Improving Carer and Comforter Procedures in Nuclear Medicine with Regulator Feedback

Christine Turner, Clinical Scientist; Rachel Bidder, Medical Physics Expert
Swansea Bay University Health Board

Background. Legislation surrounding carers and comforters was moved from IRR to IR(ME)R in the 2017 updates [2], and further clarifications from regulators have widened the group of people that should be designated. To improve compliance, the comforter and carer procedures in Nuclear Medicine at Singleton Hospital have been updated for diagnostic and therapeutic exposures. Subsequent to these improvements, an IR(ME)R inspection of the department was conducted, marking the first time that local carer and comforter procedures were to be inspected under IR(ME)R17 [1].

Methods. The employer's procedure was updated to detail when the designation of a carer and comforter is required in nuclear medicine. The procedure relating to diagnostic exposures was updated to include an evidence based dose and risk table for all commonly administered radionuclides and activities. In-depth risk assessments and dose calculations were performed for carers and comforters following radioiodine therapy exposures for a range of possible care need scenarios. These calculated doses to the comforter and carer were presented in a similar table in the procedure for a range of commonly prescribed therapy doses, including both benign and carcinoma indications. The calculations also informed the procedure on when designating a comforter and carer is required in unclear cases, for example someone driving a therapy patient home. The consent form was updated to include a record of the reason a carer and comforter is required to better allow for future auditing. All department staff were given training, including discussions of how these changes were to be implemented practically. An IR(ME)R inspection of the department was conducted by Healthcare Inspectorate Wales in October 2023, and feedback and improvements of the carer and comforter procedures were included in the final report.

Results. Initial feedback from department staff was positive, with a noticeable improvement in the proper authorisation and recording of carers and comforters when required. The regulator reported that the department had suitable procedures in place to establish dose constraints for carers and comforters, with clearly set out dose constraints for all nuclear medicine examinations. Staff were able to explain the authorisation process under the delegated authorisation guidelines to the inspectors, but it was found that the procedure for recording the authorisation of these exposures was not clearly described in the written procedure. Additionally, the regulator required a revision of the delegated authorisation guidelines to include more detail regarding the criteria which operators follow and to be consistent with the employer's procedure.

Discussion. Overall the regulator feedback on carers and comforters was positive, demonstrating a clear and detailed procedure, and good staff training and understanding. Upon reflection, the employer's procedure did not explicitly state that the entitled operator must sign the consent form to record the authorisation, however due to the clear structure of the form, this was happening in practice. This statement has since been added to the revised employer's procedure. During the initial improvements made prior to the inspection, the delegated authorisation guidelines had not been updated to the same extent as the employer's procedure, so were comparatively lacking in detail. This has since been rectified, with the delegated authorisation guidelines describing the criteria operators follow in more detail to be consistent with the employer's procedure.

Conclusion. Comprehensive procedures allow staff to immediately access dose information for comforter and carers for all local diagnostic and therapeutic exposures. This improves compliance with legislation, as verified by feedback from regulators, because the comforter and carer is easily provided with the correct information to be able to 'knowingly and willingly' consent to their own increased exposure. Regulator feedback has been implement to further improve these procedures.

Key references.

[1] Healthcare Inspectorate Wales, Jan 2024, *Ionising Radiation (Medical Exposure) Regulations Inspection Report (Announced) Nuclear Medicine Department and Mobile PET-CT Unit, Singleton Hospital, Swansea Bay University Health Board.*

[2] Schedule 4 Consequential amendments, *The Ionising Radiation (Medical Exposure) Regulations 2017.*

Non-prewhitening matched observer with eye filter (NPWE) performance in chest and abdomen radiography: The influence of tube voltage and anti-scatter grid on detectability

Craig S Moore, Tim J Wood, John R Saunderson and Andrew W Beavis

Medical Physics Department, Queen's Centre for Oncology and Haematology, Castle Hill Hospital, Hull University Teaching Hospitals NHS Trust, Castle Road, Hull, HU16 5JQ, UK

Background: The pre-whitening matched model observer with eye filter (NPWE) has been shown to reasonably predict human observer performance in general radiography and is an appropriate substitute when real clinical trials are infeasible. In this study, the NPWE model observer was used to detect simulated designer nodules ranging between 1 and 30 mm in diameter in chest and abdomen phantom images acquired across the diagnostic energy range (60 – 125 kVp) with and without an anti-scatter grid. We investigated, via maximal detectability (NPWE d') of simulated nodules, a proposed improvement to clinical practice by deriving an optimised tube voltage (kVp) range for digital radiography (DR) chest and abdomen imaging.

Methods: Images were acquired of a chest and abdomen phantom across the diagnostic energy range (60 – 125 kVp) with matched effective dose, with and without an anti-scatter grid, on a general x-ray system. Images were captured using an Agfa DX-D 40C wireless caesium iodide (CsI) imaging panel. Modulation transfer function (MTF), normalised noise power spectrum (NNPS) and contrast (C) were measured in each image. Circular designer nodules with diameters ranging from 1 – 30 mm (in steps of 1 mm) were modelled in frequency space and the detectability index NPWE d' of each nodule was calculated using an appropriate eye filter (viewing distance of 400 mm and magnification of 1.3).

Results: The calculated detectabilities (NPWE d') peaked at a nodule diameter of 3 mm irrespective of tube voltage, for both chest and abdomen images. A tube voltage of 80 kVp returned maximal NPWE d' for chest imaging across all nodule diameters both with and without an anti-scatter grid. A tube voltage of 70 kVp returned maximal NPWE d' for abdomen imaging.

Discussion: The results here back up previous studies by our group that showed, via holistic grading of realistic simulated images by expert evaluators, chest imaging was optimum with a tube voltage range of 80 kVp, and abdomen imaging at 70 kVp. For chest imaging the tube voltage that returned maximal values of NPWE d' did not depend on whether an anti-scatter grid was used or not. As expected, for abdomen imaging, NPWE d' was much lower without an anti-scatter grid than with the grid. This is because scatter dominates in this region resulting in much poorer MTF and contrast (C) with no grid; these metrics dominate the performance of NPWE d' in this dense region of the body. For chest imaging, acquiring images with a tube voltage of 80 kVp opposes advice consistently given to our institution by applications specialists of some x-ray vendors. Their advice is to use a high tube voltage, such as 125 kVp, but the findings of this study have demonstrated that this is not optimal, at least in terms of maximising NPWE d' in the lung region.

Conclusions: The NPWE observer model has been used to derive tube voltages (kVp) that return maximal detectability (d') of designer nodules for chest and abdomen radiography using a modern DR imaging system. This will provide the medical physicist with a starting point in the task of optimising tube voltage range for chest and abdomen imaging.

A roadmap to foetal dose estimation from bronchial artery embolization during pregnancy

Simona Avramova-Cholakova, Pedrum Kamali-Zonouzi

Background. Foetal radiation dose assessments are required in pregnancy to inform clinicians of the risks associated with particular radiation procedures to the mother. The decision to perform a planned C-section before interventional radiation procedures in pregnancy requires an accurate estimation of the typical risks involved with the procedure, but this can be challenging. A range of methods were used to estimate foetal doses prospectively and retrospectively for bronchial artery embolisations of the mother to assess the accuracy of existing calculation methods.

Methods.

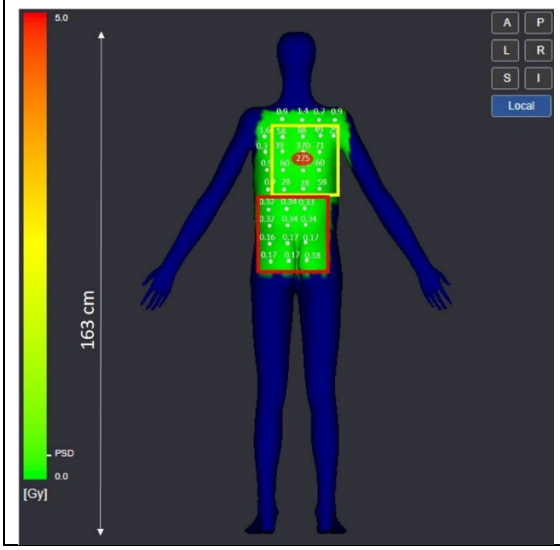
Prospective methodology: the highest dose-area product (DAP) value (170 Gy cm^2) in the last year for bronchial artery emobilisations was obtained using the Radimetrics dose management software (v. 3.4.2). Uterine/foetal dose *Df* was estimated using conventional prospective techniques, where the standard procedure field of views/irradiation areas are applied using PCXMC, NCIRF and CODE software along with all relevant available exposure conditions.

Retrospective methodology: typical exposure data (with typical DAP of 74 Gy cm^2) and skin dose maps for bronchial artery emobilisations were extracted from Radimetrics. Irradiation events were performed mainly in posterior-anterior projections. Acquisition images were checked and field sizes measured on PACS. The most frequently used field size was adopted for estimations of *Df*. Femoral approach was initially performed by the radiologist as confirmed by pelvic area exposures in the map. Data from the map was used to draw a mesh in the exposed body areas and assign a dose to each point. A chest field was drawn on the skin dose model with a size equal to the most frequently used. The size of the field was scaled using knowledge of the model height and applying simple proportions. This depicts the main exposed area for the procedure. A second field was drawn in the abdominal/pelvic area (for the femoral approach) and its size was determined on the basis of the proportions. The mean skin dose received in this field and corresponding DAP were calculated. Thus, two independent fields with typical exposure data assigned for fluoroscopy and acquisitions were applied for foetal dose estimations using the three software products.

Results. The worst case scenario *Df* using prospective and retrospective methods was 115.5 mGy and 1.5 mGy, respectively. Contributing factors to uncertainties of the estimations were reviewed and found to be significant.

Discussion. Radiation risks can be significantly overestimated when using a prospective approach. It would be beneficial to retrospectively determine *Df* to build a better understanding of the radiation risks involved for interventional procedures to improve the information provided to clinicians.

Conclusion. Bronchial artery embolisations did not produce a significant risk to the foetus. Retrospective *Df* estimation using skin dose maps provides a better insight into the likely risks involved with interventional procedures to pregnant patients.



The current status of Nuclear Medicine Medical Physics Expert support in the UK

James Scuffham, Royal Surrey NHS Foundation Trust

Background: Medical Physics Experts (MPEs) must be appointed by Employers under the Ionising Radiation (Medical Exposure) Regulations 2017 regulations (IRMER) and should be closely involved in optimisation, dosimetry, radiation safety and quality assurance in relation to medical exposures. In Nuclear Medicine, ARSAC (Administration of Radioactive Substances Advisory Committee) Employer License applications require the level of MPE support to be specified. A recent Policy Statement developed by IPEM (Institute of Physics and Engineering in Medicine), BNMS (British Nuclear Medicine Society), BIR (British Institute of Radiology) and ARSAC provides recommendations on MPE support levels. This Policy Statement has now become the standard against which ARSAC Employer Licenses are assessed.

Methods: We conducted a survey of UK Nuclear Medicine departments to determine current levels of MPE staffing, in comparison to the ranges specified in the Policy Statement. Utilising a network for senior Nuclear Medicine Physicists, a total of 56 departments across the UK were asked to participate in the survey. Departments were asked to provide their Whole Time Equivalent (WTE) MPE staffing levels, and the minimum and maximum level of MPEs that would be required to support their local services according to their own assessment based on the Policy Statement.

Results: We had 40 responses to our survey. MPE coverage ranged from 25% of the minimum guidance level up to 130% (average 61%). 84% of departments had less than the minimum number of MPEs specified in the Policy Statement.

Conclusions: Our results indicate significant challenges in meeting current guidance on MPE staffing. A possible limitation is the interpretation of WTE, given the large variation in job roles of Physicists across the country. The contribution of Clinical Scientists and hub-and-spoke distributed models for MPE support should be further considered.

Key words: Medical Physics Expert; IRMER; scientific support; ARSAC

A tale of two incidents – a case study in learnings from two very different reportable radiation incidents

Mandy Moreton, Christine Usher
Barts Health NHS Trust

Background

Barts Health NHS Trust has five hospital sites covering all modalities. A number of radiation incidents occurred in 2023 which were reported to the CQC under regulation 8 of IRMER and investigated. Remedial and corrective actions have been implemented to reduce risk of further incidents.

Method

Two of the reportable radiation incidents in 2023 were unusual; one relating to a piece of dental equipment and another relating to imaging on a linac.

Dental incident: This incident concerned an intra-oral unit being used without a collimator in place for occlusal examinations and affected a number of patients over a period of time. The incident was not picked up in the usual way and issues with staff training and equipment provision were highlighted.

Linac incident:
During annual Radiation Safety Physics QA of one of the linacs, it was found that the measured doses on the Pelvis CBCT protocol were significantly higher than the previous year. Upon further investigation it was found that the increased dose was due to a change in frame rate on a number of protocols which had previously been optimised at 11fps but changed back to the default base setting of 15fps. The change in frame rate affected a large number of Radiotherapy fractions on one linac over a three month period. Issues with protocols reverting to base mode settings, provision of and access to customer release notes and pre-exposure checks have been raised as factors in this incident.

Results and Discussion

The findings and shared learning from these incidents will be discussed. Key areas are:

- Staff training
- Equipment provision
- Pre-exposure checks
- Post manufacturer checks and changes to base settings
- Importance of audit and quality assurance tests

Key words

Reportable incident, dental, radiotherapy imaging

Optimisation of cardiac CT: a CQC reportable incident

Louise Giansante, Elizabeth Shaw, Ed McDonagh, Elly Castellano

Background: Regular multi-disciplinary optimisation meetings for cardiac CT procedures are undertaken at the Royal Brompton Hospital throughout the year. Following a dose audit carried out for the meeting in January 2023, we identified that the parameters for one of the protocols could be optimised without penalty to the image quality by reducing the Quality Reference mAs by 20%. The changes were made by a trainee medical physicist, an MPE and a radiographer. All protocols from the scanner were exported before and after changes were made, to be analysed by the physics team who would then confirm and record the changes. A few days later – after a failed software update – the parameters were reverted by a remote service engineer restoring the system to a previous state. This was only noticed before the next optimisation meeting, four months later (May 2023), and 26 patients were scanned with the wrong, unoptimized parameters in the meantime. Each patient incident on an individual basis was not CQC reportable, but under SAUE guidance they were reportable as unintended exposure of more than one individual within the same incident or theme.

Processes: A protocol export was performed immediately before and after the protocol changes. However, they were not analysed at the time due to restrictions on USB use implemented by the Trust IT Security Team. Protocol exports were made again a few weeks later by another MPE following routine physics QC testing. Again, these were not analysed. When the routine export was analysed prior to the May 2023 optimisation meeting, it was clear that the Quality Reference mAs was the same as it had been before the optimisation. Subsequent analysis of the export made immediately post protocol change showed that the optimisation change had been made as intended. At this stage, the optimisation was reimplemented and confirmed by a further protocol export which was analysed promptly.
The sequence of protocol exports provided evidence that the service engineer's intervention a few days after the original change had been the cause of the protocol reverting to the pre-optimised state. There was no indication by the service engineer that this was a risk the operators needed to consider when they returned the scanner to clinical use.

Lessons learned: A rota has been devised so that regular monthly protocol exports are allocated to the CT Radiographers, in addition to the regular exports during the physics routine QA visits. The incident has been highlighted to the physics team and a method to access the USB sticks has been established. These procedures will ensure that any unexpected changes are highlighted in a timely manner and recorded in a spreadsheet. The same spreadsheet records ad-hoc protocol exports that are now made as part of the acceptance back into clinical service procedure, after an engineer’s intervention.
Before installing any future remote updates, we will ask engineers to provide information about the nature of the update and any possible risks to the system in lieu of an AxREM form (as there is no handover of a controlled area). They will be asked to ensure that the system settings are saved before the update is commenced in case of a similar scenario.

Best practice: As well as exporting and checking all scanner protocols regularly, patient dose audits will continue to be performed as part of our ongoing radiation optimisation work. In addition, our regular CT optimisation meetings will also continue every four months for each speciality. This will help identify any trends or changes in doses and will allow us to act more quickly if required.

Conclusion: This incident could have been avoided if the remote intervention from the manufacturer had triggered a protocol export and check, and if they had made it clear to the clinical staff that the restore might have lost recent changes to protocols. The steps undertaken above should minimise the risk of potential incidents caused by unintended changes to CT scanner protocols.

Key words: *Imaging, CT, optimisation, radiation protection, IRMER, CQC.*

Implementation of MPE radiation incident review process within a QMS

Dr Christina Agnew. Head of Dosimetry, Northern Ireland Cancer Centre, Belfast

Background. This is a case study describing the collaboration of radiotherapy MPEs and radiotherapy radiographers to review all radiotherapy incidents involving radiation (radiotherapy imaging or therapeutic) within a quality managed system (QMS). This work was carried out in a large centre of 10 linacs, 2 CTs and a HDR and LDR brachytherapy service, with 10 MPEs and over 100 radiographer staff.

Historically, radiation incidents were triaged by radiotherapy radiographers with review from physics as required. Internal radiotherapy quality assurance documentation "radiotherapy incident form" contained a section to detail any correspondence with medical physics, if required. Each incident would be reviewed and coded by radiotherapy at a weekly radiotherapy incident review meeting. Updated guidance on significant accidental unintended exposure (SAUE) over the past 5 years further clarified the criteria for making a notification to the appropriate enforcing authorities. In December 2021, an incident came to the attention of an MPE and within the radiotherapy incident form a comparable incident was described, that had not previously come to the attention on an MPE. The similarity of these 2 incidents, led to a notification to the appropriate enforcing authority under SAUE notification M. This event identified 2 areas of concern 1) only more complex radiotherapy incidents were being reviewed by an MPE and 2) in a large centre the current process for identifying themes was not sufficiently robust.

Processes. Initially, a review of all, radiotherapy radiation incidents, irrespective of their complexity, from the previous 6 months were reviewed by an MPE. A meeting to consider options of how the MPEs could work together with radiotherapy in the review of radiation incidents was set up. From this meeting, a radiotherapy physics QMS process to review all radiotherapy incidents involving radiation was implemented. This included an MPE email box, to which all incidents involving radiation, irrespective of their complexity, would be sent by the radiotherapy section managers. The mailbox would be monitored on a weekly rota by one of 7 MPEs, providing a response email to *every* incident. On a separate rota, one of 9 MPEs would attend the radiotherapy weekly incident review meeting, where MPEs could comment or clarify information regarding the MPE response. Finally, a 6 monthly review meeting was also initiated with a smaller team of 2 radiotherapy QA radiographers and 2 MPEs to review all incidents in relation to themes.

Lessons Learned: Previously, radiation incidents were reviewed as requested from a smaller number of MPEs. Expanding this work but extending this to all MPEs was a positive step, with MPEs keens be more involved and learn the internal reporting procedures and application of SAUE guidance outside of their immediate specialism. Separate MPE meetings were required to distribute this work and for discussion regarding SAUE guidance and updates. Initially the previous smaller number of MPEs were consulted regarding most cases. Over time, only difficult cases now are reviewed by multiple MPEs.
There was a welcome response from radiotherapy for additional MPE support in incident review. Initially the 6 monthly review was a rolling 6 months but work load was too great and so this was reviewed and set for a fixed 6 month period instead.

Best Practice: Having this process within a QMS, retains the process under review for continuous improvement. The process has led to a closer working relationship between MPEs and radiotherapy regarding radiation incidents. This has led to increased shared learning across both departments. This process ensures each radiation incident within our centre is reviewed by an MPE. Six monthly reviews are a robust, maintainable process to assess for themes in a large department

Conclusion. A quality managed process has been implemented to allow all staff within radiotherapy (MPEs and radiotherapy operators) to meet their obligations under IRMER. This process built and extended on existing frameworks, and involved all MPEs to prevent an excessive additional workload.

- ***Key Words:*** MPE, SAUE, incident review, incident reporting

Title of Case Study: Pilot Radiotherapy MPE Training Programme
Submitters details: Kevin Alty, Gareth Webster

Background. West Midlands Network Workforce strategy appointed a 1-year fixed term MPE Education Coordinator to develop and run 6 events aimed at increasing the numbers on MPE portfolio submissions in the network.

Heads of radiotherapy and aspiring MPEs in the region were surveyed to assess general concerns and specific competency/portfolio concerns that might be the root cause of delays to submitting portfolios. Three obstacles where identified:
1) General lack of awareness amongst existing MPEs of the portfolio requirements and therefore no or incorrect support being given to aspiring MPEs.
2) Difficulties gaining appropriate experiences to support an MPE portfolio application
3) Uncertainty over what to include in a portfolio due to a lack of exemplars and mixed messaging from assessors

Processes.
The training programme consisted of three strands.

1) Existing MPEs. Each centre sent a senior member of the department to a virtual training session with an established assessor who took them through the portfolio requirements and how the assessment is performed with examples of how it is interpreted in specific cases. 1 to 1 follow sessions were offered to discuss specific competencies and questions.
2) Heads of radiotherapy discussed ways to open up MPE level experiences to band 7s and implement within their own departments. Feedback from aspiring MPEs gathered.
3) Aspiring MPEs to attend 6 events throughout the year focussing on different competencies with an emphasis on what experiences would be appropriate and on the level to pitch the write up.

Lessons Learned:

1) A lack of standardisation in training portfolio assessors led to conflicting advice that confused aspiring MPEs. A middle of the road assessor might be preferable to either extreme.
2) Anonymised, amalgamated feedback was given to the heads of each centre for them to discuss and consider how they can improve things in their own centres, but this requires active leadership, difficult to ensure given different workforce needs.
3) Feedback was gathered regularly from the attendees to help shape the future events. Each session was planned and hosted by the training coordinator, providing consistency whilst the expert was new to each event providing expertise and energy. At least one portfolio assessor was also present at each event and was able to provide general advice and answer questions.

Best Practice:

1) The assessor went through each competency showing what would work and, more importantly, what wouldn't be enough. This worked well and the option to get expert advice on specific questions was also welcomed.
2) Each aspiring MPE did a gap analysis against the competencies, followed by a joint meeting to amalgamate the needed experiences. These were sent to all MPEs in the department as a reminder to involve B7s. Centres should free up aspiring MPEs one day a month to writing up their portfolio but should be actively monitored to ensure productivity.
3) The most successful events centred around exemplar pieces of work mocked up for the events and placed the aspiring MPEs in the position of the assessor. Through this activity, aspiring MPEs came to distinguish between MPE advice/thinking and that of an experienced clinical scientist.

Conclusion. Overall thoughts - benefits/negatives of the project.

There is a raised awareness in each centre of what it means to be an MPE under IR(ME)R17 and what it takes to achieve MPE registration.

There is a raised awareness of the need to provide experiences of working at MPE level to B7s and some centres have progressed in this area.

From feedback, 100% of attendees stated that these events have increased the likelihood of submitting within the next 12 months.

The project was successful and generated resources that will support aspiring MPEs in future years.

Extravasation of 18F[FDG]: A case report with erythema

Gregory James
Royal Stoke University Hospital

Background

The PET-CT service at Royal Stoke University Hospital scans almost 4,000 patients per year. Recently, a patient attended a local A&E department presenting with a red rash on the left antecubital fossa. After considering the patient history, it was thought the rash could have been associated with a PET-CT scan conducted 3 weeks previously. The patient contacted the nuclear medicine department and physics staff were alerted.

Processes

The patient was contacted and follow-up arrangements made with the oncology nursing team. On inspection of the scanned images, it was apparent that FDG had been extravasated at the injection site. The local dose to the skin was assessed as 4,300 mGy (range 100 to 17,000 mGy) based on the image data and Monte Carlo simulations. The location, timing and duration of the patient's erythema was consistent with radiation as a possible cause. The event also met the criteria for a clinically significant accidental or unintended exposure (CSAUE) to ionising radiation and was reported to the Care Quality Commission (CQC).

Lessons Learned

Staff were reminded of the potential consequences of extravasating 18F[FDG] due to its high instantaneous dose rate. The reporting radiologists have also become more vigilant to extravasation visible in the patient images. The physics team will now be alerted to significant extravasation events so that a dose assessment can be made in case intervention and follow-up is required.

Best Practice

A standard operating procedure has been produced for calculating skin dose from extravasated activity. The image data gives an indication of extravasated activity, as well as the area and depth of distribution, provided the extravasation site is within the imaging field of view, although this would not be the case if the patient was imaged with the arms above the head. Depending on the depth of the extravasated activity, the instantaneous dose rate to the basal layer of the skin varies, for example from 4.5 mGy/MBq/hr for activity distributed between 3mm and 4mm beneath the surface of the skin, to 800 mGy/MBq/hr if the activity is distributed between 0mm and 1mm beneath the surface of the skin. However, in PET imaging, voxels are approximately 4 – 5mm in size so it is impossible to know the location of activity to better than this precision. In the present case, evidence of surface contamination, plus the presence of activity in deeper voxels, led to the assumption that the activity was uniformly distributed between 0mm and 4mm beneath the surface of the skin; giving an instantaneous dose rate of 200 mSv/MBq/hr. The activity at the injection site within this first voxel layer was assessed to be 10 MBq (in 1cm2) giving an estimated dose of 4,300 mGy.

Conclusions

Skin dose assessment from radiopharmaceutical extravasation has large uncertainties due to the assumed depth of activity. Nevertheless, dose estimation is important so that any intervention can be proactively arranged. This incident has reminded staff that the threshold for skin erythema can potentially be exceeded for positron-emitting radiopharmaceuticals used for diagnostic scans.

Key Words

Radiation protection, extravasation, skin dose, erythema.

Ionising radiation in healthcare research: what's a research exposure and how can we smooth the pathway to approval?

Andrea Williamson, Sheffield Teaching Hospitals NHS Foundation Trust

Background: many years spent checking healthcare research have illustrated the recurring pitfalls that can arise with articulating patient dose and risk in project documentation.

Processes: radiation governance checks are the local review of research applications to ensure IRMER compliance prior to R&I approval at a given trust. These include documentation review (IRAS form, protocol, participant information sheet and more) as well as confirming that local arrangements are in order for the radiation procedures in the research.

Lessons Learned: the HRA radiation assurance processes have improved the overall quality of the lead MPE and CRE statements in the IRAS form, and the radiation risk paragraph in the participant information sheet. Some trials still fail to meet local standards though, and the same issues arise repeatedly. This suggests that we could improve applications at the outset and smooth the pathway to research approval.

Best Practice: this talk goes over some of these common pitfalls and discusses better ways of handling the respective scenarios. The lead MPE statement in IRAS is a fantastic opportunity to use our specialist skills to unpick research exposures and their treatment in the application, helping other reviewers to understand the context and scope of ionising radiation in the research project.

Discussion: feedback and discussion amongst the delegates is encouraged so that we can learn from each other and improve practice in line with national policy.

Key Words: ionising radiation, research exposures, patient safety, risk communication, HRA, IRAS, ethics, IRMER, lead MPE