IPEM Diploma in Clinical Technology (Nuclear Medicine) Scope of Practice: Updated Curriculum 2021

The competencies described below are required to be attained, together with the Register of Clinical Technologist's (RCT) Scope of Practice[1] for completion of the IPEM Diploma of Clinical Technology (Nuclear Medicine).

Background

Neither the Register of Clinical Technologist's (RCT) Scope of Practice nor the Practitioner Training Programme (PTP) curriculum specifically feature computed tomography (CT) competencies. CT scans are the third most commonly performed medical imaging tests performed in England, with 6m tests performed in NHS England in the year from March 2019[2] and 5.4m in the year from February 2020[3] despite the impact of COVID-19 on NHS services. The omission of CT competencies, specific to the Nuclear Medicine environment, from the curricula has led to a notable absence of CT skills among newly qualified Clinical Technologists at point of registration. The ubiquity of these tests makes this oversight an important note to address. From October 2021, satisfactory demonstration of these additional competencies will be required for completion of the IPEM Diploma in Clinical Technology (DipT) in Nuclear Medicine.

Gap Analysis

A gap analysis of the National Occupational Standards (NOS) for SPECT/CT[4] and PET/CT, and the PTP Curriculum and RCT Scope of Practice (which inform training plans for the IPEM Diploma in Clinical Technology), resulted in a number of areas to be addressed. These are grouped by theme area in the tables below.

IPEM notes that while the PTP Curriculum and RCT Scope of Practice cover many of the areas of hybrid imaging across Nuclear Medicine required by clinical demand, it is not sufficiently explicit in its coverage of knowledge, understanding and skills such that trainees exit with sufficient competence in this area.

Reference numbers under each heading in the tables below refer to criteria from the National Occupational Standards (NOS) below:

- *SFHCI.J - Produce Positron Emission Tomography / Computed Tomography, approved 06 February 2019;*
- *SFHCI.L – Produce Single Photon Emission Tomography / Computed Tomography, approved 06 February 2019.*

[1] RCT Scope of Practice

[2] Diagnostic Imaging Dataset Statistical Release, Performance Analytics Team, NHS England and NHS Improvement, 23rd January 2020

[3] Diagnostic Imaging Dataset Annual Statistical Release 2019/2020, Performance Analytics Team, NHS England and NHS Improvement, 19th October 2020.

[4] SFHCI.L Produce Single Photon Emission Computed Tomography (SPECT) and Single Photon Emission Computed Tomography (SPECT/CT) images for diagnostic purposes

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Indicative Curriculum

Curriculum section: Cross-sectional anatomy of the areas to be scanned
SFHCI.L Knowledge and understanding: 8, 9, 16 & 24. **SFHCI.J Knowledge and understanding: 8, 9, 22 & 23.**
Additional competencies to be included: To demonstrate knowledge and understanding of: • Basic anatomy and physiology • Skeletal system, renal system, cardiovascular etc • Cross-sectional anatomy (all areas) • Morphological changes caused by pathology

Curriculum section: The common normal variants and their appearances on hybrid images
SFHCI.L Knowledge and understanding: 23 & 24. **SFHCI.J Knowledge and understanding: 22 & 23.**
Additional competencies to be included: To demonstrate knowledge and understanding of: • Typical patterns of physiological tracer uptake • Atypical patterns of physiological tracer uptake • Structural variation in key anatomical structures • Anatomical and tracer uptake variation due to surgical procedures

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Curriculum section: Common pathologies of the areas to be scanned and their appearances on hybrid images
SFHCI.L Knowledge and understanding: 23 & 24. **SFHCI.J Knowledge and understanding: 22 & 23.**
Additional competencies to be included: To demonstrate knowledge and understanding of: • Typical patterns of physiological tracer uptake • Atypical patterns of physiological tracer uptake • Structural variation in key anatomical structures • Anatomical and tracer uptake variation due to surgical procedures

Curriculum section: When additional images and contrast media are required to aid diagnosis and to enhance the examination
SFHCI.L Knowledge and understanding: 1, 2, 13, 26, 27, 30, 32, 33, 34, 35 & 40. **SFHCI.J Knowledge and understanding: 1, 2, 13, 25, 26, 27, 29, 31, 33 & 39.**
Additional competencies to be included: To demonstrate knowledge and understanding of: • Additional diagnostic value • Importance of checking previous imaging • Additional radiation exposure • Principles of radiation dose minimisation and ALARP • CT acquisition parameters and image reconstruction (kVp, mAs, pitch, detector configuration, tube current modulation, rotation speed, FOV, reconstructed slice and interval) • The roles of operator, practitioner and referrer as identified in IR(ME)R 2017 and its subsequent amendments • Potential clinical impact of scanning with contrast media • Situations where contrast media may be required • how to complete safety checks related to contrast media with accuracy and confidence • The use of 'Pause and Check' related to use of ionising radiation and contrast media

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- Signs to recognise possible contrast reaction and the action(s) to take to ensure patient safety

Curriculum section: Artefacts on the images their causes and avoidance strategies (CT component)

SFHCI.L Knowledge and understanding: 33.

SFHCI.J Knowledge and understanding: 32.

Additional competencies to be included:

To demonstrate knowledge and understanding of:

- Scanner-based artefacts
- Patient-based artefacts
- Physics-based artefacts
- How to recognise common artefacts by appearance
- Impact of artefacts on attenuation correction and image fusion
- Metal artefact reduction
- Quality assurance and quality control tests
- Principles of image formation
- Principles of image reconstruction

Curriculum section: Accurately select all parameters required for the scan according to local scan protocols for the procedure, assess for any required modifications and take appropriate action (CT component)

SFHCI.L Knowledge and understanding: 13, 18, 27, 28, 30, 32, 34, 35 & 37.

SFHCI.J Knowledge and understanding: 13, 20, 25, 26, 27, 28, 29, 31, 33, 34 & 39.

Additional competencies to be included:

To demonstrate knowledge and understanding of:

- Acquisition parameters that can be adjusted (kVp, mAs, pitch, detector configuration, tube current modulation, rotation speed, FOV)
- Image reconstruction parameters
- Influence of acquisition parameters on radiation dose, image quality and artefacts
- Importance of safety checklists in determining modifications to scan protocols, including patient compatibility and allergies

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Curriculum section: Review of images for clinical acceptability and subsequent appropriate action, including further imaging if required (CT component)
SFHCI.L Knowledge and understanding: 4, 5, 23, 24, 28, 29, 30, 32 & 40. **SFHCI.J Knowledge and understanding: 4, 5, 22, 23, 25, 31, 33, 34 & 39.**
Additional competencies to be included: To demonstrate knowledge and understanding of: • Diagnostic acceptability • Recognition of artefacts • Factors that contribute to image quality • Presentation of common findings that require additional imaging • Presentation of clinically significant unexpected findings that require immediate follow-up (e.g. pneumothorax, AAA, cord compression, other incidental findings) • Presentation of common findings that DO NOT require additional imaging • Importance of reviewing previous imaging • Awareness of limitations of the job role and when to seek expert advice • Additional radiation dose associated with additional imaging

Curriculum section: Optimising patient care for hybrid imaging
SFHCI.L Knowledge and understanding: 10, 11, 25, 39 & 44. **SFHCI.J Knowledge and understanding: 10, 11, 24, 27, 28, 34, 38, 39, 40, 42 & 43.**
Additional competencies to be included: To demonstrate knowledge and understanding of: • Solutions to patient care when separated from the patient • Preparing the patient for hybrid imaging, particularly to avoid unwanted movement between emission and transmission imaging • Methods and ensure the patient is compatible with hybrid imaging • Patient-centred skills • The role of hybrid imaging techniques in the management of patients and their pathways

The curriculum for IPEM's technologist training scheme (DipT) will be updated to include the additional competencies listed in this document as well as the current RCT Scope of Practice.

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The revised curriculum with these additions is valid from October 2021.
Indicative Curriculum V4.1