OCCUPATIONAL EXPOSURE TO RADIATION

The Issue

Radiation absorbed by the body causes cell changes that may increase the risk of cancer and hereditary effects. It is therefore important for workers, especially pregnant women, to limit their exposure to radiation in their workplaces.

Background

Radiation is found in many forms. You are exposed to natural background radiation every day from the ground, building materials, air, food, outer space (cosmic rays), and even from elements occurring naturally in your body. A millisievert (mSv) is the unit used to measure the amount of radiation received. The amount of natural background radiation you receive each year in Canada is between 2 and 4 mSv.

Ionizing radiation is the type of radiation to which people who work in the nuclear industry or around x-ray equipment in medical institutions or laboratories are exposed. The maximum amount of radiation people are allowed to receive in the workplace is regulated. The Canadian Nuclear Safety Commission sets a limit of 50 mSv in a single year and 100 mSv over 5 years (a 20 mSv per year average). The limit for a pregnant worker, once pregnancy has been declared, is 4 mSv for the remainder of the pregnancy. Provinces also have workplace radiation protection regulations, which vary from province to province. Radiation exposure limits are also set under the Canada Labour Code.

These various regulations and safe practices ensure that most people who are exposed to workplace radiation receive far below 20 mSv per year. While exposure levels vary by job, the average yearly radiation exposure of a monitored worker is about 0.3 mSv.

Health Risks of Ionizing Radiation

Ionizing radiation has enough energy to damage individual cells. When cells divide the damage is multiplied. That is why radiation exposure is a greater risk during pregnancy, when fetal cells are developing and multiplying. In some cases, cells can repair themselves. When they cannot, there may be a higher risk of cancer or hereditary effects.

Exposure to substantial amounts of radiation during pregnancy may cause birth defects, miscarriage, mental retardation,decrease in IQ, a higher risk of childhood cancer and cancer in adult life, and hereditary effects that can be passed on to future generations. The risk of experiencing the first four effects is not increased if the pregnant woman receives less than 100 mSv during the course of her pregnancy. Hereditary effects and risk of cancer in adult life are also unlikely under 100 mSv, but there is a small risk of childhood cancer above 10 mSv.

The risk of thyroid and breast cancer from radiation exposure is higher for women than for men, while the risk of leukemia is higher for men than for women.

Minimizing Your Risks

Many people who are exposed to radiation in the workplace wear a dosimeter, a badge that measures the accumulated exposure to radiation over a period of time, usually three months. A dosimeter can help ensure that best practices are followed to keep doses as low as can reasonably be achieved. Dosimeters are inexpensive and most employers supply them to workers exposed to radiation. In some jurisdictions dosimeters are required. A dosimeter will allow you monitor your exposure to radiation on a regular basis and will help occupational health specialists assess the risk in case of accidental exposure.

If you are pregnant, or thinking about becoming pregnant, you might also want to consider taking the following steps:

- Find out from your employer whether you should be wearing a personal dosimeter, if it is not already a requirement in your job.
- During the course of your pregnancy, have your dosimeter badge processed every two weeks, instead of at the usual 3 month intervals.
- Discuss ways of reducing your exposure with your employer. Your employer may be able to re-assign some of your tasks or rotate staff.
- For some tasks, using a lead apron may be useful in reducing unnecessary exposure to the fetus.

Government of Canada's Role

As the regulator of the nuclear industry, the Government of Canada sets standards for work-place exposure to radiation and conducts research on risk assessment to ensure that risks are kept to a minimum. It also monitors research and trends internationally to ensure Canadian standards are up-to-date. Currently, the federal government is participating in a worldwide effort to assess radiation risks and pool databases of information.

In addition, Health Canada maintains and monitors a database of all Canadians who have been exposed to workplace radiation, dating back to the 1950s, to monitor trends and developments. It also publishes Safety Codes providing guidance on radiation safety, and carries out radiation safety surveys in federally operated installations. The Government's goal is to keep radiation levels in the workplace as low as can reasonably be achieved, well below the regulatory limits.

Need more info?

For more information about occupational exposure to radiation please contact the Radiation Protection Bureau, at:
(613) 954-6697 or
(613) 941-0143

E-mail enquiries may be directed to the Radiation Protection Bureau's National Dosimetry Service, at:
NDS-SND@hc-sc.gc.ca

You may also wish to visit the Radiation Protection Bureau Web site, at:
www.hc-sc.gc.ca/hecs-sesc/rpb

Or the Canadian Centre for Occupational Health and Safety, at:
http://www.ccohs.ca/

For more information on possible effects to pregnancy visit Motherrisk, at:
http://www.motherisk.org/

Additional It's Your Health articles can be found at:
www.healthcanada.ca/iyh

You can also call (613) 957-2991

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