
Higher Specialist Scientific Training

Doctor of Clinical Science

Programme Summary Document for Lay Representatives

Contents

What do Healthcare Scientists do?.....	3
How to you become a Healthcare Scientists?	3
PTP (Leading to Healthcare Science Practitioner).....	4
STP (Leading to Clinical Scientist).....	4
HSST (Leading to Consultant Clinical Scientist).....	4
Specialist subjects within Healthcare Science	5
Life Sciences	7
Physiological Sciences	8
Physical Sciences	9
Informatics	9
How is the Programme Structured?	10
Section A: Leadership and Professional Development (180 credits)	10
Section B: Specialist Scientific Clinical Programme	10
Section C: Research, Development and Innovation.....	10
How are Clinical Scientists in HSST assessed?	11
Academic component	11
Work-based Assessments	11
Awards	11
What does a Programme Committee do?	12
Programme Management Structure.....	12
What is expected of a Lay Representatives?	13
Meet the Programme Team.....	13
MAHSE Team.....	13
University of Manchester.....	13
Manchester Metropolitan University	13
University of Liverpool.....	14
Aston University.....	14
Important contacts	14
List of Acronyms.....	14

What do Healthcare Scientists do?

Healthcare Scientists play a vital role in investigation, diagnosis, treatment and aftercare.

Some Healthcare Scientists have direct contact with patients; whilst other Healthcare Scientists are based in laboratories and may not directly interact with patients. Regardless of where they are based, Healthcare Scientists contribute to and affect the care that patients receive. Healthcare Scientists are involved in 80% of all clinical decisions in the NHS.

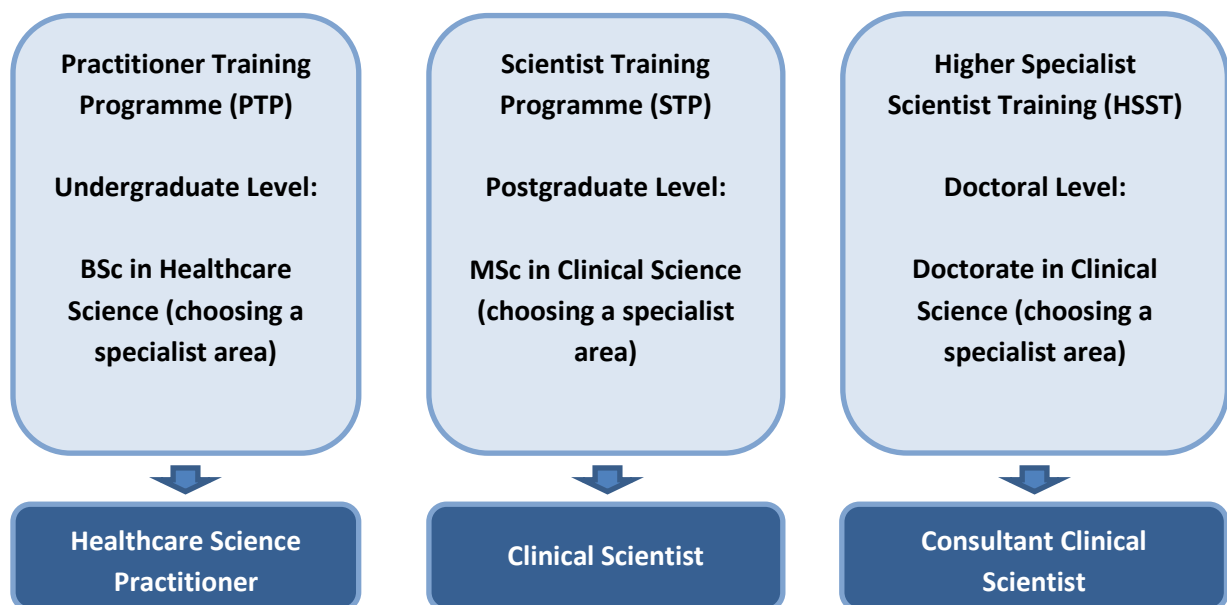
A Healthcare Scientist's work may involve:

- Generating and obtaining scientific information.
- Interpreting test results.
- Suggesting methods of treatment to doctors.
- Researching, developing and testing new methods of diagnosis and treatment.

How to you become a Healthcare Scientists?

There are a number of different routes into Healthcare Science job roles. The training routes below all involve time working within the NHS, as well as academic study.

Within England, the Modernising Scientific Careers programme was established in 2008 by the Department of Health. Modernising Scientific Careers (MSC) ensures that education and training for the Healthcare Science workforce is consistent and coherent across a wide range of specialisms. All of the training routes below fall under Modernising Scientific Careers.



Find out more...

NHS Careers: <https://www.healthcareers.nhs.uk/explore-roles>

Modernising Scientific Careers:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/215897/dh_123911.pdf

[Click to go back to Start](#)

National School of Healthcare Science: <http://www.nshcs.org.uk/for-the-public>

PTP (Leading to Healthcare Science Practitioner)

Overview of training:

The PTP programme is normally studied over 3 years at undergraduate level, combining academic learning with work based experience and competency based learning guides. PTP trainees spend 50 weeks gaining work based training in the NHS, learning how healthcare sciences teams make a difference to patients on a day to day basis. Students gain first-hand experience of scientists being involved in clinical decisions in the NHS. Once a trainee has completed the PTP programme they could work as a Healthcare Science Practitioner or think about developing as a specialist practitioner (which could then lead to STP).

Healthcare Science Practitioners:

- Work within outlined protocols but use judgement and deal with ambiguity.
- Obtain scientific information that assists in the diagnosis of disease.
- Work with other healthcare professions and contribute towards the monitoring of health and the delivery of patient care.

STP (Leading to Clinical Scientist)

Overview of Training:

The STP programme is normally studied over 3 years at postgraduate level and involves approved and accredited workplace-based training. Trainees work full-time in the NHS and are training to work in a Senior Healthcare Science role. They are required to spend time in a range of settings (completing clinical rotations within their workplace), before specialising in the last two years of the programme. Once a trainee has completed the STP programme they can apply to register as a Clinical Scientist. An individual would normally spend at least 2 years working as a Clinical Scientist developing their knowledge and experience before applying for the HSST programme (but this may vary dependent on skills and experience).

Clinical Scientists:

- Carry out complex scientific and clinical roles (may or may not be directly patient facing).
- Analyse, interpret and compare investigative and clinical options.
- Make judgements, including clinical judgements, involving complicated facts or situations that impact on patients.
- Interpret and act upon results of tests, investigations and measurements.
- Initiate and undertake innovation, improvement and research and development.
- Assist with supervision and training of support staff, students and newly appointed staff.

HSST (Leading to Consultant Clinical Scientist)

Overview of Training:

The Doctorate of Clinical Sciences is normally studied over 5 years and HSST trainees will normally be working as a Senior Clinical Scientist in the NHS during this time. Senior Clinical Scientists, already have a high level of scientific and clinical knowledge. The HSST programme is different to the PTP and STP programmes, as it is more bespoke. Training allows employers to develop and expand innovative roles to meet the challenges faced within the NHS. HSST trainees should have a high degree of autonomy and motivation to acquire and apply knowledge. They need to demonstrate high level scientific knowledge and the ability to be future leaders and innovators, who consider the impacts of actions on the patient experience.

Consultant Clinical Scientists are well established in some healthcare areas, but not others. They work at the same level and have the same status as Medical Consultants.

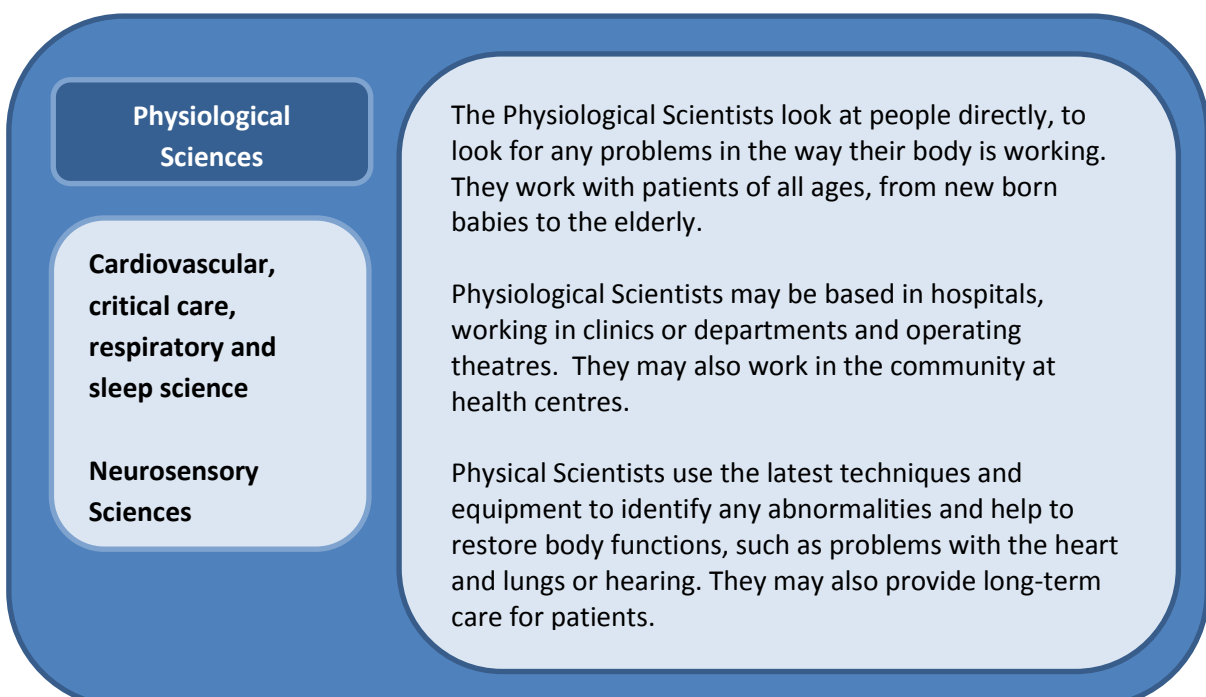
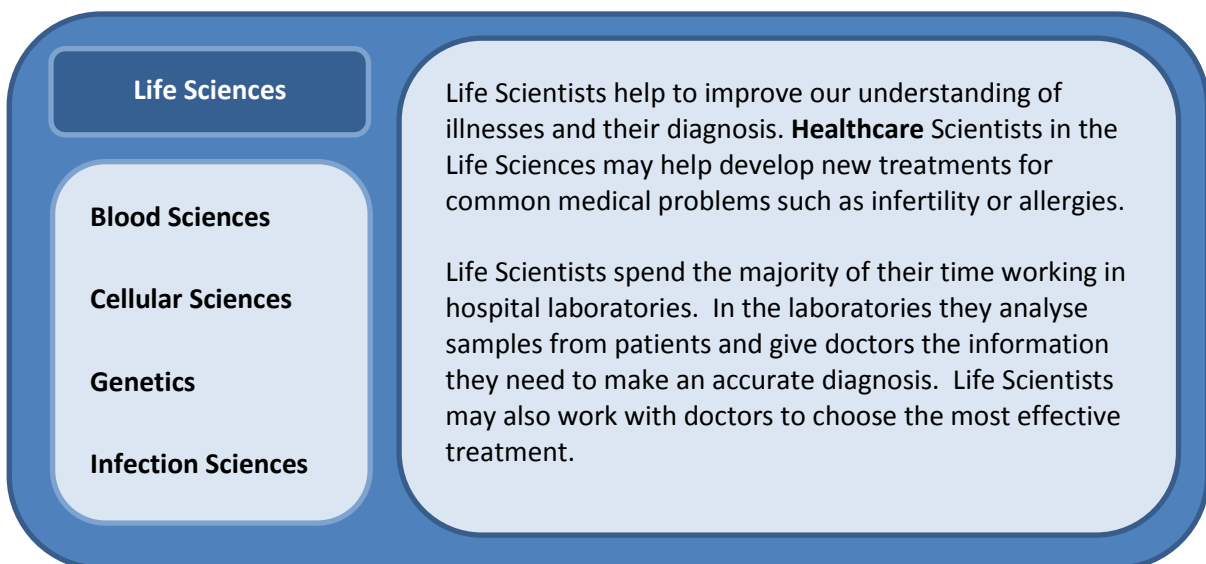
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Consultant Clinical Scientists:

- Typically focus on providing the service that supports clinical care (diagnosis, technology, treatment, prevention).
- Lead others and contribute to the leadership and strategic direction of the service in which they work.
- Lead research and innovation. (Consider, evaluate and explain to others the potential impacts of innovations on the patient.)
- Apply higher level scientific knowledge and give clinical advice within direct patient care.

Specialist subjects within Healthcare Science

The diagram on the following two pages shows the main themes within Healthcare Sciences, including some of specialist subject groups within each theme and an overview of what each area broadly involves.



[Click to go back to Start](#)

Physical Sciences

Medical Physics

Clinical Engineering

Physical Scientists work closely with other NHS clinical teams and in some roles will have direct contact with patients.

They are responsible for developing new techniques and technology to measure what is happening in the body (ultrasound, radiation, magnetic resonance) to explore or record the workings of the body.

They may also ensure complex equipment is set up, maintained and used safely.

Informatics

Clinical Bioinformatics

Within Bioinformatics Scientists develop and improve methods for acquiring, storing, organising and analysing biological data that supports the delivery of patient care.

Bioinformatics Scientists use computer science, including software tools that generate useful biological knowledge by manipulating 'big data'.

Find out more...

NHS Networks (Curricula): <https://www.networks.nhs.uk/nhs-networks/msc-framework-curricula>

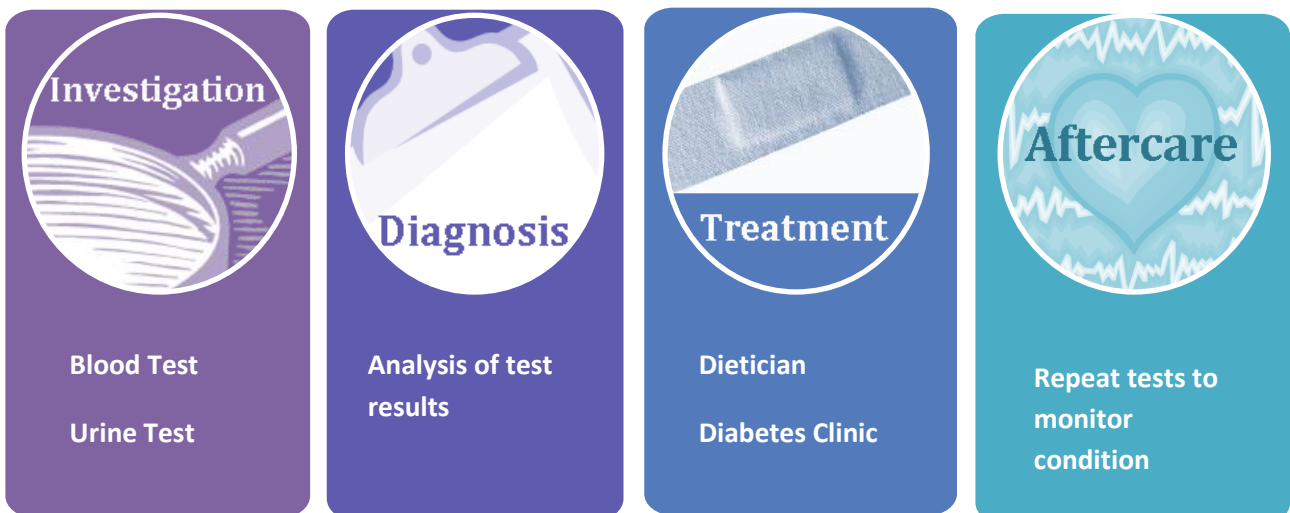
Life Sciences

The table below gives examples of roles and responsibilities for the different specialisms with the Life Sciences.

Specialism:	Example roles and responsibilities
Blood Science:	
Clinical Biochemistry	Analysing patients' samples to help with the diagnosis and management of their condition.
Clinical Immunology	Helping to diagnose and monitor conditions that attack the immune system, such as allergies or HIV.
Haematology / transfusion	Diagnosing and monitoring blood disorders such as leukaemia, anaemia and haemophilia.
Histocompatibility	Preparing suitable tissue for organ and bone marrow transplants.
Cellular Science:	
Reproductive Science	Dealing with infertility treatments such as in-vitro fertilisation (IVF).
Cytopathology	Study of a cervical smear, to identify any cancerous/pre-cancerous cells.
Histopathology	Examining tissue samples to reveal the structure of cells and tissues. For example, looking at a mole removed from a patient.
Genetics:	
Genetics	Examining patients' DNA to find inherited conditions and to predict likelihood of them being passed on to the next generation.
Infection Sciences:	
Microbiology / Virology	Studying bacteria, viruses, fungi and parasites that cause infection.

Healthcare Scientists are involved at each stage...

Below is an example of how a Blood Scientist might be involved in a patient's treatment.



[Click to go back to Start](#)

Physiological Sciences

Specialism:	Example roles and responsibilities:
Cardiovascular, Critical Care, Respiratory and Sleep Sciences:	
Cardiac Science	To test for suspected or known heart disease. Symptoms and tests can focus on diagnosis (e.g. chest pain) or monitoring of known pathology (e.g. heart failure, heart valve disease).
Vascular Science	To investigate circulation of blood and to diagnose any abnormalities and health conditions related to the arteries and veins.
Respiratory and Sleep Physiology	Use lung tests to assess patients with shortness of breath and to determine overall lung performance. Monitor sleep disordered breathing – a common condition related to obesity and upper airway malformation.
Critical Care	Provide life support systems to critically ill patients.
Neurosensory Sciences:	
Audiological Sciences	Measuring and evaluating people’s hearing and balance. Fitting hearing devices.
Ophthalmic and Vision Sciences	Investigating eye and vision disorders.
Neurophysiology	Investigate the function of the nervous system to diagnose and monitor neurological disorders such as epilepsy, strokes, dementia, nerve and muscle dysfunction and multiple sclerosis (MS).
Gastrointestinal and Urological Sciences:	
Gastrointestinal and Urological Sciences	Measuring and assessing the activity in the digestive system. Providing treatment to improve patient’s muscle tone.

Healthcare Scientists are involved at each stage...

Below is an example of how a Cardiac Scientist might be involved in a patient’s treatment.



[Click to go back to Start](#)

Physical Sciences

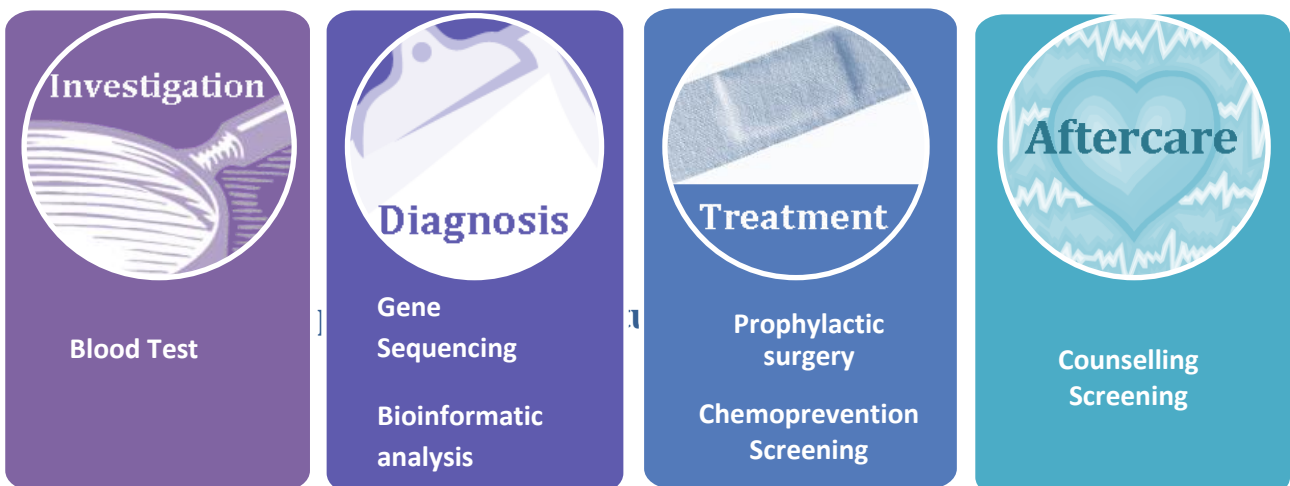
Specialism:	Example roles and responsibilities
Medical Physics:	
Radiotherapy Physics	Maintaining the precision and accuracy of radiation treatments for cancer.
Radiation Safety	Ensuring the safety of patients and staff in areas where radiation is used by monitoring dose levels.
Imaging with Ionising and Non-Ionising Radiation	Diagnostic images such as ultrasound (e.g. during pregnancy), magnetic resonance imaging (MRI) and X-rays of tissues or organs in the body.
Clinical Engineering:	
Clinical Engineering	Designing equipment for monitoring, diagnosis, treatment and rehabilitation.
Rehabilitation Engineering	Assessment of the individual needs of disabled people and the prescription of assistive technology to meet those needs, including the design and development of custom made devices/systems.
Clinical Measurement & Development	Make clinical measurements of patients, for example analysing how children walk.
Device Risk Management & Governance	Ensuring medical equipment is installed, used and maintained correctly and advising on procurement of new equipment.
Clinical Pharmaceutical Science:	
Clinical Pharmaceutical Science	Manufacturing and supplying radioactive substances for use in nuclear medicine.

Informatics

Specialism:	Example roles and responsibilities
Clinical Bioinformatics	
Genomics	Supporting the 100,000 Genomes Project, connecting computing, biology and medicine.
Health informatics	Ensuring that bioinformatics data is used efficiently and to required standards.

Healthcare Scientists are involved at each stage...

Below is an example of how a Clinical Bioinformatician might be involved in a patient's treatment.



[Click to go back to start](#)

How is the Programme Structured?

Section A: Leadership and Professional Development (180 credits)

- Included in all HSST specialisms (all Clinical Scientists study the same Section A modules shown in the table below):

Module	Title
Module A1	Professionalism and Professional Development in the Healthcare Environment
Module A2	Theoretical Foundations of Leadership
Module A3	Personal & Professional Development to Enhance Performance in Practice
Module A4	Leadership and Quality Improvement in the Clinical and Scientific Environment
Module A5	Research and Innovation in Health and Social Care

- Delivered and assessed by Alliance Manchester Business School at the University of Manchester.

Section B: Specialist Scientific Clinical Programme

- The majority of this section will be delivered and assessed by the Clinical Scientists host University, with the exception of special arrangements for the Life Sciences theme.
- Life Scientists: MAHSE has reached an agreement with the Royal College of Pathologists that allows FRCPath Part 1 to be used as fulfilment of the requirements for the section B scientific component of the DClSci.
- There are a number of shared modules for Physical Sciences (Module B5) and Physiological Sciences (Modules B1, B3 and B5). These shared modules are delivered and assessed at the University of Manchester (see table below):

Module	Title	Credits	Theme
Module B1	Advanced History Taking, Clinical and Communication Skills	15	Physiological Sciences
Module B3	Therapeutics	10	Physiological Sciences
Module B5	Contemporary Issues in Healthcare Science (including Bioinformatics, Genomics and Personalised Medicine and Patient and Public Involvement)	20	Physical Sciences and Physiological Sciences

Section C: Research, Development and Innovation

This section is mostly independent study under the supervision of an academic from the host University.

It is expected that the Clinical Scientist's research project will largely be carried out in the workplace with supervisory input from the host University and workplace supervisors.

How are Clinical Scientists in HSST assessed?

Academic component

For each component of the Professional Doctorate it is important that the Clinical Scientist in HSST understands the area, has a sufficient depth of knowledge and can effectively apply the knowledge to help guide the service towards new strategies/techniques/innovation where appropriate.

Assessments may include:

- Written output in the form of examinations, essays and literature reviews.
- Case studies, practical exercises, presentations and project work.
- Research project proposal, dissertation (thesis), scientific paper preparation, oral presentations and viva.

To ensure equity of experience for Clinical Scientists in HSST a set of common regulations have been agreed across all the Universities involved in HSST.

Pass Mark

The pass mark for all modules will be an aggregate score of 50%.

Compensation and referral

There will be no compensation or condonement across Section A (Leadership and Management) and B modules (Specialist Scientific modules). Resit marks will be capped at 50% (up to 60 credits in Section A and up to 75 credits in Section B).

Penalties for late submission of work

Penalties for late submission of work: 10% of the total marks available for the assessment shall be deducted for each working day after submission date, up to a maximum of five working days. Work received more than five working days after the submission deadline will receive a mark of zero.

Work-based Assessments

Clinical Scientists are required to store evidence of their competence and progression in an e-portfolio (the Online Learning and Assessment Tool - OLAT). The evidence they collate is reviewed by the National School of Healthcare Science (NSHCS) to check progress and make decisions about progression and completion of the programme.

The methods used for assessment in the workplace are common across HSST specialisms and are the same as those used for other levels of training within healthcare science e.g. STP: CBD (Case-based Discussion); OCE (Observed Clinical Event/Encounter); DOPS (Direct Observation of Procedural/Practical/Professional Skill OR Delivery of Professional Services); MSF (Multisource feedback); Reflective log (recording of experiential learning).

Awards

All Clinical Scientists completing the HSST have statutory registration with the Health and Care Professions Council (HCPC) as Clinical Scientists. After completing both the academic component (DClinSci) and work-based assessments of the HSST they will be awarded a Certificate of Completion of HSST (CCHSST) from the National School of Healthcare Science. Clinical Scientists will then submit their CCHSST to the Academy of Health Care Science (AHCS) who hold a voluntary register for those students completing HSST.

[Click to go back to Start](#)

What does a Programme Committee do?

The Programme Committee meets twice a year and consists of the Programme Director, Programme Administrator, the examinations officer, leads for each of the specialist pathways, and two Lay Representatives. The Committee also has student representatives (Clinical Scientists in HSST). Each representative is democratically elected by students in the year that they represent.

The Programme Committee's purpose is to:

- ✓ Oversee the teaching, assessment and examining arrangements;
- ✓ Monitor student progression including failure rate, withdrawal rate;
- ✓ Evaluate the extent to which the learning outcomes are achieved by students;
- ✓ Monitor, maintain and enhance standards of all aspects of the programme;
- ✓ Evaluate the effectiveness of the curriculum and of assessment in relation to programme learning outcomes;
- ✓ Evaluate the effectiveness and relevance of the teaching and learning methods employed;
- ✓ Review and revise the programme in the light of any relevant Quality Assurance Agency (QAA) benchmarks, any other relevant external and/or professional requirements and developing knowledge in the subject area;
- ✓ Receive, consider and respond to feedback from students, employers and external examiners;
- ✓ Where the need for change is identified, effect the changes quickly and efficiently;
- ✓ Produce an annual action plan via annual monitoring;
- ✓ Produce reports for periodic review
- ✓ Produce relevant information for an Institutional Audit;
- ✓ Review programme documentation, e.g., programme handbooks, programme specifications, promotional literature and programme website;
- ✓ Ensure suitable and efficient arrangements are in place for recruitment, admission and induction.

Programme Management Structure

MAHSE Executive Board (meets quarterly): Has oversight of MAHSE policy, strategy and budget.

MAHSE Stakeholder meeting (Meets annually): Has oversight of the PTP, STP and HSST programmes and Continuing Personal and Professional Development (CPPD) for the existing Healthcare Science workforce.

HSST Oversight Group (HOG) (Meets quarterly): HOG oversees the delivery of DClinSci programmes at MAHSE partner universities with a view to ensuring parity of experience for Clinical Scientists in HSST registered on the programmes. HOG acts as a reference point between MAHSE partner universities and external stakeholders full details of membership and the purpose of the group are available via the [HOG Terms of Reference](#).

What is expected of a Lay Representatives?

As a minimum we would expect Lay Representatives to commit to four half days each year. However, we will contact you each time that we have an appropriate involvement activity.

Lay Representative involvement in education can include a number of things, such as a patient:

- Sharing their story and experiences with learners
- Bringing their experience to learning groups
- As a simulated or volunteer patients in a learning environment or as a form of assessment
- Being involved in creating and providing comment on learning materials e.g. paper-based, electronic case studies or scenarios, course materials, videos etc.
- As teachers and assessors or evaluators involved in teaching or assessment of students/learners
- As partners in student education, assessment and curriculum development with equal input
- Contributing to developing the MAHSE Patient and Public Involvement Strategy
- Involved in decision making at the institutional level e.g. student selection (where applicable), programme committee (see below for more information)

Meet the Programme Team

MAHSE Team

Name	E-mail	Area of expertise
Phil Padfield	Philip.V.Padfield@manchester.ac.uk	MAHSE Director
Pam Vallely	pamela.j.vallely@manchester.ac.uk	Academic Director for DClinSci in HSST
Kai Uus	kai.uus@manchester.ac.uk	HSST Assessment Lead
Sarah Williams	Sarah.williams@manchester.ac.uk	MAHSE Manager
Rebecca Riley	Rebecca.Riley@manchester.ac.uk	HSST Administrator
	admin@mahse.co.uk	MAHSE Admin account

University of Manchester

Name	E-mail	Area of expertise
Pam Vallely	pamela.j.vallely@manchester.ac.uk	HSST Lead for UoM
Nathan Proudlove	nathan.proudlove@mbs.ac.uk	MBS Academic Lead
Victoria Mansfield	HSST@manchester.ac.uk	Programme Manager MBS
Kai Uus	kai.uus@manchester.ac.uk	Audiology

Manchester Metropolitan University

Name	E-mail	Area of expertise
Garry McDowell	g.mcdowell@mmu.ac.uk	HSST Lead for MMU Programme Director DClinSci Network
Martin Stout	M.Stout@mmu.ac.uk	Award Lead: DClinSci Physiological Sciences Module Leader for Cardiac, Respiratory and Sleep and Vascular Sciences Specialist Units
Carol Ainley	c.ainley@mmu.ac.uk	MAHSE Deputy Director
Anne-Marie Walsh	a.walsh@mmu.ac.uk	Programme Administrator

[Click to go back to Start](#)

University of Liverpool

Name	E-mail	Area of expertise
Paul Nolan	P.J.Nolan@liverpool.ac.uk	HSST Lead for UoL Programme Director Medical Physics / CBE
Helen Boston	H.C.Boston@liverpool.ac.uk	Programme Director Medical Physics / CBE; eLearning Support
Tony Fisher	a.c.fisher@liverpool.ac.uk	Clinical Lead on the Medical Physics and CBE DClSci
Janet Kennedy	jmk@liverpool.ac.uk	Programme Administrator
Azzam Taktak	afgt@liverpool.ac.uk	Module Lead on the Medical Physics and CBE DClSci
Andrew Reilly	areilly@liverpool.ac.uk	Module Lead on the Medical Physics DClSci
Philip Mayles	Philip.Mayles@clatterbridgecc.nhs.uk	Module Lead on the Medical Physics DClSci
Colin Baker	colin.baker@liverpool.ac.uk	Module Lead on the Medical Physics DClSci

Aston University

Name	E-mail	Area of expertise
James Wolffsohn	J.S.W.Wolffsohn@aston.ac.uk	HSST Lead for Aston Deputy Executive Dean

Important contacts

Nature of query and who to contact	
For queries about OLAT	support@olat.org.uk
Contact the National School of Healthcare Science about the work based training	nshcs@wm.hee.nhs.uk
Speak to MAHSE about the academic component	admin@mahse.co.uk

List of Acronyms

Abbreviation	Explanation
AHCS	Academy for Healthcare Science
BLS	Basic Life Support
BMS	Biomedical Science/ Biomedical Scientist
CCGs	Clinical Commissioning Groups
CMFT	Central Manchester Foundation Trust
CQC	Care Quality Commission
CSF	Core Skills Framework. A set of skills required by every healthcare scientist (and other health professionals) before they may go on placement in a hospital
DoH	Department of Health
HCA	Healthcare Assistant. Used to be called a medical laboratory assistant, or lab aid.
HCAI	Healthcare Associated Infections
HCPC	Health and Care Professions Council. The registrant body for professions including biomedical scientists and clinical scientists
HCS	Healthcare Science

[Click to go back to Start](#)

Abbreviation	Explanation
HEE	Health Education England (formally Medical Education England). The Government department responsible for education and training of healthcare professionals
HOG	HSST Oversight Group
HENW	Health Education North West. The NHS department responsible for education and training within our region
HSST	Higher Specialist Scientist Training
IBMS	Institute of Biomedical Science, the professional body
LETB	Local education and training board. They commission programmes, and provide some funding to hospitals.
MAHSE	Manchester Academy for Healthcare Scientist Education. A joint venture between University of Manchester, Manchester Metropolitan University and University of Salford. Also includes 'affiliate' Universities. Together we deliver programmes for Modernising Scientific Careers (MSC).
MSC	Modernising Scientific Careers
MSc	Master of Science (postgraduate award)
NHSBT	National Health Service Blood and Transplant
NHS FT	National Health Service Foundation Trust
NICE	National Institute for Health & Care Excellence
NSHCS	National School of Healthcare Science
PCTs	Primary Care Trusts
PHE	Public Health England
POCT	Point of Care/Testing
PSRBs	Professional, Statutory and Regulatory Bodies
PTP	Practitioner training programme. An honours degree with integrated placement learning. The students pay their own fees.
RCCP	Registration Council of Clinical Physiologists, a voluntary register of those who practice in this field
STP	Scientific Training Programme