DEVELOPING WORLD-CLASS PERFORMANCE IN HEALTHCARE SCIENCE

A LEARNING GUIDE

FOR

HEALTHCARE SCIENTISTS

Theme	Cardiac, Vascular, Respiratory and Sleep Sciences Gastrointestinal Physiology and Urodynamic Science (CVRS)
Pathway	Gastrointestinal Physiology

PREFACE

Learning Guide version 1.0 - (2011/12)

This draft Learning Guide document provides initial information relating to trainees recruited onto the CVRS theme provides information for providers and trainees for the **first phase** of work based training.

Section 4 contains detailed information on content of rotation modules, experiential learning and competences to be completed in the rotational phase of the programme (Year 1).

Sections 1-3 contain general information about the programme structure and delivery and also an outline of specialist modules for years 2 and 3.

Further development work will be undertaken between December 2011 and April 2012 in conjunction with the Professional Bodies to provide detailed modular information for specialist training and assessment. At that point a further updated copy of this Learning Guide will be produced to include detailed information on structure and content of specialist modules for Years 2 and 3 of the programme.

The Year 1 Learning Guides will also be reviewed and updated based on experience of their use with trainees

CONTENTS PAGE

SECTION 1

Introduction

1.1 Learning and development for Healthcare Scientists

The aim of this programme is to develop world class performance in Healthcare Science

The Healthcare Training Programme (STP) in Gastrointestinal Physiology is designed to provide the Healthcare Scientist (HCS) with strong science-based, clinical training across all aspects of the specialism with an appropriate level of underpinning scientific knowledge to enable them to perform in a range of healthcare settings. The full curricula for can be found on this link www.networks.nhs.uk/nhs-networks/msc-framework-curricula. This Learning Guide describes the Healthcare Scientist work based training programme in Gastrointestinal Physiology and should be read in conjunction with the *Operational Framework for Modernising Scientific Careers (MSC) (planned for publication in December 2011), the University Handbook from relevant academic institution (MSc in Clinical Sciences Gastrointestinal Physiology*) and the *manual for the Online Assessment and Personal Development Management System*. The training will be delivered both in the work place and in the University and the trainee will also be part of the National School of Healthcare Science for the duration of their training. The National of Healthcare Science School will oversee the trainee performance using the online assessment function and will actively follow progression of all trainees throughout the programme. The National School will also work with the Strategic Health Authority Modernising Scientific Careers leads to ensure the smooth delivery of the programme.

At the end of the programme the successful trainee will receive an MSc in Clinical Science – Gastrointestinal Physiology and a Certificate of Competence for the work based programme.

Description of Healthcare Science themed pathways

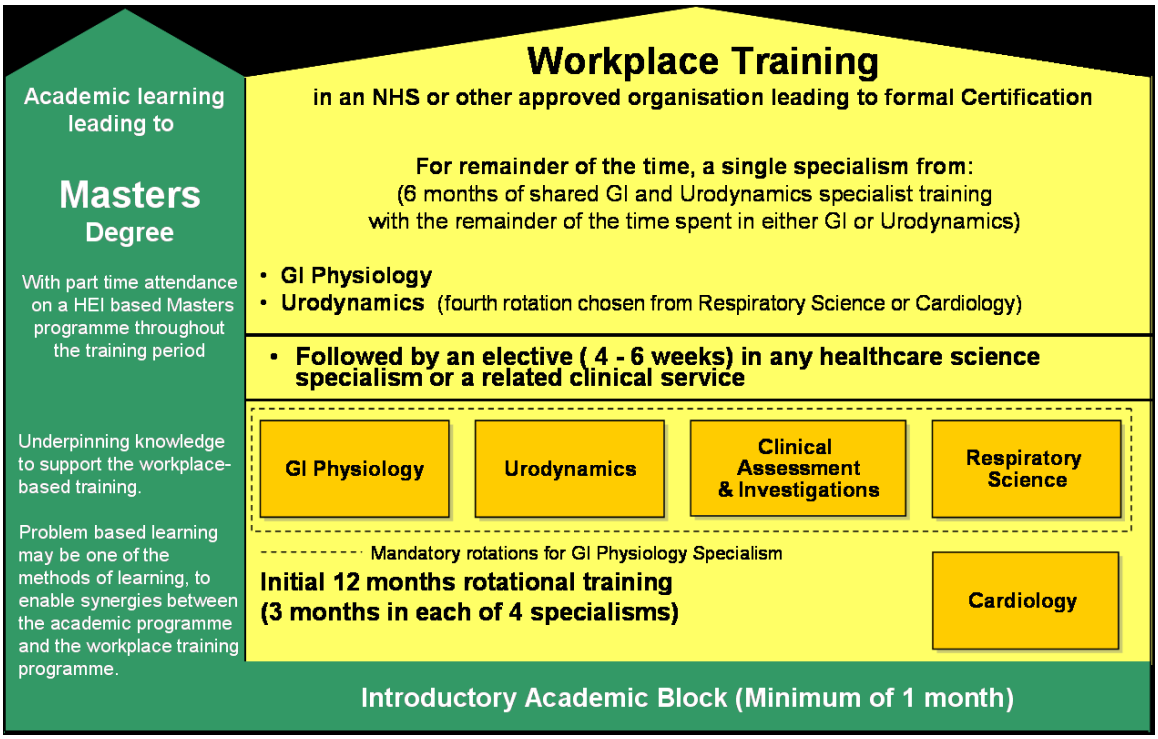
The Healthcare Science workforce consists of a diversity of specialisms. All involve the application of science, technology, engineering or mathematics to health. Traditionally, these specialisms have been divided into three broad divisional areas: life sciences, physical science and engineering and physiological science. However rapid advances in science and technology and changes in patient needs and service delivery are beginning to blur the lines between these divisions. In recognition of these changes, grouping the more than 45 specialisms into 7 themed pathways is proving to be a helpful way forward:

- Infection sciences
- Blood Sciences
- Cellular Science
- Neurosensory Sciences
- Cardiovascular, Respiratory and Sleep Sciences – hosts GI Physiology

- Clinical Engineering
- Medical Physics

For Gastrointestinal Physiology the indicative content of the 3 years is shown below. The rotational periods consist of the disciplines from CVRS theme. The order, and to some extent, the duration of the rotations may vary according to local availability.

Gastrointestinal Physiology



Broadly, the scheme of the STP includes work based training in 4 specialist CVRS rotations over the first period of training; each period of training will last for approximately 3 months depending on local arrangements and taking into account any periods of Annual leave.

At some point during the specialist training period there will be a 4-6 week elective period arranged by your local department but this may not always follow directly on from the initial rotational period. The aim of the elective period is to allow the trainees to experience other clinical departments, possibly in a different theme that has relevance to Gastrointestinal Physiology.

The remaining time will be spent on specialist Gastrointestinal Physiology training.

This work based component complements and utilises the parallel academic programme of training which results in a Masters degree in CVRS Science.

A generic module “Professional Practice” is included in the work based training element of the STP for all specialisms**;** this covers associated behaviours and professional practice common to all of Healthcare Science.

The Scope of Practice of a Healthcare Scientist (HCS)

Healthcare Scientists in Gastrointestinal Physiology will have clinical and specialist expertise underpinned by theoretical knowledge and experience in the specialism, and by broader knowledge and experience within the healthcare themes. They will undertake complex scientific and clinical roles, defining and choosing investigative and clinical options, making key judgements about complex facts and clinical situations for patients who require expert advice. They will work directly with medical colleagues, within the multidisciplinary team, to consult and advise patients. They will be involved, often in lead roles, in innovation and improvement, Gastrointestinal Physiology research and development and education and training. Some will pursue explicit academic career pathways which combine clinical practice and activity in research, innovation and education.

Good Scientific Practice

Good Scientific Practice [GSP] sets out the principles and values on which good practice within Healthcare Science is founded. It makes explicit, for Healthcare Scientists the public and healthcare providers, the standards of behaviour and practice that must be achieved and maintained in the delivery of work activities and clinical care. *GSP* is designed to contextualise the standards of practice and proficiency set down by the Health Professions Council (HPC) in a way that is accessible to the profession and the public. It therefore uses as its basis the HPC Standards of Proficiency and HPC Standards of Conduct, Performance and Ethics, which have been further elaborated for Healthcare Scientists in Good Scientific Practice, details of which can be found in the Appendices to this Guide.

1.2 How to use this learning guide

Providers of work based-learning

Section 2 provides an initial reference tool to assist providers with the provision of the training programme. .Use of this reference tool will facilitate planning for the delivery of the programme, including the management of the required rotational experience within, or external to the main provider.

Following review of this reference tool, providers should ensure that they obtain and are fully familiar with details in several specialist areas of training, e.g;

- requirements for training workplace based trainers
- assessment processes
- quality assurance and monitoring requirements
- the providers' role in supporting *equivalence* programmes for individual trainees

This information will be available in the *Operational Framework for Education and Training in Healthcare Science,* due to be published in December 2011.

Section 3 contains an overview of the Gastrointestinal Physiology programme and its delivery.

. **Section 4** contains detail on the work based learning outcomes, suggested clinical experience, competences, knowledge base and outcome performance measures (assessment criteria) and associated behaviours for each module associated with the Gastrointestinal Physiology programme .

Appendices provide further reference materials related to development and assessment in skills, behaviours and expectations of Healthcare Scientists.

Healthcare Science Trainees

Section 3 contains an overview of the Gastrointestinal Physiology programme and its delivery.

Section 4 is the Learning Framework which provides the training details of the programme. This is presented in a modular format and represents, as measures of successful completion of the programme and its learning outcomes the;

- clinical experience/assessment criteria for development of competence with recommended assessment tools/methods/criteria
- competences associated with successful work performance
- associated knowledge the trainee will be able to apply
- skills and behaviours associated with effective performance

Appendices provide further reference materials related to development and assessment in skills, behaviours and expectations of Healthcare Scientists.

Other reference materials are available through the Learning and Development Manager at the providing institution/location e.g. assessment of training details, equivalence (of prior learning and experience) processes, and monitoring and quality assurance of training programmes. It is anticipated that this information will be available, by December 2011, in the *Operational Framework for Education and Training in Healthcare Science.*

SECTION 2

Guidance for providers of work based learning in Gastrointestinal Physiology

2.1 Programme structure and rotations

PROGRAMME STRUCTURE

The work based element of the Healthcare Scientist Training Programme (STP) in Gastrointestinal Physiology takes place over the three years of the Programme. It commences with 4 rotations taken from those shown in the Gastrointestinal Physiology Pathway diagram;

The timings of these modules will depend of local availability and will be organised locally in conjunction with your Strategic Health Authority Modernising Scientific Careers Leads.

In the second phase of the workplace based training trainees specialise in Gastrointestinal Physiology based in the host Trust.

The Healthcare Scientist training programme also includes a specific research module which will be a combination of training in research methodology and a research project carried out in conjunction with the academic provider.

The Professional Practice element of the curriculum underpins both the academic and the work based training and is based on *Good Scientific Practice* (see Appendices).

This Guide describes in detail for trainees and providers the work based training for the 4 rotational placements and for the specialist programme in Gastrointestinal Physiology, in particular the curriculum content of the work based training, the details of the assessment programme and the e- portfolio structure.

It is the role of the providers of work based training to take responsibility for organising their own delivery timetables, in conjunction with the academic providers.

It is important to recognise that in the delivery of these new training programmes trainees are essentially supernumerary to service provision and will need identified and protected time to undertake their academic studies. However an equally important part of this programme is clinical competence, wherever possible and under

appropriate supervision trainees should be involved directly in clinical and laboratory practice.

Each trainee should be assigned a trainer for the duration of the programme.

Throughout the early implementation of these new training programmes the National School of Healthcare Science will provide a national co-ordinating function to support departments in delivery. Assistance will be available in terms of organising specialist rotations that might need national coordination, successful implementation of the assessment tool and the provision of a train the trainer programme. The School will continue to function with a high level over sight of all the Gastrointestinal Physiology trainees and co-ordinate mid term and final work based assessments in collaboration with the professional body. The School will also liaise with relevant academic institution to ensure the timely delivery of the academic programme.

2.2. Requirements for delivery

QUALITY OBJECTIVES AND MEASURES FOR PROVIDERS OF WORK BASED TRAINING

All training departments are responsible for the delivery of the workplace based training quality standards detailed in the Learning and Development Agreement (LDA) issued by their local Strategic Health Authority Modernising Scientific Careers Leads.

This section provides a reference tool for work based training providers to assist with decision-making to deliver the full content of this training programme. Providers may need to include plans for working with other approved providers in order to meet the rotation and elective components, although the host provider continues to hold the responsibility for the overall quality of training provision for trainees, by regular contact e.g., weekly catch up sessions.

The table below draws providers' attention to some of the challenging issues that must be addressed in the Gastrointestinal Physiology training programme.

RESOURCE OBJECTIVES

Quality objective	Requirements
Staff resources The delivery and assessment of the Gastrointestinal Physiology Healthcare Science programme requires an appropriate programme faculty across each component of the programme, all of whom have undertaken appropriate training for the role	• Trainers are appropriately trained and qualified in training and assessment • Trainers are vocationally competent to train and assess trainees in the learning outcomes of the curriculum. • Trainers are given sufficient time to effectively fulfil all aspects of the role and ensure the quality of the programme
Physical Resources The provider will ensure that sufficient physical resources are available, operational and approved for the required training	• There are sufficient physical resources to ensure that trainees can undertake the required rotations.
Rotations The range of clinical services to be available in each rotational site can be found by reference to the rotational modules in section 4	• This may require arrangements with other providing institutions – with responsibility for ensuring quality and consistency of provision remaining with the originating provider
Electives The provider will ensure that sufficient resources and locations are available for the elective component for 4-6 weeks	• Available resources for electives in any Healthcare Science specialism or related clinical service
Specialist Gastrointestinal Physiology training The provider will ensure that sufficient physical resources are available for specialist training in Gastrointestinal Physiology	• Available resources for single specialism training in Gastrointestinal Physiology, including the research module

SECTION 3

Guidance for Healthcare Scientist trainees in Gastrointestinal Physiology

3.1 The role of the Healthcare Scientist in Gastrointestinal Physiology

Healthcare Scientists in Gastrointestinal Physiology fulfil all elements of the generic Scope of Practice for the specialism. They must use knowledge and experience across a wide range of clinical pathways in Gastrointestinal Physiology services

The following roles will be developed throughout the training programme by a combination of work based competencies, underpinning academic knowledge and clinical experience. They are not exhaustive, but are indicative of the multi-layered role of the Healthcare Scientist in Gastrointestinal Physiology

Clinical Role

- Assure the quality of Gastrointestinal Physiology services
- Provide an appropriate, patient focussed, modern range of investigations in a
- Advise on patient investigation and treatment
- Interpret results and offer clinical advice on follow up and management
- Conduct clinical audit
- Contribute to evidence based good practice guidelines
- Participate in relevant collaborative research

Managerial Role

- Provide an appropriate, modern range of services in a patient focussed environment
- Understand the legal framework for genetic testing including ethical, legal and social implications
- Conduct clinical audit

Research/Training and Education

- Participate in relevant collaborative research
- Contribute to evidence based good practice guidelines

- Research the application of scientific investigation to one or more clinical situations in Gastrointestinal Physiology

- Lead or develop or participate in training and education of Healthcare Scientists in Gastrointestinal Physiology

Professional Practice

- Be a role model in excellent professional behaviours and practice as described by Good Scientific Practice

3.2 About the programme – what the trainee will do

Healthcare Scientists in Gastrointestinal Physiology work within the multidisciplinary clinical team to perform a number of functions. The following pages provide a broad overview of the role and functions related to the specialist Gastrointestinal Physiology and rotational components of the work based part of this programme.

The detailed performance measures are included in **Section 4** which serves as the basis for programme design, delivery and assessment

Induction

Each time a trainee begins work based training in a new clinical or laboratory environment, an induction will be provided and will include.

- Local hospital induction – local policies
- Review of local service and functioning of the laboratory and any related operations
- Review of clinical users of the laboratory service
- Review and more detailed description of health and safety, pertinent to the modules and to the local department.
- Basic knowledge about the function, operation of equipment appropriate to the section(s) of the laboratory in which the trainee will be working

Rotational Programme

The aim of the rotational programme is to introduce the breadth of underpinning knowledge necessary to fulfil the role of a Healthcare Scientist in Gastrointestinal Physiology.

Within the Gastrointestinal Physiology Programme the following rotational placements operate in the CVRS theme. The following provides a broad outline of the aims of each rotation. Detailed learning outcomes, workplace competences and knowledge specification are included in the Learning Framework in section 4. The corresponding academic components of these modules are being delivered by relevant academic institution using a blended learning approach described in the Handbook for the MSc

Rotational Placements in Cardiac, Vascular, Respiratory and Sleep Sciences (CVRS)	Aim
Introduction to GI Physiology	On completion of this module the trainee will have had the opportunity to observe and critically evaluate the range of GI testing available in the department and will have performed basic tests under direct supervision. They will have been involved in QA of equipment and interpreted the results of basic tests.
Introduction to Urodynamics	On completion of this module, the trainee will have had experience of preparing equipment and devices for routine investigations in Urodynamic Science and be able to describe the purpose and use of each for the investigation of urodynamic function and disease. They will be able to produce a basic interpretive report on a range of basic tests, including the use of nomograms. They will have a clear understanding of the relationship between Urodynamic Science and other specialisms within Clinical Physiology
Introduction to Respiratory and Sleep Science	On completion of this module the trainee will have undertaken a critical evaluation of diagnostic and treatment/management services within Respiratory and Sleep Sciences. They will have had the opportunity to undertake some basic investigations on adult patients and to observe other investigations and therapeutic interventions. They will have developed an understanding of the inter-relationship of Respiratory and Sleep Sciences with other Physiological Sciences specialisms
Introduction to Cardiac Science	On completion of this module the trainee will have undertaken a critical evaluation of diagnostic and treatment pathways for people with suspected or confirmed cardiac

	diseases. They will have had the opportunity to perform routine investigations including resting and ambulatory blood pressure BP and ECG and to observe a further range of procedures.
Clinical assessment and investigation (CVRS)	On completion of his rotation the trainee will have had the opportunity to apply their knowledge and basic skills of clinical assessment and investigation used in the diagnosis, care and treatment of patients with Cardiovascular, Respiratory and Sleep disorders across a range of clinical settings (e.g. Medical Assessment and Integrated Care, Critical Care and community based services). Fundamental to this rotation is that the trainee has an introductory knowledge and understanding of cardiac, respiratory, sleep and vascular diseases and their signs and symptoms, and how they frequently interact. Integral to this module is the opportunity for the trainee to gain a greater understanding of the role of other related diagnostic modalities such as Radiology and Pathology. This module will give the trainee knowledge and understanding of the interpretation and clinical decision making associated with clinical assessment and investigations in the context of differential diagnosis together with an understanding of the principles of operation, data acquisition and quality assurance of other diagnostic service modalities.

Aims of Specialist training in Gastrointestinal Physiology

The Healthcare Scientist Programme in Gastrointestinal Physiology provides work based training to complement the academic learning programme provided through the MSc in Clinical Science (CVRS).

Clinical Module	Aim
Lower Gastrointestinal Physiology and Endoanal Ultrasound	This module will provide trainees with a higher specialised body of knowledge which underpins the specialist rotation of Lower GI Physiology.
Urodynamic Science 1	This module provides trainees with the knowledge that underpins the specialist module in Urodynamic Science and gives these trainees the tools to undertake project based learning in the workplace.
Upper GI Physiology	This module will provide the trainee with a higher specialised body of knowledge and practical competency which underpins the specialist rotation of Upper Gastrointestinal Physiology
Research project in Gastrointestinal Physiology	The overall aim of this module, building on the Research Methods module is for the trainee to undertake research that shows originality in the application of knowledge, together with a practical understanding of how established techniques of research and enquiry are used to create and interpret new information in a specialism of Healthcare Science. During Years 2 and 3 the trainee will undertake a creative piece of research involving the application of scientific investigation to one or more clinical situations. The trainee will also be expected to complete either one [single] large research project or three shorter health services research projects to gain an understanding of the health services contexts within which clinical research is

	undertaken. Whichever is chosen they should include: • Evidence-based practice • Clinical audit • Supporting service users

Trainees will complete a research project in Gastrointestinal Physiology to show originality in the application of knowledge, together with a practical understanding of how established techniques of research and enquiry are used to create and interpret new information in Gastrointestinal Physiology. The research project will be carried out in conjunction with the relevant academic institution.

The generic 'Professional Practice' module underpins training and performance across the whole programme.

3.3 About the Programme - how you will be assessed

Assessment

There will be continuous assessment during the workplace-based training using a series of validated workplace based assessment tools. Trainees will be expected to keep a record of all assessments and competences in their e-training portfolio.

The overall workplace based assessment programme comprises a number of assessment tools.

- *Case based discussion* (CbD)
    - This tool is designed to demonstrate the trainee's knowledge and understanding of any aspect of an 'output' for which they have been wholly or partially responsible. This can range from discussion of the science behind the 'output' to ethical and communication issues arising in context.
- *Direct observation of practical skills*
    - This tool records an observation of a skill or procedure. Feedback is given and learning needs identified. Each discipline will have a core list of skills with documentation of what is expected at the relevant stage of training
- *Multi-source feedback*
    - The tool enables feedback to be given to trainees by different colleagues who work with them. The trainee and trainer nominate a range of colleagues who will be invited in accordance with agreed guidelines for who is eligible.
    - Research has shown that 8-10 raters are necessary to achieve reliability.
    - The trainee also rates him/herself.
    - This tool is also entirely on-line and there is no local paperwork. A report is generated which should be discussed with the trainee by a trainer who has been trained in giving feedback. The report is placed in the online training portfolio.
- *Observation of clinical events* (based on Mini-Cex)
    - A clinical event is defined as any occasion when the trainee/student is present with a patient as part of the clinical team. This is true for all patient-facing occasions whether the trainee only observes, or speaks to, touches, positions or examines a patient.
    - The tool records aspects of the trainee's communication and clinical skills as relevant. It also records professionalism

The assessment programme is an integral part of the curriculum. The curriculum in turn is based on *Good Scientific Practice*. This linkage is crucial to standard setting and to support review of the satisfactory progression of trainees through the programme. The assessment tools taken together therefore provide evidence/information about the trainee's ability in relation to all aspects of the curriculum.

The evidence provided by the work place based assessments taken together provide evidence/ information about the trainee's ability, demonstrated in the workplace, in relation to all aspects of the curriculum.

Assessment Tool	**DOPS**	**MiniCex**	**CbD**	**MSF**
Purpose	**Observation** Observe and assess the conduct of a practical procedure	**Observation** Observe and assess a clinical encounter	**Conversation/ discussion** Discuss an outcome/ output from workplace activity using a record, result,	**Review by others/colleagues** Professionalism Interpersonal skills/Team working Communication
Takes place	**Process** Reviewed and documented with feedback in the moment/ as it is happening	**Process** Reviewed and documented with feedback in the moment/ as it is happening	**Outcome/output** Discussing, explaining, justifying aspects of the report/record/result. Including aspects of professionalism	**Reflecting** on comments of others within the framework of constructive feedback

There is a requirement for each trainee to engage with the assessment process and to complete a minimum numbers of the different types of assessments within each module; these will be detailed in the assessment manual and on the tool.

Online assessment and personal development management system

An online assessment and personal development management system provides an electronic medium for completion and logging of all of the personal assessments related to the workplace elements for the Modernising Scientific Careers (MSC) training programmes and is available for the work place elements of the programme.

The electronic portfolio provides support to the trainees with their continuous professional development throughout the training programme and provides a mechanism through which their development and progress can be monitored and managed.

Progression

Maintaining the electronic portfolio is an integral part of the workplace based programme and its maintenance by the trainees is essential for progression. Trainees are responsible for maintaining their portfolio and keeping keep a record of all assessments and competences and information relating to their progression through the programme up to date.

The National School of Healthcare Science will use the assessment tool to consider the trainee's progression at any time within the programme and to provide feedback around areas of development. The successful completion of the online assessments will form the main body of evidence for the School and the Professional bodies to award the Certificate of Competence.

Rotation Assessment

During the rotational periods there should be one DOP and one CBD completed for each rotation.

The clinical experiential learning should be recorded on the online tool as reflective learning and will form an important part of your portfolio.

The trainees must complete all competences by the end of the rotation.

SECTION 4
The Learning Framework

The following section provides the framework for the design, delivery and assessment of learning and performance outcomes and associated knowledge and skills.
The framework provides a specification for each rotation and then for the specialist component of the programme
All of the underpinning academic knowledge will be taught as part of the Masters programme delivered by the academic provider

Rotational Modules

GASTROINTESTINAL PHYSIOLOGY

Rotation Module

MODULE TITLE	CVR Introduction to GI Physiology	**COMPONENT**	**Rotation**
AIM	This module will provide the student with a generalised body of knowledge which will introduce and underpin the rotation of Gastrointestinal Physiology.		
SCOPE	On completion of this module the trainee will have had the opportunity to observe and critically evaluate the range of GI testing available in the department and will have performed basic tests under direct supervision. They will have been involved in QA of equipment and interpreted the results of basic tests.		

LEARNING OUTCOMES

On successful completion of this module the trainee will achieve the following work based Learning Outcomes;

1. Critically evaluate the range of GI testing available
2. Perform non-invasive breath tests under direct supervision (hydrogen, *methane** and urea breath testing.) ***If methane analyser available.***
3. Interpret the results of hydrogen *& methane** and urea breath tests and produce a concise written report. ***If methane analyser available***
4. Understand the principles of glucose monitoring and maintenance of quality assurance of equipment whilst undertaking breath testing on diabetic patients

The following section provides detail of expected achievements in both practical and knowledge based learning outcomes for this module.

Required achievements are cross-referenced to the above Learning Outcomes to ensure application of competence across all activities within this module and thus maintain an integrated and holistic approach to development and assessment.

CLINICAL EXPERIENTIAL LEARNING

The recommended examples of clinical experiential learning for this module are

- Observe the performance of routine investigations to aid understanding of GI disorders including;
    - Oesophageal manometry, Ambulatory 24 hour pH and impedance measurement., Anorectal manometry
    - Anorectal and Low Rectal Ultrasound, Hydrogen & methane and urea breath testing

- Describe the care pathways linked to GI Physiology: including, Cancer Services, Benign Upper Gastrointestinal Disease

  Functional Gastrointestinal Disorders (FGID), colorectal functional Disorders, Nutrition, Asthma, Cystic Fibrosis

  Steatorrhoea, Carbohydrate malabsorption, Small bowel overgrowth, Malabsorption

  Coeliac disease and other conditions with villous atrophy

- Describe the regimen used in the treatment of;

  Suspected primary or secondary lactose intolerance

  Irritable bowel syndrome

  Intolerance of milk, dairy products, pastries or chocolate

  Investigation of bloating, flatulence, diarrhoea

The trainee will gain experience of;

- Gain experience of routine investigations undertaken within a Gastrointestinal Physiology department and demonstrate an understanding of the range of needs of people with disabilities within a typical care pathway for a patient with gastrointestinal disease

- Gain experience of the linkages between the Gastrointestinal Physiology and other clinical specialisms in the investigation of diseases of the Gastrointestinal System

All of these experiences should be recorded in your e-portfolio as reflective learning and discussions with your training officers.

Requirements for Professional Practice are contextualised to ensure the application and assessment of broad descriptors contained within Good Scientific Practice.

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
1	Critically evaluate diagnostic services in GI to include; o Oesophageal manometry o Ambulatory 24 hour pH and impedance measurement. o Anorectal manometry o Anorectal and Low Rectal Ultrasound o Hydrogen & methane and urea breath testing	The range of investigations undertaken in GI and their purpose. The use of diagnostic investigations in the management of patient presenting with the specified range of diseases/disorders The possible clinical outcomes for these patients The range of needs of patients with disabilities undergoing GI investigations Possible Health and Safety hazards and risks associated with investigations
1	Critically evaluate the range of treatment/management options to include A medical treatment pathway A surgical treatment pathway A therapeutic treatment pathway	The range of treatment pathways and their relevance/applicability to GI disorders and disease The options available to patients with GI disorders/ disease and implications and benefits of each Factors affecting selection of treatment option
2,3,4	Control infection risks pre, during and post investigations and actions taken to manage these.	Protocols and requirements hygiene and infection control related to the relevant range of investigations, including preparation, conduct and completion of investigation
2,3,4	Obtain a suitably completed request form, greet patient, and check patient ID and	Referral routes for GI investigations Contra-indications to testing

	recent clinical history.	Requirements for correct completion of request forms and how to validate How to communicate with patients in a way which respects their dignity, rights, privacy and confidentiality. The importance of checking patient identify The importance of explaining the procedure to the patient and gain consent. How to take and record a patient history and key information required Measurements that may be required pre and post investigation such as height, weight and their importance
2,3,4	Prepare the environment, equipment and patient for investigations to include; (for adult patients) i) Breath testing ii) Plus one other investigation	Requirements for the investigation environment to ensure privacy, dignity and comfort of patient, to facilitate investigation procedure and maximise results Clinical indications for the tests The management of the patient in relation to fasting and cessation of medication, to safely and accurately undertake the investigations How to check, calibrate and prepare equipment and devices The types of devices and the technology available to perform hydrogen, methane and urea breath testing Fault identification and remedial action Test protocols relating to non-invasive breath tests and the suitability of the test procedure for individual patients Correct configuration of recording systems Correct positioning of the patient ensuring comfort and co-operation The importance of explaining the procedure to the patient and the impact of incorrect positioning or non-co-operation on investigation results. How to identify potential special needs of patients and relevant action required
2,3,4	Confirm diabetic status of patient and take pre test glucose reading if	The importance of pre-testing for glucose with diabetic patients and implications of pre-test results

	necessary	
2,3,4	Ensure patient compliance with pre test procedures.	the range of pre test requirements and their importance, including - Fasting - Cessation of medication - Cessation of smoking - Notification of allergies
2,3	Perform non-invasive breath test with an adult patient	Importance of breath test equipment compliance with all current safety standards, confirmed by Trust BME commissioning number equipment has Regular safety-testing and maintenance in accordance with the manufacturer's recommendations. Correct labelling, replacement and disposal; of devices and components The indications, and both absolute and relative contraindications for hydrogen and urea breath tests The appropriate type and weight of substrate are used in accordance with the specific standard operating procedure
4	Assist with glucose monitoring procedure.	How to charge up the lancing device and select the appropriate skin depth Check the battery power of the glucose meter and the batch number of the test strips Selection of appropriate site and carry out procedure to obtain blood droplet. Application of the blood to the target area on the testing strip ensuring it is covered Recording of the test results from the glucose meter Recognition of the ranges of abnormal and normal results and where repeat measurements may be needed.

Associated Behaviours and Professional Practice
*. The Healthcare Scientist operates to high standards of professionalism and demonstrates essential behaviours and personal qualities These are specified within **Good Scientific Practice** and map to the professional standards needed for registration with the appropriate Regulatory Bodies.* *These include areas such as communication and Health and Safety that complement and test application of the academic learning. These qualities need to be assessed throughout the work based assessment programme and will be demonstrated using appropriate assessment tools (DOPs and CBDs). Appendix 1 contains the summary of these professional qualities* *The application of key professional qualities in this module is contextualised below*.
✓ Communicate complex and technical information to patients and those with limited technical knowledge in terms that facilitate understanding of issues ✓ Ensure validation of data, through use of appropriate sources of information including relevant databases and consultation with senior colleagues ✓ Evaluate data from a range of analysis, information and personal support sources to assist with judgements and decisions on interpretation, extended testing, reporting and communicating results ✓ Make use of suitable range of diagnostic, investigative and/or monitoring procedures when undertaking investigations ✓ Produce a range of written reports in accordance with personal level/sphere of responsibility ✓ Use the appropriate range of IT platforms and software to ensure effective and comprehensive data collection and analysis ✓ Audit scientific practice within all areas of practice associated with investigations to ensure application of ethical and governance regulations ✓ Accept the responsibilities of the role of the scientist in relation to other health care professionals and with empathy and sensitivity to patients, carers and families ✓ Prioritise and organise workload and duties with due regard for urgency, patient care, safe practice and the optimisation of department workload. ✓ Work effectively and efficiently within a multi-disciplinary team with due regard for the needs, wishes, dignity and privacy of patients and their families ✓ Present Quality Assurance data in compliance with principles of internal Quality Control and external Quality Assurance

SECTION 4
The Learning Framework

The following section provides the framework for the design, delivery and assessment of learning and performance outcomes and associated knowledge and skills.
The framework provides a specification for each rotation and then for the specialist component of the programme
All of the underpinning academic knowledge will be taught as part of the Masters programme delivered by the academic provider

Rotational Modules

URODYNAMIC SCIENCE

Rotation Module

MODULE TITLE	CVR Introduction to Urodynamics	**COMPONENT**	**Rotation**
AIM	This module will provide trainees with the knowledge and understanding of Urodynamic Science		
SCOPE	On completion of this module, the trainee will have had experience of preparing equipment and devices for routine investigations in Urodynamic Science and be able to describe the purpose and use of each for the investigation of urodynamic function and disease. They will be able to produce a basic interpretive report on a range of basic tests, including the use of nomograms. They will have a clear understanding of the relationship between Urodynamic Science and other specialisms within Clinical Physiology		

LEARNING OUTCOMES

On successful completion of this module the trainee will achieve the following work based Learning Outcomes;

1. Set up and calibration of equipment used for routine investigations undertaken within an Urodynamic Service. Have knowledge of the different types of equipment available
2. Recognise the indications for urodynamics and the choice of technology for investigating lower urinary tract (LUT) symptoms
3. Understand the linkages between Urodynamic Science and other clinical specialisms in the investigation of diseases of the urinary tract.
4. Explain flowmetry and filling/voiding cystometry to a patient and gain consent.
5. Describe the types of devices and the technology available to perform flowmetry, filling/voiding cystometry and post-void residual urine using hand held ultrasonography
6. Produce written report s of a range of basic urodynamics tests. Including the use of nomograms.
7. Understand the range of needs of people with disabilities within a typical care pathway for a patient with diseases of the bladder and urinary system.

The following section provides detail of expected achievements in both practical and knowledge based learning outcomes for this module.

Required achievements are cross-referenced to the above Learning Outcomes to ensure application of competence across all activities within this module and thus maintain an integrated and holistic approach to development and assessment.

CLINICAL EXPERIENTIAL LEARNING

The recommended examples of clinical experiential learning for this module are

- Assisting, observing and where appropriate undertaking flowmetry, filling/voiding cystometry and post-void residual urine using hand held ultrasonography, in a range of patients and disabilities, partaking of Multidisciplinary meetings to discuss results.

- Critically evaluate the investigations undertaken by a Urodynamic Science service and understand the importance of other clinical specialisms in the investigation of diseases of the urinary tract including lower GI physiology, proctography, EMG [Mini CEX

All of these experiences should be recorded in your e-portfolio as reflective learning and discussions with your training officers.

Requirements for Professional Practice are contextualised to ensure the application and assessment of broad descriptors contained within Good Scientific Practice.

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
1	Set up and calibrate equipment used for routine investigations undertaken within a Urodynamic Science Service	Demonstrate the accurate set up and calibration of equipment use in routine urodynamic investigation [DOP] Evaluate normal/abnormal ranges/traces for each type of investigation recognising variations appropriate to age, gender and relevant medical history. [CbD] Observe, assist and where appropriate, perform routine investigations in both male and female patients, including Flowmetry Urinalysis Residual urine assessment by ultrasound Filling and Voiding Cystometry, Ambulatory Urodynamics, Urethral pressure Flowmetry Urinalysis Residual urine assessment by ultrasound, Video-urodynamics [DOP, MiniCEX] Recognise the errors or potential risks of using defective equipment in clinical practice [CbD]
2	Recognise contraindications to testing prior to the test, as defined by department protocol	Demonstrate an understanding of the pathophysiology of the urinary tract and the appropriate choice of investigation to best evaluate the disorder Demonstrate the care required to achieve optimum safety prior to and during the test, as defined by departmental and national protocols, policies and guidance The clinical indications and contraindications for the tests listed above CbD
3	Understand the linkages between Urodynamic Science and other clinical specialisms in the investigation of	Describe the content and application of questionnaire such as but not limited to, the International Consultation on Incontinence Modular Questionnaire (ICIQ) and International Prostate Symptom Score (IPSS) assessments. Understand the use of nomograms in describing clinical results.

	diseases of the urinary tract.	
1	Explain the range of investigations o a patient and where appropriate gain fully informed written consent.	Demonstrate an understanding of the risks and benefits of undertaking the investigations and a good underpinning knowledge of the tests and disorders to gain fully informed consent. Understand the normal/abnormal ranges/traces for each type of investigation recognising variations appropriate to age, gender and relevant medical history. [CbD]
1	Treat patient in a way which respects their dignity, rights, privacy and confidentiality Recognise the special needs of the patient and take appropriate action, as defined by department protocol.	Understand the range of patients who will benefit from the urological investigation and demonstrate good communication and empathy with patients in whom the undertaken are undertaken. [DOP] Understand the range of needs of people with disabilities within a typical care pathway for a patient with diseases of the bladder and urinary system
4	Identify the normal/abnormal ranges/traces for each type of investigation. Recognise variations appropriate to age, gender and relevant medical history.	A good underpinning knowledge of the investigations to enable review **of** the results of the test, taking into account artefacts, necessary adjustments of values and planned / unplanned events occurring during the test and compare the values/traces obtained with the normal range/values related to the procedure.

		CbD
4	Produce a clear written summary of the measurements made.	Critical judgement in the evaluation of the data in relation to the patients presenting history, gender and co-morbidities. CbD

Associated Behaviours and Professional Practice
. *The Healthcare Scientist operates to high standards of professionalism and demonstrates essential behaviours and personal qualities These are specified within* ***Good Scientific Practice*** *and map to the professional standards needed for registration with the appropriate Regulatory Bodies.* *These include areas such as communication and Health and Safety that complement and test application of the academic learning. These qualities need to be assessed throughout the work based assessment programme and will be demonstrated using appropriate assessment tools (DOPs and CBDs). Appendix 1 contains the summary of these professional qualities* *The application of key professional qualities in this module is contextualised below*.
✓ Communicate complex and technical information to patients and those with limited technical knowledge in terms that facilitate understanding of issues ✓ Ensure validation of data, through use of appropriate sources of information including relevant databases and consultation with senior colleagues ✓ Evaluate data from a range of analysis, information and personal support sources to assist with judgements and decisions on interpretation, extended testing, reporting and communicating results ✓ Make use of suitable range of diagnostic, investigative and/or monitoring procedures when undertaking investigations ✓ Produce a range of written reports in accordance with personal level/sphere of responsibility ✓ Use the appropriate range of IT platforms and software to ensure effective and comprehensive data collection and analysis ✓ Audit scientific practice within all areas of practice associated with investigations to ensure application of ethical and governance regulations ✓ Accept the responsibilities of the role of the scientist in relation to other health care professionals and with empathy and sensitivity to patients, carers and families ✓ Prioritise and organise workload and duties with due regard for urgency, patient care, safe practice and the optimisation of department workload. ✓ Work effectively and efficiently within a multi-disciplinary team with due regard for the needs, wishes, dignity and privacy of patients and their families ✓ Present Quality Assurance data in compliance with principles of internal Quality Control and external Quality Assurance ✓

SECTION 4
The Learning Framework

The following section provides the framework for the design, delivery and assessment of learning and performance outcomes and associated knowledge and skills.
The framework provides a specification for each rotation and then for the specialist component of the programme
All of the underpinning academic knowledge will be taught as part of the Masters programme delivered by the academic provider

Rotational Modules

Respiratory and Sleep Science

Rotation Module

MODULE TITLE	CVR Introduction to Respiratory and Sleep Science	COMPONENT	Rotation
AIM	This rotation will enable trainees to gain the underpinning knowledge, skills and experience of Respiratory and Sleep Science by introducing the range of respiratory and sleep diagnostic and therapeutic services provided in the specialism and the interaction with patients and patient centred practice. Trainees will be expected to perform some routine respiratory and sleep clinical investigations and develop and build their professional practice.		
SCOPE	On completion of this module the trainee will have undertaken a critical evaluation of diagnostic and treatment/management services within Respiratory and Sleep Sciences. They will have had the opportunity to undertake some basic investigations on adult patients and to observe other investigations and therapeutic interventions. They will have developed an understanding of the inter-relationship of Respiratory and Sleep Sciences with other Physiological Sciences specialisms.		

LEARNING OUTCOMES

On successful completion of this module the trainee will achieve the following work based Learning Outcomes;

1. Critically evaluate the range of respiratory and sleep diagnostic services used in the diagnosis and monitoring of patients with respiratory and sleep disorders.
2. Critically evaluate the treatment/management pathways available for patient diagnosed with respiratory and sleep disorders
3. Plan, prepare and perform measurements of spirometry, lung volumes and gas transfer
4. Plan, prepare, perform and analyse overnight oximetry and multichannel sleep studies
5. Interpret technically full lung function test, reversibility studies, overnight oximetry and multichannel sleep study

.

The following section provides detail of expected achievements in both practical and knowledge based learning outcomes for this module.

Required achievements are cross-referenced to the above Learning Outcomes to ensure application of competence across all activities within this module and thus maintain an integrated and holistic approach to development and assessment.

CLINICAL EXPERIENTIAL LEARNING

The recommended examples of clinical experiential learning for this module are

- Critically evaluate the diagnostic and treatment pathway for a patient with COPD.
- Critically evaluate the diagnostic and treatment pathway for a patient with OSAHS.
- Critically evaluate the diagnostic and treatment pathway for a patient with a neuromuscular disorder.
- Gain experience of the linkages between Respiratory, Cardiac, Sleep and Vascular Science services and other clinical specialisms in the assessment of respiratory and sleep disorders
- Critically evaluate the range of needs of people with disabilities within a typical care pathway for a patient with respiratory disease and sleep disorders

All of these experiences should be recorded in your e-portfolio as reflective learning and discussions with your training officers.

Requirements for Professional Practice are contextualised to ensure the application and assessment of broad descriptors contained within Good Scientific Practice.

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
1	Critically evaluate diagnostic services in respiratory and sleep sciences to include; • Chronic obstructive pulmonary disease • Obstructive sleep apnoea hypopnoea syndrome • Neuromuscular disorders	The range of investigations undertaken in Respiratory/Sleep Science. The use of diagnostic investigations in the management of a patient presenting with the specified range of diseases/disorders The possible clinical outcomes for these patients The range of needs of patients with disabilities undergoing respiratory and/or sleep investigations Possible Health and Safety hazards and risks associated with respiratory and sleep investigations and actions taken to minimise these
2	Critically evaluate the range of treatment/management options to include A medical treatment pathway A surgical treatment pathway A therapeutic treatment pathway	The range of treatment pathways and their relevance/applicability to respiratory and sleep disorders/ disease The options available to patients with respiratory/sleep disorders/ disease and implications and benefits of each Factors affecting selection of treatment option
1,2,3	Control of infection risks pre, during and post investigations and actions taken to manage these.	Protocols and requirements hygiene and infection control related to the relevant range of investigations, including preparation, conduct and completion of investigation
2,3,	Obtain a suitably completed request form, greet patient, and check patient ID and recent clinical history.	Referral routes for respiratory/sleep investigations Contra-indications to testing Requirements for correct completion of request forms and how to validate

		How to communicate with patients in a way which respects their dignity, rights, privacy and confidentiality. The importance of checking patient identify The importance of explaining the procedure to the patient and gain consent. How to take and record a patient history and key information required Measurements that may be required pre and post investigation such as height, weight and their importance
2,3,	Prepare the environment, equipment and patient for investigations to include; (for adult patients) iii) Spirometry iv) Lung Volumes v) Gas Transfer vi) Administration and response to a bronchodilator vii) Oximetry viii) Limited multichannel sleep studies	Requirements for the investigation environment to ensure privacy, dignity and comfort of patient, to facilitate investigation procedure and maximise results How to check, calibrate and prepare equipment and devices Fault identification and remedial action Correct configuration of recording systems Correct positioning of the patient ensuring comfort and co-operation The importance of explaining the procedure to the patient and the impact of incorrect positioning or non-co-operation on investigation results. How to identify potential special needs of patients and relevant action required
3	Obtain accurate measurements of spirometry, lung volumes and gas transfer	Relevant protocols and procedures for investigations The relevance of investigations to referral request and differential diagnosis

		The importance of supporting patients during the test to work with patient capabilities
3	Select, prepare and administer bronchodilator and record results	Factors influencing the selection of bronchodilator and device Correct preparation of bronchodilator and device Information needs of patients and how to explain in terms that facilitate understanding and co-operation Factors influencing the effectiveness of administration that may impact on results Correct administration of bronchodilator/device Format and requirements for recording results
3	Obtain an accurate overnight pulse oximetry recording	Reasons for performing overnight pulse oximetry and relevance to a range of patient conditions Correct preparation for overnight pulse oximetry including information needs of patients and carers Requirements for monitoring and recording results
3	Obtain an accurate limited multi-channel sleep study	Conditions and disorders that may require multi-channel sleep studies Relevant protocols and procedures Requirements for monitoring and recording results
	Interpret technically data from adult patients for:	

	i) Spirometry ii) Lung Volumes iii) Gas Transfer iv) Administration and response to a bronchodilator	
	Interpret technically data from overnight pulse oximetry and limited multichannel sleep studies and generate a report	
3	Perform routine calibration/verification of full lung function testing equipment to include printouts of volume verification at different flow rates	Requirements for calibration The importance of the calibration log and records including volume, flow and gas concentration. The importance of volume verification How to identify faults and remedial action

Associated Behaviours and Professional Practice
The Healthcare Scientist operates to high standards of professionalism and demonstrates essential behaviours and personal qualities These are specified within ***Good Scientific Practice*** *and map to the professional standards needed for registration with the appropriate Regulatory Bodies.* *These include areas such as communication and Health and Safety that complement and test application of the academic learning. These qualities need to be assessed throughout the work based assessment programme and will be demonstrated using appropriate assessment tools (DOPs and CBDs). Appendix 1 contains the summary of these professional qualities* *The application of key professional qualities in this module is contextualised below*.
✓ Communicate complex and technical information to patients and those with limited technical knowledge in terms that facilitate understanding of issues ✓ Ensure validation of data, through use of appropriate sources of information including relevant databases and consultation with senior colleagues ✓ Evaluate data from a range of analysis, information and personal support sources to assist with judgements and decisions on interpretation, extended testing, reporting and communicating results ✓ Make use of suitable range of diagnostic, investigative and/or monitoring procedures when undertaking investigations ✓ Produce a range of written reports in accordance with personal level/sphere of responsibility ✓ Use the appropriate range of IT platforms and software to ensure effective and comprehensive data collection and analysis ✓ Audit scientific practice within all areas of practice associated with investigations to ensure application of ethical and governance regulations ✓ Accept the responsibilities of the role of the scientist in relation to other health care professionals and with empathy and sensitivity to patients, carers and families ✓ Prioritise and organise workload and duties with due regard for urgency, patient care, safe practice and the optimisation of laboratory workload. ✓ Work effectively and efficiently within a multi-disciplinary team with due regard for the needs, wishes, dignity and privacy of patients and their families ✓ Present Quality Assurance data in compliance with principles of internal Quality Control and external Quality Assurance

SECTION 4
The Learning Framework

The following section provides the framework for the design, delivery and assessment of learning and performance outcomes and associated knowledge and skills.
The framework provides a specification for each rotation and then for the specialist component of the programme
All of the underpinning academic knowledge will be taught as part of the Masters programme delivered by the academic provider

Rotational Module

Cardiac Science

Rotation Module

MODULE TITLE	CVRS Introduction to Cardiac Science	COMPONENT	Rotation
AIM	This rotation will enable trainees to gain the underpinning knowledge, skills and experience of Cardiac Science by introducing the range of cardiac diagnostic services provided in the specialism and the interaction with patients and patient centred practice. Trainees will be expected to perform some routine cardiac investigations and develop and build their professional practice.		
SCOPE	On completion of this module the trainee will have undertaken a critical evaluation of diagnostic and treatment pathways for people with suspected or confirmed cardiac diseases. They will have had the opportunity to perform routine investigations including resting and ambulatory blood pressure BP and ECG and to observe a further range of procedures.		

LEARNING OUTCOMES

On successful completion of this module the trainee will achieve the following work based Learning Outcomes;

1. Critically evaluate a range of cardiac diagnostic services and treatment pathways for patients with common cardiac diseases
2. Perform a resting ECG in a normal male out-patient to current nationally accepted standard including recognition of normal and abnormal results particularly myocardial infarction and life threatening arrhythmias
3. Set up a cardiac monitor
4. Measure blood pressure on a range of patients using manual and automatic methods.
5. Fit ambulatory ECG equipment including patient instruction.
6. Fit ambulatory blood pressure equipment including patient instruction.

The following section provides detail of expected achievements in both practical and knowledge based learning outcomes for this module.

Required achievements are cross-referenced to the above Learning Outcomes to ensure application of competence across all activities within this module and thus maintain an integrated and holistic approach to development and assessment.

CLINICAL EXPERIENTIAL LEARNING

The recommended examples of clinical experiential learning for this module include:

- Critically evaluate the range of cardiac diagnostic services used in the diagnosis and monitoring of patients with a range of common cardiac diseases.
- Explain and critically evaluate the diagnostic pathway for a patient with a suspected myocardial infarction or suspected angina.
- Explain and critically evaluate the diagnostic pathway for a patient requiring pacing.
- Explain and critically evaluate a medical treatment pathway for a cardiac patient.
- Critically evaluate the needs of patients with disabilities within a typical care pathway with cardiac disease.

All of these experiences should be recorded in your e-portfolio as reflective learning and discussions with your training officers.

Requirements for Professional Practice are contextualised to ensure the application and assessment of broad descriptors contained within Good Scientific Practice.

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
1	Critically evaluate cardiac diagnostic services considering the patient and service perspectives to include: • A suspected myocardial infarction • Angina • Referral for pacing	The range of cardiac investigations undertaken The use of diagnostic investigations in the management of patient presenting with myocardial infarction, angina or an arrhythmia requiring pacemaker insertion The possible clinical outcomes for the presenting patients as detailed above The range of needs of patients and patients with disabilities undergoing cardiac investigations Health and Safety including issues specific to cardiac diagnostic investigations and potential hazards and risks associated with cardiac investigations and actions taken to minimise these
1	Critically evaluate the range of treatment options to include A medical treatment pathway for a vascular patient A surgical treatment pathway for a vascular patient	The range of treatment pathways and their relevance/applicability to cardiac disease The options available to patients with cardiac disease and implications and benefits of each Factors affecting selection of treatment option
2,3,4,5	Control of infection risks pre, during and post investigation and actions taken to manage these.	Protocols and requirements hygiene and infection control related to the relevant range of investigations, including preparation, conduct and completion of investigation

2,3,4	Obtain a suitably completed request form, greet patient, check patient ID and take a recent clinical history.	Referral routes for cardiac diagnostic investigations Requirements for correct completion of request forms and how to validate How to communicate with patients in a way which respects their dignity, rights, privacy and confidentiality. The importance of checking patient identify The importance of explaining the procedure to the patient and gaining informed consent. How to take and record a patient history and key information required
2,3,4	Prepare the environment, equipment and patient for cardiac investigations to include; ix) Resting ECG x) BP measurement xi) Cardiac Monitoring xii) Ambulatory ECG xiii) Ambulatory BP	Requirements for the investigation environment to ensure privacy, dignity and comfort of patient, to facilitate investigation procedure and maximise results How to check, calibrate and prepare equipment and devices Correct positioning of the patient ensuring comfort, co-operation and optimal investigation results The importance of explaining the procedure to the patient and the impact of incorrect positioning or non-co-operation on investigation results. How to identify potential special needs of patients and relevant action required How to prepare equipment for investigations
2	Perform a resting ECG in an adult, male out-patient to meet needs of referral	How to identify electrode sites in line with current AHA/SCST guidelines to achieve optimum ECG wavef9rm How to prepare the patient's skin for electrode placement

	request	Correct placement and positioning of electrodes to minimise artefact Selection of machine settings to meet needs of referral/request including monitor and monitor settings and rate alarm Correct operation of ECG equipment How to monitor recording and make adjustments to maximise results
2	Check and annotate ECG recording for normal and abnormal results including i) Normal findings ii) Variations from normal iii) Life threatening arrhythmias iv) Myocardial ischaemia and infarction	The relationship between the ECG and the cardiac cycle Identification and measurement of amplitudes and intervals in ECG Normal and abnormal findings and their significance How to check and annotate recordings to ensure accuracy, completeness, legibility and suitability for analysis and reporting.
3	Measure blood pressure in an adult patient using i) manual method ii) automated method	Selection of correct cuff size for patient Location of pulse in the cubital fossa The correct use of palpation to estimate systolic BP Correct inflation of the cuff to at least 30mmHg above the estimated blood pressure Correct rate of pressure reduction to maximise results

		Accurate measurement of blood pressure; Difficulties that may be encountered in obtaining an accurate BP measurement and relevant remedial actions How to check and confirm results When to refer results to a senior colleague for further action
4	Fit ambulatory and BP measurement equipment for investigation of an adult patient	Factors influencing selection of correct ambulatory monitoring devices Correct preparation of ambulatory ECG and BP recording equipment including recorder and electrodes Requirements for preparation of patient's skin for electrode placement and how to instruct a patient for self-positioning Correct positioning of electrodes on patients skin The importance and use of the patient diary How to activate ambulatory devices Information needs of patients fitted with ambulatory devices including pre-test, fitting, use, activation, deactivation, diary, cleaning and removal Factors influencing the quality of results from ambulatory recordings
4	Remove ambulatory monitoring equipment and prepare results for further analysis	Correct removal of ambulatory devices Requirements for cleaning devices in compliance with infection control How to check accuracy of recording and identify artefacts and determine suitability for analysis How to download data and produce results in appropriate format for next stage

		of processing The information needs of patients following ambulatory monitoring

Associated Behaviours and Professional Practice
*The Healthcare Scientist operates to high standards of professionalism and demonstrates essential behaviours and personal qualities These are specified within **Good Scientific Practice** and map to the professional standards needed for registration with the appropriate Regulatory Bodies.* *These include areas such as communication and Health and Safety that complement and test application of the academic learning. These qualities need to be assessed throughout the work based assessment programme and will be demonstrated using appropriate assessment tools (DOPs and CBDs). Appendix 1 contains the summary of these professional qualities* *The application of key professional qualities in this module is contextualised below*.
✓ Communicate complex and technical information to patients and those with limited technical knowledge in terms that facilitate understanding of issues ✓ Ensure validation of data, through use of appropriate sources of information including relevant databases and consultation with senior colleagues ✓ Evaluate data from a range of analyses, information and personal support sources to assist with judgements and decisions on interpretation, extended testing, reporting and communicating results ✓ Make use of suitable range of diagnostic, investigative and/or monitoring procedures when undertaking investigations ✓ Produce a range of written reports in accordance with personal level/sphere of responsibility ✓ Use the appropriate range of IT platforms and software to ensure effective and comprehensive data collection and analysis ✓ Audit scientific practice within all areas of practice associated with investigations to ensure application of ethical and governance regulations ✓ Accept the responsibilities of the role of the scientist in relation to other health care professionals and with empathy and sensitivity to patients, carers and families ✓ Prioritise and organise workload and duties with due regard for urgency, patient care, safe practice and the optimisation of laboratory workload. ✓ Work effectively and efficiently within a multi-disciplinary team with due regard for the needs, wishes, dignity and privacy of patients and their families ✓ Present Quality Assurance data in compliance with principles of internal Quality Control and external Quality Assurance

SECTION 4

The Learning Framework

The following section provides the framework for the design, delivery and assessment of learning and performance outcomes and associated knowledge and skills.
The framework provides a specification for each rotation and then for the specialist component of the programme
All of the underpinning academic knowledge will be taught as part of the Masters programme delivered by the academic provider

Rotational Modules

CLINICAL ASSESSMENT AND INVESTIGATION (CVRS)

Rotation Module

MODULE TITLE	CVRS Clinical assessment and investigations	**COMPONENT**	**Rotation**
AIM	This workplace-based module draws on and integrates learning and clinical experience across CVRS rotational modules. It will provide the trainee with the opportunity to apply their acquired knowledge and some basic skills of clinical assessment and investigation used in the diagnosis, care and treatment of patients in a range of clinical settings and care. Trainees will have the opportunity to gain a greater understanding of the role and integration of other related diagnostic modalities including imaging and pathology to provide holistic patient care.		
SCOPE	On completion of his rotation the trainee will have had the opportunity to apply their knowledge and basic skills of clinical assessment and investigation used in the diagnosis, care and treatment of patients with Cardiovascular, Respiratory and Sleep disorders across a range of clinical settings (e.g. Medical Assessment and Integrated Care, Critical Care, Outpatient and Primary/community care based services). Fundamental to this rotation is that the trainee has an introductory knowledge and understanding of cardiac, respiratory, sleep and vascular diseases and their signs and symptoms, and an awareness that they may commonly co-exist in patients. Integral to this module is the opportunity for the trainee to gain a greater understanding of the role of other related diagnostic modalities such as Radiology and Pathology in the overall clinical assessment process. This module will give the trainee knowledge and understanding of the interpretation and clinical decision making associated with clinical assessment and investigations in the context of differential diagnosis together with an overview of the principles of operation, data acquisition and quality assurance of other diagnostic service modalities.		

LEARNING OUTCOMES

In this rotational module, learning outcomes are related to three key areas in **Clinical Assessment: and Investigation**

- Working in Partnership
- Imaging and Pathology Diagnostics
- Patient Pathways

Outcomes and suggested Clinical Experiential Learning for each of these three areas are specified below, followed by relevant competences and knowledge

LEARNING OUTCOMES

On successful completion of this module the trainee will achieve the following work based Learning Outcomes;

Working in partnership

- Record accurately and integrate relevant patient history with the outcome of clinical examination and determine appropriate diagnostic investigations across CVRS diagnostic services in conjunction with the wider clinical team
- Understand the range of diagnostic and therapeutic procedures that are appropriate in different clinical settings to assess a patient's presenting signs and symptoms, recognising when results deviate from normal values/finding and the implication of this on patient treatment and care

Imaging and Pathology Diagnostics

- Understand the calibration and quality assurance methodologies that are used routinely for imaging and pathology equipment; compare and evaluate how this differs in approach from those in the CVRS diagnostic specialities in maintaining accuracy and quality of outputs
- Identify key anatomical landmarks on images obtained using ionising and non-ionising imaging media in the investigation of patients with cardiovascular and respiratory presentations e.g. recognise key features in a routine chest X-ray and common deviations from it. Describe the limitations and impact of results on patient diagnosis, treatment and care
- Understand the pathology investigations that are used routinely in the investigation of cardiovascular and respiratory problems and their possible implications in reaching a differential diagnosis. Describe the limitations and the potential impact of results on patient diagnosis, management and care.

Patient Pathways

- Devise a diagnostic plan for the patient based on the presenting symptoms and clinical information available and indicate what the next steps might be (diagnostic or therapeutic) dependent on the outcome of the initial results from a mix of diagnostic modalities

CLINICAL EXPERIENTIAL LEARNING

. The recommended examples of clinical experiential learning for this module should take place through visiting and spending time in a range of healthcare environments /services, aimed at identifying the key components in providing a holistic approach to patient care. These include:

- Medical Assessment Unit
- Neonatal Care Units
- ICT / Operating Theatres
- Healthcare for older people service
- Primary Care
- Healthcare in the Community
- Independent Sector

In this range of settings trainees should experience:

- how different assessments and investigations are used in primary or secondary care services in cardiovascular, respiratory, and sleep disorders in a range of clinical settings e.g. healthcare for older people; neonatal care, (NICU) (SCBU), integrated care, critical care, primary care, independent sector.

- through working with imaging staff in the preparation and imaging of patients, as appropriate, using screening or diagnostic ionizing and non-ionizing imaging equipment, observing current safety and legislative requirements

- learning about key anatomical landmarks of cardiological, vascular and respiratory systems obtained using ionising and non-ionising imaging media.

- how samples in the pathology laboratory are processed and analysed whilst observing current safety and legislative requirements.

- how common pathology test results are obtained and compared to standard reference ranges and the possible effect on either cardiovascular, respiratory, and sleep disease or disorder.

- how the needs of people with disabilities within the neurosensory patient pathways are appropriately managed

- how the role different healthcare services contribute to the care of patients following CVRS patient pathways e.g. healthcare for older people; neonatal care, (NICU) (SCBU), integrated care, critical care, primary care, independent sector

All of these experiences should be recorded in your e-portfolio as reflective learning and should provide important material for discussions with your training officers.

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
Work in Partnership	Assist with the taking of an appropriate clinical history using a logical sequence which might include Brief biographical • History of presenting complaint • Past History • Smoking/Alcohol use • Medication (prescribed & other) • Allergies • Family/Social history • Concerns and Expectations Summary	The importance of an accurate and complete patient history and the potential implications of missing or incorrect information Factors relevant to the range of investigations to be undertaken How to validate information provided How to communicate with patients in ways which facilitate co-operation and understanding of requirements, including patients with special needs
Work in Partnership	Undertake under supervision a range of diagnostic and therapeutic procedures in a variety of clinical settings, recognising when results deviate from normal values/findings and appreciating the implication of results on	Relevant protocols and procedures for investigations How to communicate with patients in a way which respects their dignity, rights, privacy and confidentiality.

	patient treatment and care, for example in: o Medical Assessment Units - point of care testing, e.g. blood and urine glucose tests o High Dependency Settings - blood gas analysis, preparation of monitoring and ventilator system o Community settings – spirometry, ankle brachial pressure indices measurements (leg ulcer clinics) *See relevant rotational modules for integration of clinical experience, competence and knowledge requirements*	The importance of checking patient identity, fully explaining the procedure to the patient, including any potential, and obtaining informed consent prior to undertaking investigatory procedures. Requirements for the investigation environment to ensure privacy, dignity and comfort of patient in order to facilitate the investigation procedure and optimise results How to check, calibrate and prepare the appropriate equipment and devices How to identify potential special needs of patients and the relevant action required to address these Infection control and decontamination procedures Normal and abnormal ranges of relevant results and their implication for the treatment and care of the patient Relevant patient pathways and referrals arising from these The relationship between the results of a range of investigations across CVRS and their implication for holistic patient treatment and management.
Imaging	Observe experienced imaging staff in acquiring images to include at least 2 of the following;.X-ray, CT, MRI, Ultrasound	Safe use of ionising and non-ionising imaging equipment The range of equipment within the scope of learning its use, application, limitations

		The strengths and weakness of each imaging modality within a cardiac, vascular or respiratory pathway
Imaging	Review and assist in making measurements on images on Picture Archiving Systems (PACS)	PACS applications and measurement systems Confidentiality and information governance issues related to PACS
Imaging	View and identify key anatomical landmarks and abnormal pathology related to the cardiovascular and respiratory systems on images obtained using ionising and non-ionising imaging media.	Key anatomical landmarks appropriate to the investigations being performed Normal and abnormal images How different imaging tests contribute to the holistic approach in the diagnosis and management of cardiovascular and respiratory problems The selection of a particular imaging modality in preference to another Key research and development areas that are likely to translate in improvements in imaging technique
Imaging	Assist experienced imaging staff in the safety checks, calibration and quality assurance of imaging equipment using local, or national or international standards	The choice of test equipment, and the safety, calibration and quality assurance checks required for diagnostic imaging equipment used in diagnostic imaging services How imaging measurements are undertaken in a range of imaging modalities and how these contribute to patient management. Relevant Health and Safety Policies for the Imaging department Relevant National, International and local standards in ionising and non-ionising radiation
Pathology	Assist experienced pathology staff in routine maintenance, calibration and quality assurance checks on pathology test instrumentation using local, or national or	Quality Assurance and Accreditation processes in pathology Relevant National, International and local standards

	international standards	Use, care, monitoring, calibration and maintenance of laboratory equipment, including; pipettes, balances, centrifuges, refrigerators, water baths, incubators, pH meters, freezers, radioactive counters, sample preparation units and automated and semi-automated analysers
Pathology	Assist in performing: pathology tests with relevance to the routine investigation of cardiovascular and respiratory problems including the production of results, reference ranges and clinical interpretative reports, e.g. o D-dimer in the diagnosis of DVT o Brain Natriuretic Peptide (BNP) or Troponin tests used in the diagnosis of heart damage and myocardial infarction	Factors affecting health, safety and integrity in handling and processing of Specimens . Relevance and importance of specificity, sensitivity, accuracy, precision and linearity in the evaluation of analytical methods Capabilities and limitations of methods, techniques and equipment Safe laboratory practices including principles of sterilisation and decontamination Specimen preservation, distribution, separation, storage and disposal procedures Methods and procedures to establish reference ranges and how to use reference ranges in interpreting results Principles and applications of techniques using different instrumentation Use and application of reagents for analysis Significance of SOPs, internal quality control and external quality assessment
Imaging and pathology	Evaluate the role of calibration and quality assurance in pathology and imaging departments in ensuring accuracy of test outcomes and identifying any potential errors	Methods of risk assessment relevant to work activity Hazards and risks associated with the working environment and with procedures to be performed

	or risks when applied in clinical practice	The implication of defective equipment and devices on patient care
Imaging and Pathology	Assimilate reports from pathology and imaging investigations with CVRS diagnostic results and be able to present the findings for review by the clinical team	How these results are used in conjunction with physiological science investigation results in differential diagnosis or in response to treatment for cardiac, vascular, and respiratory and sleep clinical pathways
Patient pathways	Work within multidisciplinary teams to support the investigation, treatment and management of patients with cardiac, vascular, respiratory and sleep disorders	The role that different healthcare scientific services play in the care of patients with cardiac, vascular, respiratory and sleep disorders presenting in a range of healthcare setting: e.g. o integrated care o critical care o primary care o Independent sector.
Patient pathways	Use the relationship between the range of CVRS diagnostic services to facilitate the eventual differential diagnosis	The importance of ensuring that different cardiac, vascular, respiratory and sleep assessments are combined appropriately in contributing to the differential diagnosis of disease, or disability. The impact of different cardiac, vascular, respiratory or sleep investigation results on patient treatment, management and care
Patient Pathways	Devise evidence based diagnostic plans based for presenting signs and symptoms and clinical information	The signs and symptoms of cardiovascular, respiratory and sleep disorders and their interaction and significance for differential diagnosis The likely needs of people with disabilities within Cardiovascular,Respiratory and sleep patient pathways disorders The requirements of a diagnostic plan and its presentation

Associated Behaviours and Professional Practice
*The Healthcare Scientist operates to high standards of professionalism and demonstrates essential behaviours and personal qualities These are specified within **Good Scientific Practice** and map to the professional standards needed for registration with the appropriate Regulatory Bodies.* *These include areas such as communication and Health and Safety that complement and test application of the academic learning. These qualities need to be assessed throughout the work based assessment programme and will be demonstrated using appropriate assessment tools (DOPs and CBDs). Appendix 1 contains the summary of these professional qualities* *The key professional qualities for this module are contextualised below*.
✓ Communicate complex and technical information to patients and those with limited technical knowledge in terms that facilitate understanding of issues ✓ Ensure validation of data, through use of appropriate sources of information including relevant databases and consultation with senior colleagues ✓ Evaluate data from a range of analysis, information and personal support sources to assist with judgements and decisions on interpretation, extended testing, reporting and communicating results ✓ Make use of suitable range of diagnostic, investigative and/or monitoring procedures when undertaking investigations ✓ Produce a range of written reports in accordance with personal level/sphere of responsibility ✓ Use the appropriate range of IT platforms and software to ensure effective and comprehensive data collection and analysis ✓ Audit scientific practice within all areas of practice associated with investigations to ensure application of ethical and governance regulations ✓ Accept the responsibilities of the role of the scientist in relation to other health care professionals and with empathy and sensitivity to patients, carers and families ✓ Prioritise and organise workload and duties with due regard for urgency, patient care, safe practice and the optimisation of department workload. ✓ Work effectively and efficiently within a multi-disciplinary team with due regard for the needs, wishes, dignity and privacy of patients and their families