

Computerised Tomography (CT) scanners in Nuclear Medicine facilities; use by nuclear medicine practitioners from both radiographic and technologist backgrounds

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Summary

It is recognised by the Society of Radiographer (SoR) and College of Radiographers (CoR) that the developing use of multi-detector computerised tomography (MDCT) scanners within nuclear medicine facilities provides a challenge to the non-medical workforce to assure high-quality patient services. The Nuclear Medicine and Molecular Imaging Advisory Group (NMMAG) of the SoR has developed this statement to support the non-medical and molecular imaging workforce in delivering safe services.

Background

Nuclear medicine facilities employ a range of non-medical professionals from radiographic, nuclear medicine technology and healthcare science backgrounds. The complementary skills and knowledge of the team supports the safe delivery of the modality. Evolving hybrid techniques will impact on the team and the SoR and CoR are keen to understand the skills required and the psychological challenges for the workforce^{1,2}.

Modern hybrid Single Photon Emission Computed Tomography (SPECT/CT) and Positron Emission Tomography with Computerised Tomography (PET/CT) have revolutionised nuclear medicine imaging where the CT component is used for attenuation correction and image fusion². Modern systems can also be used as 'stand alone' CT scanners to perform conventional CT examinations (CT scanning) which may not be related to any radionuclide examination but form part of the patient pathway. Griffiths and Dawson noted that "there is a necessity for clear clinical protocols and appropriate use of CT within a hybrid imaging environment"¹ to ensure that CT radiation doses are optimised and justified.

The Ionising Radiation (Medical Exposure) Regulations 2017³, The Ionising Radiation (Medical Exposure) (Northern Ireland) Regulations 2018⁴ and The Ionising Radiation (Medical Exposure) (Amendment) Regulations 2024⁵, hereafter referred to as IR(ME)R, require operators to be adequately trained. Schedule 3 of IR(ME)R defines adequate training as having "successfully completed training, including theoretical knowledge and practical experience"⁶ and provides a list of required subjects related to the function and specific area of practice for the operator or practitioner.

As described in the regulations, all operators must be able to evidence appropriate specialist education, training and competency in order to perform hybrid imaging and, if appropriate or required, conventional CT examinations. These CT examinations have potential to deliver relatively high radiation doses in very short time frames. Employers are required to take steps to ensure that every practitioner or operator undertakes continuing education and training after qualification

including, in the case of clinical use of new techniques, training related to those techniques and the relevant radiation protection requirements.

Nuclear medicine technologists and radiographers follow their own professions' independently approved training curriculum at graduate and postgraduate level in the UK. The Health and Care Professions Council (HCPC) maintains the statutory register for diagnostic radiographers who have attained the Standards of Proficiency required for registration purposes⁷. Such radiographers will have theoretical underpinning knowledge and be able to perform a standard head CT examination, assist with CT examinations of the spine, chest and abdomen in acute trauma, and contribute effectively to other CT studies⁷. Local training on equipment, additional techniques and protocols is required to supplement the undergraduate competence.

Nuclear medicine technologists, who make up a large percentage of the workforce, may have no previous or recent training and experience in CT¹. They are able to apply for entry to the Register of Clinical Technologists (RCT) which is a Professional Standards Authority (PSA) accredited register managed by the Institute of Physics and Engineering in Medicine (IPEM), the Association of Renal Technologists (ART) and the Institute of Healthcare Engineering and Estate management (IHEEM). Standards for entry to the register are defined by scopes of practice, which for nuclear medicine technologists do not currently cover x-ray production, CT scanning, anatomy and pathology, and radiation protection relevant to diagnostic radiology procedures outside the nuclear medicine examination⁸.

Rationale and interim guidance

Until the advent of SPECT/CT and PET/CT, CT scanners were only found in general diagnostic imaging departments and were operated by HCPC registered radiographers.

The SoR does not consider that it is efficient use of skills or scarce human resources to require both a radiographer and a nuclear medicine technologist to be present to initiate a CT (x-ray) exposure as part of a nuclear medicine procedure, and supports the appropriate development of the scope of practice of nuclear medicine technologists to perform this aspect of their work.

The SoR will work with the nuclear medicine community, in particular representatives from IPEM and the British Nuclear Medicine Society (BNMS). The SoR *Learning and Development Framework for Hybrid Nuclear Medicine/ Computed Tomography Practice (SPECT-CT/ PET-CT)*⁹ defines clear standards of practice required in hybrid imaging. For nuclear medicine technologists to perform 'stand alone' CT scans for conventional diagnostic procedures, the standards of education and practice required should be equivalent to that required of HCPC registered diagnostic radiographers.

Anyone required to perform MDCT scanning as part of their duties are referred to Schedule 3 of IR(ME)R⁶; together with the Skills for Health competence details¹⁰, these resources will provide the legal requirements and associated guidance relevant to the knowledge and skills required to deliver a CT service in the context of diagnostic radiology. Any locally developed training packages, including competency frameworks, would need to ensure that they meet the relevant requirements of IR(ME)R Schedule 3⁶, as assessed by the employer. Nuclear medicine technologists could undertake CT scanning where and if they have evidence of appropriate education and training equivalent to that required of an HCPC registered diagnostic radiographer⁷, local achievement of CT competence, and entitlement by the IR(ME)R employer as an operator for CT scanning. IR(ME)R Regulation 12 (8) requires the practitioner/operator to pay special attention to certain factors in the optimisation process. One such factor is high doses to the patient which is relevant to some CT scanning procedures¹¹. On-site manufacturer supplied training, at installation of equipment using CT technology, does not provide the required depth of knowledge and competency required by the regulations. This should be regarded as an introduction to system safety features and practical application for staff that can already evidence the core underpinning knowledge.

In addition, nuclear medicine technologists, in terms of conventional CT practice, would also be required to comply with the Ionising Radiations Regulations 2017 (IRR 2017)¹². For example, compliance with local rules, personal dosimetry and use of personal protective equipment. Further information can be found on the 'Ionising radiation legal base'¹³ section of the Health and Safety Executive website.

Drug administration

The Human Medicines Regulations 2012¹⁴ allows appropriately trained and competent, statutorily registered healthcare professionals to administer drugs utilising Patient Group Directions (PGDs). PGDs “allow specified health professionals to supply and/or administer medicine without a prescription or an instruction from a prescriber”¹⁵. Radiographers may administer intravenous contrast agents for diagnostic CT scans using a PGD.

A PGD cannot be used to administer radioactive medicinal products and, therefore, nuclear medicine technologists and radiographers administer radioactive medicinal products and adjunct drugs under exemptions¹⁶.

The nuclear medicine technologist is not a statutorily registered healthcare professional and is therefore unable to use a PGD to administer drugs to patients for examinations not involving radioactive medicinal products.

A Patient Specific Direction (PSD) is the traditional written instruction signed by a doctor, dentist, or non-medical prescriber for medicines to be supplied and/or administered to a named patient after the prescriber has assessed the patient on an individual basis. A PSD may be an instruction to administer medicine to a list of named patients where each patient on the list has been individually assessed by the prescriber. There is no requirement to be a registered healthcare practitioner to administer medicines using a PSD.

Conclusion

- CT equipment is capable of delivering high radiation doses to patients in relatively short exposure timeframes. Appropriate optimisation of technical factors and technique for each examination (patient) needs to be considered.
- All IR(ME)R operators need to evidence appropriate education, training and CPD relating to their scope of practice for using CT equipment for hybrid imaging techniques and conventional CT scanning.
- Registered radiographers have the necessary background education and competency to use CT technology for conventional CT scanning (not part of a radionuclide procedure) and to apply this knowledge to the use of x-ray generating equipment in nuclear medicine. This is usually supplemented by postgraduate experience and courses.

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- The SoR does not encourage the practice of nuclear medicine staff requiring a 'CT-trained radiographer' to make CT/x-ray exposures on their behalf during nuclear medicine examinations.
 - Registered radiographers are able to use PGDs under the Human Medicines Regulations (2012) to administer patients with IV contrast media. Nuclear medicine technologists do not have statutory regulation and are unable to work with PGDs. Nuclear medicine technologists may administer medicines under Patient Specific Directions.
 - 'Applications specialist training' at the time of equipment installation is not sufficient to cover the core knowledge required by Schedule 3 of IR(ME)R⁶ to deliver medical exposures and use x-ray equipment safely.
 - Locally developed training packages must ensure that they meet the relevant requirements of IR(ME)R Schedule 3⁶.
 - The SoR will actively engage with relevant professional groups and regulators to issue further comprehensive joint guidance in the near future.

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These resources will provide the legal requirements and associated guidance relevant to the knowledge and skills required to deliver a CT service in the context of diagnostic radiology. Any locally developed training packages, including competency frameworks, would need to ensure that they meet the relevant requirements of Schedule 3 of IIR(ME)R 2017 (SI 2017/No.1322) as assessed by the employer. Nuclear medicine technologists could undertake CT scanning where and if they have evidence of appropriate education and training equivalent to that required of an HCPC registered diagnostic radiographer (HCPC 2017) , local achievement of CT competence, and entitlement by the IR(ME)R employer as an operator for CT scanning. IR(ME) Regulation 12. (8) requires the practitioner/operator to pay special attention to certain factors in the optimisation process. One such factor is high doses to the patient which is relevant to some CT scanning procedures (COMARE 16, 2014) On-site manufacturer supplied training, at installation of equipment using CT technology, does not provide the required depth of knowledge and competency required by the regulations. This should be regarded as an introduction to system safety features and practical application for staff that can already evidence the core underpinning knowledge.

In addition, nuclear medicine technologists, in terms of conventional CT practice, would also be required to comply with the Ionising Radiations Regulations 2017 (for example compliance with local rules; personal dosimetry; use of personal protective equipment and the Regulations can be accessed at:

tools.skillsforhealth.org.uk/competence/show/html/id/1210/. 🔍

legislation.gov.uk/uksi/2017/1322/contents 🔍

gov.uk/government/publications/the-ionising-radiation-medical-exposure-regulations-2000

and further information at

hse.gov.uk/radiation/ionising/legalbase.htm