Radiation Safety and You
Bradford Taylor, Associate Radiation Safety Officer

Radiation is a part of our everyday life. There are small amounts of naturally-occurring radioactive substances in soil, air, rocks, plants, animals, and even in our own bodies. Larger amounts of radiation are present in outer space and a small portion of this radiation penetrates the atmosphere. These sources are collectively termed natural “background” radiation. The average US citizen receives the equivalent of about 30 chest x-rays of exposure from natural background sources of radiation each year.

Medical applications of radiation are used extensively throughout the UNC Health Care System for diagnosis and treatment of illnesses, and in research. The most likely places to find radiation sources are in Radiology, Nuclear Medicine, Radiation Oncology, and certain hospital laboratories. Radionuclides like Tc-99m, I-131, P-32, Ir-192 and I-125 are frequently used. For example, I-131 is used as a diagnostic aid in the evaluation of thyroid function and as a therapeutic agent in the treatment of thyroid disease. The radionuclides used in Nuclear Medicine for diagnostic procedures emit gamma rays, which are an ionizing, penetrating radiation. It is this penetrating quality that allows images of internal structures to be obtained. These radionuclides remain in the patient after the procedure is over, but soon thereafter naturally decay to levels only slightly above “background” levels. In general, there is no radiation hazard from the sources in patients who have received diagnostic or tracer doses of radioactive materials. No special precautions are needed in caring for them, and there are no restrictions on patient activities or contacts with other people.

When therapeutic radiopharmaceuticals or sealed sources are used large amounts of radiation are involved. The patient can be a significant source of radiation exposure to staff and visitors. Under such conditions radiation precautions are implemented to negate the risk of exposure to others. A radiation sign and a precaution sheet will be posted on the door to the patient's room to warn of the potential danger, and provide guidelines for contact. Although radiation is useful in medicine because of its ability to penetrate tissue, radiation may produce harmful biological effects. For this reason, careful attention is given to the safe use of radioactive materials and radiation-producing equipment, ensuring exposures are maintained at levels as low as reasonably achievable.

Research and medical laboratories often use radionuclides that emit beta particles and low-energy gamma rays. Beta particles represent the least hazardous form of ionizing radiation; weak energy beta particles will not even penetrate human skin. The most important safety precaution for this category of radionuclide is to prevent the material from contaminating the skin, thereby avoiding the possibility of ingestion or absorption. Specifically, accidental ingestion is accomplished through either smoking or eating with contaminated hands. Washing your hands thoroughly will eliminate the potential for contamination.

Overall, the external radiation hazard to hospital personnel from procedures involving radiation is negligible. Depending on your specific job duties, you are classified as a
“radiation worker,” and are required to participate in the radiation monitoring program. The need for personnel monitoring is determined by the likelihood of receiving exposures in excess of certain regulatory limits and by the recommendations of groups such as JCAHO. The radiation dosimetry program is administered UNC-Chapel Hill, but falls under the auspices of the Environmental Health and Safety Department. Furthermore, the Radiation Safety Subcommittee oversees and approves all use of radioactive materials. The Radiation Safety section of the UNC Department of Environment, Health and Safety acts as an agent for this committee, managing the UNC Hospitals radiation protection program, and providing services including dosimetry, area surveys and x-ray equipment inspections, and training of hospital workers.

During normal working hours, questions regarding radiation safety in your work area should be directed to Brad Taylor at 962-5727, or the Radiation Safety Officer (RSO) at 962-5507. Beyond 5:00 PM, contact Campus Police at 962-6565.

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