



# Reproductive health hazards

The sexual activity of men and women and the conception and development of healthy children depends on the normal functioning of three body systems: the nervous system, the hormonal system and the sex organs (i.e. testicles, ovaries). All of these systems can be affected by agents found in the workplace.

## What are reproductive health hazards?

Reproductive hazards are agents which affect men and women's ability to have children. They can also affect the development of the foetus or baby, when the mother is exposed during pregnancy or while breastfeeding.

Workplace reproductive hazards can be (also see table over the page):

- **Chemical agents** commonly found in industrial workplaces (for example metals such as lead and cadmium and solvents such as glycol ether, benzene or toluene), in agricultural work (for example pesticides) and in all sorts of laboratory work.
- **Physical agents** such as radiation (for example ionising radiation such as X-rays used in hospitals and industrial processes such as food irradiation).

- **Biological agents** found in laboratories and health and child care workplaces, particularly viruses such as rubella, mumps, hepatitis B or cytomegalovirus.
- **Work practices** which are physically stressful or which are difficult and potentially unsafe for pregnant workers (for example, climbing ladders, standing all day and excessive bending during late pregnancy).

## Who can be affected?

Sexual function in either men or women may be affected even if they are not planning to have children. All workers are potentially affected and reproductive hazards should be controlled like any other workplace hazard. That is, hazardous agents should be removed or exposure to them should be controlled so that the workplace is safe for all workers.

## What are the effects?

### For men

In men, sperm are continuously produced by cells in the testicle. Workplace hazards may cause reproductive problems in a number of possible ways:

- The cells and tissue in the testicle may be damaged so that sperm cannot be produced at all or not in large enough numbers for fertility.
- The hormones necessary for sperm production and sexual function may be decreased.
- The sperm themselves may be damaged.
- The nerves on which orgasm and ejaculation depend may be damaged.



## Some reproductive hazards in the workplace

<b>Physical Agents, Ergonomics, Shift work</b>	Ionizing radiation (X-rays, Gamma-rays) Electromagnetic radiation (microwaves, radio frequency radiation) Ultrasound Ergonomics stressors (long working hours, heavy and frequent lifts) Shift work
<b>Chemical Agents</b>	Anaesthetic gases and liquids Medicines and drugs Aniline (dye) Organic solvents (benzene, hexane, glycol ether, toluene) Butadiene (rubber manufacture) Carbon disulfide (synthetic textile manufacture) Chloroprene (rubber manufacture) Ethylene dibromide (fumigant, antiknock in petrol) Ethylene oxide (sterilant used in hospitals and sterile packaging) Heavy metals (lead, mercury) Pesticides Phthalates (plastics manufacture) Styrene (plastics/fiberglass industry)
<b>Biological Agents</b>	Rubella Cytomegalovirus (CMV) Hepatitis B Mumps Toxoplasmosis

Agents which damage sperm are particularly worrying because many do so by damaging the genetic material carried in the sperm (that is, they cause mutations).

If this occurs and that sperm fertilises an egg, then an abnormal pregnancy may occur. Miscarriage early in pregnancy, death of the foetus later in pregnancy or the birth of a child with some sort of abnormality are all possible.

The three possible consequences for men from exposure to reproductive hazards are:

- Impaired sexual activity (For example, loss of interest in sex, impotence).
- Infertility (i.e. inability to father children despite normal sexual activity).
- Fathering an abnormal pregnancy and possibly a child born with abnormalities.

### For women

In women, reproductive hazards may adversely affect sexual activity or fertility through effects on hormones, the nervous system or the ovary. Just as chemicals can affect orgasm and interest in sex in men, so they can affect women by interfering with nerve and/or hormonal function. Ova (eggs), like sperm, are susceptible to injury, particularly mutation.

Women are born with a fixed number of ova, one of which develops each month under the influence of female hormones and is released by the ovary in mid-cycle. If an agent interferes with these hormones, the cells of the ovary or the developing egg, the men-

strual cycle may become irregular (for example bleeding too early, too long, too late or missed periods). If this occurs, infertility is likely because release of the egg may not occur, or even if it does, the womb may not be 'ready' to receive the fertilised egg. If immature ova are damaged, the supply of eggs will be depleted which may cause early menopause.

Women who smoke tend to reach menopause a couple of years before non-smokers, and chemical exposures in the workplace, if high enough, may have similar effects. The possible consequences of exposure to reproductive hazards for women are:

- impaired sexual activity
- infertility
- irregular periods
- an abnormal pregnancy
- early menopause

The foetus may be affected at all stages of development, from the moment of conception to birth.

During the first few weeks, the embryo implants itself in the uterus and the placenta (the organ through which nutrients pass from the mother to the foetus) develops.

Agents can affect the development of the placenta. This may affect the growth of the foetus and if severe enough, may cause miscarriage.

During the first 8-9 weeks after conception, the major organs of the foetus develop (heart, brain, limbs, nervous system). Agents which interfere with the formation of the foetal organs cause birth defects or congenital malformations (for example, heart defects, cleft palate, limb defects). These agents are known as

*teratogens*. The foetus is particularly susceptible to damage during this period; this is a problem because most women do not realise they are pregnant until about 6-8 weeks.

The foetus is also susceptible later in pregnancy. The brain, for example, continues to develop throughout the whole of the pregnancy and even after birth. So does the body's system for defending itself against infection (the immune system) and for getting rid of toxic substances (the liver and kidney).

The foetus is also particularly susceptible to agents causing mutation (known as *mutagens*). Exposure to mutagens may cause cancer in infancy or childhood and may also impair reproductive function later in life. Possible effects on the foetus are:

- foetal death and miscarriage
- impaired growth
- birth defects
- developmental abnormalities (e.g. learning and behavioural difficulties after birth)
- childhood cancer

## The consequences of uncertainty about reproductive effects

Hundreds of new chemicals are introduced onto the market each year, but only a limited number will be investigated as to whether they have adverse effects on reproductive health. For workers, this has potential consequences. It may mean risking their health and their future children.

Most studies of human reproductive effects face a fundamental problem: in many workplaces "exposure" is a general term for contact with all the chemical,

physical and physiological stress factors in the environment. Reproductive effects are a question of the combined effects of all these conditions and factors.

It is difficult to identify and attribute a specific reproduction problem to a single factor. There is no doubt that the foetus is particularly vulnerable to damage. Both sperm and ova (eggs) are also susceptible to damage and this may be transmitted to the foetus.

Until chemical agents are adequately tested prior to their introduction to the workplace, all chemicals should be assumed to be potentially dangerous and exposure should be controlled as far as possible at work.

It is essential that policies with special provision for parents during their conception period are used as an interim measure to prevent injury to the foetus. However, this should not be taken to discriminate against workers who choose to have children. They should be provided with alternative work for that time period, without loss of pay or seniority.

However, these policies do not protect workers in the same way as testing agents before they are introduced to workplaces. As such, they should be seen as only partial solutions to reproduction hazard problems.

## References

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2. Westerholm, P. *Pregnancy and the Working Environment*. Joint Industrial Safety Council, Sweden, 1994
3. Winder, C. Protective legislation and discrimination in employment in the Australian lead processing industry. *Journal of Occupational Health and Safety Australia New Zealand*, 1988, 5(2): 121-128.

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