public health tracking.

Submitted Jan 2009 • Awarded Feb 2009 • Project end Summer 2009
Centers for Disease Control and Prevention (CDC) - http://www.cdc.gov/nceh/tracking/

Plan to officially launch the Tracking Network this year (2009). 17 state and local health departments are congressionally funded to establish tracking networks that feed into the national network.

Purpose: Better understand how the environment affects health. Link biomonitoring and environmental public health tracking with a particular focus on hazards, exposures, and health effects

Assist Federal, state and local agencies to “develop and evaluate effective public health actions to prevent or control chronic and acute diseases that may be linked to hazards in the environment”
Louisiana

- Funded in 2003 for a preliminary Environmental Public Health Tracking Project (Pilot Data Linkage Project)
- Not a current CDC Grantee linking to the National Network
- Tulane University Academic Partner for Excellence
Louisiana Environmental & Health Effects Tracking (LEHET) Project

- Determine the feasibility of analyzing environmental, exposure, and health data for tracking
- Collaborated with the LDHH Safe Drinking Water Program, LDEQ, LTR, LDOTD Water Resources, and Tulane University
- GIS study incorporated GIS mapping of wood preservation & treatment sites (creosote), water wells, cancer rates for lung and bladder cancers, census data and env. sampling results (surface water and groundwater)

Figure 2: Creosote/Wood Treatment Facilities Map with .5 mile buffer, water well sites, and environmental sampling results for the LEHET Project. Map by George Frierson, Final Report (2007)
Lower Mississippi River Interagency Cancer Study (LMRICS)

- Population-based case-control study of lung cancer in Louisiana’s River Parishes
- Collaborated with the LDHH State Center for Health Statistics, Stanley Scott Cancer Center, LTR, LDEQ, LSUHSC and LSU Agr/Econ
- Residence and industrial site footprints geo-coded with buffers for potential carcinogen emissions in 11 parishes bordering the Mississippi River, including Baton Rouge and New Orleans

Figure 3: Industrial Site Footprints presented with Cancer Standard Incidence Ratios for the LMRICS Study. SEET Final Report (2001)
Stipend for ASTHO Fellow and GIS staff to visit the Missouri Department of Health and Senior Services (DHSS), May 2009.

Opportunity to learn first hand how Missouri’s DHSS is building their infrastructure to link health and environmental databases intra-agency, data sharing and connectivity with other agencies and linkages into the national network.

Program integrates health, exposure, and environmental hazards data and reporting for contaminants such as lead across several agency databases, including public health information systems (MOHSAIC), surveillance/monitoring systems (MOHSIS and STELLAR) and GIS data libraries at the state level (Department of Natural Resources lead smelting sites).
Develop a state project modeled on the successful components of Missouri’s program to advance environmental public health tracking in Louisiana.

Preliminary project will map mercury levels in fish from fish tissue samples in the Louisiana Department of Environmental Quality (LDEQ) database with human blood mercury levels from SEET’s heavy metal surveillance database.

GIS applications: Geocoding fish tissue and biomonitoring data; Overlaying waterbodies, marinas and potential sources of mercury contamination; Analyzing available data through exploratory data analysis, identification of space-time patterns, mapping the habitats of high-risk risk species; identification of hot spots; prediction of high-risk areas and/or the identification of high-risk human populations.
Louisiana Mercury Fish Consumption Advisories

Map prepared on 7/13/09 by:
Louisiana Department of Health and Hospitals
Office of Public Health
Section of Environmental Epidemiology and Toxicology
For additional information: 1-888-253-7029

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The Louisiana Department of Health and Hospitals has issued 41 advisories across the state urging people to limit the amount of fish consumed from these water bodies.
Louisiana has a substantial commercial and recreational fishing industry

Louisiana residents have a seafood-heavy diet

Predominant source of mercury exposure for the general population (non-occupational) is through consumption of contaminated fish

Efforts are needed to minimize exposure among high risk groups such as women of childbearing age, young children, and frequent consumers of certain locally-caught fish

Shannon Soileu, MPH
Mercury is an element that occurs naturally and can be released into the environment by both natural processes and human activity.

“Mercury in Fish,” Louisiana Department of Health and Hospitals brochure

Inorganic mercury (metallic mercury and inorganic mercury compounds) enters the air from mining ore deposits, burning coal and waste, and from manufacturing plants. It enters the water or soil from natural deposits, disposal of wastes, and volcanic activity.

ATSDR ToxFacts for Mercury

Nearly all human exposures to methyl mercury derive from fish (H. Clewell, ENVIRON Health Sciences Institute, Ruston LA)

Other sources of mercury exposure [infants and newborns] may include mercury vapors in ambient air, ingestion via drinking water, vaccines, occupational exposures, home exposures (fluorescent light bulbs, thermostats, batteries), red tattoo dye, contact lens fluid, dental amalgams… (Dr. R. Ratard, MD, MS, MPH)

The Impact of Mercury on Human Health and the Environment
Tulane University School of Public Health and Tropical Medicine
New Orleans on September 23-24, 2004
Methylation in soil (also air and water contamination), **Bio-methylation** → mercury is converted to methyl mercury (organic mercury) by microorganisms in soil and water, accumulates in the tissues of organisms.

**Mercury bioaccumulation**: Mercury concentrates in tissue when absorbed at a rate greater than it can be metabolized or excreted. **Mercury bioamplification**: Mercury is amplified in large predatory fish which eat many smaller fish.

Recognized mutagenic and teratogenic effects

**Mercury poisoning**: Methymercury affects Central Nervous System toxicity including insomnia, memory impairment and inability to concentrate. Tremors and Parkinson's-like symptoms, impaired hearing, tunnel vision. Renal, gastrointestinal, dermal

May also contribute to reproductive (infertility) and developmental (autism) effects in humans
HEALTH EFFECTS OF MERCURY (cont’d)

Mercury’s danger
Mercury gets into the environment from a variety of human sources. The biggest is the burning of fossil fuels, with coal-fired power plants accounting for nearly a third of all industrial mercury emissions. Other sources include waste incinerators and runoff from abandoned gold and mercury mines.

Studies show mercury in the marine environment is increasing at a rate of up to 4.8 percent a year. Even if mercury discharges were stopped today, it would take 50 years for mercury levels to drop in fish.

HEALTH EFFECTS
- **In infants and children**, even small amounts of mercury can affect learning ability, language, motor skills and, at elevated levels, cause permanent brain damage.
- **In adults**, mercury can damage the nervous, cardiovascular, immune and reproductive systems. Symptoms include tremors, memory loss and fatigue.

In your fish
The Food and Drug Administration has tested a variety of fish for mercury. To find out how much you’re getting from a 6-ounce
GIS Project: Environmental Data

- Marinas and boat launches (fishing)
- Waterbodies by HUC code (Region and sub-region) LDEQ basin and subsegment
- Potential environmental sources of mercury contamination (EPA Envirofacts)

- Chlor-Alkali Facilities, Coal Burning EGUs, Natural Gas Manometers (20,000 - 30,000 state-wide), Electric Arc Furnace, Crude Oil Refining, Municipal Waste Incineration and Landfills, Lumber, Pulp, and Paper Mills, Carbon Black Production, Crematoria, Hospital Waste

- Mercury Emitters (EPA/LDEQ)
- Fish Habitat Data (LWF)
- Census/City Data Population Density
New disease reporting requirements have made arsenic, cadmium, lead, and mercury reportable to SEET by all healthcare providers. SEET maintains a surveillance system for heavy metal biomonitoring data 2006-, including mercury. Approx. 25 blood mercury results are received every week (current total ~1,500 samples). *For some records there is not an address listed, only health care provider

1998 and 2003 blood mercury screening results. 1998: SEET conducted blood mercury testing for residents in parishes with fish consumption advisories for mercury. A number of the participants (out of ~313 samples) had a blood mercury level that equaled or exceeded the CDC clinical case definition for mercury poisoning. 2003: Follow-up survey (~77 samples) for NE Louisiana again showed survey participants with elevated blood mercury levels. Most reported eating locally caught fish on a regular basis (1 meal/wk)

USGS, LDEQ fish tissue sampling data since 1994 (mercury concentration and sample locations (lat/long coordinates). Approximately 1000 samples collected every year (currently ~15,000 samples being geographically analyzed by SEET)
Based on the rate of individuals with blood mercury levels above background, the parishes of potential concern are Morehouse, Orleans, Lafayette, Caddo, Calcasieu, East Baton Rouge, Ouachita, Jefferson, and St. Tammany. *Note: these parishes also had high testing rates (Map by Adrienne Katner, MS, LDHH Louisiana Morbidity Report Nov-Dec 2008).
In-state meeting planned for environmental public health stakeholders, including LDHH, LDEQ, LWF, LDNR, ASTHO community environmental groups, and Federal partners (e.g. CDC ATSDR and Environmental Health)

Explore data linkage opportunities to link health and environmental databases

Data integration and display: LDHH Data Portal (SAS Business Intelligence Platform)?

Final Project Report