Training and education framework for radiographers undertaking CT Colonography as part of the Bowel Cancer Screening service

Foreword

The CT Colonography Radiographer Education Development Group (CTC REDG) was set up in 2015 to review and develop guidelines for CTC education and practice. Membership of this group includes experienced CTC radiographers who are involved in the delivery of short courses and credit-bearing postgraduate awards to support the development of CTC services. Delivering these successful programmes of study has highlighted the wide variation in current CTC practice and education across the UK, and this has provided the momentum to explore what constitutes best practice in all aspects of CTC service delivery.

While the majority of CTC referrals are via the symptomatic service, many Trusts are involved in the provision of CTC examinations for the Bowel Cancer Screening Programme (BCSP). For a national screening programme to be both safe and effective it is important, where possible, to standardise the practice between centres. For this reason our CTC REDG activities have been supported by the Public Health England BCSP Radiology committee, and we are grateful to Public Health England who generously funded the activities of our group.

This Training and Education Framework has been designed by the CTC REDG members to support service managers and practitioners in facilitating suitable education and training to foster a safe and effective service. Recommendations for suitable learning outcomes, assessment criteria and assessment methods have been offered for each level of practitioner experience from 'Novice beginner' through to 'Expert'. At each level of practice there are additional requirements and complexity, supporting a continuum of education to support developing practice through the five levels. For further information regarding the five potential levels of practice within an effective CTC service, please read in conjunction with the CTC REDG guidance document "CTC Service Practitioner Framework".

The assessment methods outlined within this training framework can be undertaken using our CTC DOPS (Directly Observed Procedural Skills) toolkit, which provides easy to use checklists for observing and recording clinical skills in those developing their CTC expertise. We hope that you will find the information provided in these documents useful in supporting the continuing professional development of CTC service practitioners.

Yours sincerely,

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(Co-chairs of the CTC REDG)

Training and education framework for radiographers undertaking CT Colonography as part of the Bowel Cancer Screening service

The purpose of this document is to:

1. Provide a clear framework for the training and education of radiographers who are engaged in delivering a CT Colonography (CTC) service for symptomatic and screening patients
2. Synthesise and disseminate a recommended curriculum and available learning opportunities for radiographers working within the CTC service in order to inform the development of in-house, short course and credit-bearing education programmes
3. Assist employers, commissioners and patients to understand the role, competences and level of education commensurate with each level of CTC practitioner
4. Assist CTC service providers to develop and revise job plans and role descriptions for CTC practitioners, identifying professional development requirements in accordance with BCS QA guidelines (1) and the Society and College of Radiographers education and career framework (2)
5. Provide a point of reference against which structured workplace skills and competencies can be mapped in order to evidence opportunities for accreditation of prior experiential learning (APEL)

This framework will help diagnostic radiographers to:

1. Enhance their competence through the structured acquisition of knowledge, skills and attitudes to support delivery of a high quality CTC service for BCS and symptomatic patients
2. Identify educational needs and learning opportunities to meet role requirements
3. Identify academic preparation required to enable progression to the next practicing level

This document is underpinned by the following set of principles and priorities:

- Staff are the most valuable asset and play the definitive role in the patient experience
- Trained, motivated and high-performing staff are more likely to be retained and they help to attract new staff to the department
- Continuing Professional Development (CPD) is essential to meet registration requirements and the Society and College of Radiographers actively encourage radiographers to perform at their best to enhance patient care

Introduction:

CT Colonography (CTC) may be employed as either first line or second line large bowel imaging for the diagnosis of colorectal cancer and colonic polyps in the English Bowel Cancer Screening Programme (BCSP), ranging from 0.039% to 9.7% of the screening tests undertaken (3). A quality assurance (QA) programme to monitor standards and ensure best practice is universally specified for all patients visiting any screening centre, with well-established standards already in place in gastroenterology and pathology services. The Bowel Cancer Screening Radiology Quality Assurance committee was set up to develop and manage a similar QA programme for the CTC service in 2012, and subsequently published the BSCP Imaging guidelines (1). The committee recognised the need to establish CTC radiographer training and education requirements, and to review available CTC training opportunities. The establishment of a Radiographer Training and Educational Development Group (BCS CTCREDG) in 2015 subsequently led to publications related to a CTC practitioner framework, best practice guidelines, a competency framework, and this training scheme.

Background:

The diagnostic performance of CTC has been shown to be variable due to many reasons. Published literature identifies two consistent themes which may result in false negative diagnoses (missed large bowel lesions): poor CTC technique and lack of CTC experience. Achieving consistently high quality studies in all patients is challenging and requires experience and training. There are many steps to running a good quality service, some operational, some technical and some highly specialist. A good quality CTC service can be broken down into three categories: the institutional (the test itself); the radiographic (the person performing the test) and the radiological (the person reporting the subsequent images produced). Each step of the procedure benefits from training and careful thought. These are interdependent and the failure of any element can lead to poor quality studies, and incorrect diagnostic outcomes.

Radiographers traditionally perform the CTC procedure and radiologists interpret the images, but this is not universal in the UK. Whilst some radiographer training will be delivered in a formal setting (i.e. a course), most will take place in the workplace. If the individuals in an organisation wish to engage in practical, work-based training of radiographers in CTC, then their CTC service needs to be of a high quality. Good quality, effective training in the workplace requires knowledgeable trainers with a full understanding of the opportunities and barriers to learning, along with a protected learning environment, appropriate training opportunities, relevant educational materials, standardised assessments and ongoing mentoring.

Training Opportunities:

Training capacity: Sufficient numbers of CTCs should be taking place for training opportunities to arise. Ideally these should be clustered into lists of consecutive patients undergoing CTC rather than sporadic cases.

Environment: The CT scanner on which the studies are performed should be multi-slice, capable of acquiring isotropic voxels to allow high quality volume datasets for 3D interpretation. CT workstations should contain modern CTC software, allowing for training of both 2D and 3D interpretation techniques. Ideally, the CTC review workstations should be situated in a quiet location, where uninterrupted navigation and decision-making training may take place.

Educational resources: Ideally a large range of interesting teaching cases, with pathological confirmation by endoscopy or surgery, should be on hand for trainees to review. Books, DVDs, e-learning tools and internet access should be freely available. Copy of department policies should be easily accessible.

Trainers: The trainers should be sufficiently experienced in the CTC field. Ideally a lead trainer should be appointed, who is a clinical CTC expert and, ideally, formally trained in education techniques or 'how to train'. Formal training plans (Personal Development Plans) should be agreed with each trainee. Trainers should personalise the training of each individual radiographer, depending on their needs, and be skilled in order to adapt the training if the trainee is struggling.

Assessment & Mentoring: The trainer should review the achievements of each trainee in relation to their agreed goals listed in their PDPs. Structured feedback should be provided on an ongoing basis to each trainee in order to help them stay on target to achieve the set goals. Even if a trainee is practising independently, they should be evaluated objectively on a regular basis. Mapping against a competency framework, Direct Observation of Procedural Skills (DOPS) and VIVAs are useful assessment tools to establish and record competency and acquisition of relevant knowledge, skills and attitudes.

This strategy is aligned with the Society and College of Radiographers Education and Career Framework (2). It is advisable to also read in conjunction with the Health Education England Advanced Clinical Practice Framework (Nov 2017).

References:

1. Taylor S., Burling, D. & Patnick, J. (2012). NHS Bowel Cancer Screening Programme: Guidelines for the use of imaging in the NHS Bowel Cancer Screening Programme. 2nd Ed . accessed from http://www.bcsp.nhs.uk/files/nhsbcsp05.pdf
2. SCoR career framework[1] Education and career framework for the radiography workforce: https://www.sor.org/learning/document-library/education-and-career-framework-radiography-workforce/9-autonomous-practice-practitioners
3. Plumb AA, Halligan S, Nickerson C, *et al.* (2014). Use of CT colonography in the English Bowel Cancer Screening Programme. *Gut* 63:964-973.
4. Health Education England ACP Framework: https://hee.nhs.uk/our-work/advanced-clinical-practice/multi-professional-framework

CTC training level	**Novice beginner – Radiographer Practitioner**
Unit level	**One: In house training and established CTC service/study day**

LEARNING OUTCOMES	**ASSESSMENT CRITERIA**	**ASSESSMENT METHOD**
The learner will:	The learner can:	Demonstrated by :
1. Understand the dietary and bowel preparation requirements for a satisfactory CTC	1.1. Explain the function of bowel preparation 1.2. Explain the function of faecal tagging	Have observed 10 CTC examinations and discussed the bowel preparation process with their local assessor: Sign off at local level • Clinical log book • Competency chart
2. Understand the CTC informed consent process	2.1. Explain the function of the consent process 2.2. Define the key concepts and principles of the consent process 2.3. Understand that this is an ongoing process and consent can be withdrawn at any point by the patient	Have observed 20 CTC consent interactions and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart
3. Understand the standard patient scan positions used during a CTC	3.1. Evaluate the benefits of each position 3.2. Summarise key factors affecting patient positions	Have observed 20 CTC examinations and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart
4. Understand the anatomy of the large intestine	4.1. Define the sections of the bowel 4.2. Describe the difference between large and small bowel anatomy and histology 4.3. Describe the configuration and calibre of the large bowel	Assessed locally • Competency chart
5. Understand the principles of using the automated insufflator	5.1. Evaluate the role of the automated insufflator in achieving colonic distension 5.2. Explain the process of turning on and off the insufflator 5.3. Describe the safety features of the insufflator 5.4. Explain features of the CO_2 catheter equipment set	Have observed 20 CTC examinations and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart
6. Understand the principles of using a spasmolytic	6.1. Evaluate the importance of spasmolytics in achieving satisfactory colonic distension 6.2. Describe the basic safety principles	Have observed 20 CTC examinations and discussed the process with their local assessor:

	for the administration of a spasmolytic	Sign off at local level • Clinical log book • Competency chart
7. Understand the importance of colonic distension	7.1. Evaluate the importance of colonic distension 7.2. Explain the basic principles for determining good and poor distension on CTC images	Have observed 20 CTC examinations and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart
8. Understand the principles behind different types of scanning protocols which can be used during a CTC	8.1. Explain the contribution that the selected CT scanning parameters bring to patient dose and image quality	Have observed 20 CTC examinations and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart
9. Understand patient management after the CTC test	9.1. Explain what aftercare instructions must be given to the patient	Have observed 20 CTC examinations and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart
10. Understand the basics of patient management if an adverse event occurs during the CTC	10.1. Summarise the types of adverse events which could occur during a CTC	Discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart

CTC training level	**Advanced beginner – Radiographer Practitioner**
Unit level	**Two: short CTC course completion**

LEARNING OUTCOMES	ASSESSMENT CRITERIA	ASSESSMENT METHOD
The learner will:	The learner can:	Demonstrated by :
1. Understand the dietary and bowel preparation requirements for a satisfactory CTC	1.1. Explain the function of bowel preparation 1.2. Explain the function of faecal tagging **1.3. Understand the importance of renal function when prescribing bowel cleansing agents** **1.4. Evaluate the CTC image for adequacy of bowel preparation**	Have observed 40 CTC examinations / bowel preparation and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • **DOPS**
2. Understand the CTC informed consent process and be able to consent a normal referral for CTC	2.1. Explain the function of the consent process 2.2. Define the key concepts and principles of the consent process 2.3. Understand that this is an on-going process and that consent can be withdrawn at any point by the patient **2.4. Display the ability to begin and complete the consent process in routine patients**	Have observed 20 CTC consents, carried out 20 supervised consents and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • **DOPS**
3. Understand the patient standard scan positions used during a CTC	3.1. Evaluate the benefits of each position 3.2. Summarise key factors affecting patient positions **3.3. Describe the thought process and mechanics behind why each position is used**	Have observed 20 CTC examinations, carried out 20 supervised and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • **DOPS**
4. Understand the gross anatomy and common pathologies of the bowel seen on CTC	4.1. Define the sections of the bowel 4.2. Describe the difference between large and small bowel anatomy and histology 4.3. Describe the configuration and calibre of the large bowel **4.4. Explain significance of the bowel configuration and calibre on CTC** **4.5. Recognise large CTC pathology**	Discussed the process with their local assessor: Sign off at local level • Competency chart • **DOPS**
5. Understand the principles of using the automated	5.1. Evaluate the importance of the automated insufflator in achieving colonic distension	Have observed 20 CTC examinations, carried out 20 supervised and

	insufflator	5.2. Explain the process of turning on and off the insufflator 5.3. Describe the safety features of the insufflator 5.4. Explain features of CO_2 catheter equipment set **5.5.** **Explain the thought process behind the use of different pressure levels**	discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • **DOPS**
6.	Understand the principles of using a spasmolytic	6.1. Evaluate the importance of using spasmolytics in achieving satisfactory colonic distension 6.2. Describe the basic safety principles for the administration of a spasmolytic 6.3. **Describe contraindications to giving spasmolytics**	Have observed 40 CTC examinations and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • **DOPS and PGDs**
7.	Understand the importance of colonic distension	7.1. Evaluate the importance of colonic distension 7.2. Explain the basic principles of achieving good colonic distension, and the limiting factors which can prevent it **7.3.** **Undertake preliminary colon tracking, and evaluate need for further series**	Have observed 20 CTC examinations and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • **DOPS**
8.	Understand the principles behind different types of scanning protocols which can be used during a CTC	8.1. Explain the contribution that the selected CT scanning parameters have to patient dose and image quality **8.2.** **Explain the reason why different scanning protocols are used (low dose, ultra-low dose etc.)**	Have observed 20 CTC examinations, carried out 20 supervised and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • **DOPS**
9.	Understand patient management after the CTC test	9.1. Explain what aftercare instructions must be given to the patient **9.2.** **Summarise the reason behind the aftercare instructions for patients**	Have observed 20 CTC examinations, carried out 20 supervised and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • **DOPS**
10.	Understand the process of the patient management if an adverse event occurs during the CTC	10.1. Summarise the types of adverse events which could occur during a CTC **10.2.** **Explain the basic principles of how to manage these adverse events**	Discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • **Protocols**

CTC training level	**Competent – Radiographer Practitioner**
Unit level	**Three: PG credited CTC related module**

LEARNING OUTCOMES	**ASSESSMENT CRITERIA**	**ASSESSMENT METHOD**
The learner will:	The learner can:	Demonstrated by :
1. Understand the dietary and bowel preparation requirements for a satisfactory CTC	1.1. Explain the function of bowel preparation 1.2. Explain the function of faecal tagging 1.3. Understand the importance of renal function when prescribing bowel cleansing agents 1.4. Evaluate the CTC image for adequacy of bowel preparation **1.5. Re-appoint patient with alternative bowel preparation for patients with ineffective prep**	Have undertaken a minimum of 100 CTC protocols/distributed bowel preparation, and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • DOPS • **Viva** • **RIS data**
2. Understand the CTC informed consent process and be able to consent a normal referral for CTC	2.1. Explain the function of the consent process 2.2. Define the key concepts and principles of the consent process 2.3. Understand that this is an ongoing process and consent can be withdrawn at any point by the patient 2.4. Display the ability to begin and complete the consent process in routine patients	Have undertaken a minimum of 100 CTC consents, and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • DOPS
3. Understand the patient scan positions used during a CTC	3.1. Evaluate the benefits of each position 3.2. Summarise key factors affecting patient positions 3.3. Describe the thought process behind why each position is used 3.4. **Justify need for additional series** 3.5. **Modify exam to patient needs e.g. claustrophobic patients**	Have performed 100 CTC examinations independently, and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • **DOPS**
4. Understand the anatomy and common pathologies of the bowel seen on CTC images	4.1. Define the sections of the bowel 4.2. Describe the difference between large and small bowel anatomy 4.3. Describe the configuration and calibre of the large bowel 4.4. Explain the significance of the bowel configuration and calibre when reviewing CTCs	Discussed the process with their local assessor: Sign off at local level • Competency chart • DOPS • **Case studies** • **Viva**

	4.5. Recognise common large pathology found on CTC and its significance to the scan technique 4.6. **Explain the relevance of previous bowel surgery and highlight any likely associated modification in practice**	• **IPEX**
5. Understand the principles of using the automated insufflator	5.1. Evaluate the importance of the automated insufflator in the role of colonic distension 5.2. Explain the process of turning on and off the insufflator 5.3. Describe the safety features of the insufflator 5.4. Demonstrate use and features of CO_2 administration set 5.5. Explain the thought process behind the use of different pressure levels	Have performed a minimum of 100 CTC examinations, and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • DOPS
6. Understand the principles of using a spasmolytic	6.1. Evaluate the importance of the role of spasmolytics in achieving satisfactory colonic distension 6.2. Describe the basic safety principles for the administration of a spasmolytic 6.3. Describe contraindications to giving spasmolytic	Have performed a minimum of 100 CTC examinations and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • DOPS • PGD
7. Understand the importance of colonic distension	7.1. Evaluate the importance of colonic distension 7.2. Explain the basic principles of achieving good colonic distension, and the limiting factors which can prevent it 7.3. Perform preliminary colon tracking and justify any need for repeat series or further series.	Have performed a minimum of 100 CTC examinations and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • DOPS
8. Understand the principles behind different types of scanning protocols which can be used during a CTC	8.1. Explain the contribution the selected CT scanning parameters have to the patient dose and image quality 8.2. Explain the reason why different scanning protocols are used (low dose, ultra-low dose etc.) **8.3. Perform staging scans on identification of colorectal cancer**	Have performed a minimum of 100 CTC examinations and discussed the process with their local assessor: Sign off at local level • Clinical log book • DOPS • **Case study**

9. Understand patient management after the CTC test	9.1. Explain what aftercare instructions must be given to the patient 9.2. Summarise the reason behind the aftercare instructions for patients **9.3. Explain the medical implications if the aftercare advice is not followed/ given**	Have performed a minimum of 100 CTC examinations and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • DOPS • **Protocols** • **Viva**
10. Understand the process of the patient management if an adverse event occurs during the CTC	10.1. Summarise the types of adverse events which could occur during a CTC 10.2. Explain the basic principles of how to manage these adverse events	Discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • **Protocols** • **Viva**
11. Undertake Preliminary reporting	**11.1. Review CTC images and undertake preliminary report**	**Audit against authorised reported evidenced on** • **RIS**
12. Undertake Mentor and Assessor role and responsibilities	**12.1. Undertake the competency based assessments and carry these out for other CTC staff** **12.2. Demonstrate a CTC task whilst explaining it to the learner** **12.3. Demonstrate mentorship qualities**	Have performed a minimum of 100 CTC examinations and discussed the process with their local assessor: Sign off at local level • **Clinical log book**

CTC training level	Proficient - Advanced Clinical Practitioner
Unit level	Four: MSc / PG including CTC practice and reporting module or equivalent

LEARNING OUTCOMES	ASSESSMENT CRITERIA	ASSESSMENT METHOD
The learner will:	The learner can:	Demonstrated by :
1. Understand the dietary and bowel preparation requirements for a satisfactory CTC	1.1. Explain function of bowel prep 1.2. Explain function of faecal tagging 1.3. Understand the importance of renal function when prescribing bowel cleansing agents 1.4. Evaluate the CTC image for adequacy of bowel preparation 1.5. Re-appoint patient with alternative bowel preparation for patients with ineffective prep	Have undertaken a minimum of 100 CTC protocols/distributed bowel preparation , and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • RIS data • DOPS and Viva
2. Understand the informed consent process and be able to consent normal and complex referrals for CTC	2.1. Explain the function of consent 2.2. Define the key concepts and principles of the consent process 2.3. Understand that this is an on-going process and consent can be withdrawn at any point 2.4. **Complete and document patient consent in routine and complex CTC referrals**	Have undertaken a minimum of 500 CTC consents, and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • **DOPS**
3. Understand the patient scan positions used during a CTC and provide training for other staff	3.1. Evaluate the benefits of each position 3.2. Summarise key factors effecting patient positions 3.3. Describe the thought process behind why each position is used 3.4. Justify need for additional series 3.5. Modify exam to patient needs e.g. claustrophobic patients **3.6. Justify need for staging scans**	Have performed 500 CTC examinations independently, and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • DOPS • **Staging protocol**
4. Understand the anatomy and pathologies of the bowel seen on CTC and provide training for other staff	4.1. Define the sections of the bowel 4.2. Describe the difference between large and small bowel anatomy 4.3. Describe the configuration and calibre of the large bowel 4.4. Explain the significance of the bowel configuration and calibre when reviewing CTC's 4.5. Recognise pathology found on CTC and its significance to the scan technique 4.6. Explain relevance of previous	Discussed the process with their local assessor: Sign off at local level • Competency chart • DOPS • Case studies • Viva • IPEX • **Lectures**

		bowel surgery and highlight any associated modified practice 4.7. **Present lectures related to CTC pathologies**	
5. Understand the principles of using the automated insufflator	5.1. 5.2. 5.3. 5.4. 5.5.	Evaluate the importance of automated insufflator in achieving satisfactory colonic distension Explain the process of turning on and off the insufflator Describe the safety features of the insufflator Demonstrate use and features of CO_2 administration set Explain the thought process behind the use of different pressure levels	Have performed a minimum of 500 CTC examinations, and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • DOPS
6. Understand the principles of using a spasmolytic	6.1. 6.2. 6.3.	Evaluate the importance of the role of spasmolytics in achieving satisfactory colonic distension Describe the basic safety principles for the administration of a spasmolytic Describe contraindications to giving spasmolytic	Have performed a minimum of 500 CTC examinations and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • DOPS and Viva
7. Understand the importance of colonic distension and be able to educate others on this topic	7.1. 7.2. 7.3.	Evaluate the importance of colonic distension Explain the principles of achieving good colonic distension, and the limiting factors which can prevent it Justify repeat series or further series	Have performed a minimum of 500 CTC examinations and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • **DOPS**
8. Understand the principles behind different types of scanning protocols which can be used during a CTC and adapt appropriately	8.1. 8.2. 8.3. 8.4.	Explain the contribution the selected CT scanning parameters have to patient dose and image quality Explain the reason why different scanning protocols are used (low dose, ultra-low dose etc.) Perform staging scans on identification of Colorectal Cancer **Contribute background CT physics knowledge to the adaptation of scanning protocols to achieve diagnostic images within ALARP**	Have performed a minimum of 500 CTC examinations and discussed the process with their local assessor: Sign off at local level • Clinical log book • DOPS • **Competency chart**

9. Understand patient management after the CTC test	9.1. Explain what aftercare instructions must be given to the patient 9.2. Summarise the reason behind the aftercare instructions for patients 9.3. Explain the medical implications if the aftercare advice is not followed/ given	Have performed a minimum of 500 CTC examinations and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • DOPS and Viva
10. Understand the process of the patient management if an adverse event occurs during the CTC	10.1. Summarise the types of adverse events which could occur during a CTC 10.2. Explain the basic principles of how to manage these adverse events **10.3. Able to carry out a risk analysis to establish if a change in practice/ further team education is needed to prevent again in the future**	Discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • Protocols • **Viva**
11. Undertake Preliminary reporting	**11.1.** Review CTC images and undertake preliminary report **11.2. Explain and action the process to expedite urgent reports** **11.3. Compare CTC findings with pathology reports**	Audit against authorised reports evidenced on • RIS • **MDT** • **Email** • **Cancer register**
12. Undertake Mentor and Assessor role and responsibilities	12.1. Undertake the competency based assessments and carry these out for other CTC staff 12.2. Demonstrate a CTC task whilst explaining it to the learner 12.3. Demonstrate mentorship qualities **12.4. Set the learner specific small goals, to enable more engagement** **12.5. Display adult education teaching methods** **12.6. Demonstrate assessor qualities**	Have performed a minimum of 100 CTC examinations and discussed the process with their local assessor: Sign off at local level • Clinical log book • **CPD reflection piece**
13. Understand the research process	**13.1. Explain Good Clinical Practice research principles** **13.2. Initiate a research question relevant to CTC practice**	**Evidence:** • **Research outputs such as journal papers, posters, external lectures, letters to Editor**

CTC training level	Expert - Service lead/ Consultant Radiographer
Unit level	Five: MSc CTC performance/reporting and service development Achieved or working towards doctoral qualification

LEARNING OUTCOMES	ASSESSMENT CRITERIA	ASSESSMENT METHOD
The learner will:	The learner can:	Demonstrated by :
1. Understand the dietary and bowel preparation requirements for a satisfactory CTC	1.1. Explain function of bowel prep 1.2. Explain the function of faecal tagging 1.3. Understand the importance of renal function when prescribing bowel cleansing agents 1.4. Evaluate the CTC image for adequacy of bowel preparation 1.5. Re-appoint patient with alternative bowel prep for patients with ineffective prep **1.6. Audit examination quality** **1.7. Liaise with pharmacy / dieticians to establish approved service**	Have undertaken a minimum of 1000 CTC protocols and patient preparations , and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • RIS data • DOPS • Viva • **Protocol** • **Audit**
2. Understand the informed consent process and be able to consent normal and complex referrals for CTC	2.1. Explain the function of consent 2.2. Define the key concepts and principles of consent process 2.3. Understand that this is an on-going process and informed consent can be withdrawn at any point by the patient 2.4. Complete and document patient consent in routine and complex CTC referrals **2.5. Regular review of consent form and completion rate**	Have undertaken a minimum of 1000 CTC consents, and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • DOPS • **Audit**
3. Understand the patient scan positions used during a CTC and provide training for other staff	3.1. Evaluate the benefits of each position 3.2. Summarise key factors effecting patient positions 3.3. Describe the thought process behind why each position is used 3.4. Justify need for additional series 3.5. Modify exam to suit patient needs e.g. claustrophobic **3.6. Establish protocol for justification of staging scans**	Have performed 1000 CTC examinations independently, and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • DOPS • **Protocols**

4. Understand the anatomy and routine and rare pathologies of the bowel seen on CTC, and provide training for other staff	4.1. Define sections of the bowel 4.2. Describe difference between large and small bowel anatomy 4.3. Describe the configuration and calibre of the large bowel 4.4. Explain the significance of the bowel configuration and calibre when reviewing CTCs **4.5. Recognise all routine and complex intra luminal pathology found on CTC and its significance to scan technique** **4.6. Explain relevance of previous bowel surgery and highlight any associated CTC modifications** 4.7. **Present lectures/teaching related to CTC pathology**	Discussed the process with their local assessor: Sign off at local level • Competency chart • DOPS • Viva • Case studies • IPEX • **Lectures**
5. Understand the principles of using the automated insufflator	5.1. Evaluate the importance of the automated insufflator in achieving satisfactory colonic distension 5.2. Explain the process of turning on and off the insufflator 5.3. Describe the safety features of the insufflator 5.4. Demonstrate use and features of CO_2 administration 5.5. Explain the thought process behind the use of different pressure levels 5.6. **Check relevant service contracts** 5.7. **Liaise with manufacturer re quality concerns**	Have performed a minimum of 1000 CTC examinations, and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • DOPS • **Service contract**
6. Understand the principles of using a spasmolytic	6.1. Evaluate the importance of the role of spasmolytics in achieving satisfactory colonic distension 6.2. Describe safety principles for the administration of a spasmolytic 6.3. Describe contraindications to giving spasmolytics 6.4. **Ensure ratified PGD in place**	Have performed a minimum of 1000 CTC examinations and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • DOPS • **PGD**
7. Understand the importance of colonic distension and be able to educate others on this topic	7.1. Evaluate the importance of colonic distension 7.2. Explain principles of achieving good colonic distension, and the limiting factors 7.3. Justify repeat or further series **7.4. Audit examination quality**	Have performed a minimum of 1000 CTC examinations and discussed the process with their local assessor: Sign off at local level • Clinical log book

		• Competency chart • DOPS • **Audit**
8. Understand the principles behind different types of scanning protocols which can be used during a CTC and adapt appropriately	8.1. Explain the contribution the selected CT scanning parameters have to the patient dose and image quality 8.2. Explain reason why different scanning protocols are used (low dose, ultra-low dose etc.) 8.3. Perform staging scans on identification of CRC 8.4. Can contribute background CT physics knowledge to the adaptation of the scanning protocols to achieve diagnostic images within ALARP 8.5. **Liaise with radiation physics to ensure CT pre-sets are at levels to ensure ALARP principle upheld including service and down time**	Have performed a minimum of 1000 CTC examinations and discussed the process with their local assessor: Sign off at local level • Clinical log book • DOPS • Competency chart • **Radiation physics**
9. Understand patient management after the CTC test	9.1. Explain what aftercare instructions must be given to the patient 9.2. Summarise the reason behind the aftercare instructions for patients 9.3. Explain the medical implications if the aftercare advice is not followed/ given 9.4. **Liaise with other clinical departments in designing pathways and patient leaflets (e.g. the BCS team)**	Have performed a minimum of 1000 CTC examinations and discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • DOPS • **BCSP RIS**
10. Understand the process of the patient management if an adverse event occurs during the CTC	10.1. Summarise adverse events which could occur during a CTC 10.2. Explain the basic principles of how to manage these adverse events 10.3. **Able to carry out a risk analysis to establish if a change in practice/ further team education is needed to prevent again in the future** 10.4. **Establish an AVI protocol**	Discussed the process with their local assessor: Sign off at local level • Clinical log book • Competency chart • Protocols • Viva
11. Undertake Preliminary reporting	11.1. Review CTC images and undertake preliminary report 11.2. Explain and action the process to expedite urgent reports 11.3. Compare CTC findings with pathology reports **11.4.** **Audit service accuracy, sensitivity and specificity**	Audit against authorised reports evidenced on • RIS • MDT • Email • Cancer register • **Audit**

12. Undertake Mentor and Assessor role and responsibilities	12.1. Undertake the competency based assessments and carry these out for other CTC staff 12.2. Demonstrate a CTC task whilst explaining it to the learner 12.3. Demonstrate mentorship qualities 12.4. Set the learner specific small goals, to enable more engagement 12.5. Display adult education teaching methods 12.6. Demonstrate assessor qualities **12.7. Identify instructor recruitment and development** **12.8. Display high level of effective delivery of learning objectives (train the trainers), methods and techniques for proper and appropriate delivery of training**	Have performed a minimum of 100 CTC examinations and discussed the process with their local assessor: Sign off at local level • Clinical log book • CPD reflection piece • **Train the Trainers/ higher education assessment (eg. PgC education)**
13. Understand the research process and be actively engaged in seeking new topics to investigate	13.1. Explain Good Clinic Practice research principles 13.2. Initiate a research question relevant to CTC practice **13.3. Make appropriate steps to formally set up the research study (e.g. ethical approval)** **13.4. Lead a research study as either PI, sub PI or CI**	Evidence: • Research outputs such as Journal papers, Posters, External lectures, Letters to the editor etc.
14. Initiate and conduct CTC team meetings	**14.1. Arrange meetings within the CTC team, to discuss best practice, and any changes in service** **14.2. Understand the importance of a discrepancy meeting, and arrange and lead this**	**Evidence:** • **Meeting minutes**
15. Understand the management of a team and how to deal with staffing issues	**15.1. Ensure adequate staffing levels/cover to provide service** **15.2. Understand future service staffing requirements and plan for these** **15.3. Write and develop CTC protocols to ensure an effective competent CTC team and service**	**Evidence:** • **Workforce Training Plan** • **Management meeting minutes** • **Local olicies and protocols** • **Appraisal**

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