Australian Government
Australian Radiation Protection and Nuclear Safety Agency

AUSTRALIAN RADIATION INCIDENT REGISTER (ARIR)
SUMMARY OF RADIATION INCIDENTS:
1 JANUARY TO 31 DECEMBER 2005

The total number of radiation incidents reported to the Register that occurred during the period from 1 January to 31 December 2005 was **77.** A summary of the incidents in each category is given below:

Nuclear Medicine: 34 Incidents

19 incidents involved the wrong scanning agent/radiopharmaceutical being given to the patient. In six cases, there were errors reconstituting the dose due to misreading labels (4 patients affected in one case) or being distracted mid-way through preparation. In four cases there was a dispensing error due to absence of labelling or not checking the label properly. Another 6 cases involved the wrong radiopharmaceutical being drawn up due to incorrectly labelled syringes or vials, or not adequately checking the vial prior to administration. In three cases, the reason for the wrong scanning agent/radiopharmaceutical being given to the patient was not reported but resulted doses to the patient of between 2.6 – 8 mSv.

7 incidents involved the wrong patient being given the radiopharmaceutical due to mistaken identity. In one case, the error was due to the wrong patient ID information being put on the request form, in 2 cases staff failed to properly identify patients, and in 3 cases staff mistook patients with the same surname and caused unnecessary doses of between 2.6 mSv and 5.7 mSv. Another incident was due to a misplaced patient data sheet resulting in unplanned exposure to the incorrect patient of approx 2.3 mSv.

3 incidents involved the wrong dose being administered to the patient. In one incident the staff member could not read the graduations on the syringe and therefore injected the patient with more tracer than required leading to an unnecessary patient dose of 15.77 mSv. Another case was as a result of the settings of the gamma camera not being changed from previous Gallium-67 study causing counts read to be higher (unnecessary patient dose of 3 mSv); the Nuclear Medicine Technologist misreading the date and injecting patient with decayed pertechnetate (unnecessary patient dose of 0.5 mSv) and; an electronic fault in calibrator causing a patient to receive 2 times the necessary dose. The third case was as a result of the label being misread resulting in an wrongly administered effective dose of 0.5 mSv.

2 incidents involved unnecessary/unplanned patient doses. One incident saw the technologist failing to inform the technologist on the next shift that the patient had been injected already. Another incident was the result of lost patient data after a software upgrade requiring three patients to undergo rescans and receiving extra effective doses of 7.4 mSv.

1 incident involved the wrong procedure being undertaken. A medical intern requested an unnecessary scan for a patient leading to an unnecessary patient dose of 3.3mSv.

1 incident involved equipment malfunction. An electronic fault in a dose calibrator resulted in several patients receiving approximately twice their standard dose.

1 incident involved release of radioactive material into the sewer. 8.6 GBq of radioactive Iodine-131 was released into the sewer. The incident was caused by a valve blockage in one of the radioactivity storage tanks. The tank needed to be emptied to give plumbers access to a valve blockage.

Diagnostic Radiography: 15 Incidents

6 incidents involved patients being given unnecessary/unplanned CT scans or radiology examinations due to mistaken identity. In 1 case, the mistaken identity involved patients with similar names. In 5 cases, there were errors in correctly identifying because there were errors in not following identification protocols. patient identification protocols. In another case, misidentification was due to miscommunication between staff. Three of the incidents involved CT scans, where the unnecessary patient doses ranged from 2.5 mSv to 20 mSv. The other 3 cases involved X-ray procedures where two incidents involved x-ray procedures; in both these cases the unnecessary dose was estimated to be 0.02 mSv to 0.06 mSv.

3 incidents involved patients being given unnecessary/unplanned CT scans or radiology examinations due to incorrect labelling on requests. In 1 case a patient's name was incorrectly recorded on a request and another two had an incorrect label attached to the request form. Estimated effective doses received were between 3.3 mSv and 2.8 mSv.

1 incident involved a CT scan being performed on the wrong region. A patient was given a cerebral CT instead of an abdominal CT. The effective dose received was 3.9 mSv.

1 incident involved an unnecessary CT/Radiology exam being performed on a patient. A patient was given an unnecessary repeat CT scan due to the original booking not being cancelled. The estimated effective dose to the patient was 28 mSv.

1 incident involved a CT scan of a patient later found to be pregnant. Prior to the CT examination, the patient denied she was pregnant. The foetus received a dose estimated 39 mSv as a result.

1 incident involved an unintended exposure of a staff member. A radiography student unintentionally exposed another student to during an training exercise. The estimated dose to the model patient was 160 μSv.

1 incident involved a patient receiving a high skin dose. A patient received a high skin entrance dose (between 3 and 8 Gy) during an interventional fluoroscopy procedure.

1incident exposing an unusual dose to personal monitor. The personal radiation monitor of a radiographer recorded a high dose (6.38 mSv in 3 months) due to the radiographer wearing the badge on their shirt collar.

High recorded dose: 6 Incidents

2 incidents involved unexplained high doses on personal radiation monitors. Unexplained high doses were recorded on the personal radiation monitors of an employee at a radioisotope laboratory (65.9 mSv in 2 months), and two employees using cabinet X-ray screening equipment were unlikely to have received recorded doses of 15.2 mSv and 45 mSv in 4 months.

2 incidents involved high doses to personal radiation monitors as a result of radiation contamination. In 1 case, a high dose (4.45 mSv in 1 month) was recorded on a personal radiation monitor due to contamination from leakage during preparation of an iodine-131 patient therapy dose. In another, a high dose was recorded (5.55 mSv in 1 month) on a personal radiation monitor due to it being left in a radiopharmaceutical laboratory.

2 incidents involved high doses to personal monitors being left near a logging source. Two personal radiation dosimeters recorded high doses over a 2 month period - 4.2 mSv (photon) + 5.2 mSv (neutron) and 3.7 mSv (photon) and 3.3 mSv (neutron) - due to dosimeters transported in the same freight package as a logging source. Another situation involved a high dose (8.62 mSv in 1 month) on a personal radiation monitor of an industrial radiographer due to the monitor being left near an item being radiographed.

Radiation Gauge: 3 Incidents

2 incidents involved exposure to personnel working in the vicinity of gauges. In the first case, 2 workers were exposed as they accessed a vessel where the level gauge containing cobalt-60 of approximately 0.5G Bq had not been isolated. The exposure to the workers was 120 µSv and 21 µSv. In the second case, 2 workers entered a controlled area while the industrial gauge shutter containing caesium-137, approximately 3.7 GBq was open. The maximum calculated exposure to the workers was calculated to be 0.9 µSv.

1 incident involved the malfunction of radiation gauge during isolation. During the isolation of a radiation gauge containing caesium-137 of approximately 63.6 GBq the source holder was being pulled into the closed position and became stuck. Further attempts to close the holder resulted in the source coming out of the gauge housing and becoming unshielded for approx 15 seconds. The whole body doses to the 3 workers were estimated to be 150 µSv, 10 µSv and 10 µSv.

Radiotherapy: 3 Incidents

1 incident involved wrong dose (higher than prescribed) delivered using a linear accelerator. A patient was administered an increased tumour and lung dose because the linear accelerator was incorrectly programmed resulting in the reversal of direction of two treatment wedges of 60 degrees. Prescribed dose to the tumour increased from 40 Gy to 46 Gy and the lung dose increased from 12 Gy to 20 Gy.

1 incident involved the wrong procedure using a linear accelerator. A radiation therapy patient was administered 10 MV X-rays instead of an electron beam exposure. The resulting total effective dose was estimated to be 430 mSv.

1 incident involving exposure to staff following repair of a linear accelerator. Staff were exposed to neutron radiation (3 µSv) when the neutron safety interlock on a linear accelerator was overridden during repair work and not re-enabled.

Industrial Radiography: 2 Incidents

2 incidents involved an industrial radiography source that did not return to the gamma camera. A radiography source iridium-192 source of 767 GBq detached from its wind-out cable during routine radiography. The source was partially shielded in the collimator, and unshielded for a short period while being transferred to the recovery pot. Persons involved received doses of 1.52 mSv and 28.33 mSv. In the second case, while winding the source into the projection container to change X-ray film, the radiographer dismissed alarms thinking the meter to be faulty. Assistant entered and noticed readings, and realising the hazard, confirmed the source was in guide tube and unshielded. The source was then properly rewound into the container. The radiographer and assistant received an estimated dose of 1.8 mSv and 29 mSv, respectively.

Laboratory: 2 Incidents

1 incident involved contamination of a laboratory with an un-thawed source. A researcher received negligible exposure when placing a Gibson tip into a vial containing phosphorus-32 (25 µL, 9.25 MBq) before the material had thawed resulting in ice crystals contaminating the bench, floor of the laboratory and shoes of the researcher.

1 incident involved a needle stick to a person from a syringe that had previously contained an unsealed source. An employee received a negligible dose when an expelled syringe containing

tritiated thymidine (0.037 MBq) was wrapped in the bench coat and during the process a needle stick to the left middle finger occurred.

Laser: 2 Incidents

1 incident involved a laser being fired in the presence of an unprotected person. A visiting medical officer who was not wearing safety goggles was exposed to laser light (Class 4 laser apparatus). No eye damaged occurred.

1 incident involved a possible laser flash to the eye while adjusting a laser installation. A research scientist adjusting a Class 3B laser noticed a flash and soreness in the left eye. The research scientist was wearing appropriate safety goggles and there was no verified exposure and no evidence of eye damage.

Ultraviolet: 2 Incidents

2 incidents involved UV radiation doses to the eyes during repair or maintenance work. In the first case, a person received unprotected UV exposure to both eyes after over-riding the cover cut-out switch when visibly testing lamps on a UV water steriliser/filtration unit. In the second case, an electrician received UV exposure from a faulty ultraviolet lamp when both tubes turned on. No protective eyewear was worn.

Theft of Sources: 2 Incidents

There was one incident of theft of a mobile veterinary X-ray unit by persons unknown breaking into a locked car. The unit was not recovered.

Borehole Logging: 1 Incident

While a borehole logging source (americium-241/beryllium of activity 37 GBq) was being winched from a borehole the source was inadvertently dropped from the logging tool. The source was subsequently located, retrieved and returned to the container. The operator recorded no exposure on his radiation monitor. There was one incident where the sources were not actually stolen. It involved an unsuccessful break-in attempt to a radiation storage area, which held minor quantities of mainly iodine-125 and carbon-14 sources. Estimated exposures were slight or non-existent.

Luminising/Luminous Device: 1 Incident

9 sealed gaseous tritium light devices (total activity of 180 GBq) were used in the manufacture of fishing lures. Tritium contamination was found in various places throughout the work room at a residential address after a routine source contamination test.

Radiofrequency: 1 Incident

A person rested their arm on a MBITR radio antenna during a transmission and received a burn on their left tricep.

Sources Lost: 1 Incident

After a check of sources it was found that 8 demonstration school sources were unaccounted for. Of these 8 sources 2 were above exemption levels: cobalt-60 source (222 kBq) and a strontium-90 source (74 kBq).

Transport: 1 Incident

A source caesium-137 of 74 GBq was inadequately secured in vehicle. Damage to the container resulted in the radioactive source being released. Remediation occurred at the destination although the driver, passenger and person who picked up the source received doses up to 50 μSv (whole body) and 200 mSv (extremity).

Unauthorised Possession of Source: 1 Incident

This incident involves possession of an unregistered level detection device containing a cobalt-60 source (3.65 MBq in 1999). The company had been informed by the supplier that the source was an exempt activity level.