



PATIENT RESOURCES

Endocrine Disrupting Chemicals (EDCs)

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The endocrine system is a network of glands and organs that produce, store, and secrete **hormones**. When functioning normally, the endocrine system works with other systems to regulate your body's healthy development and function throughout life.

Endocrine-disrupting chemicals (EDCs) are substances in the environment (air, soil, or water supply), food sources, personal care products, and manufactured products that interfere with the normal function of your body's endocrine system. Since EDCs come from many different sources, people are exposed in several ways, including the air we breathe, the food we eat, and the water we drink. EDCs also can enter the body through the skin.

Endocrine Connection

EDCs are chemicals or mixtures of chemicals that interfere with the way the body's hormones work. Some EDCs act like "hormone mimics" and trick our body into thinking that they are hormones, while other EDCs block natural hormones from doing their job. Other EDCs can increase or decrease the levels of hormones in our blood by affecting how they are made, broken down, or stored in our body. Finally, other EDCs can change how sensitive our bodies are to different hormones.

EDCs can disrupt many different hormones, which is why they have been linked to numerous adverse human health outcomes including alterations in sperm quality and fertility, abnormalities in sex organs, endometriosis, early puberty, altered nervous system function, immune function, certain cancers, respiratory problems, metabolic issues, **diabetes, obesity, cardiovascular problems**, growth, neurological and learning disabilities, and more.

► **Diagnosis and Prevention**

High EDC exposures during fetal development and childhood can have long-lasting health effects since there are periods where hormones regulate the formation and maturation of organs. Early-life exposures have been

linked to developmental abnormalities and may increase the risk for a variety of diseases later-in-life. Importantly, various EDCs have been found to cross the placenta and become concentrated in the fetus' circulation. Other EDCs can be transferred from mother to infant through breast milk.

Although evidence linking EDCs to adverse health outcomes continues to grow, the cause-and-effect relationship is not yet fully understood. Generally, chronic high exposures pose the highest risk, however, a developing fetus or infant is more vulnerable to lower exposures.

Additionally, a person's genetic predisposition to specific health conditions, as well as additional environmental risk factors can modify how a person is affected by EDCs.

► **Taking Precautions**

Even if some health effects are not fully proven, taking precautions is wise. Become familiar with EDCs to which you and your family may be exposed. Try to avoid unnecessary, preventable exposure to EDC-containing consumer products. The following is a list of precautionary steps that one can take to minimize EDC exposures. These precautions are especially important if you are pregnant or planning a family.

Food and Water

- › Consult local guides regarding which sport fish are safe to consume.
- › Trim fat from meat and the skin from fish and cook using a rack to allow fat to drain.
- › Thoroughly wash fruits and vegetables before consuming them.

- › Don't microwave plastic food containers or use them for storing hot liquids.
- › Avoid plastic containers designated #3, #6, and #7.
- › Reduce consumption of canned and processed foods.
- › Use glass, porcelain, or stainless-steel containers, when possible, especially for hot food and drinks.
- › Prepare more meals at home and emphasize fresh ingredients.
- › Consider using a water filter.
- › If possible, purchase organic produce, meat, and dairy products.
- › Replace older non-stick pans with newer ceramic-coated pans.
- › Eat a diversified diet with plenty of variety.

Exercise and Activity

- › Check air quality in your area [<https://airnow.gov>].
- › Avoid outdoor exercise when pollution levels are high.
- › Avoid exercise near high traffic areas. Choose routes away from busy roads and vehicles

Personal Care

- › Read labels and avoid products containing phthalates.
- › Choose products labeled "Phthalate-Free", "BPA-Free", and "Paraben-Free".
- › Avoid fragrances and opt for cosmetics labeled "no synthetic fragrance", "scented only with essential oils".
- › Wash your hands often, especially before preparing and eating food.
- › Minimize handling of receipts and thermal paper.

Around the Home

- › For those with a submersible pump in their well who notice an oily film or fuel odor in their well water, check to see if the pump has failed and, if so, replace it. Contact your local Department of Public Health for information on how to clean the well.
- › Replace and discard safely old fluorescent bulbs and deteriorating construction materials from older buildings.
- › Minimize burning wood or trash.
- › Use hand-powered or electric lawn care equipment instead of gas-powered alternatives.
- › Forbid smoking indoors and advocate for measures to make public spaces tobacco-free.
- › Clean your floors regularly and remove dust from your home.
- › Plant trees, which filter out airborne gases and particulate matter.

For Children

- › Avoid hand-me-down plastic toys.
- › Use infant formula bottles and toys that are labeled “BPA-Free”.

Transportation

- › Choose transportation options and transit routes that limit time sitting in traffic.
- › Encourage your child’s school to reduce school bus emissions, including reducing idling.

› Sources of Common EDCs

Example of Common EDC Sources:

- Industrial chemicals and pesticides can leach into soil and groundwater, and make their way into the food chain by building up in fish, animals, and people.
- Non-organic produce can have pesticide residues
- Some consumer products contain EDCs or are packaged in containers which can leach EDCs, such as household chemicals, fabrics treated with flame retardants, cosmetics, lotions, products with fragrance, and anti-bacterial soaps
- Processed foods can accumulate traces of EDCs that leach out of materials used in manufacturing, processing, transportation, and storage
- Soy-based products contain phytoestrogens, which are chemicals produced by plants that mimic estrogen
- Household dust can contain EDCs such as lead, flame retardants, and PCBs from weathering construction material or furniture

Common EDCs	Used In
DDT, Chlorpyrifos, Atrazine, 2, 4-D, Glyphosate	Pesticides
Lead, Phthalates, Cadmium	Children's Products
Polychlorinated biphenyls (PCBs) and Dioxins	Industrial Solvents or Lubricants and their Byproducts

Bisphenol A (BPA), Phthalates, Phenol	Plastics and Food Storage Materials
Brominated Flame Retardants, PCBs	Electronics and Building Materials

► Symptoms and Risk Factors

More research is needed, but we know EDCs affect:

Response to psychological stress

- › Neurological and behavioral changes
- › Reduced ability to handle stress

Metabolism

- › Some EDCs have been linked to obesity and type 2 diabetes
- › Some industrial chemicals and flame retardants can interfere with thyroid function

Reproduction

- › Some classes of EDCs (DDT, BPA, phthalates, PCBs, others) can affect reproductive health by mimicking or blocking the effects of male and female sex hormones

Growth and development

- › High exposures to EDCs during gestation can lead to low-birth weight
- › Altered development
- › Disrupted sexual development
- › Weakened immune system

Cancer

- › Exposure to estrogen or androgen mimicking EDCs can promote breast and prostate cancer growth and/or interfere with hormonal cancer therapy
- › Prenatal exposure to some EDCs may alter mammary gland development and increase breast cancer risk later-in-life

AN ENDOCRINE SOCIETY PATIENT RESOURCE

HORMONES AND ENDOCRINE DISRUPTING CHEMICALS

WHAT YOU NEED TO KNOW

The endocrine system is a network of glands and organs that produce, store, and secrete hormones. When functioning normally, the endocrine system acts as a chemical messenger to help maintain the body's health. Endocrine disrupting chemicals (EDCs) are substances in the environment (in soil or water supply), food sources, personal care products, and manufactured products that may interfere with the normal function of your body's endocrine system.

WHAT ARE EDCS
EDCs is a broad category of compounds used in consumer products, agriculture and agriculture, and has been associated with a diverse array of health issues. These non-steroid chemicals or mixtures of chemicals sometimes block, or interfere with the way the body's hormones work.

They have been linked to human health issues related to sperm quality, fertility, abnormality in sex organs, reproductive- and puberty, immune system function, immune function, diabetes, breathing problems, reproductive issues, obesity, heart health, growth, neurological and learning disabilities, and more.

Exposure to EDCs can happen anywhere and anytime in the environment, the food we eat, and the water we drink. EDCs can enter the body through the air and by transfer from mother to fetus during the placenta, or mother to infant through breastfeeding. In women, EDCs in the body.

Examples of EDCs include: **Herpesticides** (A, DDT), **pesticides**, **pesticides**, and **pesticides** such as **organochlorine pesticides (OCPs)**.

COMMON EDCS
Some common EDCs and their uses include the following:

- PESTICIDES**
Example EDC: DDT (Chlorpyrifos, Atrazine, 2,4-D, Diquat)
- CHLORINE-19 PRODUCTS**
Example EDCs: Lead, Phthalates, Cadmium
- INDUSTRIAL SOLVENTS OR LIQUIDS AND THEIR BYPRODUCTS**
Example EDCs: PCBs and Dioxins
- PLASTICS AND FOOD STORAGE MATERIALS**
Example EDCs: BPA, Phthalates, Phenoxy
- ELECTRONICS AND BUILDING MATERIALS**
Example EDCs: Brominated Flame Retardants, PCB
- PERSONAL CARE PRODUCTS, MEDICAL TUBING**
Example EDCs: Paraben, Parabens, UV Filter
- ANTI-BACTERIALS**
Example EDCs: Triclosan
- TEXTILES, CLOTHING**
Example EDCs: Perfluorinated



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