

# Chemicals are everywhere: impact on reproduction

[Science](#), [Chemistry](#)



\n[[toc title="Table of Contents"](#)]\n

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1. [Chemicals in Soil](#) \n \t

2. [Chemicals in Air](#) \n \t

3. [Chemicals in Plastic](#) \n

\n[/toc]\n \n

Everything from our plastic water bottles and cosmetics to our non-stick frying pans contains chemicals that accumulate in our bodies. From furniture to food containers, our lives are filled with chemicals, many of which may be hazardous to our health. Some of these substances can have negative effects on the reproductive health of both male and female workers who are exposed to them. Human reproduction is any form of sexual reproduction resulting in human fertilization, typically involving sexual intercourse between a man and a woman. During sexual intercourse, the interaction between the male and female reproductive systems results in fertilization of the woman's ovum by the man's sperm. Reproductive toxicology is the term used to describe the discipline that investigates which compounds are toxic for reproduction and the mechanism(s) of this toxicity. Scientific indicators of declining reproductive function and increasing rates of reproductive illnesses have been observed since the mid-20th century. Everyday chemicals have also been associated with difficulty in conceiving & maintaining pregnancy. Exposure to certain hazardous substances or hazardous work conditions can affect reproductive health before or after conception takes place. Some occupational hazards, particularly certain chemicals and radiation, can seriously affect a developing embryo or foetus. Everyday chemicals known to

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be hazardous to human sperm are carbaryl (insecticide), carbon disulphide, DBCP (fungicide), lead and toluenediamine (found in some azo dye).

Certain authors consider that 90% of congenital malformations are caused by environmental factors. In Europe, over one half of women work during their pregnancies. In addition, the age of first pregnancy is increasingly late. At European level, in January 2004 the European Agency for Safety and Health at Work published a report examining gender differences with respect to injuries and disease of occupational origin, gaps in knowledge, and implications for improving risk prevention. That report notes, for example, that women are under-represented in occupational safety and health decision-taking and that physiological differences are not always taken into account. In France, there are about 800, 000 births every year, and in 8% of cases the babies need to be cared for in hospital because they are premature or because they are suffering from a handicap. 1% of the babies have serious neurodevelopmental and psychiatric handicaps. Based on these few studies, the impact of occupational activity on reproduction is not very well known, and chemicals are not the only risk factors to be taken into account. Finally, developing a programme of studies could make it possible to meet the considerable expectations of physicians for more knowledge on the field. The scientific community in the twentieth century showed growing interest in the risk to reproductive function of occupational exposure to chemicals, aware that increasing numbers of couples were having fertility problems, especially in industrialized countries. It has in fact been estimated that 10-15% of couples are sterile. In 39% of these cases the problem

involves the woman, in 20% the man and in 26% both; there are also 15% of cases where no specific clinical disorder can be identified as the cause.

## **Chemicals in Soil**

There are three common ways that humans are exposed to soil materials: (i) ingestion, (ii) respiration and (iii) skin absorption or penetration. Ingestion can occur deliberately, known as geophagy, or incidentally, such as during hand to mouth contact (particularly children) or when raw fruits or vegetables are consumed without adequate washing. Ingestion of soil is especially common in children and pregnant women. Ingested soil can lead to exposure to heavy metals, as well as organic chemicals or pathogens. Respiration involves inhaling soil materials while absorption or penetration of the skin can expose an individual to pathogens and soil chemicals. The soil may be contaminated either naturally or through human activities with chemical elements and substances that are in toxic amounts when ingested or inhaled.

Lead is probably the single largest soil contaminant worldwide because it has been widely introduced into soil from human sources such as leaded petrol (gasoline), lead-based paint, lead mining and smelting, and other industrial activities. The effects of lead, especially on reproduction, are well documented. In humans, only lead has been reported to have male reproductive effects while data concerning cadmium, mercury, nickel, chromium, vanadium and aluminum suggest no effect. In most of the laboratory studies, animals were treated with high parenteral doses of the

metals for short periods of time. Humans, however, are usually exposed to low level doses for prolonged periods of time.

Hence, discrepancies in dose, duration and route of exposure drastically complicate extrapolation of laboratory data to man. For women, the potential health disorders caused by chronic or acute heavy metals toxicity include immunodeficiency, endometriosis and spontaneous abortions, as well as pre-term deliveries. Stillbirths and hypotrophy have also been reported.

### **Chemicals in Air**

Toxic, or hazardous air pollutants cause or are suspected of causing cancer, birth defects, or other serious harms. They can be gases, like hydrogen chloride, benzene or toluene, dioxin, or compounds like asbestos, or elements such as cadmium, mercury, and chromium. The U. S.

Environmental Protection Agency has classified 187 pollutants as hazardous.

Pesticides can contribute to air pollution. Pesticide drift occurs when pesticides suspended in the air as particles are carried by wind to other areas, potentially contaminating them. Pesticides that are applied to crops can volatilize and may be blown by winds into nearby areas, potentially posing a threat to humans.

### **Chemicals in Plastic**

One ingredient of plastic is phthalates. These are found in vinyl flooring, detergents, automotive plastics, soap, shampoo, deodorants, fragrances, hair spray, nail polish, plastic bags, food packaging, garden hoses, inflatable toys, blood-storage bags, and intravenous medical tubing. The constant exposure to plastics has raised some concerns against human health,

particularly when it comes to phthalates. These compounds have endocrine-disrupting properties, as they have the ability to bind molecular targets in the body and interfere with hormonal function and quantity. The main use of phthalates is to give flexibility to polyvinyl chloride (PVC) polymers.

Phthalates are found in a variety of industrial and consumer products, and as they are not covalently bound to the plastic, phthalates contaminate the environment from which human exposure occurs. Studies in human and animal populations suggest a correlation between phthalate exposure and adverse health outcomes, particularly at the reproductive. Exposure to phthalates can lead to incomplete testicular descent in foetuses. Another common ingredient in plastic is bisphenol A. It is commonly found in reusable water bottles and resins lining some food cans and dental sealants. It can change the course of fetal development in a way that increases your risk of breast cancer.