THE ANNUAL REPORT OF

THE RADIATION ADVISORY COMMITTEE

FOR THE FINANCIAL YEAR ENDING JUNE 2010

RADIATION ADVISORY COMMITTEE

Melbourne, Australia

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Daniel Andrews MLA
Minister for Health

Dear Minister

Pursuant to Section 110 of the *Radiation Act 2005*, the Radiation Advisory Committee submits the 2010 annual report of the Committee for presentation to Parliament.

Yours faithfully

Dr John Heggie
Chair
RADIATION ADVISORY COMMITTEE

CONTENTS

RADIATION ADVISORY COMMITTEE

The Radiation Advisory Committee is established under Part 10 of the *Radiation Act 2005*. The term of appointment for the Committee was the period 17 August 2008 to 16 August 2011.

(i) Composition

The Radiation Advisory Committee met on 11 occasions from July 2009 to June 2010.

The members of the Committee for the period from July 2009 to June 2010 were:

<table>
<tr>
<td> 
Dr. John Heggie (Chair)
Consultant medical physicist

Meetings attended: 9</td>
<td> 
Dr. David Bernshaw
Consultant Radiation Oncologist
Peter MacCallum Cancer Centre

Meetings attended: 9</td>
</tr>
<tr>
<td> 
Mr. Peter Burns
Acting CEO
Australian Radiation Protection & Nuclear Safety Agency

Meetings attended: 2</td>
<td> 
Professor Robert Gibson
Deputy Head, Department of Radiology
University of Melbourne

Meetings attended: 5</td>
</tr>
</table>

Dr. Roslyn Drummond
Radiation Oncologist
Peter MacCallum Cancer Centre

Meetings attended: 6

Dr. Ken Joyner
Director
Joyner and Associates
Telecommunications Consultancy

Meetings attended: 8

Dr Graeme O'Keefe
Principal Scientist
Austin Health

Meetings attended: 9

Dr Russell Horney
Physicist
Department of Medical Imaging and Radiation Sciences
Monash University

Meetings attended: 8

Mr Russell Booth
Chief Nuclear Medicine Technologist
Medical Imaging Department
St Vincent's Hospital

Meetings attended: 7

Mr Stephen White
Chief Nuclear Medicine Technologist
Cabrini Health

Meetings attended: 7

Associate Professor Rob Davidson
Head of Discipline, Medical Radiations
RMIT University

Meetings attended: 8

(ii) Responsibilities

The Radiation Advisory Committee is to advise the Minister for Health or the Secretary of the Department of Health, on any matters relating to the administration of the *Radiation Act 2005*, referred to it by the Minister or the Secretary including the following:

(a) The promotion of radiation safety procedures and practices.

(b) Recommendation of the criteria for the licensing of persons and the qualifications, training or experience required for licensing.

(c) Recommendation of which radiation sources should be prescribed as prescribed radiation sources.

(d) Recommendation of the nature, extent and frequency of tests to be conducted on radiation apparatus and sealed radioactive sources.

(e) Codes of practice, standards or guidelines with respect to particular radiation sources, radiation practices or uses.

Section 110 of the Radiation Act requires that the Committee must give the Minister a report on its activities during a financial year no later than 1 November following that year.

1. INTRODUCTION

Throughout the year a number of issues were considered by the Committee including:

- the licensing and training requirements for various radiation practices;
- radiation incidents;
- non-ionising radiation matters; and
- a variety of research projects involving the irradiation of human volunteers.

The Committee would like to thank the Radiation Safety Team of the Department of Health for their continuing assistance and support.

2. IONISING RADIATION

2.1 Research involving irradiation of human volunteers

The Committee evaluated proposed research projects where doses to volunteers exceeded dose constraints specified in the *Code of Practice for the Exposure of Humans to Ionizing Radiation for Research Purposes (2005)*, published by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), and where there was no benefit to volunteers who are patients. Approval of other research projects involving radiation exposures of human volunteers was the responsibility of institutional human research ethics Committees.

A list of the research projects considered by the Committee is provided in Appendix 1.

2.2 Radiation incidents

The Committee continued to review reports of radiation incidents, accidental radiation exposures and maladministrations reported to the Radiation Safety Team (RST).

Of the reports of inadvertent exposures:

- 14 involved an unintended computed tomography (CT) scan being performed on a patient.
- Two involved misalignment of a radiotherapy treatment field.
- One involved medical imaging of patients who were subsequently found to be pregnant.
- 11 involved the maladministration of a radiopharmaceutical to a patient.
- One involved a cerebral angiogram being performed inadvertently on a patient.
- One involved a patient inadvertently undergoing a fluorography examination instead of a fluoroscopy examination.
- One involved an oncology patient returning excreted iodine-125 (I-125) seeds to the treating hospital.

Follow-up actions by practices designed to prevent recurrences were monitored. Information was circulated to radiological practices generally explaining common errors that can lead to radiation incidents.

The Committee believes that, in the interests of open reporting, the identification of staff members involved in these medical incidents should not be mandatory.

In addition to the incidents involving inadvertent patient exposures, the following incidents were also reported:

- A fluoroscopic x-ray unit was used at a Victorian hospital by a medical specialist not licensed to do so.
- A pregnant radiographer claimed to have been inadvertently exposed to scattered radiation from a CT scanner at a Melbourne hospital. It is unlikely, however, that she was exposed.
- A nuclear density/moisture gauge (NDMG) containing a 320 megebecquerel (MBq) caesium-137 source and a 1.5 gigabecquerel (GBq) americium-241 source was stolen from the premises of the employee of a Melbourne environmental and engineering consulting company.
- A motor vehicle collision occurred involving a vehicle that was transporting 1 gigabecquerel (GBq) of technetium-99m (Tc-99m). The vehicle was hit in the rear by a van, after which the container holding the lead pot that contained the Tc-99m was ejected from the rear window of the vehicle and onto the road. The lead pot appeared to have then been run over by a truck. The vial containing the Tc-99m was smashed and fragments of glass, the label from the vial, and the radioactive material were spread over the road.

  The Radiation Safety Team attended the scene and managed radiological aspects of the incident. The road was surveyed for radiological contamination. The Metropolitan Fire Brigade was subsequently asked to hose down the road in the areas where contamination had been found. The radiological contamination was not at any time considered to pose a serious risk to the health or safety of persons at the scene, the public, or the environment.

A list of incidents, accidental exposures and maladministrations is provided in Appendix 2.

2.3 Request for licensing of Division 1 nurses at South West Healthcare Camperdown

The Committee was advised that the RST had received correspondence requesting consideration of the licensing of division 1 registered nurses to take radiographs at a Victorian rural hospital.

The correspondent indicated that there were a number of factors that indicated the need for additional personnel to be permitted to perform radiography at the hospital. These included:

- The hospital employed only one radiographer. There were two general practitioners available who were licensed to perform limited radiography. It was difficult for the hospital to access a licensed person to perform radiography and the current arrangements placed a strain on the three licensed individuals.
- Earlier in 2009, a nearby town lost its radiology services, meaning that the population of that town now utilised the above hospital for radiology services.
- If patients were not able to access radiology services at the hospital, they would have to travel to a relatively distant hospital, which would result in extra cost and inconvenience for the patients involved.

The Committee noted that it had considered the issue of licensing of nurses in 2001. The Committee at that time agreed that, under specific circumstances, licensing of Division 1 nurses to use x-ray units for limited views was acceptable.

Once again, however, concerns were raised regarding the limits imposed by a limited licence. Persons currently licensed to perform limited radiography were restricted to radiography of extremities, except in the case of an emergency. However consideration of what might constitute an emergency was a subjective matter. The Committee also expressed concern that, once granted a licence, there would be nothing stopping a nurse moving to a metropolitan area and continuing to perform radiography there.

There was also concern that, in the current milieu, licensing of nurses would raise questions around scope of professional practice and registration with the Medical Radiation Practitioners Board of Victoria.

It was the Committee's opinion that the hospital had not provided sufficient evidence that there was a genuine need for nurses to be licensed and that the hospital had exhausted other options.

The Committee asked that the RST write to the hospital requesting that further evidence be provided that a sufficient need exists to allow the licensing of nurses at the hospital to take radiographs and that other options had been exhausted.

2.4 Use of Monash University CT scanner for human research

The Committee was asked to review a proposal from a Victorian university to use a CT scanner located at the university for research involving human volunteers. The scanner was only licensed for use in research on objects and materials.

The Committee was advised that the proponents of the proposed research project had previously engaged third-party radiology services to perform imaging on human volunteers for research. This option, however, had been found to be unsatisfactory for logistical reasons. The researchers wished to pursue the possibility of amending the University's management licence to permit the CT scanner to be used on humans for research purposes. The Committee was further advised that the university was arranging to have the CT scanner undergo compliance testing and servicing to ensure that it was fit for use on humans.

The Committee noted that the *Code of Practice for Radiation Protection in the Medical Applications of Ionizing Radiation (2008)***,** published by ARPANSA, would apply to any radiation procedures the researchers wished to conduct. It was agreed that, as per the requirements of the code of practice, the researchers would need a medical practitioner to ensure justification of the procedures, specify the CT protocols to be used, and ensure that the protocols were adequately optimised. It was suggested that a radiologist be part of the team of investigators to oversee these processes. In addition, any research projects would be subject to the requirements of the ARPANSA *Code of Practice for the Exposure of Humans to Ionizing Radiation for Research Purposes (2005).*

The Committee asked the RST to write to the proponents advising that any research involving CT scans of human volunteers would be subject to the requirements of the above two codes of practice.

2.5 Electronic ordering systems used to request radiological procedures at a hospital

The Committee reviewed the processes for electronic ordering of medical imaging procedures and of the possible causes of errors with electronic ordering used at a Melbourne hospital. It is common practice in hospitals to use non-electronic means such as whiteboards to manage patient caseloads in conjunction with electronic ordering systems. The Committee was of the view that if an electronic system was to be used, then the entire process needed to be electronic to prevent incidents occurring due to manually recorded information not being kept up to date.

2.6 Implementation of the ARPANSA Code of Practice for the Security of Radioactive Sources

The Committee was updated on the progress of the implementation of the *Code of Practice for the Security of Radioactive Sources*.

The Committee noted that there were numerous issues that were raised by the code of practice. These included the preparation of source security plans, transport security plans, and background checking of persons dealing with security enhanced sources. It was thought that it would be difficult to implement background checking of staff in practices where there was high staff turnover or where many staff have access to source storage areas such in brachytherapy rooms.

The Committee was advised that the RST had facilitated training sessions for stakeholders in conjunction with the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA).

In accordance with an agreement between jurisdictions, compliance with the code of practice was to be made mandatory from July 1 2009 for persons who possessed security enhanced sealed radioactive sources. This would be achieved by making compliance with the code of practice a condition of licence for those persons who possessed a management licence that authorised the possession of such sources.

2.7 Requirement regarding warning signs at entrances to rooms containing CT scanners or fluoroscopy units

The advice of the Committee was sought in relation to the requirement for signage in rooms used for medical CT and fluoroscopy examinations. Specifically, clarification was sought regarding the application of clauses 3.1.18(d) and 3.1.18(e) of the *Code of Practice for Radiation Protection in the Medical Applications of Ionizing Radiation*. The clauses specified a requirement for all entry points to a CT or fluoroscopy room to be equipped with a warning sign that is illuminated when the machine is placed in preparation mode.

It was thought that many rooms in Victorian medical facilities would not strictly meet this requirement because there might be additional entrances to examination rooms that were not signed, such as entry points to change rooms or the control room.

The Committee advised that further information should be gathered from medical facilities regarding the feasibility of meeting the requirement that all access points to CT and fluoroscopy rooms should have an illuminated warning sign.

The Committee asked the RST to seek feedback from licence holders on the feasibility of this requirement.

2.8 Requirement regarding supervision of high dose-rate brachytherapy procedures

The advice of the Committee was sought on a requirement of the *Code of Practice for Radiation Protection in the Medical Applications of Ionizing Radiation* regarding the supervision of high dose-rate brachytherapy procedures.

Clause 3.2.11 of the code of practice required that the 'radiation medical practitioner' be immediately available in person while a radioactive source was in a patient during high dose-rate brachytherapy procedures. The Committee advised that the removal of radioactive sources in the event of an emergency during a procedure was the responsibility of the radiation medical practitioner. Nevertheless, whilst the responsibility remained with radiation medical practitioner, it would be acceptable for a suitably trained medical practitioner to perform the actual removal. This would mean that a medical practitioner could supervise a procedure in person on behalf of the radiation medical practitioner. This position was consistent with the advice provided in the *Safety Guide for Radiation Protection in Radiotherapy*.

2.9 Personal monitoring requirements for users of the Australian Synchrotron

The Committee was advised that the RST had been reviewing the requirements for the radiation monitoring program for users at the Australian Synchrotron.

There has been an extensive radiation monitoring program in place that included both area and personal monitoring. The Australian Synchrotron had previously flagged with the RST the possibility of removal of mandatory personal monitoring of synchrotron users. The RST had agreed that the removal of mandatory personal monitoring of synchrotron users would be appropriate if it could be demonstrated that alternative monitoring programs were satisfactory. The RST sought the views of the Committee on the criteria that would need to be met by the synchrotron before allowing the discontinuation of personal monitoring of users.

Mr Sergio Costantin, Radiation Safety Officer, Australian Synchrotron attended the meeting to discuss the issue with the Committee. He advised that discontinuation of personal monitoring of users would reduce administrative and cost burdens on the facility, allowing resources to be allocated towards the area monitoring program. A large pool of data on gamma and neutron levels had been collected from both area and personal monitoring results over a period of approximately five years. Mr Costantin advised that it would not be cost effective to replace the current passive personal monitors issued to users with active personal dosimeters, due to equipment and regular calibration costs.

The Committee agreed that, provided a substantial data set could be produced that indicated it was unlikely that a user could receive a dose in excess of the public dose limits, the requirement for mandatory personal monitoring of synchrotron users could be removed. It was intended, however, that the synchrotron move towards a 'top-up' mode of operation in the coming years. The Committee agreed that radiation monitoring arrangements and in particular the personal monitoring requirements for users would have to be reviewed again as part of this process.

2.10 Radiation Act Amendment Bill 2010

The Committee was advised that on 27 May 2010 the Radiation (Amendment) Bill 2010 was passed by both houses of parliament. The purpose of the bill was to amend the Radiation Act

2005 to allow the Secretary to impose further conditions on management licences relating to the management or control of the use of radiation sources, to clarify the scope of certain offences relating to breach of licence conditions, to empower the Secretary to impose conditions of licence exemptions that require compliance with certain incorporated documents, and to provide for the publication on the Internet of parts of the licensing register relating to use licences.

The provisions of the bill allowed for conditions to be placed on management licences that related to the manner in which as radiation source was used. This would allow for greater accountability of management licence holders over the way in which radiation sources that they possessed were used.

There would be implications for medical practices in which a specialist such as a radiologist or radiation oncologist directed the use of a radiation source without actually using it. There were currently no regulatory controls over how such specialists managed the exposure of persons to ionising radiation when they were not actually using a radiation source themselves. This appeared to be inconsistent with laws in other jurisdictions.

2.11 Royal Australian and New Zealand College of Radiologists standards of practice for diagnostic and interventional radiology

Dr Matthew Andrews, President of the Royal Australian and New Zealand College of Radiologists (RANZCR) wrote to the Committee advising that the RANZCR Standards of Practice for Diagnostic and Interventional Radiology were being reviewed and that feedback was being sought. The closing date for comments was 30 June 2010.

The Committee reviewed the consultation draft (version 9.1) of the standards and offered feedback that included the following points:

- Radiography students or radiographers undertaking their professional development year (i.e. who do not possess full registration with Medical Radiation Practitioners Board) must not be allowed to work unsupervised or on-call.

- A referring party should take adequate steps to ensure that requests are issued for the correct patient. There should be a process in place to avoid unnecessary repeat examinations caused by duplicated requests (for example due to faxed requests or shift handovers).

- There should be a requirement for practices to establish a positive patient identification protocol. It should also be made clear that the final responsibility for positively identifying patients rests with the operator conducting the procedure (the radiographer for example).

- There should be a requirement for the practice to establish systems to ensure that unnecessary repeat examinations are not carried out.

- Practices should record and compare doses with the diagnostic reference levels published as per the requirements of the *Code of Practice for Radiation Protection in the Medical Applications of Ionizing Radiation*.

- CT scans have the potential to deliver high radiation doses and therefore should only be used where there has been a rigorous justification, especially for procedures involving children.

2.12 Security screening of humans in correctional facilities

The Committee was advised that the Department of Justice was investigating the use of backscatter and transmission x-ray scanning devices for security screening of persons in correctional facilities.

A dose constraint for such security x-ray units of 1 millisievert (mSv) per individual per annum had been adopted in New South Wales and a dose constraint of 250 microsieverts (μSv) per individual per annum had been adopted in the ACT. Discussion of security screening devices at a meeting of the Radiation Health Committee had not addressed the possibility of adopting a nationally uniform dose constraint.

A single scan from a screening device would result in a low exposure to ionising radiation. There were benefits indicated in terms of detection of contraband materials that could result in harm to the person carrying them or others. If the devices were to be used routinely on correctional staff, however, it would be possible for a staff member to receive an effective dose in excess of 1 mSv per annum. In this case such staff would have to be considered occupationally exposed and would not be subject to dose constraints.

The Committee agreed that persons who were scanned by the devices in correctional facilities and who were not considered occupationally exposed should be subject to a dose constraint of 250 μSv. To determine whether staff members were likely to receive a dose of greater than 1 mSv per annum, the Committee recommended that electronic personal dosimeters be used initially to determine the level of exposure of staff. If this monitoring could demonstrate a pattern of acceptably low doses then staff could be considered to be not occupationally exposed and monitoring would not need to continue.

The Committee asked the RST to write to the Department of Justice to advise of requirements regarding dose constraints and monitoring of persons undergoing security scanning.

3. NON-IONISING RADIATION

3.1 Solaria

The committee noted that the International Agency for Research on Cancer (IARC) has elevated ultraviolet tanning machines into its top-most cancer risk category. University of Sydney Professor of Public Health Bruce Armstrong was a member of the IARC working group that reviewed ionising and solar radiation, and rated sunbeds as carcinogenic to humans. Prof Armstrong said "We can now say unequivocally that artificial sources of solar radiation - including ultraviolet-emitting tanning devices - can cause both skin and eye melanomas".

3.2 Australian Centre for Radiofrequency Bioeffects Research (ACRBR) position statement on paper by Khurana, Teo, Hundi, Hardell and Carlberg, 2009

The paper by Khurana et al. was discussed in section 3 of last year's annual report, available at www.health.vic.gov.au/environment/radiation/committee.htm.

The ACRBR believes it is important to recognise that the paper by Khurana et al. does not present any new data relevant to the mobile phone health debate. The pre-existing data they consider are not synthesised in a meaningful fashion. Many of the conclusions made in the paper contradict those made by international expert committees, without providing adequate reasons for rejecting these conclusions. The ACRBR believes that the standard view of science, which is that there is currently no evidence that mobile phones have any negative health effects (as espoused by such groups as the World Health Organisation), is an accurate reflection of the literature to date.

3.3 Brain tumour risk in relation to mobile telephone use: results of the INTERPHONE international case–control study

The committee noted that the Interphone Study Group published the results of the INTERPHONE study in the International Journal of Epidemiology (2010; 1 – 20). The paper presents the results of analyses of brain tumour (glioma and meningioma) risk in relation to mobile phone use in all INTERPHONE study centres combined. This interview-based case-control study, which included 2708 glioma and 2409 meningioma cases and matched controls was conducted in 13 countries using a common protocol. No studies to date have included as many exposed cases, particularly long-term and heavy users of mobile phones, as this study.

The authors state "*this is the largest study of the risk of brain tumours in relation to mobile phone use conducted to date and it included substantial numbers of subjects who had used mobile phones for 5-10 years. Overall, no increase in risk of either glioma or meningioma was observed in association with use of mobile phones. There were suggestions of an increased risk of glioma, and much less so meningioma, at the highest exposure levels, for ipsilateral exposures and, for glioma, for tumours in the temporal lobe. However, biases and errors limit the strength of the conclusions we can draw from these analyses and prevent a causal interpretation*."

3.4 ICNIRP publication 16/2009: Exposure to high frequency electromagnetic fields, biological effects and health consequences (100 kHz-300 GHz)

The Committee noted the recently released publication of the International Commission on Non-Ionizing Radiation Protection. The publication was consistent with the findings of the Commission's 1998 publication Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (up to 300 GHz).

3.5 The Committee's view on possible health effects of power frequency electromagnetic fields.

The Committee's position is that, based on the total database of scientific research, there is insufficient evidence to conclude that exposure to normally encountered environmental levels of power frequency electromagnetic fields causes adverse health effects in humans.

3.6 The Committee's view on possible health effects of radiofrequency radiation

The additional evidence reviewed by the Committee during the year has not altered its position that there is no substantive evidence to suggest that exposure to radiofrequency radiation can increase the risk of chronic health effects such as cancer. However, the Committee acknowledges the current controversy over mobile phones and their base stations and will continue to review the relevant research literature.

APPENDIX 1 RESEARCH PROJECTS CONSIDERED BY THE COMMITTEE

TITLE OF RESEARCH PROJECT
A Phase 2, open-label, multicenter study to assess the safety and efficacy of certolizumab pegol in children and adolescents with active Crohn's disease (NURTURE Study).
CoreValve International ReValving® Clinical Trial: Percutaneous Aortic Valve Replacement (PAVR) with the CoreValve ReValving System (CRS).
A Randomised, Double-blind, Multicenter Phase lll Study of Brivanib versus Sorafenib as First-line Treatment in Patients with Advanced Hepatocellular Carcinoma (The Brisk FL study).
A Randomized Double-blind Placebo-Controlled Trial of Neratinib (HKI-272) After Trastuzumab in Women with Early-Stage HER-2/neu Overexpressed/Amplified Breast Cancer.
A Randomized, Double-Blind, Placebo-Controlled, Multi-Center Phase 3 Study of Denosumab as Adjuvant Treatment for Women with Early-Stage Breast Cancer at High Risk of Recurrence (D-CARE)

APPENDIX 2 INCIDENTS, ACCIDENTAL EXPOSURES AND MALADMINISTRATIONS REPORTED TO THE COMMITTEE

DESCRIPTION OF INCIDENT	ACTION TAKEN
A patient at a Melbourne radiation oncology centre was implanted with four iodine-125 seeds containing a total of 43 megabecquerel (MBq) for therapeutic purposes on 30 April 2009. The patient subsequently excreted four of the seeds and transported them on 1 June 2009 to the centre, when he returned for a scheduled treatment review. He took the excreted seeds with him to the consultation, carrying them in a cylindrical plastic specimen container in his trouser pocket. The skin dose to the patient as a result of carrying the seeds in his pocket was approximately 400 millisievert (mSv). At the review consultation the seeds were received by the attending radiation oncologist and left in the consultation room without being placed in a shielded container. The seeds were left in that position, approximately 0.5 m from a desk used by medical staff, for a period of more than 3 days. The maximum total effective dose that a person could have received as a result of this was approximately 170 μSv.	The centre undertook to review its procedures for handling of excreted brachytherapy implant seeds. The Committee expressed concern that the radiation oncologist left the unshielded seeds in his office after receiving them and asked that the RST write to the centre reminding them of the requirement to store radioactive material safely. The Committee requested that other brachytherapy centres be asked to review their procedures for handling of excreted seeds.

DESCRIPTION OF INCIDENT	ACTION TAKEN
A fluoroscopic x-ray unit was used at a Victorian hospital by a person not licensed to do so. A patient at the hospital had been taken to an operating theatre for treatment of a fractured ankle. The attending radiographer was then called to the emergency department for an urgent case. When the radiographer was requested to attend the case in theatre he advised that he could not do so and another radiographer was called to attend the hospital to assist in theatre. This radiographer, on arrival in theatre, found that the image intensifier had been turned on and that there was an image of the patient concerned on screen. The image had been taken by a locum orthopaedic surgeon present at the hospital for the weekend. The locum surgeon later advised that he had attended a course on the operation of such equipment but did not yet possess a licence to use the equipment. The key had been left in the machine by the previous user and the machine was able to be activated.	The Committee advised the RST to follow up with the surgeon who used the fluoroscopy unit. The Committee also asked the RST to write to the hospital advising that keys not be left in the x-ray units when licensed users are not present.
A patient had been taken from the intensive care unit of a hospital for a CT scan with contrast of the abdomen. Prior to the scan, a nurse from the intensive care unit had told the radiographer at least twice that the patient had ingested oral contrast media. Once the scan was performed it became clear from the images that there was no contrast media in the patient. The radiographer was then told by someone else that the patient had not been given contrast media. The patient received a total effective dose of approximately 21 mSv as a result of the first scan.	The Committee noted that it was common for oral contrast media to be sent to ward for a patient to take before coming to the radiology department for a CT scan and that the administration of oral contrast would generally not be recorded. The Committee considered that nursing staff needed to be made more aware of the significance of errors in administration of contrast due to the potential for unnecessary high radiation exposures. The Committee asked the RST to write to the hospital asking them to alert nursing staff to the significance of the additional radiation exposure caused by unnecessary CT scans.

DESCRIPTION OF INCIDENT	ACTION TAKEN
A patient at a Melbourne radiology centre was injected with what was thought to be Tc-99m HDP with the intention of conducting a bone scan. Upon imaging neither patient displayed signs of bone uptake. It appeared that the vial used actually contained Tc-99m pertechnetate. The centre claimed that the agent was labelled as Tc-99m HDP. The supplier of the radiopharmaceutical was informed of the case and images acquired from the patients were sent to the supplier. The two patients were injected with activities of 987 MBq and 858 MBq of what is presumed to have been Tc-99m. The two patients received a total effective dose of approximately 13 mSv as a result of the incorrect scan.	The Committee noted that it was possible that mislabelling occurred during the reconstitution process. The Committee asked the RST to write to the radiology centre seeking further information as to the root cause of the failure.
Another patient at the same Melbourne radiology centre as above was injected with what was thought to be Tc-99m HDP with the intention of conducting a bone scan. Upon imaging neither patient displayed signs of bone uptake. It appeared that the vial used actually contained Tc-99m pertechnetate. The centre claimed that the agent was labelled as Tc-99m HDP. The supplier of the radiopharmaceutical was informed of the case and images acquired from the patients were sent to the supplier. The two patients were injected with activities of 987 MBq and 858 MBq of what is presumed to have been Tc-99m. The two patients received a total effective dose of approximately 13 mSv as a result of the incorrect scan.	The Committee asked the RST to write to the radiology centre seeking further information as to the root cause of the failure.
A patient at a Melbourne hospital received an unintended repeat CT scan of the brain due to a request slip being duplicated by fax. The patient received a total effective dose of approximately 2 mSv as a result of the repeated scan The Committee noted that this type of incident had occurred previously at other centres.	The Committee agreed that faxed forms should be marked as such to reduce the possibility of repeating scans due to duplicate forms. It was noted that the procedure for ordering brain scans would be reviewed with emergency department and ward staff.

DESCRIPTION OF INCIDENT	ACTION TAKEN
A patient at a Melbourne hospital was administered 720 MBq Tc-99m HM-PAO ('Ceretec') whilst she was suffering from a seizure. It was later revealed, however that she did not require a brain scan. It had been estimated that the patient received a total effective dose of approximately 6.7 mSv as a result of the unintended administration. The error was attributed to a hand-over of nursing staff and a failure to communicate adequately as to which patients were in need of a 'Ceretec' injection. The staff member responsible failed properly to check the sign on the door to the room to confirm the need for an injection.	The Committee agreed that patients requiring an administration of a radiopharmaceutical during an ictal episode should be identified at each staff handover and that it was too late to attempt to identify such patients once the ictal episode had begun. There should be an easy method for quickly identifying whether a patient required an administration during an ictal episode. The Committee requested that the RST write to the hospital involved requesting that they review their procedures for the identification of patients requiring an administration of a radiopharmaceutical during an ictal episode and incorporate lessons learnt from the incident.
A patient had been referred for a bone densitometry ('DEXA') scan at a Melbourne radiology centre. The referral indicated that a bone densitometry scan was required. The request, however, was misinterpreted as a nuclear medicine bone scan. The patient was therefore brought to the nuclear medicine department. The technologist responsible failed to check the referral properly and therefore assumed that the patient required a nuclear medicine bone scan. Consequently, the patient was administered with 763 MBq Tc-99m HDP. The referring physician later confirmed that a DEXA scan, not a nuclear medicine scan, had been required. The patient received a total effective dose of approximately 4.4 mSv as a result of the unintended nuclear medicine scan.	The Committee noted that a copy of the request form had not been provided with the incident report and that the form might shed some light on why the incident occurred. The Committee asked the RST to write to the centre requesting a copy of the referral slip relating to this incident to be provided.
A patient at a Melbourne hospital underwent a myocardial nuclear medicine scan that had been based on a faxed copy of a request form. Approximately one week after the first scan, the original of the request form was physically delivered to the nuclear medicine department and another scan was carried out for the patient based on this original. The patient received a total effective dose effective dose of approximately 10 mSv as a result of the extra scan.	The Committee noted that the hospital had conducted a root cause analysis into a number of previous incidents. The Committee asked the RST to write to the hospital to reinforce the existing recommendations regarding faxing of radiological request forms and to investigate the implications of the adoption of electronic ordering systems for radiological procedures.

DESCRIPTION OF INCIDENT	ACTION TAKEN
A female patient at a Melbourne hospital received an unplanned CT scan of the abdomen and pelvis with no contrast. This occurred because the patient's radiographer did not follow the patient identification procedure. The patient received a total effective dose of approximately 10 mSv as a result of the scan.	The Committee noted that possible disciplinary action against the radiographer had been discussed by hospital management. The Committee wished to reiterate that punitive action was not seen as warranted in cases such as this as it discouraged open reporting of incidents.
A patient at a Melbourne hospital incorrectly underwent a nuclear medicine scan because the referring physician had attached the wrong patient identification label to the nuclear medicine request form. The patient received a total effective dose of approximately 4.5 mSv as a result of the scan.	The Committee asked the RST to send a summary of the causes of recent incidents to the hospital for their information.
A patient at a Melbourne hospital was referred by a physician for a DEXA bone densitometry scan to query possible osteoporotic bone but the request was interpreted as for a nuclear medicine bone scan. The patient received a total effective dose as a result of approximately 4.8 mSv as a result of the nuclear medicine scan.	Bone densitometry scans at that particular hospital were performed at the Department of Endocrinology and Diabetes whereas nuclear medicine scans were performed at the Medical Imaging Department and each department had separate request forms. The Committee agreed that it was not unreasonable to perform a nuclear medicine bone scan under these circumstances (looking for possible crush fractures). The Committee asked the RST to write to the hospital to determine whether the referring physician had used the wrong request form to request the DEXA scan.
A nuclear medicine technologist at a Melbourne hospital reconstituted a Tc-99m PYP kit in the belief that she was reconstituting a MAA kit. Prior to performing the reconstitution, the technologist had selected the wrong cold kit. This was partially attributable to a change in the supplier of the cold kits which had occurred six months prior to the incident. As a result of this error, the same technologist later administered Tc-99m PYP to a patient who had been scheduled for a Tc-99m MAA scan. The total effective dose to the patient as a result of the administration of Tc-99m PYP was approximately 1.1 mSv.	The Committee noted that the new supplier used a different colour coding scheme to the previous supplier for vials. The colour used by the previous supplier for MAA had been the same colour as was used by the new supplier for PYP. The lack of a standard national or international colour coding scheme for radiopharmaceutical packaging left scope for errors in identification of nuclear medicine agents. The Committee asked the RST to investigate the issue of colour coding of storage pots and labels used in nuclear medicine departments.

DESCRIPTION OF INCIDENT	ACTION TAKEN
A patient at a Melbourne hospital was booked in for a CT scan at the radiology department of a Melbourne hospital. The referral slip for the scan had indicated that the patient required a CT scan of the left shoulder. Whilst positioning for the scan the patient complained of pain in his right shoulder. The radiographer claimed that this caused her to shift focus to the right shoulder and, as a result, she scanned the right shoulder by mistake. The total effective dose as a result of the incorrect scan was approximately 7.5 mSv.	The Committee noted that the radiographer concerned had conceded that she had made a mistake in letting her attention lapse.
A nuclear medicine technologist at a Melbourne hospital, in drawing up a radiopharmaceutical for administration to a patient, did not properly check the vial and selected the wrong vial. As a result the technologist administered 920 MBq Tc-99m HDP instead of the intended Tc-99m MIBI. The technologist became aware of the error when bone uptake was noted during imaging instead of myocardial uptake. The patient received a total effective dose of approximately 5.2 mSv as a result of the incorrect scan.	It was noted that the technologist had been spoken to regarding the incident and reminded to take greater care when drawing up radiopharmaceuticals. The Committee asked the RST to write to the hospital to stress that nuclear medicine technologists are responsible for correctly identifying a radiopharmaceutical prior to a procedure.
At a Melbourne radiology centre, an incident occurred where the wrong patient received a CT scan. The incident was attributed to an error on the part of the assisting nurse who had been taking patients from the waiting room to the CT room. There had been two people in the waiting room with similar names and of similar ages. The nurse had misread patient information and asked closed identifying questions rather than open questions while identifying the patient. The patient incorrectly selected for the CT scan was actually scheduled for two plain radiographs. The patient received a total effective dose of between 11 and 13 mSv as a result of the scan.	The nurse involved and other staff at the centre have since been cautioned to take greater care in confirming the identity of patients to ensure that the procedures are performed on the right patients. A positive identification procedure had not been followed. It was agreed that that final responsibility for positively identifying the patient rested with the radiographer. This view was in accord with the guidance on the responsibilities of operators provided in the ARPANSA Safety Guide *Radiation Protection in Diagnostic and Interventional Radiology* 2008. The Committee asked the RST write to the centre reminding them that radiographers are responsible for positive identification of patients prior to radiology procedures.

DESCRIPTION OF INCIDENT	ACTION TAKEN
A request for an urgent cerebral angiography procedure was made for a patient at a Melbourne hospital. The order for the procedure had been made using the Powerchart medical records system used by the hospital. On the morning of the procedure, the work list for the whole day's angiography cases, including the patient in question, had been registered in the radiology information system (RIS) as per standard procedure. The referring physician later cancelled the order for the procedure on the Powerchart system but did not make immediate phone contact with the angiography staff to advise of the cancellation. When the referring physician made a follow-up call to the angiography suite, he discovered that the procedure had already commenced. He advised staff to continue with the procedure. The patient received a total effective dose of approximately 7 to 10 mSv as a result of the angiogram	The Committee agreed that if cancellations of Powerchart orders were not reflected in the RIS and viewable immediately to other users, the cancellation option should be removed to prevent miscommunication. It was requested that the hospital provide a flow chart of the processes governing the interaction of the Powerchart system with other hospital systems. The Committee asked the RST to write to the hospital requesting a flow chart of the booking and registration process and the interface between relevant software systems.
A CT scan of the abdomen and pelvis was ordered for another patient at the same hospital as in the previous incident. Prior to the scan, the order was cancelled in the hospital's Powerchart electronic ordering system. The system provided two cancellation options, one of which was designed to cancel an order completely ('cancel'), and one which was designed to cancel an order and then automatically reorder it again ('cancel/reorder'). The operator who was cancelling the order for the CT scan used the 'cancel/reorder option' and as a result the procedure was reordered by the system without the operator realising that this had occurred. As a result, the scan was reordered and carried out. The patient received a total effective dose of approximately 10 mSv as a result of the scan. The 'cancel/reorder option' was located higher on the menu than the cancel option, which may have led the operator to click this option.	In response to the incident the hospital had changed the on-screen labels of the 'cancel/reorder' to simply read 'reorder'. This measure was designed to reduce scope for confusion between the functions of the two options. It was agreed that continued distribution of information regarding causes of medical incidents such as this would be beneficial.

DESCRIPTION OF INCIDENT	ACTION TAKEN
A radiology request was issued at a Melbourne hospital for a CT pulmonary angiogram of a patient who had the surname 'Smith'. A radiographer rang the ward that was indicated on the request form to request that the patient be brought for the scan. There were, however, two patients in the ward with the surname 'Smith' and the intended patient had been moved to another ward. Prior to the procedure the radiographer only verified the patient's surname, and thus scanned the wrong patient. Afterwards the reporting radiologist noted that the scan did not appear to be for the correct patient. Upon investigation the radiographer discovered the error. The hospital had advised that the case had been discussed with the radiographer concerned and it had been stressed that full name, date of birth, and address needed to be checked prior to a scan. The patient who had been incorrectly scanned received a total effective dose of approximately 16 mSv.	The Committee agreed that it was the responsibility of the radiographer to positively identify the patient prior to performing a CT procedure. This view was in accord with the guidance on the responsibilities of operators provided in the ARPANSA Safety Guide *Radiation Protection in Diagnostic and Interventional Radiology* 2008. The Committee asked the RST to write to the hospital and alert them to the guidance regarding responsibilities for operators provided by the safety guide.

DESCRIPTION OF INCIDENT	ACTION TAKEN
A patient at a Melbourne hospital was scheduled for a routine bone scan involving the administration of 931 MBq Tc-99m HDP. Upon acquisition of images, however, the nuclear medicine technologist who was conducting the scan noticed free pertechnetate uptake, and the images were deemed to be not diagnostically useful. The patient was then rescheduled for the procedure the same day. The HDP administered to the patient had been from a cold kit and had been reconstituted the morning of the procedure. The nuclear medicine technologist had confirmed the presence of HDP in the vial and performed the reconstitution as per standard protocols. Subsequent quality control tests by the supplier later confirmed that there had been a complete failure of the HDP to label to the Tc-99m.	The Committee noted that there had been a number of similar cases that had occurred in recent times in which HDP had failed to label to Tc-99m. It was agreed that high quality control standards were important in preventing this type of incident, however it was noted that access to testing was limited because the chromatography paper used for quality control testing of HDP was no longer being manufactured. The supplier has advised that it had looked at the possibility of batch testing of HDP but cautioned that this would not provide complete assurance that every single vial would perform acceptably. The Committee noted that incident reporting requirements did not require centres to report instances where nuclear medicine agents had failed quality control testing, so it was difficult to ascertain the number of cases in which defective labelling had been detected before administration. The Committee asked that the RST hold further discussions with the supplier to determine if they could shed any light on this. The Committee also noted that ARPANSA was investigating the issue of quality control testing with the aim of developing cheap and readily available testing method that could be used at nuclear medicine centres.

DESCRIPTION OF INCIDENT	ACTION TAKEN
A pregnant radiographer claimed to have been inadvertently exposed to scattered radiation from a CT scanner at a Melbourne hospital. The radiographer was asked to take over a CT scan that was about to be performed on a patient. Approximately one quarter of the way through the scan, the patient sat up. The radiographer attempted to speak to the patient through the microphone but the patient was proving noncompliant. The radiographer then pressed the 'pause' button on the CT console and went into the CT room to reassure the patient. Upon settling the patient back down, and leaving the room, the radiographer noticed that images were still appearing on the CT monitor. The radiographer believed that this was an indication that the scan had not paused. Subsequent to this, the scan was successfully repeated.	The Committee decided that there was insufficient information to determine whether the radiographer had been exposed to radiation whilst she was in the CT room. The Committee asked the RST to write to the hospital seeking further information regarding the circumstances of the incident.
A nuclear density/moisture gauge (NDMG) containing a 320 megebecquerel (MBq) caesium-137 source and a 1.5 gigabecquerel (GBq) americium-241 source was stolen from the premises of the employee of a Melbourne environmental and engineering consulting company. The gauge was stolen from the back of a utility vehicle that had been parked overnight outside the residence of the operator who was to take it to a job the next morning. The operator had advised that the transport case was not locked, nor was the source rod containing a Cs-137 source.	Dandenong police initiated an investigation into the theft, ARPANSA, the Australian CBRN Data Centre of the Australian Federal Police, Victoria Police and the other state and territory radiation regulators were also advised of the theft. The gauge has not yet been recovered.
A patient at a Melbourne hospital was booked to undergo a CT scan of the elbow on 31 December 2009. The unit that had requested the scan later asked that the booking be brought forward to 30 December 2009. A booking was created for 30 December but the original booking for 31 December was not cancelled. As a result of the error, the patient had received an unnecessary repeat scan on 31 December. The patient received a total effective dose of approximately 3.5 mSv as a result of the repeat scan.	The Committee noted that corrective action had been taken by the hospital.

DESCRIPTION OF INCIDENT	ACTION TAKEN
A CT scan of the abdomen was carried on the wrong patient at a Melbourne radiology centre. This occurred because a ward nurse had accidentally collected the wrong patient from the ward. Both the nurse and the radiographer who later conducted the scan failed adequately to identify the patient. the patient received a total effective dose of up to 5.6 mSv as a result of the scan.	Under the requirements of the *Code of Practice for Radiation Protection in the Medical Applications of Ionizing Radiation* the operator was responsible for taking reasonable step to ensure that the patient is correctly identified. The Committee agreed that the radiographer failed to do so in this case. Compliance with this code of practice was a condition of use licences for radiographers. The Committee asked the RST to write to the centre that the centre be reminded of the requirements of the code of practice regarding identification of patients.
A CT scan for renal colic and a CT intravenous pyelogram (including non-contrast and contrast scans) was carried out at a Melbourne hospital. Upon subsequent ultrasound examination it was discovered that the patient was pregnant. The patient had not been aware that she was pregnant at the time. The foetal radiation dose was approximately 50 milligray (mGy). The Committee queried why an ultrasound examination was conducted and whether it should have been conducted before the CT scans. The provision of advice regarding radiography procedures and pregnancy to women of child-bearing age was also discussed.	The Committee noted that an interpreter had been provided to aid in discussing the exposures with the patient after the pregnancy had been discovered. There had previously been incidents involving language difficulties at the hospital and the Committee considered that the use of telephone interpreter services could minimise the likelihood of this type of incident occurring in the future.

DESCRIPTION OF INCIDENT	ACTION TAKEN
A patient at a Melbourne hospital, who had previously been diagnosed with breast cancer, underwent a whole body nuclear medicine bone scan, CT scan of the brain, and a CT scan of the chest, abdomen, and pelvis. An ultrasound sound was later conducted on the patient and during this scan it was discovered that the patient was pregnant. The foetus received a dose of approximately 27 mGy as a result of the procedures.	The Committee noted that the nuclear medicine department had implemented a requirement for referral forms to be stamped to indicate whether the pregnancy status of the patient had been queried. A scan would not be conducted if the referral form did not indicate that the pregnancy status had been queried. The Committee suggested that if an ultrasound scan and ionising radiation procedures were to be conducted, the ultrasound scan should be performed first to alert staff to a possible unknown pregnancy. The Committee asked the RST to write to the hospital to advise them of the UK Health Protection Agency publication *Protection of Pregnant Patients during Diagnostic Medical Exposures to Ionising Radiation*, published in March 2009.
A patient at a Melbourne hospital was booked in for a CT scan of the abdomen and pelvis without contrast, which was to be conducted in the radiology department. Whilst an emergency department staff member was booking the procedure, an incorrect patient identification number was selected in the booking system. After the procedure had been conducted the referring physician realised that the wrong patient had been scanned.	The Committee asked the RST to write to the hospital seeking clarification as to the exact steps taken in booking the procedure that lead to the selection of an incorrect patient. The Committee wished to determine whether it was relatively easy to select the wrong patient, or whether the mistake was more likely to be caused by human error. It was agreed that once a patient had been selected in the booking system there should be a method for confirming that the correct selection had been made.
A dose of approximately 3 Gy was unintentionally delivered to healthy tissue during a course of radiotherapy treatment at a Melbourne radiotherapy centre in December 2009.	A full investigation into the incident was conducted by the centre. The investigation determined that the error occurred due to an incorrectly targeted treatment beam. Staff needed to move the treatment couch from the isocentre position during the patient setup but failed to move the couch back prior to the first fraction. Quality assurance checks prior to the delivery of the first fraction failed to detect that the couch was in the wrong position as staff did not conduct all of the visual checks specified in the relevant work instruction. The supervising radiation oncologist assessed the case and determined that the clinical outcome was considered to be minor, and that no change in the treatment plan was required.

DESCRIPTION OF INCIDENT	ACTION TAKEN
A patient at a Melbourne radiotherapy centre received an unplanned dose of approximately 2 Gy to normal tissue during a treatment fraction for the head and neck. A report by the centre indicated that during a radiotherapy treatment of the head and neck, a treatment field was positioned 7cm superior to planned location. This occurred only on the 11th fraction of the 35 planned fractions. The incident was detected by routine portal image review. Disclosure was made to the patient concerned, and it is considered that there were no adverse medical consequences.	The centre was to conduct a root cause analysis to investigate the reason for the fraction being delivered with the beam targeted incorrectly. The Committee noted the incident report and requested that further details of the incident be provided upon completion of the root cause analysis.
A patient was brought into the radiology department of a Melbourne hospital for a CT pulmonary angiogram. Each of the three staff who had been helping to set the patient up had assumed that somebody else had verified the identity of the patient. It was later discovered, however, that the wrong patient had been scanned.	The Committee asked the RST to write to the hospital recommending the implementation of a radiology time-out procedure and stressing the importance of the requirement for the radiographer to identify the patient correctly prior to a scan.
A CT scan of the brain was requested for a patient at a Melbourne hospital. After the scan was conducted the requesting physician rang to say that the order had been made for the wrong patient.	The Committee noted that the patient had a clinical condition that could have required a scan as described on the request form. It was also noted that the radiographer conducting the scan had correctly verified that the patient was the person indicated on the request form. In this case the referring physician was responsible for the error.

DESCRIPTION OF INCIDENT	ACTION TAKEN
A patient at a Melbourne radiology practice was booked for a CT scan of the abdomen and pelvis, and radiographs of the pelvis and hip. She had been referred by her GP because she was experiencing abdominal pain. During the CT acquisition the radiographer noticed the head of a foetus appearing on the image. Upon noticing this, the radiographer aborted the scan and asked whether or not she was pregnant. She replied that she was not. The CT and radiographs were cancelled. The patient was referred back to her GP for follow-up and it was confirmed that she was pregnant. Prior to the CT scan, the patient had completed a questionnaire for intravenous contrast media. The patient indicated on the form that she was not pregnant. The foetus received a body dose of approximately 1.4 to 1.7 mSv. This estimate was based on the estimated uterine dose. The estimate assumed a whole body dose but it was believed that only the head of the foetus was directly irradiated.	A report was prepared by the radiology practice for the benefit of the patient and her GP, detailing the estimated dose and the associated risks to the foetus. The Committee asked the RST to write to the practice advising that a better surrogate for assessing radiation dose to the foetus would have been the intestines or stomach as the pregnancy was in its third trimester. The Committee also asked the RST to write to the Medical Practitioners Board of Victoria to circulate information to its members advising them to consider the possibility of pregnancy in the case of female patients experiencing symptoms such as abdominal pain.

DESCRIPTION OF INCIDENT	ACTION TAKEN
A patient at a Melbourne hospital was administered 1100 MBq fluorine-18 (F-18) FDG in preparation for a PET scan. The intended activity of the administration was 392 MBq so the patient received an additional unplanned activity of approximately 710 MBq. The excessive dose was caused by an error in the use of the dose calibrator while the dose was being prepared. The QC setting of the dose calibrator was inadvertently used instead of the F-18 setting. This lead to an underestimation of the activity that had been dispensed. The patient received an extra effective dose of approximately 14 mSv as a result of the additional activity.	The matter was discussed with the patient and she was provided with advice on the additional radiation exposure and associated risks. In response to the incident, the nuclear medicine department of the hospital indicated that it would implement the following procedural changes: 1. The dose calibrator QC procedure would be changed to ensure the calibrator is not left on a setting that would underestimate the patient dose. 2. Staff would calibrate the delivered isotope vial and then immediately complete and attach a label stating the activity and time and then check this against the supplier's QC data sheet. 3. The patient dose labels would be amended to include a field that requires the technologist to document which isotope calibrator setting was selected. The Committee asked the RST to write to the nuclear medicine department advising that the technologists must check the setting of the calibrator every time it is used.
A patient at a Melbourne hospital was undergoing a video fluoroscopy swallow study The procedure was being performed using a fluoroscopy system recently acquired by the hospital. The procedure is usually performed using high pulse rate fluoroscopy of 30 frames per second (fps). However on this occasion the procedure was performed using 8 fps fluorography (resulting in a higher dose than fluoroscopy mode). The radiographer made this mistake because the new equipment had greatly improved image quality in fluoroscopy mode compared to the previous equipment, as well as having a variable pulse rate. The dose-area product reading for the procedure was 8736 microgray×m^2.	The case was discussed with all staff who use or would be using the room. An education session was delivered in the fluoroscopy room with emphasis on ensuring that the correct x-ray mode is always being used. The foot pedals are now labelled, not only with their original symbols, but with "fluoroscopy" and "acquisition".

DESCRIPTION OF INCIDENT	ACTION TAKEN
A motor vehicle collision occurred involving a vehicle that was transporting 1 gigabecquerel (GBq) of technetium-99m (Tc-99m). The vehicle was hit in the rear by a van, after which the container holding the lead pot that contained the Tc-99m was ejected from the rear window of the vehicle and onto the road. The lead pot appeared to have then been run over by a truck. The vial containing the Tc-99m was smashed and fragments of glass, the label from the vial, and the radioactive material were spread over the road.	The Radiation Safety Team attended the scene and managed the radiological aspects of the incident in liaison with other emergency services. A systematic sweep of the scene was conducted to determine the extent of contamination. Contaminated debris and other materials such as booties and gloves were recovered by the Radiation Safety Team. The Metropolitan Fire Brigade was asked to hose down the road in areas where contamination had been found. The radiological contamination was not at any time considered to pose a serious risk to the health or safety of persons at the scene, the public, or the environment.