Section of Environmental Epidemiology & Toxicology
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INFORMATION FOR HEALTH CARE PROFESSIONALS
MERCURY EXPOSURE AND TOXICITY

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This document summarizes information on the sources, exposure pathways, laboratory testing, recognition, and reporting of mercury poisoning. Louisiana Law requires the reporting of all cases of mercury poisoning and all mercury laboratory test results to the Louisiana Department of Health and Hospital's Office of Public Health.

EXPOSURE TO MERCURY

Mercury (Hg) is a naturally occurring metal and exists in three forms: elemental (metallic), inorganic, and organic. The form of mercury greatly influences mercury's distribution within the body and its health effects.

Elemental mercury is a shiny, silver-white liquid (quicksilver) primarily obtained from the refining of mercuric sulfide in cinnabar ore. Elemental mercury is used in electrical equipment (e.g., thermostats and switches), electrical lamps, thermometers, sphygmomanometers, barometers, and dental amalgams. It is also used to produce chlorine gas and caustic soda for industrial applications. Elemental mercury easily vaporizes at room temperature to an invisible, odorless toxic gas referred to as elemental *mercury vapor* (ATSDR, 2014).

Inorganic mercury compounds, or mercury salts, are formed when mercury combines with other elements such as chlorine (e.g., mercuric chloride), sulfur, or oxygen. Inorganic mercury compounds exist in two oxidative states—mercurous (+1) and mercuric (+2). Inorganic mercury compounds such as mercuric oxide are used in the production of batteries, polyvinylchloride, and pigments (ATSDR, 2014). Mercury salts are highly toxic and corrosive.

Organic mercury compounds are formed when inorganic mercury is methylated or combines with organic agents. The most important organic form of mercury in terms of human exposure is methylmercury. Methylmercury is formed by anaerobic methylation of inorganic mercury by microorganisms in sediments. In waterbodies, methylmercury accumulates in aquatic organisms and biomagnifies up the food chain. The primary source of human exposure to mercury is through the consumption of fish and shellfish containing methylmercury.

Other forms of organic mercury may be found in outdated fungicides, antiseptics, and disinfectants. Most of these uses have been discontinued, however, small amounts of these compounds may still be found in some medicines (FDA, 2017a).

Occupational Exposure: Most occupational exposures to mercury occur through inhalation of elemental mercury vapors in the workplace. This is of particular concern in some chemical manufacturing plants and facilities that manufacture and/or use instruments that contain elemental mercury. Inhalation of particulate matter containing inorganic and/or organic compounds is not a major source of exposure. Ingestion is also not a major occupational exposure pathway. Dermal absorption of elemental mercury and inorganic mercury is possible, but the rate is extremely low (ATSDR, 2014). In research laboratories, dermal absorption of methyl or dimethyl mercury is an occupational hazard that has been overlooked and may result in mercury poisoning to lab personnel.

Take-Home Exposure: Workers can transport metallic or inorganic mercury on shoes, work clothes, skin, hair, and tools into their homes or automobiles with subsequent exposure to their families (NIOSH, 2017). Take-home exposure to mercury has been reported in children of workers who bring mercury into the home from their jobsite; increased levels of mercury were measured in places where work clothes were stored and in some washing machines (ATSDR, 2015).

Steps to prevent take-home mercury contamination:

- Change shoes and clothes at work before getting into the car or going home. Dirty work clothes and shoes should be put in a plastic bag.
- Wash face and hands prior to leaving work.
- Shower and wash hair immediately upon arriving home (or before leaving work).
- Wash work clothes separately from all other clothes and run the washing machine again to rinse residual mercury (or have the employer wash clothes).

Exposure Risks to the General Population: The predominant source of mercury exposure for the general population is through consumption of fish and shellfish that are contaminated with methylmercury. For most people, the risk from consuming sufficient mercury from eating fish is low. However, some fish contain higher levels of mercury that can be harmful, particularly to the fetus and young children (FDA, 2017b).

People may be exposed to mercury from other sources that may not be readily known or recognized. The unique nature of elemental mercury evokes curiosity and cases of mercury poisoning have occurred from people collecting or playing with elemental mercury. Elemental mercury rapidly volatilizes so spilled mercury from gauges or other equipment poses a risk for inhalation if not cleaned properly. Liquid mercury should be never be vacuumed as it will vaporize. Some household items may contain mercury and are potential sources of exposure. These items include broken thermometers and fluorescent light bulbs, imported jewelry, outdated paints or pesticides, barometers, and certain antique clocks, mirrors, and lamps. People who live near incinerators, hazardous waste sites, chlorine manufacturing plants, smelting operations or other industrial mercury sources may also be at an increased risk of exposure through air, soil, dust, or water contamination (ATSDR, 2015). Use of elemental mercury (typically referred to as azogue) in certain Caribbean and Latin American folk medicine and religious practices including Santeria, Palo, Voodoo, and Espiritismo can result in high exposures to elemental mercury vapor (Riley, 2001 and EPA, 2006).

Potential Sources of Mercury Exposure	
OCCUPATIONAL	**NON-OCCUPATIONAL**
Manufacturing of paints/pigments	Fish consumption
Chemical plants (chloralkali)	Religious practices (azogue used in Voodoo, Santeria, Espiritismo)
Dental medicine	Folk medicine/herbal remedies
Electroplating	Antiques (clocks, mirrors, lamps)
Pulp/paper mills	Fluorescent light bulbs
Battery manufacturing	Outdated medicines (laxatives, worming medications, teething powders)
Mercury recycling	Broken thermometers & electrical switches
Manufacturing of electrical equipment	Photography
Manufacturing of fluorescent light bulbs	
Fungicide manufacturing	
Petroleum refineries	
Manufacturing of medical equipment	

This is not a complete list of exposure sources. The above information was compiled from: EPA, 2006; OSHA, 2014; ATSDR, 2015.

Mercury in Seafood: The FDA and EPA (FDA, 2017b) recommend that pregnant women, women who might become pregnant and nursing women reduce their exposure to mercury by not eating fish containing high levels of mercury (including shark, swordfish, king mackerel, and tilefish). The FDA and EPA state that women and children 8 years and older can eat up to 12 ounces (2-3 servings) per week of commercially caught fish containing lower levels of mercury, such as shrimp, canned light tuna, salmon, pollock, and catfish. Since albacore tuna contains higher levels of mercury,

it is recommended that not more than 6 ounces be eaten per week. More information on commercial fish consumption during pregnancy can be found on the EPA website.

In addition, the Louisiana Office of Public Health issues consumption advisories for locally caught fish from Louisiana water bodies. Information regarding the current fish advisories in Louisiana can be obtained online or by calling 504-568-8142 or 888-293-7020.

Mercury in Religious Practices: Some religions have practices that may involve the use of elemental mercury. Not all people who observe these religions use mercury, but those who do may expose themselves and their families to elemental mercury both at the time of the practice and afterwards from contaminated air. Since elemental mercury vaporizes into the air at room temperature, it presents an immediate health risk to anyone spending a significant amount of time in a room where elemental mercury has been sprinkled, spilled, or where open containers of elemental mercury are present (ATSDR, 2014).

The ATSDR has issued the following national alert concerning the use of elemental mercury exposure in religious practices:

> "Persons who use elemental mercury in ethnic folk medicine and for religious practices are at risk. Elemental mercury is sold under the name "azogue" in stores called botanicas, which specialize in religious items used in Espiritismo (a spiritual belief system native to Puerto Rico), Santeria (a Cuban-based religion that venerates both African deities and Catholic saints), and Voodoo.
>
> The use of azogue in religious practices is recommended in some Hispanic communities by family members, spiritualists, card readers, and santeros. Typically, azogue is carried on one's person in a sealed pouch prepared by a spiritual leader or sprinkled in the home or automobile. Some botanica owners suggest mixing it in bath water or perfume and placing it in devotional candles."

EPA's Office of Pollution Prevention and Toxics (OPPT) has conducted an investigation of the ritualistic uses of mercury to gain a better understanding of these practices and traditions and their potential public health and environmental impacts. These findings and recommendations for further investigation, outreach, and action have been published (EPA, 2006).

TOXICITY OF MERCURY

The adverse health effects from mercury exposure depend upon the form of mercury, dose, route of exposure, age of the person exposed (e.g., the fetus and young children are more susceptible), and duration of the exposure. There is wide variability in the symptoms and responses to mercury poisoning within the general population. The developing fetus and young children are very susceptible to mercury toxicity.

Elemental Mercury: The primary route of exposure for elemental mercury is through inhalation; 80% of elemental mercury vapors are absorbed. Elemental mercury may be metabolized to inorganic ionic forms and excreted as inorganic mercury. The most sensitive target organ is the central nervous system (peripheral and central). Chronic and acute exposures elicit similar neurological effects. Specific neurotoxic symptoms include tremors (initially affecting the hands and sometimes spreading to other parts of the body), emotional changes (characterized by irritability, excessive shyness, loss of confidence, and nervousness), insomnia, memory loss, neuromuscular changes (weakness, muscle atrophy, and muscle twitching), headaches, paresthesias, and performance deficits in tests of cognitive and motor function (ATSDR, 2014). The peripheral nervous system may also be affected resulting in slowed sensory and motor nerve conduction velocities. Symptoms may become irreversible as exposure duration and/or dose increases. At higher exposures, renal effects may occur and are characterized by excessive loss of protein in the urine and edema. Irritation of the respiratory tract may also occur at high exposures. If ingested, elemental mercury presents minimal health risks because it is not well absorbed from the gastrointestinal tract (ATSDR, 2014).

Inorganic Mercury: The kidney is the critical target organ following ingestion of inorganic mercury with the possible development of proteinuria (damage to renal tubules) and an autoimmune nephritic syndrome. Other health effects include gastrointestinal disturbances, skin rashes, dermatitis, and muscle weakness. Many inorganic mercury compounds are irritating or corrosive to the skin, eyes, GI tract, and mucus membranes (ATSDR, 2014). Acute high-dose oral exposure can induce severe gastrointestinal effects (WHO, 2017). In contrast to elemental and organic mercury, the inorganic form does not readily cross the blood brain barrier and, therefore, does not have similar central nervous system effects. However, inorganic mercury may damage the peripheral nervous system (ATSDR, 2014).

Methylmercury/Organic Mercury: The central nervous system is the major target organ following exposure to methylmercury and most other organic mercury compounds. Chronic or multiple exposures over time are usually needed for effects to be observed. In adults, effects appear to selectively affect areas of the brain associated with sensory and coordination functions producing symptoms such as constricted visual fields and ataxia (WHO, 2017). Due to the chronic nature of the exposures, the onset of symptoms may not be observed for weeks to months. Early symptoms usually include paraesthesia in the extremities and around the mouth. Neurological symptoms similar to those observed following elemental mercury exposure may be observed and include tremors (initially affecting the hands and sometimes spreading to other parts of the body), emotional changes (mood swings, irritability, nervousness), headaches, weight loss, and insomnia. At high doses, the peripheral nervous system may be affected, but usually after effects have already appeared in the central nervous system (ATSDR, 2014).

Form of Mercury	**Elemental**	**Inorganic**	**Methylmercury**
Route of exposure	*Inhalation*	*Oral*	*Oral – fish consumption*
Target organs	Central Nervous System Peripheral Nervous System Kidney	Kidney Peripheral Nervous System	Central Nervous System
Local Clinical Signs	Lungs: Bronchial Irritation Pneumonitis	GI: Irritation, corrosive Skin: Irritation; ulceration	
Systemic Effects	Kidney: Proteinuria Central Nervous System: mood changes Peripheral Nervous System: tremors	Kidney: Proteinuria; tubular necrosis Peripheral Nervous System: tremors, numbness	Developmental effects in fetus and newborn Central Nervous System in adults: tremors, paraesthesia

Carcinogenesis: Mercury is not classified as a human carcinogen by the International Agency for Research on Cancer. However, the EPA has determined that mercury chloride and methylmercury are possible human carcinogens.

Susceptible Populations:

Pregnant Women

Pregnant women are a sensitive population because of danger of exposure of the fetus in utero. Mercury may hinder the development of the central nervous system in the fetus during the prenatal period. The most common exposure to pregnant women occurs from ingesting contaminated fish and shellfish. Women are encouraged to eat fish as an excellent source of nutrition; however, care must be taken to avoid fish under state or federal advisories for mercury. Occupational exposure to mercury vapor may occur in women working in the fluorescent light manufacturing industry or the chloralkali industry. Pregnant women should take measures to avoid these and other possible mercury exposures.

A woman's body burden and exposure to mercury during pregnancy may affect the developing fetus. During pregnancy and in the early months after birth, the fetus and infant are particularly sensitive to the harmful effects of mercury (particularly methylmercury and elemental mercury vapor). Both inhaled mercury vapors and ingested methyl mercury enter the mother's blood, cross the placenta (ATSDR, 2014) and expose the fetus. Mercury can accumulate in the fetus at concentrations higher than those in the mother's blood. Nursing infants may also be exposed to mercury from breast mild. Inorganic mercury, and to a lesser extent elemental and methyl mercury, will move into breast milk (ATSDR, 2014).

Neurodevelopmental effects of mercury in the fetus or infant depend on the dose, length of exposure, and age at the time of exposure. Effects range from developmental delays to more severe effects including brain damage with mental retardation, eventual blindness, and muscle weakness. There is little information regarding the developmental effects associated with inorganic mercury exposure in humans (ATSDR, 2014).

Young Children

Young children are also vulnerable to the effects of mercury because their brains are still developing. Exposure to very high mercury levels can cause irreversible neurodevelopmental damage to children's brain function, including

problems with attention span, language, visual-spatial skills, and coordination. Other mercury-induced health effects observed in children are similar to those seen in adults. High exposures cause CNS, lung, kidney, and intestinal damage. Milder symptoms include diarrhea, weight loss, abdominal pain, muscle twitching, or cramping in the legs and/or arms (ATSDR, 2014). Children who breathe elemental mercury vapors, ingest inorganic mercury, or use mercury containing skin ointment for an extended period may develop a delayed non-allergic hypersensitivity to mercury called acrodynia (pink disease). Symptoms include irritability, sleeplessness, sweating, severe leg cramps, and a painful peeling rash. In some cases, acrodynia can develop when exposure lasts for only a few days (ATSDR, 2014).

Children exposed to comparable concentrations of elemental mercury vapor receive larger doses than adults because of the greater surface area in the lung relative to their body weight. In addition, elemental mercury vapor is heavier than air and higher concentrations may be seen at lower levels near the child's breathing zone.

EVALUATION OF MERCURY POISONING

Assessment of a patient for mercury poisoning requires the following:

- Work history and identification of possible mercury exposure sources
- Medical history
- Laboratory testing for mercury

Work and Exposure History: Often patients do not recognize that they have been exposed to mercury unless directly asked about their work environment and activities. A detailed occupational and environmental exposure history is a fundamental step toward acquiring information on possible exposures to mercury.

- A full work history is necessary to identify jobs with possible mercury exposures. Ask patients about their job (where they work and what they do), potential exposure occurring in current and previous jobs, hygiene practices in the workplace, and use of any personal protective equipment. If the individual is employed in a job that may involve exposure to mercury, further questions on length of time at the job, frequency of tasks handling mercury materials, and descriptions of how they carry out their work should be asked.
- An environmental history can identify non-occupational exposure sources. Ask patients about their fish consumption; religions practices; items around the home; spouse's occupation and the potential for "take-home" mercury exposure; and proximity of their residence to hazardous waste sites, incinerators, or other industries.

The Agency for Toxic Substances & Disease Registry (ATSDR) offers a self-instructional module on "Taking an Exposure History" which provides an exposure history form in Appendix 1 of the document.

Medical History: A medical history may help to identify symptoms that may be associated with mercury poisoning. Early symptoms of mercury toxicity in adults might include tremors, mood swings, irritability, nervousness, weight loss, insomnia, and gastrointestinal distress. Laboratory testing for mercury should be considered if the work or exposure history indicates possible mercury exposure and/or the patient is experiencing symptoms that suggest possible mercury poisoning.

Laboratory Tests:

Mercury may be measured in blood and urine, however, the interpretation depends on the form of mercury and the time following exposure.

There is no ideal biological monitor for evaluating mercury exposure. An individual's level may vary greatly from day to day and even within a given day. In addition, because of the complex distribution and kinetics of different forms of mercury, the concentrations in urine or blood may be low soon after exposure has ceased, despite the fact that levels in critical organ systems may still be elevated. The proper interpretation of biological test results requires an understanding of the differences in distribution of mercury. The detection of mercury in blood and/or urine is the best method to confirm the level of mercury exposure.

- **Mercury in Blood** is an indicator of recent exposure to all types of mercury. Since inorganic or elemental mercury remains in the bloodstream for only a short time (days), blood analyses are useful to confirm acute exposures. Blood levels from elemental or inorganic mercury decrease rapidly and are not useful for

estimating cumulative exposure. Methylmercury remains in the blood longer and blood samples are the best way to test for this form of mercury.

Mercury levels in blood can be influenced by consumption of fish contaminated with methylmercury. Levels may remain elevated 2-3 days after a seafood meal. Therefore, it is important to inquire about recent diet when interpreting these test results.

- **Mercury in Urine** is an indicator of total mercury body burden and detects elemental mercury vapor and other inorganic forms of mercury. Organic mercury, including methylmercury, is not excreted in the urine and thus cannot be accurately measured this way. An individual's urinary mercury excretion levels may vary greatly from day to day and within a given day even when exposure conditions are considered constant. In addition, there is inter-individual variability in urinary mercury excretion among people in similar exposure circumstances. The reasons for this variability are unknown but it can be partially controlled for by standardizing the sample collection (e.g., collect samples at the same time of day and at the beginning of the work week).

- **Mercury in Hair** can provide qualitative information about exposure to mercury compounds. Hair mercury tests are not commonly offered by labs, are less accurate then other biomonitoring techniques, do not provide quantitative results, and are notoriously prone to misinterpretation. Mercury levels in hair should be interpreted with an understanding of the tests limitations (ATSDR, 2003; 2015).

HEALTH-BASED REQUIREMENTS, RECOMMENDATIONS, and GUIDELINES

Occupational Safety and Health Administration: The Occupational Safety and Health Administration (OSHA) promulgates and enforces regulations for toxic substances in the workplace. These regulations are enforceable by law. OSHA regulations are based on both air monitoring and biological monitoring of the worker. Air monitoring provides data on work place conditions, guides industrial hygiene measures and serves as the basis for requiring medical/biological monitoring of workers. Biological monitoring measures the uptake of mercury into the body, reflects actual exposure and is used to assess health risk to workers (OSHA, 2014).

Elemental Mercury Vapor and Inorganic Mercury Compounds

OSHA is currently developing medical surveillance regulations for individuals occupationally exposed to inorganic mercury and elemental mercury vapor. When these requirements are formalized, healthcare providers should refer to them for additional information. Until a complete standard is promulgated, OSHA has put-forth recommended guidelines for protection from the risk of illness resulting from exposure to mercury vapor or dust of its inorganic compounds.

- Workers who are or will be exposed to levels of airborne concentrations of elemental mercury vapor or the dust of its inorganic compounds above the permissible exposure limit (PEL) of 0.1 mg/m^3 expressed as a time-weighted average concentration for an 8-hour period should be placed in a medical surveillance program that includes biological monitoring.
- Total urinary inorganic mercury (includes elemental mercury) level of 20ug/g creatinine pre-shift should be used as the biological exposure index for elemental mercury vapor and inorganic mercury compounds. (ACGIH and OSHA, 2012)
- Total inorganic mercury is measured in the blood drawn at the end of the shift at the end of the workweek. A mercury level of 15 ug/L of blood should be used as the biological exposure index.

Occupational Biological Exposure Indices for Mercury	
Blood Mercury	15 µg/L
Urine Mercury	20 µg/g creatinine

American Conference of Governmental Industrial Hygienists: The American Conference of Governmental Industrial Hygienists (ACGIH) is a non-profit, nongovernmental scientific organization which develops peer-reviewed guidelines for workplace exposures. These guidelines are considered best practices for protecting workers health, but are not legally enforceable (ACGIH, 2012).

- ACGIH develops Biological Exposure Indices (BEIs®) as guidance values for assessing biological monitoring results. The BEI® generally indicates a concentration below which nearly all workers should not experience adverse health effects.
- ACGIH has developed a BEI® of 15ug/L for total inorganic mercury in blood and 20ug/g creatinine for total inorganic mercury in urine.

Centers for Disease Control and Prevention: The US Public Health Service agencies provide guidance and set national goals for improving health and preventing disease and injury. The Centers for Disease Control (CDC) has established clinical case definitions for chemical poisoning involving mercury compounds in non-occupational settings. These definitions are based on biological monitoring results.

- For elemental mercury vapor and inorganic mercury, a case of mercury poisoning is confirmed when urinary or whole blood mercury levels are >10 µg/L.
- For organic mercury, a case of mercury poisoning is confirmed when whole blood mercury levels are >10ug/L.

Fourth National Report on Human Exposure to Environmental Chemicals: The "Fourth National Report on Human Exposure to Environmental Chemicals" (CDC, 2017) provides an assessment of the exposure of the U.S. population to environmental chemicals using biomonitoring. One of the primary purposes of this report is to establish reference ranges that can be used by physicians to determine whether an individual has been exposed to higher levels than are found in the general population. Mercury levels in blood and urine samples from a random sample of participants from the National Health and Nutrition Examination Survey (NHANES) conducted by the Centers for Disease Control and Prevention's National Center for Health Statistics are shown in the table below. People who are occupationally exposed may have higher background levels then those found in the general population.

		Background Mercury Levels				
		1-5 yrs	6-11 yrs	12-19 yrs	>=20 yrs	Females*
Blood (ug/L)	Geometric Mean (95% conf.interval)	ND	ND	0.412 (.367-.463)	0.814 (.736-.900)	0.678 (.617-.745)
	95th perct. (95% conf. interval)	1.21 (1.05-1.48)	1.62 (1.38-2.19)	1.87 (1.30-2.38)	4.88 (4.36-5.21)	4.15 (3.37-4.93)
Urine (ug/L)	Geometric Mean (95% conf.interval)	NC	ND	ND	0.274 (.246-.305)	0.249 (.218-.284)
	95th perct. (95% conf. interval)	NC	0.890 (.640-1.10)	1.02 (.610-1.81)	1.76 (1.44-2.04)	1.75 (1.25-2.26)
Urine (ug/g creatinine)	Geometric Mean (95% conf.interval)	NC	ND	ND	0.318 (.291-.349)	0.330 (.297-.367)
	95th perct. (95% conf. interval)	NC	1.11 (.713-1.72)	0.846 (.580-1.07)	1.76 (1.50-1.88)	1.83 (1.60-2.12)

Average background levels in a representative sample of the U.S. population, 2013-2014 (CDC, 2017).
NC- Not collected.
ND- Not determined due to high proportion of results below the level of detection.
*This category also includes females of childbearing age (considered to be 16-49 years old), who are advised to reduce consumption of certain fish species when they become pregnant or are breastfeeding to limit exposure to methylmercury.

ACUTE MEDICAL MANAGEMENT GUIDELINES

The Agency for Toxic Substances and Disease Registry (ATSDR) has published "Medical Management Guidelines" for acute exposure to elemental mercury. These guidelines were developed to aid emergency department physicians and other emergency healthcare professionals who manage acute exposures resulting from chemical incidents. They provide instruction on effective decontamination of patients, protection from contamination during treatment, efficient transport of patients to a medical facility, and medical evaluation and treatment recommendations (ATSDR, 2014).

Louisiana Mercury Poisoning Reporting Requirements

The State of Louisiana mandates that all cases of mercury poisoning and all laboratory mercury test results (regardless of the mercury levels) be reported to the Louisiana Office of Public Health. Mercury poisoning cases are defined as, "any medical condition/visit resulting from exposure as determined from the exposure history or patient statement and/or acute, subacute, or chronic illness or injury resulting from inhalation, ingestion, dermal exposure or ocular contact."

Cases of mercury poisoning must be reported to the Office of Public Health's Section of Environmental Epidemiology and Toxicology using one of the following methods:

fax (504)568-8149
telephone 888-293-7020 (business hours)
Reporting Form

SOURCES OF INFORMATION

The **Agency for Toxic Substances and Disease Registry** (ATSDR) is a federal public health agency focused on providing trusted health information to prevent harmful exposures and diseases related to toxic substances. Succinct fact sheets, detailed documents, and educational resources regarding mercury exposure and toxicity can be found on their website.

The **Centers for Disease Control and Prevention** (CDC) is a federal agency that provides health protection through disease surveillance and healthcare education and support. Background mercury levels in the U.S. population are measured as part of the NHANES survey, and the website also has national biomonitoring guidelines.

The **US Environmental Protection Agency** (EPA) provides a broad range of information about mercury including commercial fish consumption advisories; effects of mercury on people and the environment; lists of consumer and commercial products containing mercury; and how to clean up mercury spills and dispose of mercury containing items in the home. Information is available in English and Spanish.

The **Louisiana Department of Environmental Quality** (LDEQ) provides information designed to increase mercury awareness among Louisiana residents. Topics include Louisiana fish consumption advisories, cleaning mercury spills in the home, presence of mercury in household products, and mercury recycling.

The **National Institute for Occupational Safety and Health** (NIOSH) is a federal agency established to help assure safe and healthful working conditions by providing research, information, education, and training in the field of occupational safety and health. Information on occupational mercury exposure can be found on their website.

The **US Department of Labor's Occupational Safety & Health Administration** (OSHA) develops and enforces regulations for toxic substances in the workplace. Occupational standards and medical monitoring standards for occupational mercury exposure can be found on their website.

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