

Health Consultation

(EXPOSURE INVESTIGATION)

MIAMI CIVIC CENTER

MIAMI, MIAMI-DADE COUNTY, FLORIDA

EPA FACILITY ID:

MAY 21, 2003

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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HEALTH CONSULTATION NO. 2

(EXPOSURE INVESTIGATION)

MIAMI CIVIC CENTER

MIAMI, MIAMI-DADE COUNTY, FLORIDA

Prepared by:

Florida Department of Health
Department of Health and Human Services
Bureau of Environmental Epidemiology
Under a Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

Foreword

This health consultation summarizes public health concerns arising from a parcel of undeveloped land in Miami. Buried debris containing metals and ash contaminates the parcel. It is identified as the Miami Civic Center in Miami, Florida. A site evaluation prepared by the Florida Department of Health (DOH) provides the basis for this health consultation. A site evaluation requires a number of steps:

- *Evaluating exposure:* Florida DOH scientists begin by reviewing available information about environmental conditions at the site. The first task is to find out how much contamination is present, where it is found on the site, and how people might be exposed to it. Usually, Florida DOH does not collect its own environmental sampling data. We rely on information provided by the Florida Department of Environmental Protection (DEP), U.S. Environmental Protection Agency (EPA), other government agencies and private businesses, and the public.
- *Evaluating health effects:* If evidence shows that people are now or could in the future be exposed to hazardous substances, Florida DOH scientists will take steps to determine whether that exposure could be harmful to human health. Their report focuses on public health—that is, the health impact on the community as a whole—and they base their report on existing scientific information.
- *Developing recommendations:* Florida DOH outlines its conclusions regarding any potential health threat posed by a site, and offers recommendations for reducing or eliminating human exposure to contaminants. The role of Florida DOH in dealing with hazardous waste sites is primarily advisory. For that reason, the evaluation report will typically recommend courses of action to other agencies—including the EPA and Florida DEP. Nevertheless, if the health threat is immediate, Florida DOH will issue a public health advisory warning of the danger, and will work to resolve the problem.
- *Soliciting community input:* The evaluation process is interactive. Florida DOH starts by soliciting and evaluating information from various government agencies, organizations or individuals responsible for cleaning up the site, and community members who live near the site. Florida DOH shares its conclusions with those who provided information. After completion of its report, Florida DOH seeks feedback from the public. *If you have questions or comments about this report, we encourage you to contact us.*

Please write to:

Susan Bland

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(850) 245-4299, or toll-free during business hours: 1-877-798-2772

Summary and Statement of Issues

This exposure investigation evaluates blood-cadmium and lead results from two children living near the Miami Civic Center (MCC) site in Miami, Florida. Because of the cadmium and lead levels found in the soils, the Miami-Dade County Department of Environmental Resource Management (DERM) recommended that the Miami-Dade County Health Department (CHD) conduct blood-cadmium and lead testing of children living near the site. The Florida Department of Health (DOH) coordinated the testing. The CHD collected blood samples from two children, ages 1½ and 2. Their blood-lead levels were below the normal range; cadmium was not detected in either child's blood. The measured blood-cadmium and lead levels in the two children are not likely to cause illness. It should be noted that these results are applicable to the two participants only of this investigation, not to the general population.

Site Description and History

In March 2000, the Miami-Dade County Department of Environmental Resources Management (DERM) asked the Florida Department of Health (DOH) whether non-native ash and heavy metals in the soil at the Miami Civic Center (MCC) property are hazardous to human health. The Florida DOH, through a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR), evaluates the public health importance of hazardous waste sites in Florida. This is the first review of the MCC property by either Florida DOH or ATSDR.

The MCC property is an approximately 3-acre parcel of undeveloped land at 1700 N.W. 14 Avenue in Miami, Miami-Dade County, Florida (Figure 1, 2 and 3). In the 1930s The property was residential, and from approximately 1949 until the mid-1980s supported a plant nursery in its northwest portion. By 1986, the residences and nursery had been cleared from the property. For the last 16 years the property has remained vacant. Currently, the property is an open, rolling field with tall grass and a few trees, surrounded by a small residential housing community to the southeast, a high-rise residential building to the north, a canal to the northeast, and major roads to the south, east and west.

In 1989 and 1990, one of the property owners hired a contractor to conduct an environmental assessment. The contractor found debris (e.g., glass, charcoal, metal, concrete) on the property and, in the subsurface soil, elevated concentrations of lead and cadmium. In 1998 and 1999 another contractor conducted an environmental assessment and, in a non-native layer of ash, found elevated concentrations of total lead, arsenic and barium. This ash was on the eastern portion of the property approximately 1 to 4½ feet below land surface. According to the Florida Department of Environmental Protection (DEP), the source of this non-native ash could be an incinerator previously located a few blocks away from the property.

According to the DERM, a chain-link fence limits but does not completely restrict property access. In August 2002, the DERM observed a worn vehicle path on the property and bare patches of soil containing metal and small glass fragments, as well as residential-type refuse. The DERM also observed domestic chickens and banana trees on residential property to the south along N.W. 14 Avenue.

On August 23, 2001, DERM collected surface soil samples near the residential areas where children had been observed playing. DERM found elevated levels of arsenic, cadmium and other metals.

In its May 2001 health consultation Florida DOH evaluated for health effects the metals in soil collected by DERM. As a result of its evaluation Florida DOH characterized the MCC property is an “Indeterminate Public Health Hazard.” The Florida DOH also recommended DERM conduct more soil testing for metals, dibenzodioxins and dibenzofurans. This health consultation also compared the average blood-lead level for children living in the immediate vicinity of the MCC property with the county average. Based on these results, the Florida DOH predicted children living near the MCC property do not have above-average blood-lead levels. Additionally, the Florida DOH used an ATSDR multiple-lead exposures model to predict child blood-lead levels. This model predicted that for children continuously exposed to lead in the surface soil at the Miami Civic Center property, blood-lead levels are not likely to exceed the action level of 10 micrograms per deciliter ($\mu\text{g}/\text{dL}$) (ATSDR & FDOH 2001).

Discussion

Eating and drinking are the principal routes by which most lead enters the body. Some lead can also enter the body from breathing in lead-containing dust or chemicals. Shortly after lead gets into the body, it travels in the blood to the soft tissues such as the liver, kidneys, lungs, brain, spleen, muscles, and heart. After several weeks, most of the lead moves into the bones and teeth. In adults, about 94% of the total amount of lead in the body is contained in the bones and teeth.

In children, about 73% of the lead is stored in their bones; and some of that lead can remain in their bones for decades. But under certain circumstances some lead can leave the bones and reenter the blood and organs. This can occur when a woman is pregnant or while she is breast-feeding. It can also occur after one breaks a bone or as one reaches advanced age. The half-life of lead in the blood is 28–36 days. This means after 28–36 days, the amount of lead in the blood is 2 the amount it was on the first day of exposure. This also means that higher blood-lead levels will generally reflect more recent exposures (ATSDR 1999).

Centers for Disease Control and Protection (CDC) studies show that since the late 1970s blood-lead levels of U.S. children have dropped dramatically. This is because lead has been banned from gasoline, residential paint, and the solder used for food cans and water pipes. Still, about 900,000 U.S. children between the ages of 1 and 5 are believed to have blood-lead levels equal to or greater than 10 micrograms per deciliter ($\mu\text{g}/\text{dL}$)—the CDC level of concern (ATSDR 1999).

All children with blood-lead levels equal or greater than 20 $\mu\text{g}/\text{dL}$ should receive medical evaluation, an environmental investigation, and remediation. If the lead concentration in blood is higher than 45 $\mu\text{g}/\text{dL}$, medical treatment might be necessary (ATSDR 1999).

Biological Sampling—Blood Cadmium and Lead Testing

In June 2002, the Miami-Dade CHD distributed blood testing fact sheets prepared by the Florida DOH. During the last week of June, the Miami-Dade CHD went door-to-door to announce free blood-cadmium and lead testing for area children. After learning that homes closest to the site were either vacant or did not house children, on June 28 and July 2, 2002, the Miami-Dade CHD tested two children, ages 1 ½ and 2 years, who lived in the nearby apartment complex.

Results

The laboratory showed no cadmium in either child's blood. The blood-lead level of one child was within the recommended CDC's guidance level of <10 µg/dL. The results did not show lead in the other child's blood.

Therefore, the two children's measured blood levels of cadmium and lead are not likely to cause illness.

Child Health Considerations

Children are not small adults; the effects of a child's exposure and an adult's exposure to hazardous substances are different in many ways. First, a child's diet often differs from an adult's, and in ways that can affect exposure. Children drink more fluids, eat more food, and breathe more air per kilogram of body weight than do adults. Children also have a larger skin surface in proportion to their body volume. Further, a child's behavior and lifestyle influence exposure. Children are close to the ground—they crawl on the floor, they put things in their mouths and they can ingest inappropriate substances such as dirt or paint chips. Children also spend more time outdoors than do adults. Finally, children do not have the judgment of adults in avoiding hazards (ATSDR 1999).

Through hand-to-mouth behavior children can absorb more cadmium and lead from soils than adults would normally absorb, But the two children living in the apartment complex near the MCC site do not have measured blood levels of cadmium or lead that would likely cause illness.

Conclusions

The measured blood-cadmium and lead levels of the two children living near the MCC site are within acceptable ranges and are not likely to cause illness. Therefore, the Miami Civic Center site is categorized as a no apparent health hazard.

Recommendations/Public Health Action Plan

At this time and for this health consultation only, the Florida DOH does not offer any recommendations for this site.

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Certification

The Second Miami Civic Center Health Consultation was prepared by the Florida Department of Health, Bureau of Environmental Epidemiology, under a cooperative agreement with the Agency for Toxic Substances and Disease Registry. It is in accordance with approved methodology and procedures existing at the time the health consultation was begun.

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The Division of Health Assessment and Consultation, ATSDR, has reviewed this health consultation, and concurs with its findings.

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References

[ATSDR] Agency for Toxic Substances and Disease Registry. 1999. Toxicological profile for lead. Atlanta: US Department of Health and Human Services.

[ATSDR and FDOH] Florida Department of Health and Agency for Toxic Substances and Disease Registry. 2001. Health consultation regarding Miami Civic Center Property. Atlanta: US Department of Health and Human Services.

Figures

Figure 1

FLORIDA COUNTIES



Figure 1
Miami Civic Center Property
Florida Counties Map

Source: ArcMap 2000

Figure 2



Figure 3

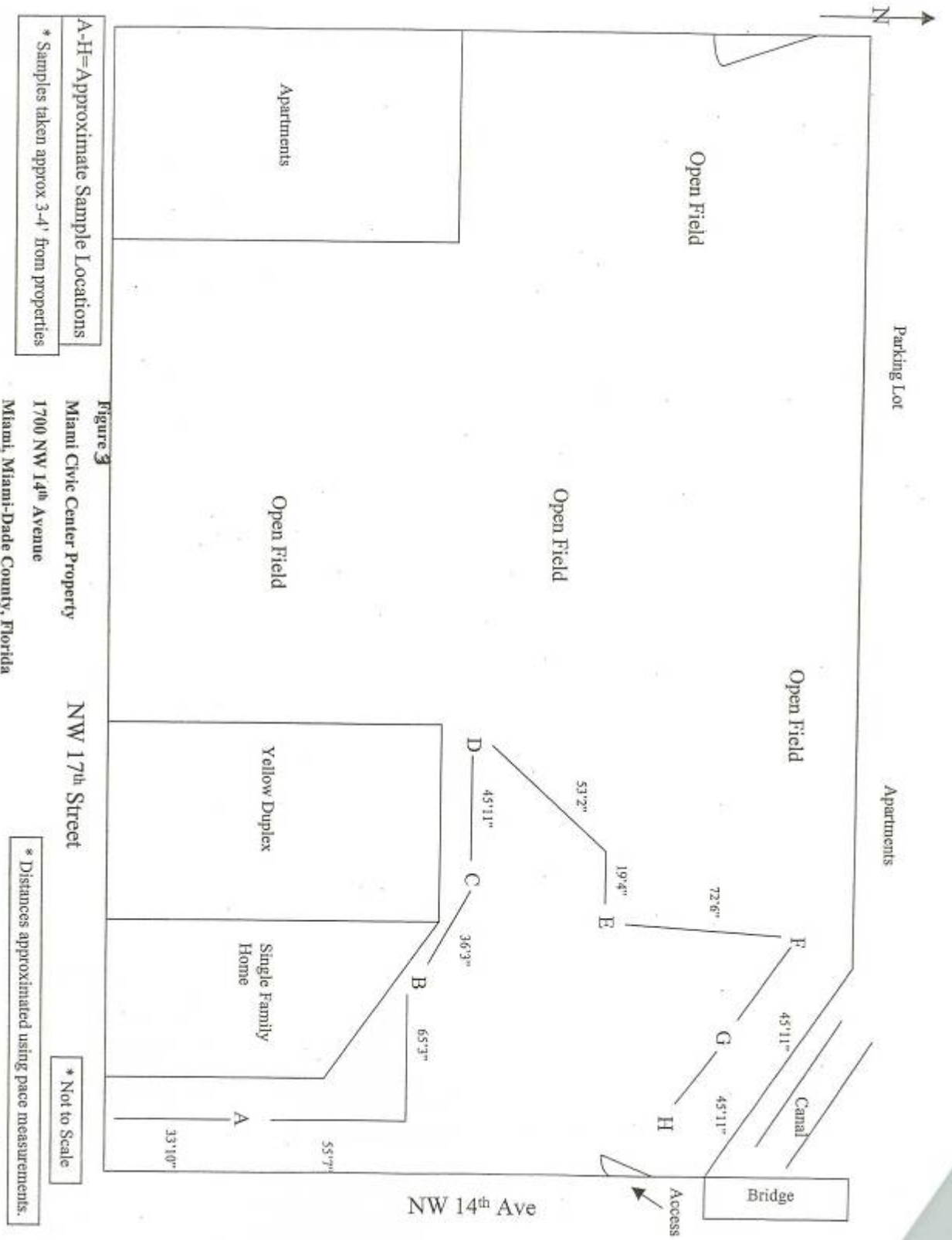


Figure 3
 Miami Civic Center Property
 1700 NW 14th Avenue
 Miami, Miami-Dade County, Florida

ATSDR Glossary of Environmental Health Terms

The Agency for Toxic Substances and Disease Registry (ATSDR) is a federal public health agency with headquarters in Atlanta, Georgia, and 10 regional offices in the United States. ATSDR's mission is to serve the public by using the best science, taking responsive public health actions, and providing trusted health information to prevent harmful exposures and diseases related to toxic substances. ATSDR is not a regulatory agency, unlike the U.S. Environmental Protection Agency (EPA), which is the federal agency that develops and enforces environmental laws to protect the environment and human health.

This glossary defines words used by ATSDR in communications with the public. It is not a complete dictionary of environmental health terms. If you have questions or comments, call ATSDR's toll-free telephone number, 1-888-42-ATSDR (1-888-422-8737).

Absorption

The process of taking in. For a person or animal, absorption is the process of a substance getting into the body through the eyes, skin, stomach, intestines, or lungs.

Acute

Occurring over a short time [compare with **chronic**].

Acute exposure

Contact with a substance that occurs once or for only a short time (up to 14 days) [compare with **intermediate duration exposure** and **chronic exposure**].

Adverse health effect

A change in body function or cell structure that might lead to disease or health problems.

Ambient

Surrounding (for example, *ambient* air).

Analyte

A substance measured in the laboratory. A chemical for which a sample (such as water, air, or blood) is tested in a laboratory. For example, if the analyte is mercury, the laboratory test will determine the amount of mercury in the sample.

Background level

An average or expected amount of a substance or radioactive material in a specific environment, or typical amounts of substances that occur naturally in an environment.

Biodegradation

Decomposition or breakdown of a substance through the action of microorganisms (such as bacteria or fungi) or other natural physical processes (such as sunlight).

Biologic indicators of exposure study

A study that uses (a) **biomedical testing** or (b) the measurement of a substance [an **analyte**], its **metabolite**, or another marker of exposure in human body fluids or tissues to confirm human exposure to a hazardous substance [also see **exposure investigation**].

Biologic monitoring

Measuring hazardous substances in biologic materials (such as blood, hair, urine, or breath) to determine whether exposure has occurred. A blood test for lead is an example of biologic monitoring.

Biologic uptake

The transfer of substances from the environment to plants, animals, and humans.

Biomedical testing

Testing of persons to find out whether a change in a body function might have occurred because of exposure to a hazardous substance.

Biota

Plants and animals in an environment. Some of these plants and animals might be sources of food, clothing, or medicines for people.

Body burden

The total amount of a substance in the body. Some substances build up in the body because they are stored in fat or bone or because they leave the body very slowly.

Cancer

Any one of a group of diseases that occurs when cells in the body become abnormal and grow or multiply out of control.

Cancer risk

A theoretical risk of for getting cancer if exposed to a substance every day for 70 years (a lifetime exposure). The true risk might be lower.

Carcinogen

A substance that causes cancer.

Central nervous system

The part of the nervous system that consists of the brain and the spinal cord.

CERCLA [see **Comprehensive Environmental Response, Compensation, and Liability Act of 1980**]

Chronic

Occurring over a long time (more than 1 year) [compare with **acute**].

Chronic exposure

Contact with a substance that occurs over a long time (more than 1 year) [compare with **acute exposure** and **intermediate duration exposure**].

Comparison value (CV)

Calculated concentration of a substance in air, water, food, or soil that is unlikely to cause harmful (adverse) health effects in exposed people. The CV is used as a screening level during the public health assessment process. Substances found in amounts greater than their CVs might be selected for further evaluation in the public health assessment process.

Completed exposure pathway [see **exposure pathway**].

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)

CERCLA, also known as **Superfund**, is the federal law that concerns the removal or cleanup of hazardous substances in the environment and at hazardous waste sites. ATSDR, which was created by CERCLA, is responsible for assessing health issues and supporting public health activities related to hazardous waste sites or other environmental releases of hazardous substances.

Concentration

The amount of a substance present in a certain amount of soil, water, air, food, blood, hair, urine, breath, or any other media.

Contaminant

A substance that is either present in an environment where it does not belong or is present at levels that might cause harmful (adverse) health effects.

Dermal

Referring to the skin. For example, dermal absorption means passing through the skin.

Dermal contact

Contact with (touching) the skin [see **route of exposure**].

Detection limit

The lowest concentration of a chemical that can reliably be distinguished from a zero concentration.

Disease prevention

Measures used to prevent a disease or reduce its severity.

Dose (for chemicals that are not radioactive)

The amount of a substance to which a person is exposed over some time period. Dose is a measurement of exposure. Dose is often expressed as milligram (amount) per kilogram (a measure of body weight) per day (a measure of time) when people eat or drink contaminated water, food, or soil. In general, the greater the dose, the greater the likelihood of an effect. An

“exposure dose” is how much of a substance is encountered in the environment. An “absorbed dose” is the amount of a substance that actually got into the body through the eyes, skin, stomach, intestines, or lungs.

Environmental media

Soil, water, air, **biota** (plants and animals), or any other parts of the environment that can contain contaminants.

Environmental media and transport mechanism

Environmental media include water, air, soil, and **biota** (plants and animals). Transport mechanisms move contaminants from the source to points where human exposure can occur. The **environmental media and transport mechanism** is the second part of an **exposure pathway**.

EPA

United States Environmental Protection Agency.

Exposure

Contact with a substance by swallowing, breathing, or touching the skin or eyes. Exposure may be short-term [**acute exposure**], of intermediate duration, or long-term [**chronic exposure**].

Exposure assessment

The process of finding out how people come into contact with a hazardous substance, how often and for how long they are in contact with the substance, and how much of the substance they are in contact with.

Exposure investigation

The collection and analysis of site-specific information and biologic tests (when appropriate) to determine whether people have been exposed to hazardous substances.

Exposure pathway

The route a substance takes from its source (where it began) to its end point (where it ends), and how people can come into contact with (or get exposed to) it. An exposure pathway has five parts: a **source of contamination** (such as an abandoned business); an **environmental media and transport mechanism** (such as movement through groundwater); a **point of exposure** (such as a private well); a **route of exposure** (eating, drinking, breathing, or touching), and a **receptor population** (people potentially or actually exposed). When all five parts are present, the exposure pathway is termed a **completed exposure pathway**.

Feasibility study

A study by EPA to determine the best way to clean up environmental contamination. A number of factors are considered, including health risk, costs, and what methods will work well.

Groundwater

Water beneath the earth’s surface in the spaces between soil particles and between rock surfaces [compare with **surface water**].

Hazard

A source of potential harm from past, current, or future exposures.

Hazardous Substance Release and Health Effects Database (HazDat)

The scientific and administrative database system developed by ATSDR to manage data collection, retrieval, and analysis of site-specific information on hazardous substances, community health concerns, and public health activities.

Hazardous waste

Potentially harmful substances that have been released or discarded into the environment.

Health consultation

A review of available information or collection of new data to respond to a specific health question or request for information about a potential environmental hazard. Health consultations are focused on a specific exposure issue. Health consultations are therefore more limited than a public health assessment, which reviews the exposure potential of each pathway and chemical [compare with **public health assessment**].

Health education

Programs designed with a community to help it know about health risks and how to reduce these risks.

Health promotion

The process of enabling people to increase control over, and to improve, their health.

Indeterminate public health hazard

The category used in ATSDR's public health assessment documents when a professional judgment about the level of health hazard cannot be made because information critical to such a decision is lacking.

Ingestion

The act of swallowing something through eating, drinking, or mouthing objects. A hazardous substance can enter the body this way [see **route of exposure**].

Inhalation

The act of breathing. A hazardous substance can enter the body this way [see **route of exposure**].

Lowest-observed-adverse-effect level (LOAEL)

The lowest tested dose of a substance that has been reported to cause harmful (adverse) health effects in people or animals.

Medical monitoring

A set of medical tests and physical exams specifically designed to evaluate whether an individual's exposure could negatively affect that person's health.

Metabolism

The conversion or breakdown of a substance from one form to another by a living organism.

Metabolite

Any product of **metabolism**.

mg/kg

Milligram per kilogram.

mg/cm²

Milligram per square centimeter (of a surface).

mg/m³

Milligram per cubic meter; a measure of the concentration of a chemical in a known volume (a cubic meter) of air, soil, or water.

Migration

Moving from one location to another.

Minimal risk level (MRL)

An ATSDR estimate of daily human exposure to a hazardous substance at or below which that substance is unlikely to pose a measurable risk of harmful (adverse), noncancerous effects. MRLs are calculated for a route of exposure (inhalation or oral) over a specified time period (acute, intermediate, or chronic). MRLs should not be used as predictors of harmful (adverse) health effects [see **reference dose**].

National Priorities List for Uncontrolled Hazardous Waste Sites (National Priorities List or NPL)

EPA's list of the most serious uncontrolled or abandoned hazardous waste sites in the United States. The NPL is updated on a regular basis.

No apparent public health hazard

A category used in ATSDR's public health assessments for sites where human exposure to contaminated media might be occurring, might have occurred in the past, or might occur in the future, but where the exposure is not expected to cause any harmful health effects.

No-observed-adverse-effect level (NOAEL)

The highest tested dose of a substance that has been reported to have no harmful (adverse) health effects on people or animals.

No public health hazard

A category used in ATSDR's public health assessment documents for sites where people have never and will never come into contact with harmful amounts of site-related substances.

NPL [see **National Priorities List for Uncontrolled Hazardous Waste Sites**]

Pica

A craving to eat nonfood items, such as dirt, paint chips, and clay. Some children exhibit pica-related behavior.

Plume

A volume of a substance that moves from its source to places farther away from the source. Plumes can be described by the volume of air or water they occupy and the direction they move. For example, a plume can be a column of smoke from a chimney or a substance moving with groundwater.

Point of exposure

The place where someone can come into contact with a substance present in the environment [see **exposure pathway**].

Population

A group or number of people living within a specified area or sharing similar characteristics (such as occupation or age).

Potentially responsible party (PRP)

A company, government, or person legally responsible for cleaning up the pollution at a hazardous waste site under Superfund. There may be more than one PRP for a particular site.

ppb

Parts per billion.

ppm

Parts per million.

Prevention

Actions that reduce exposure or other risks, keep people from getting sick, or keep disease from getting worse.

Public availability session

An informal, drop-by meeting at which community members can meet one-on-one with ATSDR staff members to discuss health and site-related concerns.

Public health action

A list of steps to protect public health.

Public health assessment (PHA)

An ATSDR document that examines hazardous substances, health outcomes, and community concerns at a hazardous waste site to determine whether people could be harmed from coming

into contact with those substances. The PHA also lists actions that need to be taken to protect public health [compare with **health consultation**].

Public health hazard

A category used in ATSDR's public health assessments for sites that pose a public health hazard because of long-term exposures (greater than 1 year) to sufficiently high levels of hazardous substances or **radionuclides** that could result in harmful health effects.

Public health hazard categories

Public health hazard categories are statements about whether people could be harmed by conditions present at the site in the past, present, or future. One or more hazard categories might be appropriate for each site. The five public health hazard categories are **no public health hazard, no apparent public health hazard, indeterminate public health hazard, public health hazard, and urgent public health hazard**.

Public health statement

The first chapter of an ATSDR **toxicological profile**. The public health statement is a summary written in words that are easy to understand. The public health statement explains how people might be exposed to a specific substance and describes the known health effects of that substance.

Public meeting

A public forum with community members for communication about a site.

RCRA [See Resource Conservation and Recovery Act (1976, 1984)]

Receptor population

People who could come into contact with hazardous substances [see **exposure pathway**].

Reference dose (RfD)

An EPA estimate, with uncertainty or safety factors built in, of the daily lifetime dose of a substance that is unlikely to cause harm in humans.

Registry

A systematic collection of information on persons exposed to a specific substance or having specific diseases [see **exposure registry** and **disease registry**].

Remedial Investigation

The CERCLA process of determining the type and extent of hazardous material contamination at a site.

Resource Conservation and Recovery Act (1976, 1984) (RCRA)

This Act regulates management and disposal of hazardous wastes currently generated, treated, stored, disposed of, or distributed.

RFA

RCRA Facility Assessment. An assessment required by RCRA to identify potential and actual releases of hazardous chemicals.

RfD

See **reference dose**.

Risk

The probability that something will cause injury or harm.

Risk reduction

Actions that can decrease the likelihood that individuals, groups, or communities will experience disease or other health conditions.

Risk communication

The exchange of information to increase understanding of health risks.

Route of exposure

The way people come into contact with a hazardous substance. Three routes of exposure are breathing [**inhalation**], eating or drinking [**ingestion**], or contact with the skin [**dermal contact**].

Safety factor [see **uncertainty factor**]**SARA** [see **Superfund Amendments and Reauthorization Act**]**Sample**

A portion or piece of a whole. A selected subset of a population or subset of whatever is being studied. For example, in a study of people the sample is a number of people chosen from a larger population [see **population**]. An environmental sample (for example, a small amount of soil or water) might be collected to measure contamination in the environment at a specific location.

Sample size

The number of units chosen from a population or environment.

Solvent

A liquid capable of dissolving or dispersing another substance (for example, acetone or mineral spirits).

Source of contamination

The place where a hazardous substance comes from, such as a landfill, waste pond, incinerator, storage tank, or drum. A source of contamination is the first part of an **exposure pathway**.

Special populations

People who might be more sensitive or susceptible to exposure to hazardous substances because of factors such as age, occupation, sex, or behaviors (for example, cigarette smoking). Children, pregnant women, and older people are often considered special populations.

Stakeholder

A person, group, or community who has an interest in activities at a hazardous waste site.

Statistics

A branch of mathematics that deals with collecting, reviewing, summarizing, and interpreting data or information. Statistics are used to determine whether differences between study groups are meaningful.

Substance

A chemical.

Substance-specific applied research

A program of research designed to fill important data needs for specific hazardous substances identified in ATSDR's **toxicological profiles**. Filling these data needs would allow more accurate assessment of human risks from specific substances contaminating the environment. This research might include human studies or laboratory experiments to determine health effects resulting from exposure to a given hazardous substance.

Superfund Amendments and Reauthorization Act (SARA)

In 1986, SARA amended CERCLA and expanded the health-related responsibilities of ATSDR. CERCLA and SARA direct ATSDR to look into the health effects from substance exposures at hazardous waste sites and to perform activities including health education, health studies, surveillance, health consultations, and toxicological profiles.

Surface water

Water on the surface of the earth, such as in lakes, rivers, streams, ponds, and springs [compare with **groundwater**].

Survey

A systematic collection of information or data. A survey can be conducted to collect information from a group of people or from the environment. Surveys of a group of people can be conducted by telephone, by mail, or in person. Some surveys are done by interviewing a group of people.

Teratogen

A substance that causes defects in development between conception and birth. A teratogen is a substance that causes a structural or functional birth defect.

Toxic agent

Chemical or physical (for example, radiation, heat, cold, microwaves) agents which, under certain circumstances of exposure, can cause harmful effects to living organisms.

Toxicological profile

An ATSDR document that examines, summarizes, and interprets information about a hazardous substance to determine harmful levels of exposure and associated health effects. A toxicological profile also identifies significant gaps in knowledge on the substance and describes areas where further research is needed.

Toxicology

The study of the harmful effects of substances on humans or animals.

Tumor

An abnormal mass of tissue that results from excessive cell division that is uncontrolled and progressive. Tumors perform no useful body function. Tumors can be either benign (not cancer) or malignant (cancer).

Uncertainty factor

Mathematical adjustments for reasons of safety when knowledge is incomplete. For example, factors used in the calculation of doses that are not harmful (adverse) to people. These factors are applied to the lowest-observed-adverse-effect-level (LOAEL) or the no-observed-adverse-effect-level (NOAEL) to derive a minimal risk level (MRL). Uncertainty factors are used to account for variations in people's sensitivity, for differences between animals and humans, and for differences between a LOAEL and a NOAEL. Scientists use uncertainty factors when they have some, but not all, the information from animal or human studies to decide whether an exposure will cause harm to people [also sometimes called a **safety factor**].

Urgent public health hazard

A category used in ATSDR's public health assessments for sites where short-term exposures (less than 1 year) to hazardous substances or conditions could result in harmful health effects that require rapid intervention.

Volatile organic compounds (VOCs)

Organic compounds that evaporate readily into the air. VOCs include substances such as benzene, toluene, methylene chloride, and methyl chloroform.

