

Guidelines for IRB Protocols Involving the Use of Ionizing Radiation Virginia Commonwealth University EHS/Radiation Safety Section

The Radiation Safety Committee (RSC) is charged by State and Federal regulatory agencies to oversee the use of ionizing radiation at Virginia Commonwealth University/Virginia Commonwealth University Health Systems (VCU/VCUHS). Sources of ionizing radiation include both radioactive materials and radiation producing devices. Examples include (but are not limited to) chest x-rays, DEXA scans, CT scans, fluoroscopy, and nuclear medicine procedures. **Use of ionizing radiation in human research in any manner that does not directly benefit the patient/subject and is not within normal standard of care must be approved by the RSC.**

To comply with FDA and DHHS guidelines and regulations, the Institutional Review Board (IRB) must assure that the research subject/patient enrolled in an investigational study is adequately informed about risk and consents to the procedure. Since the use of ionizing radiation in humans is associated with health risks in proportion to the amount of radiation received, it is the responsibility of the Principal Investigator (PI) to inform the IRB of any ionizing radiation procedures employed in the study. Additionally, the PI will be required to identify those ionizing radiation procedures that are not within routine standard of care and for research purposes only (i.e., procedures that a patient would not otherwise undergo and **do not** directly benefit the patient/subject). **Note: the PI and the IRB will be ultimately responsible for determining whether a procedure is for the direct benefit of the patient/subject.** If the protocol includes procedures of this type, prior RSC approval is necessary before the protocol can be submitted to the IRB. The PI should seek assistance in estimating effective dose equivalent (EDE) from a Medical Physicist in the VCU Health Systems or from the Department of Radiology/Clinical Radiation Safety office responsible for the diagnostic areas of interest. The Radiation Safety Officer (RSO) will review estimates of the total effective dose (TED) and the informed consent form (ICF). The RSO will make recommendations on appropriate risk statement for inclusion into the informed consent document if necessary. The EDE and other pertinent information will be used by the PI to complete an RSC application form to be reviewed for approval by the RSC (10 working day turnaround after all documents have been received). Protocols received by the IRB without prior RSC approval (and proper consent form risk statement) will not be evaluated until RSC approval is obtained.

Dose to the skin from fluoroscopic procedure may present a more immediate risk to the research subject and is addressed later in the document.

VCU IRB Submission Form

Question 13 on the Other VCU Requirements page of the VCU IRB submission form includes Questions 13-1, 13-2, and 13-3 to provide a quick means of determining whether the research subject/patient is exposed to ionizing radiation and whether or not the PI has complied with the instructions stated above.

Question 13-1 Identifies if the project involves radiation exposure and/or scans involving radiation (e.g.: PET, CT, DXA, nuclear medicine, etc.). All studies answering YES receive the following message “When radiation is part of usual clinical care, submit certification to that effect from a radiologist or radiation oncologist to the RSC.”

Question 13-2 asks, “Are all participants receiving the same type, dose, and number of radiation exposures that they would receive as part of clinical standard of care even if they were not in this research study? Select "No" if participants receive radiation exposure in a procedure done solely for research purposes (i.e. they would not otherwise receive the radiation exposure except for their participation in the study).” If so, the PI is instructed to check YES@ and continue to the next question. **If the PI checks NO they are prompted to upload documentation of RSC review or approval.**

Question 13-3, prompts investigators to provide further explanation about the YES response in question 13-2.

Informed Consent Information for Ionizing Radiation Procedures

The investigator is responsible for obtaining an estimate of the whole-body effective dose for all procedures involving ionizing radiation that are not for the direct clinical benefit of the research subject/patient and not within normal standard of care.

The effective dose values should be summed for all procedures involving radiation exposure. Make sure that values are expressed in the appropriate units (use rem; 1 rem = 1000mrem) in the consent form statement.

1. For studies using ≤ 0.6 rem

This research study includes exposure to radiation from x-rays or gamma rays. This radiation exposure is for research purposes only and is not part of your medical care. X-rays and gamma rays can damage cells, but at low doses, the body is usually able to repair these cells.

The radiation exposure that you will get in this research study is _____ rem (a rem is a unit of absorbed radiation). This is less than the 0.6 rem that the average person in the United States gets each year from natural sources like the sun, outer space, air, food, and soil. The risk from the radiation exposure in this research study is very small.

The radiation exposure described here is what you will get from this research study only. It does not include any exposure you may have received or will receive from other medical tests outside of this study that are a part of your medical care. Radiation risk builds up with each exposure. You should think about your own history of radiation exposure from tests (like x-rays or CT scans) in deciding about the radiation in this study. If you have questions about the total amount of radiation you will be receiving, you should ask your doctor.

For studies using > 0.6 rem but ≤ 5.0 rem

This research study includes exposure to radiation from x-rays or gamma rays. This radiation exposure is for research purposes only and is not part of your medical care. X-rays and gamma rays from natural or

medical sources can damage the genetic material (DNA) in your cells. At low doses, the body is usually able to repair the damage.

The radiation exposure that you will get in this research study is _____ rem (a rem is a unit of absorbed radiation). This is more than the 0.6 rem that the average person in the United States gets each year from natural sources like the sun, outer space, air, food and soil. It is less than the 5 rems of radiation that is allowed each year for people who are exposed to radiation in their jobs.

The radiation exposure described here is what you will get from this research study only. It does not include any exposure you may have received or will receive from other tests outside of this study that are a part of your medical care. Radiation risk builds up with each exposure. You should think about your own history of radiation exposure from tests (like x-rays or CT scans) in deciding about the radiation in this study. If you have questions about the total amount of radiation you will be receiving, you should ask your doctor.

For studies using > 5.0 but < 15 rem

This research study includes exposure to radiation from x-rays or gamma-rays. This radiation exposure is for research purposes only and is not part of your medical care. X-rays and gamma rays can damage the genetic material (DNA) in cells. At low doses, cells usually can repair this damage. There is some possibility that an incorrect repair may increase the risk of cancer in your lifetime. The normal lifetime risk of cancer is 25%. A radiation dose of 15 rem (a rem is a unit of radiation dose) would increase your lifetime risk to 25.6%.

The radiation exposure that you will get in this research study is _____ rem. To put that in context, the average person in the United States gets a radiation exposure of 0.6 rem per year from natural sources, like the sun, outer space, air, food and soil. People who work with radiation (for example, x-ray technologists) are allowed a maximum exposure of 5.0 rem each year. Although these levels of radiation are thought to cause an increased risk of cancer, studies in people who work with radiation have rarely shown a measurable increase in cancer risk.

The radiation exposure described here is what you will get from this research study only. It does not include any exposure you may have received or will receive from other tests outside of this study that are a part of your medical care. Radiation risk builds up with each exposure. You should think about your own history of radiation exposure from tests (like x-rays or CT scans) in deciding about the radiation in this study. If you have questions about the total amount of radiation you will be receiving, you should ask your doctor.

If women capable of having children are included in the protocol, they must be informed that they cannot take part in the study if they are pregnant†. One of the following statements should be included in the consent form.

For research studies where pregnancy testing is NOT required, but may be requested.

“Pregnant women cannot take part in this study. If you are a woman capable of having children, you may take part in this study only if you are certain you are not pregnant. A pregnancy test will be performed at your request. If you become pregnant (or suspect pregnancy) before this study is completed, you must inform the study doctor.”

For research studies where pregnancy testing IS required.

“Pregnant women cannot take part in this study. If you are woman capable of having children, you must have a pregnancy test. The results of that test must be negative for you to continue in the study. If you become pregnant (or suspect pregnancy) before the study is completed, you must inform the study doctor.”

† Pregnant participants are typically excluded from protocols using ionizing radiation. However, conditions could exist where pregnant participants may be involved. If pregnant participants are recruited into a protocol using

ionizing radiation, their involvement will be reviewed on a case by case basis.

Fluoroscopic Skin Dose Risk

Research fluoroscopic procedures, in conjunction with routine fluoroscopic procedures may lead to notable skin doses and a risk of radiation induced skin damage. For this reason, any research protocol involving fluoroscopic procedures must be reviewed by the RSC to evaluate the need for inclusion of the following risk statement in the informed consent:

“Although unlikely, additional fluoroscopy studies that are part of this research may result in injury to your skin. Skin injuries are very rare and usually happen only when unforeseen problems cause the procedure to be longer than originally planned. Skin injuries are usually limited to reddening of the skin (like a sunburn), but may also involve loss of hair or blistering.”

In order to make this evaluation the applicant must include a list of all routine and research related procedures associated with the protocol so that a clear estimation of the potential skin dose can be made.

For risk statements involving **therapeutic procedures**, the risk statement described above is not suitable since the magnitude of the radiation exposure from these procedures is not adequately addressed. In order to put the risk of the additional radiation exposure into perspective with the research subject’s/patient’s therapeutic dose, the following risk statement must be used when the research subject/patient is receiving a therapeutic radiation dose and additional ionizing radiation research procedures:

You will receive extra radiation dose from _____ (*list here additional studies resulting in radiation exposure that are not for the direct clinical benefit of the patient or considered normal standard of care*). The extra radiation dose from participating in this study is _____% of the total effective dose you will receive for the treatment of your cancer (insert calculated percentage of total therapeutic effective dose). The radiation dose mentioned is what you will receive from the research component of this study only and does not include any exposure you may have received or will receive in the future from other tests.

The radiation treatment that you get in this study will expose you to significant amounts of radiation. This radiation is intended to damage and kill certain cells and tissues. As a part of this process, healthy cells may also be damaged. Scientists believe that being exposed to this amount of radiation can cause an increase in your risk of getting cancer and/or leukemia. However, it may be 5-20 years before any effect occurs. Certain diseases or conditions may affect your sensitivity to radiation. For more detailed information on the risks of radiation or if you wish to have a more detailed dose estimate, please ask your study doctor. A table of possible side effects is provided below.

COMMON, SOME MAY BE SERIOUS

In 100 people receiving radiation therapy, 20 to 100 may have:

- Reddening, tanning, or peeling of the skin
- Mild pain
- Hair loss
- Tiredness
- Diarrhea, nausea
- Anemia, which may require transfusion
- Infection, especially when white blood cell count is low

OCCASIONAL, SOME MAY BE SERIOUS

In 100 people receiving radiation therapy, 4 to 20 may have:

- Thickening and numbness of the skin
- Sores or ulcers on the skin or near the cancer location
- Permanent hair loss
- Bleeding from the skin
- Sores in mouth which may cause difficulty swallowing

RARE, AND SERIOUS

In 100 people receiving radiation therapy, 3 or fewer may have:

- Damage to internal organs
- Abnormal opening in internal organs which may cause pain and bleeding

Radiation Oncology is responsible for performing the calculations for these percentages.

Application form is available at <https://srm.vcu.edu/resources/forms/>

Contact the Radiation Safety section at 804-828-9131 if there are any questions.

References:

1. JHM- IRB Guidelines for Radiation Statements.
2. NCRP Report No. 185, Evaluating and communicating radiation risks for studies involving human subjects: guidance for researchers and institutional review boards