

**Petrochemicals** and their byproducts, such as dioxin, are known to cause an array of serious health problems, including cancers and endocrine disruption. Of the more than 75,000 chemicals registered with the Environmental Protection Agency, only a fraction have gone through complete testing to find out whether they might cause problems for human health. Many that are produced in enormous quantities have never been tested at all. Usually, it takes dramatic episodes of workplace injuries or wildlife poisonings, combined with rigorous scientific proof of harm and public outcry, before the government will act to restrict or ban any chemical. And that is no accident. The current regulatory system allows synthetic chemicals into our lives unless proven beyond doubt to be dangerous.

#### Terms

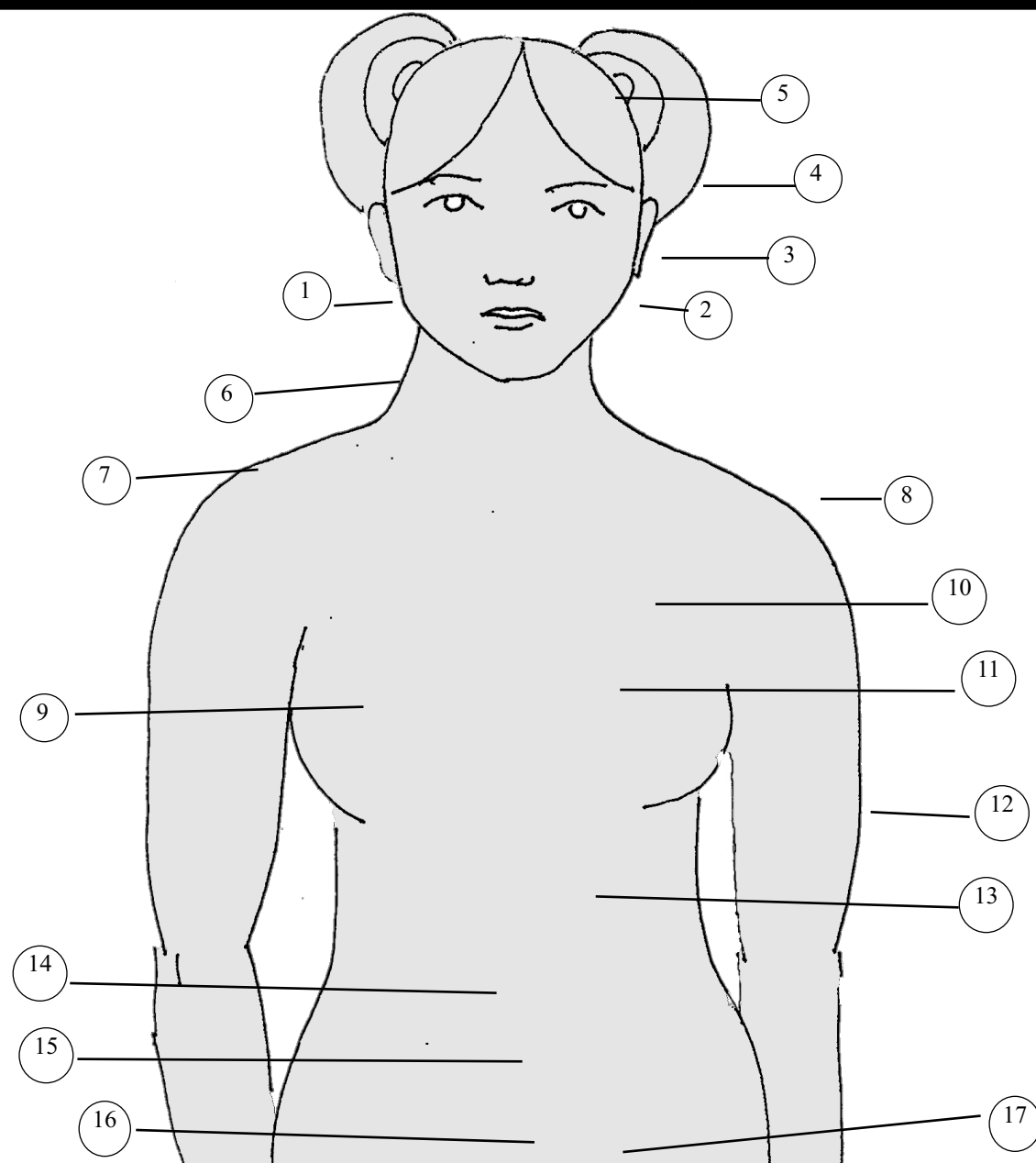
**Dioxins** are not intentionally manufactured. They are unintentionally formed as byproducts of chemical processes involving chlorine, such as the manufacture of pesticides and the bleaching of paper. The manufacture and incineration of plastics such as polyvinyl chloride (PVC, commonly used in consumer product packaging and medical devices) is another major source of dioxin. Two of the most serious health effects of dioxin exposure are cancer and endocrine disruption.

**The endocrine system** is a complex network of glands and hormones that regulate many of the body's functions including growth, development, and maturation, and the way various organs operate. The endocrine glands — including the pituitary, thyroid, adrenal, thymus, pancreas, ovaries, and testes — release carefully-measured amounts of hormones into the bloodstream that act as natural chemical messengers, traveling to different parts of the body in order to control and adjust many life functions.

**An endocrine disruptor** is a chemical that, when absorbed into the body, either mimics or blocks hormones and disrupts the body's normal functions. This disruption can happen through altering normal hormone levels, halting or stimulating the production of hormones, or changing the way hormones travel through the body, thus affecting the functions that these hormones control. Because endocrine disruptors affect the development of the body's vital organs and hormonal systems, infants, children, and developing fetuses are more vulnerable to exposure.

**Exposure to endocrine disruptors** can occur through direct contact with pesticides and other chemicals or through ingestion of contaminated water, food, or air. Dioxin is one known endocrine disruptor and there are others: diethylstilbesterol (the drug DES), PCBs, DDT, and some other pesticides. Many chemicals, particularly pesticides and plasticizers, are suspected endocrine disruptors based on animal studies. Chemicals suspected of acting as endocrine disruptors are found in insecticides, herbicides, fumigants, and fungicides that are used in agriculture as well as in the home. Industrial workers can be exposed to chemicals such as detergents, resins, and plasticizers with endocrine-disrupting properties. Endocrine disruptors also enter the air or water as byproducts of many chemical and manufacturing processes, and when plastics and other materials are burned. Further, National Institute of Health studies have found that endocrine disruptors can leach out of plastics, including the type of plastic used to make hospital intravenous bags (PVC.) Many endocrine disruptors are persistent in the environment and accumulate in fat, so exposures can also come from eating fatty foods and fish from contaminated water. (Visit [www.mindfully.org](http://www.mindfully.org).)

# The True Costs of Petroleum Map: The Body



### ---LEGEND---

**There is a legend that modern body care products are keeping us “cleaner” and improving our health. There is a legend that the daily stew of chemicals that we come in contact with doesn't affect our bodies. In fact, these petrochemicals are linked to increases in cancers, endocrine disruption, asthma and environmental illness.**

**There is also a legend that the government is protecting us from harm. In fact, the majority of the more than 2,000 chemicals that come onto the market every year are not subjected to even the simplest tests to determine toxicity. In addition, the ways that these chemicals react with each other and with our bodies is even less studied. Instead, the Precautionary Principle can be used to create policies that protect us and the environment from harm.**

**Phthalates** are a particular group of petrochemicals that are known to have endocrine disrupting properties. Phthalates are used to make rigid plastics soft and pliable and are also commonly added to cosmetics. Phthalates are linked to elevated rates of endocrine disruption and are possibly carcinogenic. A Centers for Disease Control report found alarming rates of phthalates in urine and blood samples. Some common phthalates and the items in which they are used include:

Di-ethyl phthalate (DEP): Toothbrushes, auto parts, tools, toys, food packaging, insecticides, mosquito repellents, aspirin, and volatile components of cosmetics – perfumes, nail polishes, and hair sprays.

Di-n-butyl phthalate (DBP): Cellulose plastics, solvents for dyes, solvents for cosmetics (i.e., nail polish), food wrap, perfumes, skin emollients, hair spray, insect repellents.

Benzyl butyl phthalate: Plasticizers in adhesives, PVC flooring, wood finishes, tampon packaging.

**What is the Precautionary Principle?** The majority of the more than 2,000 chemicals that come onto the market every year are not subjected to even the simplest tests to determine toxicity. In addition, the ways that these chemicals react with each other and with our bodies is even less studied. A better way to create public policy is by using the **Precautionary Principle** as a guide to protect us and the environment from harm:

When an activity (or product) raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause-and-effect relationships are not fully established scientifically. In this context, the proponents of an activity (the product manufacturer), rather than the public, should bear the burden of proof (to prove that the product is safe). The process of applying the Precautionary Principle must be open, informed and democratic and must include potentially affected parties (the public and consumers).

#### Map Key

##### 1. Petrochemicals and Food:

**Pesticides** — One way we ingest petrochemicals in food is from pesticides. Many widely used pesticides are classified by the EPA as probable or possible causes of cancer in humans; and many are known to cause damage to the nervous, reproductive and immune systems in laboratory animals. EPA pesticide regulations do not take into consideration potential chronic health effects from low-level exposures that do not cause immediate and obvious harm. The EPA also ignores potential combined effects from exposure to more than one chemical at a time. Current regulations do not consider exposure to vulnerable populations such as children and the immune-compromised. Dairy products, apples, bananas, broccoli, cantaloupes, and carrots have among the highest rates of petrochemical residues and are foods commonly consumed by children, who are particularly sensitive to pesticides. The alternative? Support organic, pesticide-free food production.

**Plastics** — An advertisement for the American Plastic Council calls plastic “an important part of your healthy diet,” noting, “you could think of them as the sixth basic food group.” Yum! How true this is when you take into account the fact that plastics tend to migrate into food, especially meats, cheeses, and other fatty foods. More migration occurs if food is heated or microwaved in plastic containers. The safest bet is to avoid food sold or stored in plastic, especially plastic wraps, PVC, and polystyrene foam. Source: [www.mindfully.org](http://www.mindfully.org).

**Meat and Dairy Products** — Chemicals from the petroleum manufacturing process enter our bodies through the foods we eat, especially meat and dairy products. Chemicals such as pesticides and antibiotics tend to accumulate in milk and in animal flesh. Another way in which we ingest petrochemicals and dioxins is less obvious: The manufacture and incineration of PVC (polyvinylchloride, #3) creates and disperses dioxins into the air and water. From there, they enter the food chain and accumulate in the fatty tissues of animals.

**Food as defense** – Diets rich in fresh fruits and vegetables, which contain high levels of vitamins and anti-oxidants, help the body combat the effects of petrochemicals. Help counterbalance the effects of petroleum in your body and world by visiting local farmers' markets to get your recommended 5 servings a day of fresh fruits and veggies. Plus, consider becoming a vegan and growing your own pesticide-free food instead!

**2. Toothpaste** — Many toothpastes include ingredients made from petroleum, such as artificial colors and mineral oil. Baking soda or natural toothpaste is a better choice.

**3. Cosmetics** — Petrochemicals are very prevalent in cosmetics. Examples include lip gloss, which is commonly made from petroleum oil, and nail polish, which contains petroleum-derived solvents such as toluene. Many cosmetics on the market contain harmful phthalates. The Environmental Working Group's interactive website lists cosmetics by brand name and the hazardous ingredients contained in them. Visit it at [www.ewg.org/cosmetics](http://www.ewg.org/cosmetics).

**4. Hair Products** – Hair mousse, gels, and sprays commonly contain endocrine-disrupting phthalates. Synthetic hair dyes include petroleum-derived coloring chemicals as well as other harmful ingredients such as ammonia and lead. Synthetic hair dyes are known to penetrate skin and to cause cancer in laboratory animals. To avoid warning labels about carcinogenic effects, manufacturers slightly reformulate their products by removing the carcinogen and replacing it, quite legally, with another chemical that is just as dangerous. Henna, derived from plants, is a safe alternative that has been used for centuries in Egypt and the Middle East.

**5. Learning Disabilities** — In a study in Mexico, pesticide-exposed children were less proficient at catching a ball, which is reflective of poor eye-hand coordination. They had lower stamina levels, more trouble remembering things, and were less able to draw accurate drawings of people. This study is one of many documenting the negative effects of petroleum products on the brain. However the overall effects of exposure to pesticides, plastics, and air pollution remain largely unstudied.

**6. Perfume and Aftershave** — These usually consist of a combination of chemicals, solvents, and natural essential oils in a base of alcohol, which can include toluene, ketone, and other hazardous substances. Approximately 95% of the ingredients in perfumes are derived from petrochemicals. Little scientific study has been done on the health effects of scented products, but generally they are recognized as highly allergenic and are notorious for causing skin irritation, headaches, and nausea. Try natural, essential oils instead.

**7. Soaps** — Many soaps contain petroleum-derived synthetic fragrances, artificial colors, and mineral oil that may cause skin rashes and other allergic reactions. Instead, look for vegetable oil-based soaps without artificial fragrances.

**8. Lotions, Sunscreens, and Body Care Products** – Many body care products contain phthalates such as DEHP and DBP. In animals, both DEHP and DBP are toxic to the liver, kidneys, testes, and the nervous system. DBP is used extensively in perfumes, nail polishes, lotions, and hair sprays. High levels of exposure have been found in women of reproductive age. Ironically, some sunblocks contain suspected carcinogens, including diethanolamine and related ingredients (DEA, TEA), padimate-o, and titanium dioxide. Other ingredients are suspected endocrine disruptors: benzophenone (oxybenzone), homosalate, octyl-methoxycinnamate (octinoxate), and the parabens (methyl-, ethyl-, butyl-, propyl-). Moreover, sunscreens can contain chemicals associated with skin irritation and rashes, including avobenzene (parsol 1789), benzophenone, octyl-methoxycinnamate, and PABA (para-aminobenzoic acid). Not only are these chemicals potentially bad for you, they're bad for the environment. Diethanolamine has been found in waterways around the country, posing a threat to animals and humans. According to the National Toxicology Program, benzophenone has been found in surface water, groundwater, soil, and air, and may affect the liver and bone marrow of animals ingesting large amounts of contaminated water. This and other endocrine disruptors in sunblocks can also enter the water system when we swim or bathe, eventually winding up in fish, amphibians, and marine wildlife, and posing a threat to the animals' reproductive cycles. Source: Grist Magazine, Environmental Working Group.

**9. Breast milk** — If breast milk from American women were bottled and sold commercially, it would be banned by the US Food and Drug Administration because it is contaminated with more than 100 industrial chemicals, including dioxins and pesticides. Despite the presence of toxic chemicals in human milk, breast feeding is a highly desirable practice. Breast feeding gives an infant immunity against gastrointestinal diseases and respiratory infections; it may also offer protection against food allergies. Furthermore, the alternatives (prepared formulas) are even less healthy. Source: Rachel's Hazardous Waste News #193.

**10. Breast Cancer** — Over the last 20 years, breast cancer alone has claimed more American lives than the Vietnam war, the Korean war, World War I, and World War II combined. Cancer mortality has risen from 5% of American deaths a hundred years ago to 25% today. Overall lifetime cancer rates for Americans have risen from one in four people in 1960 to 1 in 2 for men and more than 1 in 3 for women. When so many petroleum products and derivatives are known carcinogens, it's hard not to see a connection.

**11. Lungs** — Every year over 5,500 people in the US die from asthma. Children are particularly susceptible. Asthma, like many environmental health problems, disproportionately affects minority and low-income communities; rates are more than 21% higher among African-Americans than among whites. And the incidence of the disease is doubling every ten to fifteen years. This rise can be traced to increased environmental pollution, from both household sources and industrial and motor vehicle pollution. An extensive body of studies has found strong associations between asthma and other respiratory health concerns and direct exposure to motor vehicle pollution resulting from residing or attending school near major roads with high traffic levels. Also implicated are the plastics and other petroleum products used in homes and buildings, such as carpeting and insulation. The "outgassing" of plastics used in building products creates serious indoor air quality issues which are known to cause increases in asthma and other serious allergic reactions. Source: Environmental Health Perspectives.

**12. Clothing** — Clothing made from synthetic fibers such as acrylic, nylon, and polyester, and coated with formaldehyde finishes, will continuously give off minute plastic vapors as the fabric is warmed against your skins (outgas), causing unknown effects as well as known ones: commonly allergies and breathing troubles. Cotton grown for clothing uses enormous amounts of pesticides and petrochemicals and may be just as hazardous to wear as synthetics. Try picking clothing made from organic cotton, hemp, or tencel, as well as purchasing reused clothing, which may outgas less.

**13. Body Fat** — Petrochemicals tend to accumulate in body fat. The most notorious petrochemical in body fat is polystyrene; studies have shown that virtually all people in the United States carry polystyrene in their body fat. The International Agency for the Research on Cancer has classified styrene as possibly carcinogenic to humans.

**14. Fetal Development** — The petrochemicals that are so pervasive in our environment have especially adverse effects on rapidly growing fetuses and infants. Laboratory animals exposed prenatally to one form of dioxin displayed physical deformities, retarded growth, and changes in physiology. Adverse effects on learning and behavior were also evident.

**15. Hormone Function and Endocrine Disruption** — Many plastics and other petroleum products mimic the effects of natural hormones in the body, disrupting normal hormone function. Many of the most studied synthetic hormone disruptors are known as xenoestrogens, because they mimic the effects of estrogen in the body. Xenoestrogens come from factories, not food. But they wind up in food because they get into the environment, where toxic organic pollutants like DDT can persist for more than 50 years. Even pesticides banned in the US can wind their way back to our homes by way of imported fruits, vegetables, and flowers. Xenoestrogens can also be encountered in items of everyday use - gasoline, weed killers, even some plastics.

**16. Tampons and Sanitary Pads** – Commonly made from synthetic fibers derived from petroleum, tampons and pads can outgas harmful chemicals and because they're also usually bleached, they contain dioxins. Traces of the dioxin TCDD – possibly the most toxic chemical ever produced - has been found in tampons and is a known carcinogen. It's also known to cause birth defects and sterility as well as liver damage and suppression of the immune system. Plus, it can be absorbed easily through the skin. The alternative: For thousands of years women have used rags. Today's alternatives also include organic, bleach-free cotton tampons and natural latex "Keepers." Source: [Home Safe Home](http://www.ewg.org)

**17. Low and Poor Sperm Quality in Men** — Men exposed to pesticides commonly used on crops are far more likely to have defective sperm and low sperm counts than men who are not exposed. This is even true for men who do not work on or live next to farms but are likely exposed to pesticides in drinking water. Source: Environmental Health Perspectives.

#### Sources / Resources

*Rachel's Environment and Health News*, [www.rachel.org](http://www.rachel.org)  
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Health Care Without Harm, [www.hcwh.org](http://www.hcwh.org)  
[Home Safe Home](http://www.ewg.org), Debra Lynn Dadd, (Penguin Putnam, 1997)  
Women's Cancer Resource Center, [www.wcrc.org](http://www.wcrc.org)  
[www.mindfully.org](http://www.mindfully.org) (extensive information on health and toxics)

As of July, 2003



# The True Costs of Petroleum

## Body Map



### Environment — Community — Justice

The Ecology Center provides practical information, tools, and services to create a more just and sustainable world.

Our focus on *The True Costs of Petroleum* aims to expose the many ways in which petroleum and petroleum products affect us and the environment. Collect all four of the maps: World, Community, House, and Body.

For more information about the issues described in the maps, and resources for alternatives, please stop by or call our Environmental Resource Center, open Tuesday through Saturday, 11 am - 6 pm.



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