ATSDR

AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

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Substance-Specific Applied Research Program

Division of Toxicology **January 2004**

The Agency for Toxic Substances and Disease Registry's (ATSDR) congressionally mandated Substance-Specific Applied Research Program (SSARP) currently consists of a research agenda for 60 top hazardous substances that is being accomplished through successful partnerships with other federal agencies, universities, and industry groups.

Legislative Mandate

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA, or "Superfund" legislation) requires ATSDR to carry out the following activities:

- Develop, jointly with the U.S. Environmental Protection Agency (EPA), a priority list of hazardous substances found at waste sites on EPA's National Priorities List (NPL).
- Prepare toxicological profiles for hazardous substances found at NPL sites.
- Assure, in cooperation with the National Toxicology Program (NTP), the initiation of a research program to address identified data needs associated with the toxic substances, i.e., SSARP.

Program Objectives

- Address the substance-specific information needs of the public and scientific community.
- Supply information necessary to improve the database used to conduct comprehensive public health assessments of populations living near hazardous waste sites.
- Establish linkages between levels of contaminants in the environment and levels in human tissues and organs that are associated with adverse health effects.

Program Activities and Status

- Developed a "Decision Guide" in 1989 for determining research priorities for hazardous substances found at waste sites and in the environment.
- Established the Tri-agency Superfund Applied Research Committee (TASARC) in 1991 to:
  - Advise ATSDR on assigning priorities for mechanisms to address research needs.
  - Coordinate knowledge of research activities to avoid duplication of research in other programs and under other authorities.
  - Advise ATSDR on issues of science related to substance-specific research needs.
  - Maintain a scheduled forum that provides an overall review of SSARP.
- Established a research agenda in 1991 for an initial 38 hazardous substances - aldrin/dieldrin, arsenic, benzene, beryllium, cadmium, carbon tetrachloride, chloroethane, chloroform, chromium, cyanide, p,p -DDT, DDE, DDD, di(2-ethylhexyl) phthalate, lead, mercury, methylene chloride, nickel, polychlorinated biphenyl compounds (PCBs), polycyclic aromatic hydrocarbons (PAHs), which include 15 substances, selenium, tetrachloroethylene, toluene, trichloroethylene, vinyl chloride, and zinc. Comments from the public were invited.
- Expanded the SSARP in 1997 by identifying research needs for 12 additional substances (chlordane, 1,2-dibromo-3-chloropropane, di-n-butyl phthalate, disulfoton, endrin, endosulfan, heptachlor, hexachlorobutadiene, hexachlorocyclohexane, manganese, methoxychlor, and toxaphene).
- Announced research needs in 2003 for 10 additional substances (asbestos, benzidine, chlorinated dibenzo-p-dioxins, 1,2-dibromoethane, 1,2-dichloroethane, 1,1-dichloroethene, ethylbenzene, pentachlorophenol,

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1,1,2,2,-tetrachloroethane, and total xylenes).

- Identified key mechanisms, with the oversight of TASARC, for filling research needs, including industry testing as a result of EPA rule-making, voluntary industry testing (studies conducted by industry groups at no expense to ATSDR), NTP testing, and direct ATSDR-supported testing, including university-based research through a cooperative agreement with the Minority Health Professions Foundation (MHPF).
- To date, of 263 research needs identified for 60 substances, 62 research needs have been filled, and an additional 68 are currently being addressed through various mechanisms.

Examples of Research Findings

- Lower chlorinated Aroclors (commercial polychlorinated biphenyl [PCB] mixtures) (e.g., Aroclor 1016 and Aroclor 1242), previously thought to be less toxic, are capable of producing tumors in rats. Subsequently, EPA used the data from this study to revise its cancer slope factor for PCBs.
- Exposure to benzo(a)pyrene (BaP) may adversely affect reproductive health. BaP and its break-down products accumulate in the testes and ovaries of animals exposed to BaP by ingestion or inhalation. Pathological changes were observed in the testes of male animals exposed to BaP, as well as a dose-dependent decrease in the number of active sperm.
- Developed a new ATSDR health guidance value (Minimal Risk Level) of 0.2 mg/kg/day for methylene chloride for short-term exposure via the oral route.
- Consumption of water containing large amounts of methylene chloride (approximately 600-6000 mg of methylene chloride per liter of water) may result in adverse health effects on the central nervous system, liver, and the development of newborns.
- Infants may be at risk for neurobehavioral effects from exposure to maternal blood lead levels that are less than 10 µg/dL. These results among African American subjects corroborate findings in other populations on the effects of low-level, prenatal lead exposures.
- Lead accumulated preferentially in the brain of young animals exposed to blood lead levels that are less than 5 µg/dL. This provides biological evidence that even low levels of lead can reach the brain and may cause adverse health effects during early developmental stages.
- Hydroxylated metabolites of PCBs, which are considered to be strong indicators of naturally occurring aerobic biodegradation, were detected in sediment samples collected from PCB-contaminated sites in the upper Hudson River.

Program Impact

The ATSDR SSARP, to date, has accomplished the following:

- Filled 62 research needs for populations potentially exposed to hazardous environmental substances.
- Demonstrated the effectiveness of successful partnerships with other federal agencies, universities, and industry groups in filling critical public health research needs.
  - Filled 19 public health research needs through university-based research via an agreement with the MHPF.
  - Addressed 18 research needs for 8 substances using an EPA/ATSDR test rule currently under development.
  - Established Memoranda of Understanding with four private sector organizations (American Chemistry Council, Electric Power Research Institute, Inc., General Electric Company, and Halogenated Solvents Industry Alliance, Inc.). These industry groups are conducting studies to fill at least 16 research needs associated with five substances at no expense to the agency, resulting in a savings of about $10 million in research costs to ATSDR.

Future Directions

Through the SSARP, ATSDR plans to broaden efforts to fill research needs through outreach to a wider range of potential federal and private-sector partners, including international organizations.

For more information about SSARP, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-29, Atlanta, GA 30333. Phone: 1-888-422-8737 (toll free). The ATSDR Internet address is **http://www.atsdr.cdc.gov.**

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