NEW JERSEY DEPARTMENT of HEALTH and SENIOR SERVICES

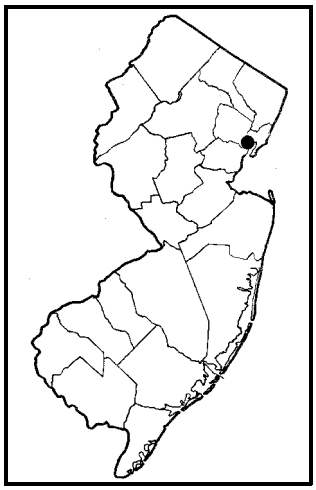
HEALTH and HAZARDOUS WASTE

A Practitioner's Guide to Patients' Environmental Exposures

Volume 1, Issue 1 September 1995

Focus on:

Diamond Alkali



80 and 120 Lister Avenue
Newark, New Jersey

The importance of this site: The Diamond Alkali Superfund site is one of the most highly dioxin-contaminated sites in the country, and is in a densely populated area. Although the dioxin is currently largely contained, clean-up activities at the site proposed for summer, 1995, can potentially release dioxin-containing dusts. Dioxin contamination of the Passaic River, adjacent to the original manufacturing area and now part of this Superfund site, can result in fish and biota contamination. The river is posted for fishing and recreational activities.

Is your patient at risk from this site?

Your patient is at risk if:

- he had direct contact with elevated levels of site contaminants

Your patient is not at risk if:

- he did not have contact with site contaminants;
- he did not live or work in this area prior to off-site clean-up

Your patient is at indeterminate risk if:

- he had exposure to unknown levels of site contaminants

Site history: Between 1951 and 1969, the Diamond Alkali Company manufactured the herbicides 2,4-D (2,4-dichlorophenoxyacetic acid) and 2,4,5-T (2,4,5-trichlorophenoxyacetic acid). The compound 2,3,7,8-tetrachlorodibenzo-p-dioxin, commonly referred to as dioxin, was produced as a by-product.

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DIOXIN and Your Patient

Dioxin is the common term used to describe a group of 75 isomers. The most well-studied is 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). It is a colorless solid with no known odor. It does not occur naturally. As a group they are generally lipophilic with low water solubility. In the environment they are associated with particulate and organic matter.

Public health significance of dioxin: Dioxins and related compounds are found nearly everywhere in the developed world. These compounds are potent animal toxicants, producing a range of effects including cancer, developmental and reproductive effects, hepatotoxic reactions, enzyme induction, and death. Some of these effects may also occur in exposed humans, although the scientific tools and data to directly measure some of these outcomes are lacking. However, there is sufficient data to support the inference that humans are likely to respond to dioxins and dioxin-like compounds with a range of effects, if exposures are high enough. Various animal species range from insensitive to very sensitive to dioxin's effects, and humans are believed to fit somewhere in the middle of this sensitivity range. On a cellular level, subtle changes can occur in humans at levels within one order of magnitude of the average background body burden.

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Welcome to **HEALTH AND HAZARDOUS WASTE**, a quarterly newsletter for physicians and primary care providers in New Jersey treating patients exposed to environmental contaminants. New Jersey has more than 100 Superfund sites, and thousands of other hazardous waste sites. Potentially exposed residents place a high degree of trust in their physicians to provide appropriate care in all health matters, including exposure to toxic substances. This newsletter will provide you with information on a selected hazardous waste site, major contaminants found at that site, and a resource available to you, the care provider, in treating potentially exposed patients.

DIAMOND ALKALI continued

Dioxin contamination was discovered in the early 1980's. On-site soil was found to be heavily contaminated with dioxin, and contaminated soil and dust was transported off-site as well. Area streets were vacuumed, and on-site contaminated bulk materials collected. All collected contaminated materials are stored at 120 Lister Ave. This is considered an interim remedy. The contaminated sediments from the Passaic River have not yet been remediated.

Presently exposed population: There is presently no documented human exposure to site contaminants. Previously exposed population: Residents and workers in the vicinity of the site may have been exposed to site contaminants in the past, prior to off-site remediation.

Potential for future exposures: There may be off-site exposures to dioxin in the future during on-site remediation activities via fugitive dusts. Limiting this potential pathway is a key component of the remedial design.

Community health concerns: In 1992, residents requested that the New Jersey Department of Health determine if there was an increased rate of cancer in the area. An analysis of data supplied by the NJDOH Cancer Registry found that the observed number of total cancers in the area was not elevated compared to State rates, and in fact was substantially lower.

Prevention strategies for your patient:
Because the off-site clean-up is partially complete, i.e., dusts have been removed from area streets, your patients can avoid exposure to site contaminants by avoiding recreational use of or consuming fish from the Passaic River, particularly adjacent to the site.

What other Superfund sites in New Jersey have dioxin as an off-site contaminant?
None.

Other area Superfund sites:
There is one additional Superfund site in Newark (White Chemical Corporation, 660 Frelinghysen Ave.) and four other Superfund sites in Essex County. There are also numerous hazardous waste sites in Newark and throughout the County.

For further information on this site:
Contact the New Jersey Department of Health, Environmental Health Services at (609) 984-2193, or the Newark Division of Health at (201) 733-7590.

DIOXIN continued

Source: Dioxins are formed during chlorination of phenolic products and the production of chlorinated organic solvents, PCBs, and phenoxyherbicides. Dioxins are also formed during the incomplete burning of municipal, industrial and medical wastes containing chlorine. They are also generated in metallurgical processes such as smelting and scrap metal recovery, and the burning of wood, coal and petroleum products. Because they accumulate in soils, sediments and organic matter and persist at waste disposal sites, they are available for redistribution by resuspension, or by operations such as dredging.
Pathways of exposure: Routes for human exposure include ingestion, dermal absorption and inhalation. The major route of human exposure is through food, especially meat, fish and dairy products. Populations with potentially higher levels of dioxin exposure through food include nursing infants, as dioxin is found in breast milk, and subsistence fishermen who fish from contaminated sources.

In general, lower levels of dioxin are absorbed more completely when ingested than higher levels, and dioxin in food is absorbed more readily than ingested soil-contaminated dioxin. Dermal absorption of TCDD from contaminated soil is slow in intact skin, with most TCDD remaining in the stratum corneum layer. Animal studies of inhalation indicate that bioavailability of TCDD in small respirable soil particles is very high, although no human studies were available.

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Staff

Editor: Sharon Kubiak
Medical Reviewers: Marilyn Howarth, M.D.,
Patricia Price, M.D.

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Telephone (609) 984-2193
FAX: (609) 984-2192.

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DIOXIN continued

Human effects: Once absorbed into the blood, dioxin is distributed to most organs. It is found at the highest levels in adipose tissue and liver. It has a biological half-life of approximately seven years.

Dioxin is known to cause chloracne in some exposed individuals, although absence of chloracne does not indicate lack of exposure. Less commonly, hyperpigmentation and hypertrichosis may be signs of acute exposures.

Some studies indicate a transient increase in hepatic enzyme levels without clinical disease. High levels of dioxin exposure are associated with an increase of GGT. There may be neurologic and cardiovascular effects. There is also some evidence that substantial occupational exposure to TCDD results in an alteration of male reproductive hormone levels.

Dioxin is a probable human carcinogen, and is associated with soft tissue sarcomas.

Laboratory tests: Adipose tissue or serum can be analyzed for TCDD levels by GC-MS, however, the tests are expensive and time consuming. Unless a high level exposure is suspected, these tests are not recommended. Liver function tests may be sensitive indicators of dioxin exposure, but these tests are non-specific.

Treatment and management: Treatment is supportive and symptom-dependent. Removal from exposure is important.

This article is based in part on the ATSDR Case Study in Environmental Medicine - Dioxin Toxicity. For your copy, please contact the editor.

EVALUATION

Please circle the appropriate response and mail or fax your evaluation of this newsletter to the NJDOH.

I found the articles useful and informative. Yes No

I will be requesting additional materials in the near future. Yes No

I will be requesting a seminar on environmental health within the year. Yes No

I would like the following in a future issue:

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_____

For Your Reference:

The Agency for Toxic Substances and Disease Registry (ATSDR)

1600 Clifton Road, N.E., Mailstop E28
Atlanta, Georgia 30333
(404) 639-0700

Regional Office:
290 Broadway Floor 18
New York, N.Y. 10007
(212) 637-4305

The Agency for Toxic Substances and Disease Registry (ATSDR) is one of the eight federal public health agencies which constitute the Public Health Service. ATSDR's mission is to prevent exposure and adverse human health effects and diminished quality of life associated with exposure to hazardous substances from waste sites, unplanned releases, and other sources of pollution in the environment.

To carry out its mission and to serve the needs of the public, ATSDR conducts activities in several areas.

- **Public Health Assessments**: ATSDR evaluates data on the health impacts from the release of hazardous substances into the environment, develops health advisories, and identifies actions needed to evaluate, mitigate or prevent human health effects.
- **Health Consultations** address specific requests for health risks related to a particular site, release or material.
- **Health Investigations** study the relationships between toxic substances and human health effects.

Case Studies in Environmental Medicine are a series of self-instructional monographs designed to increase the primary care provider's knowledge of hazardous substances in the environment and aid in the evaluation of potentially exposed patients. Written by physicians in the form of a case history, they cover topics ranging from specific chemicals found at hazardous waste sites to taking an environmental exposure history.

- **Health Education**: ATSDR develops and disseminates to physicians and other health care providers materials on the effects of toxic substances on human health.
- **Exposure Registries** are established for

persons exposed to particular hazardous substances in the environment.

- **Toxicological Profiles** contain data on the health effects of over 200 individual hazardous substances.

- **Applied Research**: ATSDR conducts or sponsors research on the effects of hazardous substances on human health.

- **Emergency Response**: ATSDR provides health-related support to health care providers, states and local agencies in public health emergencies involving exposure to hazardous substances.

The ATSDR, located in Atlanta, Georgia, funds activities at the New Jersey Department of Health, including health professional and community education, health assessments, and health investigations on human exposure to hazardous waste sites in New Jersey.

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As part of its health education activities, the NJ Department of Health will provide one-hour seminars to groups of ten or more physicians and care providers on hazardous waste site exposures and your patients' health. These seminars are approved for CME and CEU credits, and are provided at your location at no cost. Please call the Physician Education Project at (609) 984-2193 for additional information and scheduling.

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Materials available to Health Care Providers from the New Jersey Department of Health Physician Education Project

For Care Providers:

Environmental Resource Guide for Health Care Professionals: A county-specific manual containing information on hazardous waste sites and resources for health professionals

For Patient Education:

"Am I Exposed to Hazardous Waste?" - factsheet assisting your patients in determining if they live near a hazardous waste site

Environmental Exposures and Your Health - booklet guiding patients through the issues relating to exposures to hazardous materials in the environment and their links to illness

Hazardous Waste Sites and Reproductive Health - booklet on the effects of hazardous waste site contaminants and reproductive health

Please call (609) 984-2193 or fax (609) 984-2192 to order copies. There is no cost, but we request your evaluation of these materials.

Coming Next Issue:

- Focus on: VINELAND CHEMICAL COMPANY and IMPERIAL OIL COMPANY (Marlboro Twp.)
- ARSENIC and Your Patient
- For Your Reference: ASSOCIATION OF OCCUPATIONAL AND ENVIRONMENTAL CLINICS

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