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Cooperative Program with the Minority Health Professions Foundation

Division of Toxicology

January 2004

Minority populations often are at greater risk of exposure to hazardous substances

The probability of living near hazardous waste sites is higher in mid-to-low income neighborhoods that often have a higher proportion of minority residents.

As a result, people in these communities are at higher risk for adverse health outcomes that are potentially associated with exposures to hazardous substances. Moreover, many of the health conditions considered to be most sensitive to exposures to hazardous substances, for example cancer, lung and respiratory diseases, also are linked with excess morbidity and mortality among minority populations.

This fact sheet describes the Agency for Toxic Substances and Disease Registry (ATSDR) program to conduct research and other environmental public health activities in cooperation with the Minority Health Professions Foundation (Foundation).

The Foundation supports research, receives funds to carry out the mission of the Association of Minority Health Professions Schools (AMHPS), and addresses the program goals shared by AMHPS' member institutions.

The Foundation manages numerous minority health-focused program activities for AMHPS' member institutions and has demonstrated its expertise in minority health issues.

ATSDR has developed a collaborative relationship with the Foundation to provide critical information necessary to address national environmental health concerns.

In addition, findings from this effort will help determine how environmental hazards may contribute to racial and/or ethnic disparities in health and support efforts to eliminate these disparities.

In 1992, ATSDR began its collaborative relationship with the Foundation to:

- Initiate research to close gaps in our knowledge about the effects of toxic

chemicals in the environment, one of ATSDR's Congressional mandates, and

- Enhance existing capacities in environmental health at the Foundation's member institutions.

Highlights of the ATSDR/Foundation Program

The ATSDR/Foundation Program (cooperative program) has filled 19 important public health research needs identified in the ATSDR Substance-Specific Applied Research Program. Among its other accomplishments are:

- The cooperative program provides support for health education and community-related issues that are the focus areas of ATSDR's work at Superfund sites.
- The cooperative program has increased environmental public health capacity (clinical, basic and applied research, training, and funding) at historically black colleges and universities.
- The program increases the number of practicing environmental health scientists.
- The cooperative program published a report entitled "Environmental Health & Toxicology Research Program: Meeting

For More Information...

**Call our toll-free information line,
(888) 42-ATSDR...that's (888) 422-8737,
between 8:30 AM and 5:00 PM Eastern time.**

Or, visit us on the Web at <http://www.atsdr.cdc.gov>.

- Environmental Health Challenges through Research, Education, and Service.” This report describes findings and other successes from the first 5 years of the program.
- The cooperative program established a model for ATSDR partnerships and enhanced participation of scientific and health professionals to better serve low-income and minority communities affected by hazardous sites and releases.
- The program addresses ATSDR’s Agenda for Public Health Environmental Research.
- It supports the Presidential Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks, April 1997.
- The cooperative program helps the agency achieve departmental goals in environmental justice, minority health, and women’s health.

New Directions for the ATSDR/Foundation Program

A new ATSDR/Foundation program, The Environmental Health, Health Services, and Toxicology Research Program, began in September 2003.

The goals of the new program are to apply findings from the 10-year Environmental Health and Toxicology Research Program and to improve public health and environmental medicine in low-income and/or minority communities.

This new program will build upon earlier efforts and expand the program’s public environmental health impact on affected communities. Activities across four research and environmental public health focus areas were funded to initiate this new program. They are:

- Substance-specific toxicology research
 - Pb/Mn: Cell Signaling and Gene Expression in Primary Neurons
 - The Effects of Chlorpyrifos on Glial Cell Development

- Effects of Arsenic and Dieldrin Mixtures on Reproduction
- Environmental exposure assessment
 - Quantitative Determination of PCBs, PAHs, and Heavy Metals in the Urban Environment of New Orleans
 - Multimedia Study of Arsenic, Selenium, Mercury, and Molybdenum in Rural & Urban Environments of New Orleans
- Community-based Environmental Health Education
 - Community-Based Internships to Address Environmental Issues
- Environmental Health Education for Primary-care Providers
 - Environmental Medicine and Toxicology Rotation Program

Future efforts to expand the program will include health services research, additional health education efforts, and toxicology research.

Some Important Findings from the ATSDR/Foundation Program

Research shows that the lead body burden plays a role in elevated blood pressure during pregnancy. For example:

- Blood lead levels among immigrant pregnant women were significantly higher than among non-immigrants; these levels declined over the time they lived in the United States;
- Blood pressure during pregnancy was correlated with blood lead levels in Latina and African-American women; and
- Maternal bone lead, indicating past exposures, influenced blood lead levels and, by correlation, blood pressure.

This study provides clear evidence that even low blood lead levels can influence blood pressure. Thus,

lead may contribute to the increased risk for adverse birth outcomes related to high blood pressure during pregnancy.

Another study indicated that newborns may be at risk for effects from exposure to maternal blood lead levels <10 µg/dL. Findings showed that:

- Otherwise clinically healthy African-American newborns exposed to maternal blood lead levels <10 µg/dL showed decreased motor control and attention; and
- A dose-related trend in effects was revealed among newborns exposed to maternal blood lead levels < 10 µg/dL but >2.5 µg/dL

This study was the first U.S. study to report lead-induced effects at levels below 10 µg/dL.

These results among African-Americans corroborate findings in other populations on effects from low-level, prenatal lead exposures.

In other research, inorganic mercury exposures altered reproductive function in animals. The study found:

- A dose-dependent decrease in pregnancy rates among exposed female animals;
- Decreased number of live pups born to exposed mothers over 2 successive generations; and
- Lower birth weight and smaller male reproductive organs in pups from the exposed mothers was observed.

These results suggest that adults (and their children) exposed to inorganic mercury could be at risk for altered reproductive success.

Other research indicated that benzo[a]pyrene (BaP), the most common polycyclic aromatic hydrocarbon (PAH), affects reproduction and development in animals. Findings include the following:

- BaP and its breakdown products are transferred from the mother to the developing fetus in animals. These substances alter molecular factors thought critical for the developing nervous system;

- BaP reaches reproductive organs in females and males, causing pathological changes in the testis after exposure;
- BaP caused a dose-dependent decrease in live sperm and impaired hormonal function involved in healthy sperm development.

These effects of BaP on the male and female reproductive system and on the developing fetus in animals suggest a potential risk for adverse reproductive and developmental outcomes when people are exposed to BaP in the environment.

Other research from the ATSDR/Foundation program suggests the following:

- Problems with reproduction and/or development may occur when parents or their children are exposed to chlordane and di-n-butyl phthalate.
- Lead accumulated preferentially in the brain of young animals exposed to blood lead levels < 5 µg/dL. This finding provides biological evidence that even low levels of lead can reach the brain and may cause health effects during early developmental stages.
- Behavior and locomotor activity in animals are altered following ingestion of excess dietary zinc.

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