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HEALTH & WELLNESS / LIFESTYLE

What's a Hazardous Waste Anyway?

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Modern Western society is "environmentally dysfunctional," say authors Brooks, Benson, and Gochfeld, in the introduction to Environmental Medicine (Brooks, et al., 1995). Polluted soil, water, and air can negatively affect the health and well-being of people, animals and the earth itself. Mismanaged hazardous wastes can threaten our families, patients, communities, countries, and even the entire globe.

Many environmentally aware people feel that humankind has become disconnected from mother earth with the advances of industrial societies. Today's modern societies are distinguished by a marked rise in production and consumption of goods and services; a shift to manmade synthetics; dependence on nonrenewable resources; and mammoth increases in energy consumption for agriculture, industry, and day-to-day living (Chiras, 1994). Technological advancement and population increases have brought soaring amounts of waste production and fallout. Mother earth has become the repository for this increasing human and technological discard.

American industry produces an estimated 200-250 million metric tones of hazardous waste annually. This equates to nearly one metric ton for every man, woman, and child in the United States (Chiras, 1994). Have you driven through a neighborhood and seen signs prohibiting hazardous materials or wastes? Did you ever wonder what is the difference between plain, toxic, and hazardous wastes, especially when one considers that everything is potentially toxic and hazardous? Certain criteria distinguishes hazardous waste from other wastes. This article presents a relatively simple explanation of how to identify a hazardous waste.

Many communities and even countries have now recognized the potential for environmental and human health catastrophe from mismanaged hazardous wastes. The Love Canal crisis in New York was a community polluted by hazardous waste products from a previously established chemical company. Its citizens suffered injury, death, and financial loss because of hazardous waste. The EPA spent $31 million cleaning up the hazardous and toxic waste in Love Canal. Times Beach, Missouri was another polluted community that nearly became extinct when oils (which were later found to contain cancer causing dioxins) were sprayed on the streets to control dust (Chiras, 1994).

The Environmental Protection Agency (EPA) has identified over 1,700 locations around the country that qualify as hazardous waste sites for Superfund clean-up action. These contaminated locations have the potential to, or already have, injured the environment and life within their proximity. As of 1993, the EPA has suspicion to believe that a total 37,598 potential sites actually exist in the U.S. Even more startling is that worldwide the number may be as high 425,000 polluted and toxic sites from discarded hazardous wastes (Crowell & Moring, 1993).

Communities who choose to reduce the threat of hazardous waste contamination restrict and control transportation through storage, treatment, or disposal of hazardous wastes within their city or township limits. Even if their local industries produce such technological by-products, they require exportation to more permissive communities or sites for storage, treatment, and disposal. So, what's a "hazardous waste"?

The distinction of a "hazardous waste" from other wastes is a legal one. As stated earlier, all things are potentially toxic and therefore hazardous; it's just a matter of dose. The toxicity of a substance is crafted into the definition of a hazardous waste under the Resource Conservation and Recovery Act (RCRA). This is often referred to as the "cradle-to-grave" law. It was designed to regulate hazardous wastes in the U.S. from its point of generation to disposal. The Code of Federal Regulations (CFR) 40 Part 261 provides the definitive lists and characteristics of a hazardous waste (CFR, 1994). For a substance to be considered a "hazardous waste" it must be either "listed" or it must fail a "characteristic test." Identifying lists of hazardous wastes can be found in 40 CFR, Part 261. However, these lists have changed over the years per the authority granted to the EPA to add chemicals and subtract other chemicals under RCRA. The RCRA was passed into law in 1976 and has remained a living document to date.

The first list is found in Part 261.31 and is titled "Hazardous Waste From Non-Specific Sources." This list provides 39 categorical descriptions of waste products from a variety of industrial processes. Generic numbers have been assigned, F001-F039. Examples include:

F001 -- spent halogenated solvents used in degreasing
F006 -- wastewater treatment sludges from electroplating
F037 -- petroleum refinery sludges

These descriptions are fairly brief but do require effort and careful review when looking up waste products from one of the many processes and substances listed.

The second list is found in Part 261.32 and is titled "Hazardous Wastes from Specific Sources." This list names 15 major categories of wastes such as: inorganic pigments; organic chemicals; pesticides; explosives; petroleum refining; and iron and steel. Interestingly, the list identifies veterinary pharmaceutical waste, but not human pharmaceutical waste products.

List number three follows suit in Part 261.33 and is titled "Discarded Commercial Chemical Products, Off-Specification Species, Container Residues, and Spill Residues." This list specifically names approximately 120 chemicals that are by-products of various industrial processes. This list uses a P002-P122 numbering system to identify chemicals. Examples include:

P041 -- phosphoric acid
P095 -- phosgene
P098 -- potassium cyanide
P115 -- sulfuric acid

A variety of family compounds are listed that contain cyanide, benzene, arsenic, copper, mercury, and nickel. Careful screening is needed to identify the specific species of chemical.

The fourth and last list, found in Part 261.33 (F), contains over 300 specific substances. These are classified as "toxic" and identified using "U" numbers. Listed substances include:

U002 -- acetone
U051 -- creosote
U061 -- DDT
U211 -- carbontetrachloride
U220 -- toluene

The "toxic" distinction makes the "U" list the most noted of all the lists. These chemicals are believed to be acutely toxic.

So, if your chemical isn't on one of these lists it may still be considered a hazardous waste. It must now must pass or fail the characteristic tests. This means a sample of the waste must be obtained and laboratory tested for hazardous characteristics. These characteristics may pose a hazard to either the public or the workers who manage waste. If it fails the test, it's 'hazardous waste. Subpart C, "Characteristics of Hazardous Wastes" requires substances be lab analyzed for:

1. Ignitability
2. Corrosivity
3. Reactivity
4. Toxicity

Ignitability is assessed through flash point determination of the liquid form of the substance. A flash point below 140o is threshold for ignitability that determines a waste to be hazardous. The flash point is felt to represent gradations of vapor ignitability. Low flash points mean the substance is easily ignited and represents a potential hazard to workers managing it.

Corrosivity is assessed through "pH" determination. Substances with a pH less than 2 (acids) and greater than 12.5 (bases) are considered corrosives. One test for corrosiveness is to test the rate at which a substance will eat through steel. Rates faster than 6.35 mm/yr. are also considered corrosive and a hazardous waste.

Reactivity refers to the reactive nature of a substance to explode or release toxic gases during the waste management process. Substances like nitroglycerine would be extremely hazardous to handle for those workers managing the waste, regardless of precautions.

Toxicity is assessed by the potential of a substance to be leached into the environment at toxic levels. Toxicity levels have been defined and are available for review through the American Conference of Governmental Hygienists (ACGIH), the National Institute for Occupational Safety and Health (NIOSH), and other registry databases. There are 39 different constituents divided into four major groups that are assessed:

1. Heavy metals
2. Insecticides
3. Herbicides
4. Organic compounds

Hazardous waste management is an ever increasing challenge to modern society. Scientists and policymakers must work together to design safe management practices acceptable to communities and the public at large.

Chiropractic continues to be a strong voice in health related policy and administration. Health issues like hazardous waste and materials should be part of your concern. Being informed makes you a better resource for your patients and a better environmental citizen. The next time you see one of those "Hazardous Materials/Waste Prohibited" signs, you will know what it means. If you don't see them in your community, maybe you should be asking questions. It's only your health at stake.

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