Examples of different radiation incident scenarios

The examples below show when an event is considered a radiation incident and whether it must be reported.

Scenario 1: A Nuclear Medicine Technologist is preparing a patient dose of technetium-99m (Tc-99m), and while withdrawing the dose from a vial, the syringe disconnects and a small amount of radioactive liquid spills onto the workbench and floor. In this scenario, the incident falls under RP4, and an initial notification is to be provided within 24 hours, and a radiation incident report with dose calculations needs to be submitted within 72 hours.

Scenario 2: A patient who has received a radiopharmaceutical may excrete radioactive material through normal bodily functions within a radiation-controlled area. Contamination arising within a toilet following routine use and flushing by a patient would generally be considered an expected consequence of the procedure rather than a radionuclide spill. This event would not require a radiation incident report.

Scenario 3: A patient who has received a radiopharmaceutical may, following discharge, enter the community while retaining residual radioactivity. Consequently, members of the public may receive low levels of radiation exposure from the patient. Given the practical limitations in monitoring a patient's movements and identifying potentially exposed individuals, individual public doses are often not readily ascertainable, and as such, submission of a radiation incident report would not be required.

Scenario 4: A patient received a dental intra-oral radiograph that had to be repeated because a software error resulted in the image data being lost. The effective dose to the patient from the initial, non-diagnostic examination was estimated to be < 1 mSv, therefore falling into incident category RP1.

Scenario 5: A patient received a radiographic examination at a medical imaging facility that needed to be repeated due to the wrong body part being imaged. The dose from the first image was estimated to be < 1 mSv. This incident is categorised as RP1.

Scenario 6: A patient underwent a diagnostic CT examination; however, the images were non-diagnostic due to patient motion, and the scan had to be repeated the following day. The effective dose from the unsuccessful scan was estimated to be 2 mSv, thereby falling into the RP2 category.

Scenario 7: Extravasation of a radionuclide during PET/CT imaging resulted in a non-diagnostic scan that required repeat imaging the following day. The effective dose received by

the patient from the unsuccessful PET/CT examination was estimated to be 12 mSv. The incident is therefore categorised as RP3.

Scenario 8: During administration of I-131 for thyroid cancer treatment, the vial containing the radiopharmaceutical was accidentally dropped and broken, resulting in a radioactive spill. The incident was classified as RP4. A detailed assessment of radiation doses received by all staff involved in the clean-up, together with any dose to the patient, and an incident report must be submitted within 72 hours.

Scenario 9: A patient undergoing radiation therapy inadvertently received one treatment fraction to an adjacent vertebra. The unintended dose delivered to the vertebra was 2 Gy. This incident is categorised as RP4 and requires an initial notification to be provided within 24 hours and an incident report with a detailed dose calculation to be provided within 72 hours.

Scenario 10: A member of the public or staff who inadvertently enters a radiation controlled area, such as a CT examination room during a scan, and receives an unintended radiation dose. This incident falls under category RP4.