

10.0 General Radiation Monitoring of Personnel

10.1 General Policy

It is the general policy of this Medical Center that radiation exposure to all employees shall be kept as low as reasonably achievable (A.L.A.R.A.) regardless of gender. See Section 7.0 for the details of the ALARA Policy. Exposure of either the male or female reproductive systems to ionizing radiation before conception may introduce a degree of reproductive risk. The amount of risk depends upon total radiation dose, dose rate and the time between exposure and conception. Careful adherence to the A.L.A.R.A. Policy for all employees should reduce the reproductive risk to an insignificant level.

After conception, continued adherence to the A.L.A.R.A. Policy should also assure minimal radiation exposure to the embryo/fetus during the gestational period. However, since both the NCRP and Nuclear Regulatory Commission (NRC) have made recommendations concerning the radiation exposure to the embryo/fetus and since the embryo/fetus is a member of a different exposure group (general public vs. occupationally exposed), SUNY-Upstate has developed a specific policy to cover this.

10.1.1 SUNY Upstate Medical University policy concerning occupationally exposed women who are or could be pregnant:

The current recommendations of the National Council on Radiation Protection and Measurements (NCRP)¹ are that as a result of occupational exposure to the mother by ionizing radiation, the total dose to the embryo/fetus during the entire period of gestation not exceed 5 millisieverts (0.5 Rem). Although the mother is considered a radiation worker, the unborn child is held to be a member of the general public and is limited to 1/10 the dose of the occupationally exposed worker. The exposure should be received at a rate as constant as possible over the period of gestation.

Complicating this issue is the Pregnancy Discrimination Act (Amendment of Civil Rights Act of 1964, PL95055, October 31, 1978), which states: "Women affected by pregnancy, childbirth or related medical conditions shall be treated the same for all employee-related purposes as other individuals not so affected, but similar in their ability or inability to work."

Also, a recent (1991) U.S. Supreme Court decision stated that businesses "...cannot bar women of child-bearing age from certain jobs because of potential risk to their fetuses."

10.1.2 POLICY

The employee working with or around radiation sources, should notify² her supervisor or other appropriate representative of the administration as

¹See NCRP Report No. 91, "Recommendations on Limits for Exposure to Ionizing Radiation.

The NCRP (not a regulatory agency) is the primary body in the United State which develops recommendations on radiation safety. Most federal and state regulations are patterned after NCRP guidelines. See Nuclear Regulatory (NRC) Guide 8.13, 1987 in Appendix G for current federal guidelines. The current NY State Public Health Code addressing ionizing radiation makes no recommendation concerning the embryo/fetus.

² Note: This notification is voluntary.

soon as she finds she is pregnant or has the intention of becoming pregnant.

The supervisor or administrator will notify the Radiation Safety Officer (RSO) who will then investigate and document the nature of the employee's work and the radiation levels in the working area. If a reasonable possibility exists that the embryo/fetus could receive a dose of 5 millisieverts (0.5 Rem) before birth, the employee will be given the following options³:

- (a) modification of work assignments to reduce her exposure,
- (b) reassignment of the worker to an area involving less radiation exposure with no loss of pay or other employee benefits.
- (c) continuing her current assignment with no change⁴

The SUNY Upstate Medical University shall have no responsibility for providing specific embryonic or fetal radiation dose precautions until the employee declares her pregnancy status to the supervisor and RSO.

Any employee may obtain embryonic/fetal dose and related radiation safety information at any time through the RSO without declaring pregnancy status.

³Whichever option is chosen by the worker, the RSO shall discuss with the employee the implications and risks of radiation exposure to the embryo/fetus and as deemed necessary, the RSO will provide additional personnel monitoring devices so that rapid dose evaluation can be made.

⁴If appropriate radiation safety precautions are taken, it is extremely unlikely an embryo/fetus would receive a radiation dose approaching 5 millisieverts during gestation. This observation is based on review of the permanent radiation exposure records found in files at the Radiation Safety Office.

10.2 Monitoring of External Radiation Exposure

External radiation exposure can result from the use of radioactive materials emitting x-rays, Gamma rays or Beta particles, and from radiation equipment emitting x- or gamma rays.

One can limit radiation exposure by observing the following basic rules of radiation protection:

1. Limit the time spent in the vicinity of a radiation source.
2. Maintain as much distance as possible between the individual and the radiation source.
3. Use appropriate shielding to reduce the intensity of radiation reaching the individual.

The radiation level to which a person is exposed in the work environment should be known. A properly calibrated survey meter can provide an estimation of the exposure rate for x- and gamma radiation.

10.3 Individuals Who Should Be Monitored.

In general, all individuals occupationally exposed on a regular basis to ionizing radiation or who handle radioactive materials may be issued a whole body monitor. In addition, individuals who may receive doses to the hands from handling radioactive materials on a regular basis may be issued an extremity monitor.

Individuals working only with Tritium, Carbon-14 and similar low energy Beta radiation emitting isotopes will not be issued monitoring devices. Also, those persons working with very small amounts of radioactive materials may not require monitoring.

10.3.1 Basic Guidelines for Requiring Radiation Monitoring.

The basic guidelines for requiring radiation monitoring shall be Part 16.11 of the NY State Sanitary Code, which states:

"16.11 Personnel monitoring.

(a) External radiation sources. Each person who possesses any radiation source shall supply and require the proper use of appropriate, calibrated and operable individual monitoring devices by:

(1) Adults likely to receive, in one year from sources external to the body, a dose in excess of 10 percent of the limits in paragraph (1) of section 16.6(a); and

(2) Minors and declared pregnant women likely to receive, in one year from sources external to the body, a dose in excess of 10 percent of any of the applicable limits in sections 16.6(g) or 16.6(h); and

(3) Individuals entering a high or very high radiation area.

10.3.2 Frequency of Issuing Monitoring Devices.

Devices will be issued on a quarterly, monthly or more frequent basis. The Radiation Safety Officer will determine, on an individual basis, the type of monitoring device and the issuance frequency required after review of the worker's radiation environment.

10.3.3 Rules for Using Radiation Monitoring Devices

Persons working with radioactive materials or around radiation producing equipment such as x-ray machines, are issued radiation monitoring devices.

These devices are used to measure the extent of radiation exposure you receive while working at the Upstate Medical University. The fact that you have been issued a radiation monitoring device indicates, in the judgement of the Radiation Safety Officer, that you are working in an area where the possibility of significant radiation exposure exists. Here, "significant" means there is a reasonable possibility of an employee receiving a significant portion of his or her maximum permissible dose each calendar quarter.

The radiation monitoring devices are sensitive instruments and must be

handled carefully in order to obtain accurate readings. Please observe the following rules:

- a) Badge-type monitoring devices should normally be worn at or near the waist. However, if the badge holder must wear a protective apron, the badge would be placed at the neck, outside the apron.
- b) Ring badges should be placed under protective gloves that are worn while handling radioactive materials, with the detector portion on the palm side of the finger. The detector is usually located under the inscription on the ring.
- c) Please wear these devices only while working at the Upstate Medical University. However, if you are temporarily assigned to other institutions as a part of your regular work, use the monitor assigned to you from the Upstate Medical University.
- d) Store the device in a safe place when not being used. In many cases, badge holders are provided. Otherwise, storage in a locker or desk drawer is acceptable. It is assumed all storage areas will be away from sources of radiation.
- e) Do not expose the monitoring device to excessive heat (such as a room radiator) or moisture as this may invalidate any radiation dose determined by the monitor.
- f) Please return the used insert (or entire badge in the case of quarterly monitoring) or the ring badge as soon as you receive the replacement for the new period. You will be instructed in the return procedure for your area.
- g) Wear only the monitoring device assigned to you. Do not loan or borrow someone else's monitor. If you lose or misplace yours, contact the Radiation Safety Office immediately to arrange for a replacement.

10.4 Issuance of Radiation Monitoring Devices to Persons Involved in High Radiation Exposure Situations, e.g. Heart Catheterization.

At the discretion of the Radiation Safety Officer, a two-badge radiation monitoring system may be required of persons working in high radiation exposure areas where protective aprons, glasses and thyroid shields are used. One badge will be worn at the neck, outside the apron, the other at the waist, inside the apron. Since neither badge will give a true estimate of total body exposure, the effective dose equivalent for external radiation will be determined as described in 16.6(a)(3)(ii)(b) of Part 16.

As an alternative to the above: A single monitoring badge can be worn outside the protective apron at an appropriate position as determined by the Radiation Safety Officer. The effective dose equivalent for external radiation will be determined as described in 16.6(a)(3)(ii)(a) of Part 16.