

## TRAINING FOR THE HEALTH SECTOR

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World Health  
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# OCCUPATIONAL RISKS AND CHILDREN'S HEALTH

**Children's Health and the Environment  
Global Occupational Health Programme  
WHO Training Package for the Health Sector  
World Health Organization**

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<<NOTE TO USER: This is a large set of slides from which the presenter should select the most relevant ones to use in a specific presentation. These slides cover many facets of the problem. Present only those slides that apply most directly to the local situation in the region. It is very useful if you present regional/local examples of child labour and solutions and discuss local actions.>>

## LEARNING OBJECTIVES

After this presentation, trainees will be able:

- ❖ To understand how occupational risks can affect children's health
- ❖ To develop preventive strategies for managing occupational risks that can potentially affect children's health
- ❖ To provide advice to current and future parents about how to avoid and deal with occupational risks that can affect their children

After this presentation, you will be able to:

- Explain how children's health can be harmed as a result of workplace exposures.
- Suggest several aspects of protecting children from occupational risks, namely:
  - parents' reproductive health
  - prenatal health
  - children's health
- Give advice to future and current parents on how to avoid work-related reproductive hazards and how protect their children from health risks arising from the workplace.
- Special emphasis will be put on the particular situation of child labour – as it requires different interventions.

## EXPOSURE TO OCCUPATIONAL RISKS DURING THE PHASES OF CHILDREN'S DEVELOPMENT

- ❖ **Before birth** (before conception and during pregnancy) – parental exposures to mutagens and teratogens, neurotoxicants, psychological and mechanical risks
- ❖ **Infancy** – take-home exposure, home work
- ❖ **Childhood** – take-home exposure, home work, child labour
- ❖ **Adolescence** – home work, vocational training, apprenticeship, work

Most children do not work, however health risks from the workplace can affect their health and development in a number of ways.

Exposure of children to occupational risks can occur at any stage of their life: during reproductive age before conception; during early life before birth through parental exposure; in the situation of child labour (4 to 14 years old); or even when adolescents are early incorporated to the work force and exposed to the worse forms of child work (14 to 18 years old).

The exposure of future mothers and fathers to certain risks at the workplace can have a serious impact on the health of their unborn child. Occupational exposures before birth can occur before conception and during the whole period of pregnancy.

During the period of infancy, children can be also exposed to different hazards related to work. Parents could bring toxic hazards home through contaminated working clothes or shoes (the so-called "take-home exposures"), or they may expose their children to environmental hazards when they work at home. Activities such as work on home-made handcrafts or car mechanicals or those performed by the family in the rural areas (growing vegetables or taking care of animals) are usually undertaken with the participation of the whole family.

The most direct form of occupational exposure for children is child labour. Child labour which can damage health is prohibited by a special ILO international convention (see upcoming slides on child labour).

In many countries, adolescents from 14 years of age and on can be formally incorporated to the work force. They can still be exposed to risks at the workplace which can harm their health and development with life-long consequences, if they are not trained adequately or if they are working under the worse forms of child labour conditions.

Adolescents start learning working skills and preparing for their future working life at technical schools, universities and during apprenticeships. The educational institutions and trainers have the responsibility to be informed about the special hazards that threaten the health of young girls and boys and educate them to assure their healthy development and their becoming healthy and productive adults. Therefore it is important that together with the work skills that the adolescents are taught, they also learn about safety measures to adequately protect themselves from occupational risks.

There are strict limitations on the work adolescents are allowed to perform: the weight they can hold; the working hours and resting time they are entitled to; have to be respected and are different from those of adults. Adolescents should not be exposed to situations where attention has to be held for a long time; they can not drive heavy machines (e.g. tractors); nor be in contact with big animals (e.g. horses, cows). There is "tolerance zero" for adolescents to work in contact with dangerous chemicals.

We will now explore how occupational risks can affect the health of children during the different stages of their life.

## **GENDER AND EXPOSURE TO OCCUPATIONAL RISKS**

- ❖ **Girls** may start to be active in family tasks since very early in life and may undertake activities that demand the physiological and physical skills of an adult
  
- ❖ In rural areas, young girls and adolescents have a double role:
  - They often help with the home activities (e.g. cleaning, cooking, washing, caring for smaller children and others)
  - They may also work in the family farm, growing vegetables and raising small animals
  
- ❖ During reproductive age, women may be exposed to hazards that can affect the outcomes of pregnancy and the health of their offspring

<<READ SLIDE>>

## GENDER AND EXPOSURE TO OCCUPATIONAL RISKS

- ❖ **Boys** may be exposed to occupational risks since early in life, while helping the father during the weekends or while working as apprentices
- ❖ Boys may be involved in hazardous work, such as repairing cars, recycling batteries, applying pesticides or scavenging
- ❖ Young men may
  - ❖ be exposed to toxic chemicals that can affect the quality of their sperm
  - ❖ bring home workplace toxicants and expose their family members (e.g. pregnant wife, small children)

<<READ SLIDE>>



## OCCUPATIONAL EXPOSURE BEFORE CONCEPTION

### Future fathers

#### Decreased sperm count

*estrogens, heat stress, lead, ionizing radiation, carbon disulfide, dibromochloropropane, pesticides*

#### Decreased sexual drive

*chloroprene, stress*

#### Changes in genetic material (birth defects)

*mutagens – carbon dioxide, ethylene dichloride, vinyl chloride, ionizing radiation, pesticides*

### Future mothers

#### Menstrual disorders

*ionizing radiation, shift work, pesticides*

#### Reduced fertility or sterility

*arsenic, benzene, carbon disulfide, carbon monoxide, epichlorohydrin, ethylene dibromide, lead, manganese, mercury, phosphorus, trichloroethylene, vinyl chloride, pesticides*

#### Changes in genetic material (birth defects, miscarriages)

*antimony, arsenic, cadmium, carbon disulfide, carbon dioxide, chlorinated hydrocarbons, ethylene compounds, lead, mercury, methyl-ethyl ketone, nitrous oxides, trichloroethylene, vinyl chloride, pesticides*

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Future parents can be exposed at their workplaces to many occupational health risks that can affect their ability to have children or the health of their future children.

Both men and women can be affected by reproductive occupational health risks.

-Exposures to some chemicals or to stressful conditions can cause both male and female workers to experience a decrease in their desire or ability to have sex. For example, chemicals which have depressant effects, such as certain solvents, may suppress the libido (sex drive).

-Occupational exposures can also cause menstrual problems, which may prevent ovulation from taking place. Stress, working on shifts, or exposure to certain organic solvents can disrupt the normal menstrual cycle, which in turn can affect fertility.

-Another possible effect of exposure to certain occupational hazards is their ability to cause direct damage to the germ cells (sperm and eggs). Radiation and certain chemicals can cause decreased fertility or even sterility. Occupational risks can reduce the number of sperm to a level below the minimal necessary for fertilization.

-Certain occupational hazards can cause mutations in genetic material that can be passed on to future generations. Such hazards are called mutagens. Genetic mutations can result in birth defects, stillbirth or miscarriage, depending on the type of damage caused.

#### References:

- Male and Female Reproductive Hazards in the Workplace. *ILO (International Labour Organization)*. Available at [actrav.itcilo.org/actrav-english/telearn/osh/rep/prod.htm](http://actrav.itcilo.org/actrav-english/telearn/osh/rep/prod.htm)
- Reproductive and Developmental Hazards: A Guide for Occupational Health Professionals. *US Navy Environmental Health Centre*, 2001, available at [www-nehc.med.navy.mil/Downloads/Occmed/Reprodev2006.pdf](http://www-nehc.med.navy.mil/Downloads/Occmed/Reprodev2006.pdf)

A significantly elevated risk of childhood leukaemia and non-Hodgkin's lymphoma was found among children of men and women who were occupationally exposed to ionizing radiation before conception.

*References:*

- Gardner MJ et al. Results of case-control study of leukemia and lymphoma among young people near Sellafield nuclear plant in West Cumbria. *BMJ*, 1990;300:423–9.
- Gardner MJ. Paternal occupations of children with leukaemia. *BMJ*, 1992;305:715.
- Perez-Saldivar ML et al. Father's occupational exposure to carcinogenic agents and childhood acute leukemia: a new method to assess exposure (a case-control study). *BMC Cancer*, 2008, 14;8:7.

## EXAMPLE

### Pesticide exposure before or during pregnancy associated with increased risk of:

- ❖ Infertility
- ❖ Genotoxicity
- ❖ Perinatal death
- ❖ Spontaneous abortion
- ❖ Premature birth
- ❖ Fetal growth retardation
- ❖ Low birth weight
- ❖ Congenital malformations
- ❖ Early childhood cancer



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Exposure of either **mother** or **father** to pesticides before conception, or exposure of the mother during pregnancy, has been associated with an increased risk of fetal death, spontaneous abortion and early childhood cancer.

There is increasing evidence that *in utero* exposure increases the risk of growth retardation: a small-for-gestational age baby, low birth weight, reduced length and small head circumference (see photo).

Significant increases in the risk of congenital anomalies have also been reported. These include: eye defects, limb reduction, urogenital defects, hypospadias, cryptorchidism, orofacial clefts, central nervous system defects and heart defects.

#### References:

- Bell. A case-control study of pesticides and fetal death due to congenital anomalies. *Epidemiology*, 2001, 12:148.
- Berkowitz. In utero pesticide exposure, maternal paraoxonase activity, and head circumference. *Environ Health Perspect*, 2004, 112:388.
- Garcia. Parental agricultural work and selected congenital malformations. *Am J Epidemiol* 1999, 149:64.
- Heeren. Agricultural chemical exposures and birth defects in the Eastern Cape Province, South

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