

Information for Declared Pregnant Radiation Worker

Studies have shown that the embryo/fetus is more sensitive to ionizing radiation than mature, adult cells. To minimize any risk to the fetus, UNMC/Nebraska Medicine has a fetal monitoring program for women who voluntarily declared their pregnancy in writing (“Declared Worker”).

The Nuclear Regulatory Commission (NRC) has put together the following regulatory guides to provide information on radiation exposure:

- **Regulatory Guide 8.13, “Instruction Concerning Prenatal Radiation Exposure”**, provides information to pregnant women, and other personnel, to help them make decisions regarding radiation exposure during pregnancy.
- **Regulatory Guide 8.29, “Instruction Concerning Risks from Occupational Radiation Exposure”**, provides information on the risks of radiation exposure to occupational workers (individuals exposed to radiation in their work).

Both of these documents can easily be found on the internet and are on the UNMC Radiation Safety website.

What is Dose Limit for the Fetus?

To minimize the possibility of any adverse health effects to the fetus from ionizing radiation, the federal and state regulatory agencies have set the radiation limit for Declared Workers to **500 mrem for the entire pregnancy**.

The NRC has reviewed the available scientific literature and concluded that the 500 mrem limit provides an adequate margin of protection for the embryo/fetus. This radiation dose is 10 times less than the annual regulatory limit for radiation workers. The best way to put 500 mrem into perspective is to look at other events where we receive radiation dose:

Event	Whole Body Dose
Whole Body CT	1000-2000 mrem
Radiation Received by an Average American from Natural Background Radiation (e.g., air, water, food)	311 mrem annually
Radiation Worker Limit	5000 mrem annually
Fetal Dose Limit	500 mrem for pregnancy

What are the Potential Adverse Health Effects?

The biggest health concerns to the fetus from radiation exposure are non-cancer effects (such as malformations and mental retardation) and an increase in the incidence of cancer over the childhood (ages 0 to 19).

- **Below a fetal dose of 500 mrem (regulatory limit) non-cancer health effects are NOT detectable.**
- **Below a fetal dose of 500 mrem (regulatory limit) the estimated childhood cancer incidence essentially does not increase.**

Although the health effects to the fetus at low radiation exposures are minimal it only makes sense to minimize you and your child's radiation dose whenever possible.

How is Fetal Dose Measured? - Radiation Badges

The fetal dose limit of 500 mrem includes fetal radiation exposure from external sources (e.g., scattered radiation from patients receiving x-rays, radiation from radioactive material) and from internal sources (e.g., inhaling airborne radioactivity from volatile radioactive material). However, for all workers on campus, the contribution from internal sources is likely to be zero so the external dose is the main concern. The external dose is measured by radiation badges.

In addition to the regular whole body badge you normally wear, you will also be provided with a fetal radiation badge ("fetal badge"). Both your whole body and fetal badge will be exchanged monthly.

- Wear your regular whole body badge where you normally wear that badge. For example, if you are wearing a lead apron, continue to wear the badge on the collar area on the **outside** part of the apron
- Wear your fetal badge on the front part of your abdomen. If you are wearing a lead apron, wear the fetal badge **underneath** the apron.
- After the pregnancy is over, contact the Radiation Safety Office to indicate that you no longer need to be on the Fetal Monitoring Program.
- If you are wearing a lead apron, your fetal badge reading will be less than your collar badge reading. Also, keep in mind that maternal tissue can reduce scattered diagnostic x-rays by up to 70%.



Wear your regular badge on OUTSIDE of apron



Wear Fetal Badge UNDER the apron



The Radiation Safety Officer reviews all radiation badge reports and investigates all fetal radiation badge readings that are 40 mrem in a month. Please contact the Radiation Safety Officer if you have any questions or concerns related to radiation exposure.