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Addysg a Gwella Iechyd Cymru (AaGIC)
Health Education and Improvement Wales (HEIW)

Gwyddor Gofal Iechyd Cymru
Healthcare Science Cymru

NHS Wales Healthcare Science Career Framework

July 2025

Contents

Foreword

We are delighted to present the NHS Wales Healthcare Science Career Framework which supports HEIW's strategic objectives to develop a skilled, sustainable, and adaptable workforce that meets the evolving needs of our healthcare system.

Healthcare science professions are integral to the delivery of high-quality patient care, contributing significantly to diagnostic pathways, quality management, and the implementation of cutting-edge technologies.

This comprehensive document shows our dedication to advancing the education, training, and career growth of healthcare science professionals along with insights into their various roles in NHS Wales. We believe this resource will be valuable for healthcare science professionals, workforce planners, and educators, helping to enhance the capabilities of our workforce and support NHS Wales's commitment to high-quality, patient-centered care.

This framework is the result of a collaborative effort led by the Healthcare Science Programme and co-produced with healthcare science professionals across NHS Wales and their professional bodies. It truly reflects our dedication to multi-professional workforce development and our commitment to valuing and supporting all healthcare science professions.

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Executive Summary

The NHS Wales Healthcare Science Career Framework brings together initiatives undertaken to strengthen and develop healthcare science education and training. With clarified career progression routes and education availability for healthcare science professions, this single point of reference on healthcare science is aimed at three key audiences.

For the healthcare science professions themselves, it answers the frequently posed questions on education and training funding in NHS Wales, clarifies how to apply the multi-professional developments and visually maps full career progression routes for the first time. It also enables collaboration between professions with detail on commonalities and differences.

For those less familiar with these professions, it includes the often requested descriptions of roles and different career progression routes for the 6 healthcare science 'families' which include over 30 professions, across over 50 service areas, spanning the whole NHS. The visual pathways and accompanying narratives describe that some healthcare science professions progress from graduate level registration to advanced and consultant practice, others complete formal training programmes and Royal College examinations, but many use both approaches for different roles and have routes to move between them.

The NHS Wales funding of multi-professional education and training in a flexible, organisation-led way, has enabled workforce transformation based on service need rather than funding available. This framework will also enable further clarity for all involved in workforce planning and transformation to use and develop this essential workforce to its full potential for an effective NHS that meets the needs of the population of Wales.

Navigating this Document

Due to this framework being the first of its kind and describing not only the current services and future vision for the healthcare science profession, detailed career progression routes, but also multi-professional context and funding available for education and training in Wales, it will naturally have many different uses depending on the reader's perspective.

For chief executives, the detail on the professions will enable questions to be posed on the use of these roles in your organisation, towards becoming a part of the future described. You may wish to start from the introduction and vision, take note of the beginning of section A on language and groupings, and then move straight to the descriptions of services in section D.

If you are involved in workforce planning, the visual career pathways are likely to be of value; these roles along the career pathways can be compared to your local Electronic Staff Record data using the job role descriptors and indicative bandings to the left.

Those with responsibility to manage education funding provided by HEIW for healthcare support workers or for enhanced, advanced and consultant practitioners will find section C and figure 3 of value, along with the pathways illustrating education needs in healthcare science.

Wherever you are in your career, the narratives in section D will help to give you a sense of the innovative and passionate services within Wales, and you can identify yourself on the career pathway visual to understand your role in a wider context and development options available.

For those in healthcare science professional leadership roles, the whole document will be of value as a reference handbook to read through initially and to come back to time and again.

Introduction

Healthcare science professions are a critical workforce in NHS Wales, fundamental to almost all diagnostic pathways, responsible for quality management, radiation safety and medical equipment, providing executive leadership, and delivering patient rehabilitation and care. Whilst a sixth of the size of the nursing workforce, both healthcare science professions and allied health professionals number over 7,000 in Wales due to the defined professions included within each that are used by Welsh Government.

From their origins in the application of scientific advancements, technologies and engineering to medicine and healthcare, healthcare science professions were fundamental to early healthcare. They are essential in the services, pathways and diagnostics that they deliver and in implementing the scientific, digital and technological developments of the past decade across the NHS, including artificial intelligence, machine learning, genomic applications and more. As the modern healthcare workforce evolves to meet patient needs and increasing demands, this critical workforce will provide scientific skills and expertise as part of the multi-disciplinary workforce, as well as working with medical colleagues to provide highly specialist leadership driving NHS Wales forwards.

The NHS Wales Healthcare Science Career Framework will enable understanding of these professions and their careers within Wales for all, whether new chief executives, healthcare science students, mid-career professionals in Wales or those interested in working here. For the healthcare science professions in common with the groupings in England and Scotland, the previous Healthcare Scientists Career Framework and Modernising Scientific Careers introduced new combined approaches for most roles; the HEIW career framework is an update to these. Whilst this new framework for NHS Wales is aligned with the intent of the prior publications, there are significant additions in recognition of all professional areas and professional registrations, utilising professional body frameworks and guidance.

Radiographers, radiotherapists and operating department practitioners are also professionally supported by the Chief Healthcare Science Officer in Welsh Government. For these, career route details are aligned to the AHP and nursing frameworks across the UK, with clarity on the funding and education opportunities for those working in NHS Wales. Inclusion within the healthcare science career framework does not intend to impact professional identity or diminish alignment with AHP and nursing transformation in the other UK nations; the Executive Directors of AHP and Health Science (EDAHPHS) within health boards and equivalent leadership in the trusts and strategic health authorities are responsible for both healthcare science and AHP professions together and HEIW is committed to multi-professional workforce development.

With the need set out by Welsh Government in Healthcare Science in NHS Wales and co-produced with the healthcare science professions across NHS Wales, and their professional bodies across the UK, this HEIW career framework demonstrates the commitment to this key workforce in Wales.

Vision

The healthcare science profession in Wales have a clear vision for their future as leading transformational change through:

- Cutting-edge transformation - essential in research and implementation of AI, genomics, diagnostics, precision medicine and advanced therapies,
- Adoption - specialist expertise in digital technologies, data connectivity and innovation, enabling transformation and performance across the whole NHS,
- Specialist skills - scientific, engineering and clinical expertise both enabling highly specialist services in tertiary centres, and used in workforce skill mix to enable medical consultants to focus on where their skills are essential,
- Enabling change - enabling the move to neighbourhood working through remote diagnostics and monitoring, point of care testing, home based treatments, and closer to home diagnostic and rehabilitation services.

Fundamentally, we believe that the healthcare science professions are both essential now but also will shape and impact the future of the NHS in Wales. Whilst the pathways describe how to utilise this workforce now, in doing so, you will enable development towards the future vision.

Success

One year after publication, success will be measured by:

- Demonstrated improved understanding of healthcare science profession, roles and career pathways.
- Further improvements complete, with education provision in place for CQFW levels 2 to 4, detailed pathway visuals for 100% specialties, an online interactive career pathway and clarity on scopes of practice for roles/ professions not currently utilised in Wales.

After year 2, we are aiming for:

- Impact seen across the healthcare science profession, including improved sense of professional identity and feeling valued, and increased use of all routes to registration.
- Publication of the updated framework, including detail for roles/professions not currently utilised in Wales, and further detail on support worker, assistant and associate roles, including education provision for career progression of employees via CQFW levels 5 to 6.

By year 3, measures will review if workforce needs are met in all regions of Wales, including:

- Registration policies in place in all health boards and trusts.
- Improved uptake of graduate roles in Wales and retention beyond 2 years, and improved attraction and retention across profession.
- Improved use of assistant/associate and advanced practice/consultant roles and full utilisation of professions in MDT services.

A. Who are the Healthcare Science Professions in NHS Wales?

Healthcare Science Professions

In NHS Wales, all healthcare science professions are valued, recognising the different contributions that they make to the NHS and the different strengths that they bring. It is recognised that the specific identity of each profession matters (Davies et al., in press) and, while grouping the professions into 6 families supports understanding and reduces the sense of being too complex, the 30+ professional areas and their protected titles should be recognised:

1. **Physiology** – Audiology, Cardiac Physiology, Respiratory & Sleep Physiology, Neurophysiology, Perfusion Science, Vascular Science, Vision Science, Gastrointestinal Physiology & Urology
2. **Pathology** – Blood Sciences & Transplantation, Cellular Sciences, Reproductive Sciences, Infection Sciences, Decontamination Science, Public Health & Environmental Science, Anatomical Pathology Technology, Phlebotomy
   Genomics – including Human Genomics, Pathogen Genomics & Genetic Counselling
3. **Physical Sciences** – Clinical Engineering, Medical Physics, Medical Illustration, Reconstructive Science, Pharmaceutical Science
4. **Clinical Computational Sciences** – Bioinformatics (Human & Pathogen), Clinical Informatics, Clinical Scientific Computing
5. **Radiography** – Diagnostic Radiography, Therapeutic Radiography
6. **Operating Department Practitioners (ODP)**

Historical origin

Healthcare science professionals have long been associated with development and use of technology, with each profession developing around a particular focus with highly specialist expertise. Marie Curie is heralded as the first medical physicist and provided x-ray equipment for soldiers in the First World War. Audiology also became a profession from the needs of soldiers in the World Wars with significant reports of deafness, the first audiometer having been invented by Welsh scientist David Edward Hughes in 1879. Professional bodies for biomedical scientists date back to 1912 and radiographers to 1920. Clinical engineering has been essential since the early hospitals, using engineering techniques to manufacture devices.

The term “healthcare science” was coined around the 1990s to group the professions allied to medicine that included both technical roles and the scientific advanced and consultant roles. There was fluidity in terminology initially, with professions such as radiotherapy and audiology including both therapeutic and scientific characteristics and, whilst the terminology is now more defined, the breadth of skills has not narrowed, such as incorporating the patient care from ODPs and the creativity of medical illustrators.

The mid-2000s review of responsibilities for professions in Welsh Government led by Owen Crawley, Chief Scientific Adviser for Health at the time, placed diagnostic and therapeutic radiographers under the responsibility of health science policy leads, whilst in England, Northern Ireland and Scotland the radiography professions were represented within Allied Health Professionals (AHP). ODPs were also included under health science in Wales at the time, remaining under nursing in Northern Ireland and Scotland to this day, and recently moving to AHP responsibility in England alone in 2017. A timeline is given in Figure 1 to aid visualisation.

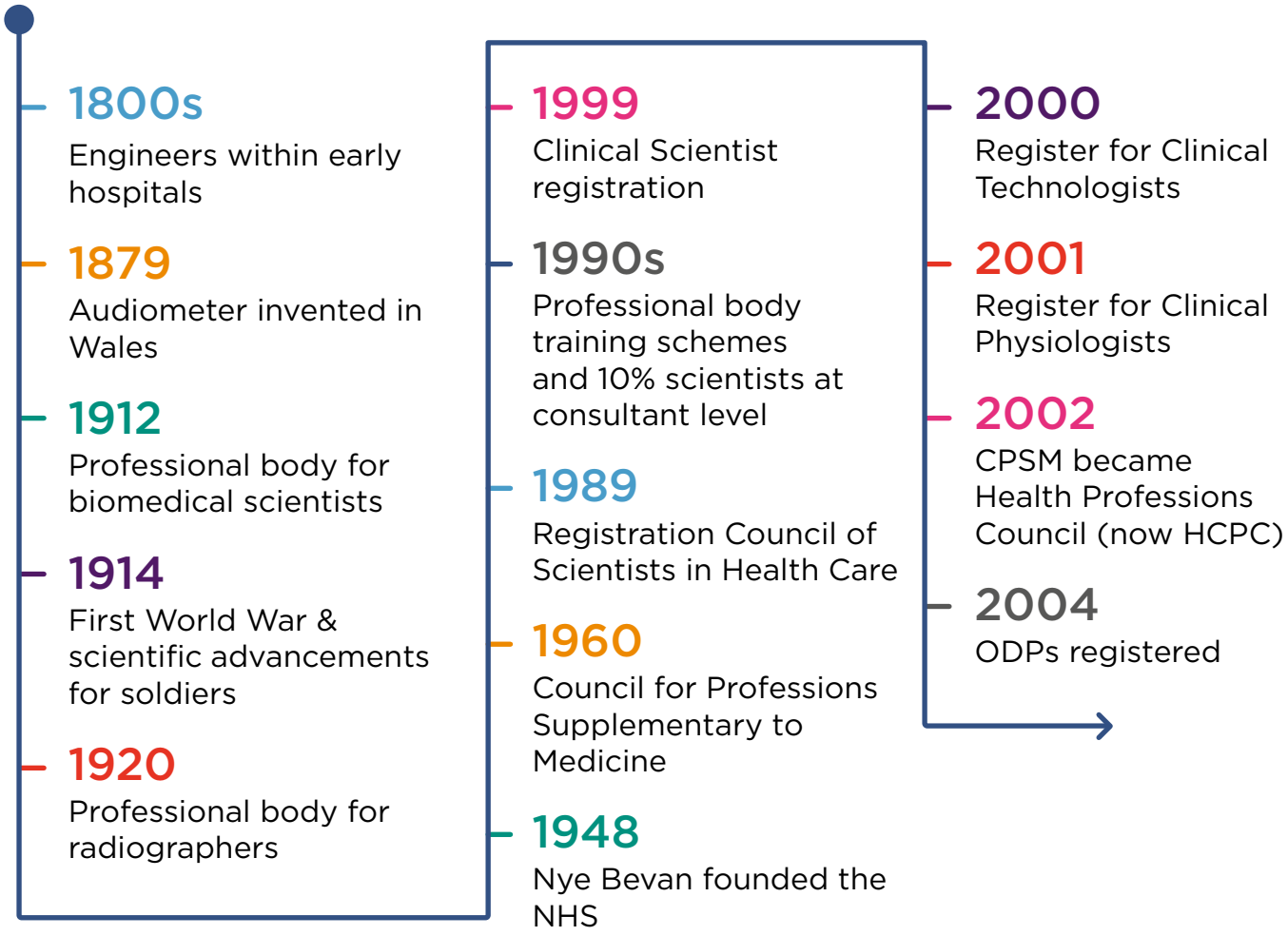


Figure 1: Historical timeline of the healthcare science professions in NHS Wales

Professional Registration

The Council for Professions Supplementary to Medicine (CPSM) had regulated biomedical scientists and radiographers since it began in 1960.

By the 1990s, the role of the scientist across healthcare had grown substantially, with 10% said to reach consultant scientist level, particularly biochemists, audiological scientists, medical physicists and geneticists. In 1999, CPSM registration was extended to include postgraduate level clinical scientists. This brought together roles that differed significantly in responsibilities but had much in common professionally. The term 'clinical scientist' was more applicable to some than others, in laboratory sciences it denoted clinical skills not held by the biomedical scientist, but for all that were included, it provided a way to access mandatory registration.

For clinical technologists (technical roles in clinical engineering and medical physics) and physiologists, professional registers were set up with the Register of Clinical Technologists (RCT) in 2000 and the Registration Council for Clinical Physiologists (RCCP) in 2001.

In 2002, CPSM was replaced by Health Professions Council, now Health and Care Professions Council (HCPC), with registration of biomedical scientists, radiographers and postgraduate clinical scientists. In 2004, operating department practitioners' registration was introduced, initially with graduate diploma accepted for registration but from 2024 this was changed to degree only, in line with other professions. Figure 2a details routes to HCPC registration.

The 2002 NHS Reform and Health Care Professions Act also set up a body to oversee all UK professional regulators of healthcare, now known as the Professional Standards Authority (PSA). This independent organisation is accountable to UK Parliament to monitor regulators such as HCPC, and in 2012 was given powers to accredit organisations holding registers not regulated by law; with both the RCT and RCCP becoming PSA-accredited registers shortly after. Figure 2b lists routes to PSA-accredited registration.

The Academy for Healthcare Science (AHCS) was established in 2011 as a joint initiative of the UK Health Departments and the professional bodies across healthcare science. The AHCS was set up to:

- Develop consistent regulation e.g. by establishing PSA-accredited registers, with the Healthcare Science Practitioner Register opened in 2014 and the Higher Specialist Scientist Register in 2015. The RCCP register was also incorporated into the AHCS in 2021.
- Implement a system to assess and confer 'equivalence' mapped to the outcomes of formal training programmes.
- Quality assure education and training in partnership with other stakeholders.
- Develop common standards for healthcare science practice.

The Higher Specialist Scientist Register enables eligibility for consultant clinical scientist roles via either the formal training programmes or associated equivalence routes, and has been fully embraced by the profession in Wales. National guidance published by the Wales Healthcare Science Network resulted in increased applications for equivalence routes to registration at clinical scientist and consultant levels, and enabled creation of this framework.

Non-PSA registers have also now been developed by AHCS for the healthcare science assistant and associate workforce, linked to the NHS England apprenticeships. Support has been confirmed for AHCS to work with HEIW to add details of the NHS Wales education once both the pathways and providers are in place.

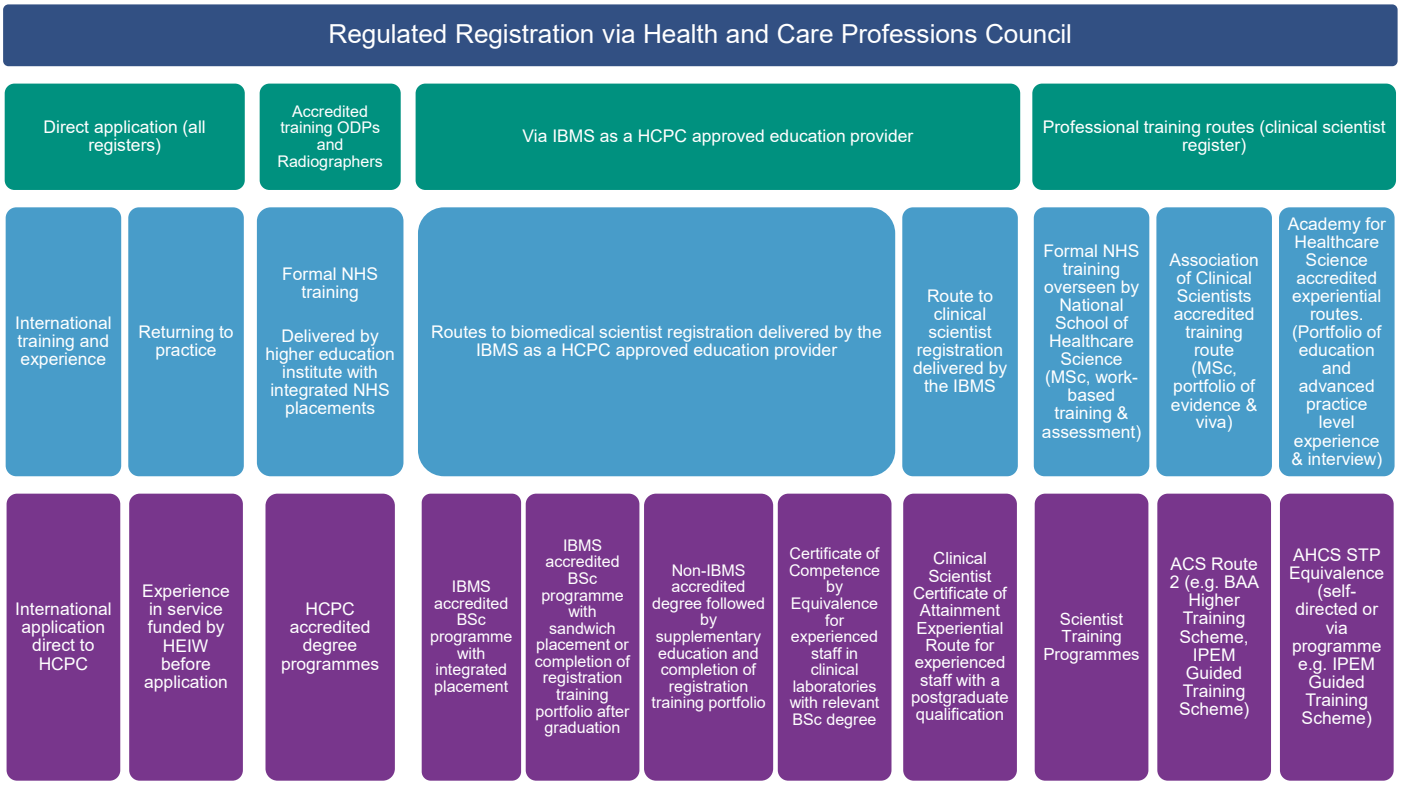


Figure 2a: Registration is available for all healthcare science professions, but only some have access to regulated HCPC registration. HCPC are overseen by the Professional Standards Authority who set standards and review the work of regulators such as HCPC, NMC and GMC.

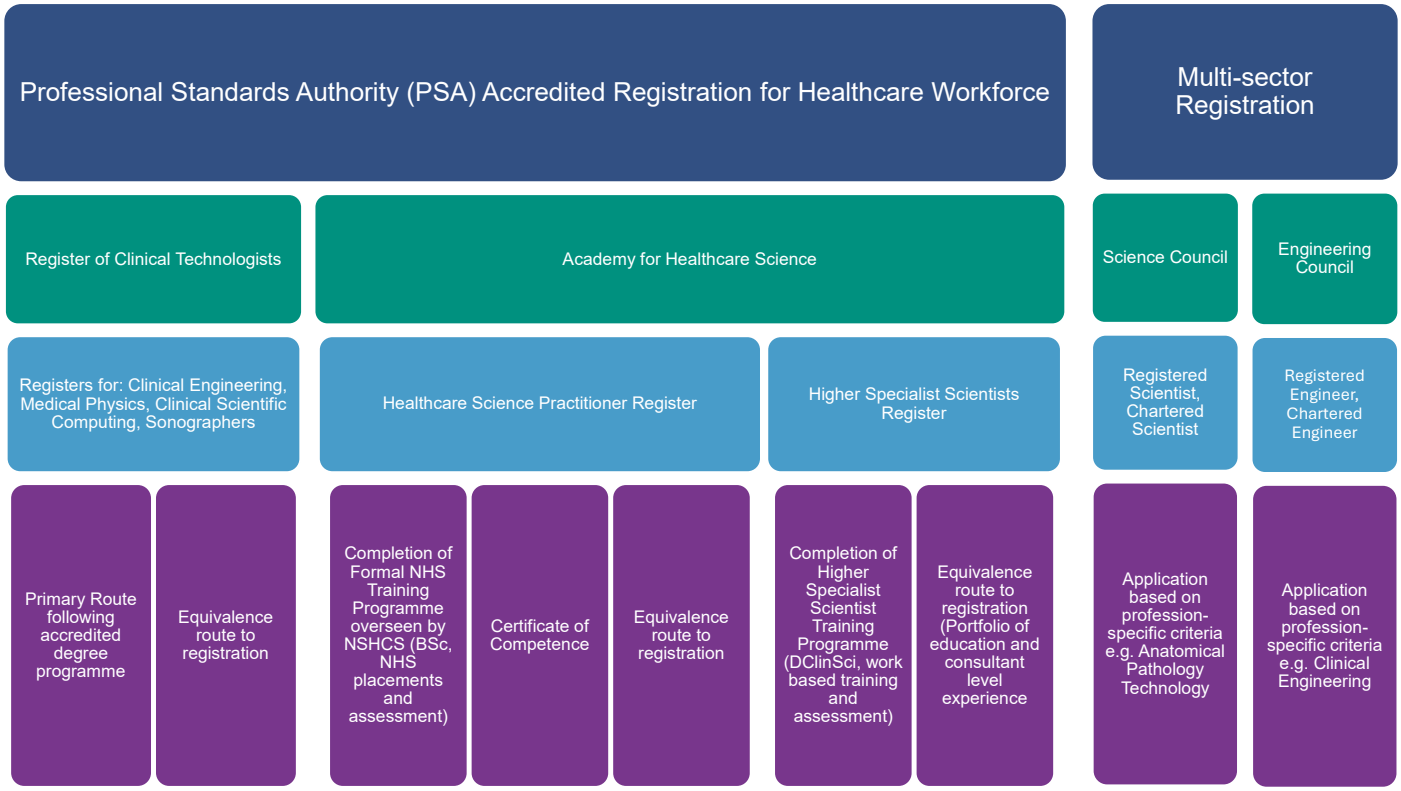


Figure 2b: Other registers are accredited by the Professional Standards Authority to provide registration where they are not regulated by law. Some also use multi-sector registration bodies.

Clinical Scientist Registration

Intent to bring healthcare science professions together with a consistent career framework extends back to the 1989 Registration Council of Scientists in Health Care (later named Association of Clinical Scientists, ACS). Two routes to registration were offered: “Route 1” following an accredited training programme, and “Route 2” combining university courses with a work-based programme managed through the relevant professional body and culminating in portfolio and interview. The former route is still used in histocompatibility and immunogenetics, and the latter route is still used in audiology, medical physics and clinical engineering. The IBMS were also approved to offer a Clinical Scientist Certificate of Attainment Experiential Route for experienced biomedical scientists with a postgraduate qualification that can demonstrate they already work at clinical scientist level.

With the establishment of a National Advisory Group for Scientists and Technicians, recommendation was made in 1998 to the House of Commons that “Resources similar to those provided for medically qualified staff should be made available for the advanced training of clinical scientists.” This led to a career framework in 2005 which described the AHCS, to be approved by HCPC to accredit clinical scientist training programmes, as well as to assess and confer ‘equivalence’ for those with existing qualifications and experience across all areas.

The Modernising Scientific Careers Programme was set up in 2008 and the National School for Healthcare Science (NSHCS, or ‘the National School’) was formed in 2010 within Health Education England to manage this new approach to the majority of healthcare science professions education. In relation to clinical scientist training, new postgraduate level (CFQW level 7) Scientist Training Programmes (STP) were set up. These combined a part-time MSc Clinical Science from commissioned HEIs with full-time service-lead local training over 3 years.

The healthcare science professions in NHS Wales were a key influence in the conception, initiation and delivery of these training programmes, having delivered the preceding profession-specific training. Funding to match that within England has long been provided from Welsh Government via HEIW and the predecessors National Leadership and Innovation Agency for Wales (NLIAH) and Workforce, Education and Development Services (WEDS).

By 2012, the number of professions in Wales using postgraduate training programmes had doubled from 4 (audiology, biochemistry, genetics and medical physics) to 8 (including microbiology, immunology, clinical engineering and embryology). Whilst use of ACS route 1 and 2 continued in Wales, in the period 2013 to 2015 the new STP training programmes were embraced alongside across all the existing specialties. Further services joined since, with 15 specialties in 2020 and over 20 specialties underway in 2025, 70% of the programmes available. HEIW lists all STP programmes in the annual Education and Training Plan submission forms for health boards and trusts to express interest, and services are directed to the National School to apply for accreditation.

Equally the equivalence routes to registration, where NHS employees demonstrate that their education, development and experience in all domains are “equivalent” to the associated training programme, were fully supported in Wales with specific funding for portfolio submission fees and associated training and experiential costs.

Consultant Clinical Scientist Registration

As a result of Modernising Scientific Careers, a doctoral level (CFQW level 8) Higher Specialist Scientist Training (HSST) was also set up as a service-lead consultant training scheme with an integrated DClinSci at commissioned HEIs. On completion, doctoral graduates register on the Higher Specialist Scientist Register for eligibility for consultant clinical scientist roles in Wales, whilst also retaining their HCPC clinical scientist registration.

Advanced and Consultant Practice Regulation for Radiographers and ODPs

Whereas the healthcare science professions common to the rest of the UK focus on registration as the demonstration of level of practice, there are not currently accredited or regulated registers at postgraduate and doctoral level for those grouped into allied health professions or nursing.

Instead, Masters programmes are themselves accredited by either professional bodies or by the Centre for Advancing Practice in NHS England, which has also now developed an e-Portfolio route to recognise experienced advanced practitioners with a similar ethos to those for healthcare science. Whilst this is an England-only set of processes currently, UK approaches are under consideration. Consultant practice currently is only supported by frameworks.

B. Context of Healthcare Science Career Progression in NHS Wales?

Education and Training for the Healthcare Science Workforce

Training for your professional role in the NHS is essential to all professions, and in healthcare science there are multiple routes to achieve this. Training may be undertaken as a student in a university or Higher Education Institute (HEI) with placements in NHS services. In healthcare science, there are additional formal training programmes at postgraduate and doctoral levels, akin to those in medicine and pharmacy, with some healthcare science professions undertaking the same medical examinations.

Some may instead take a work-based learning route, i.e. "earn as you learn", often called apprenticeships in other parts of the UK (note that in Wales, the apprenticeship levy is only available for CQFW levels 2 to 4, but work-based learning may be undertaken at any level). Such training roles are typically enabled locally, where the individual is employed in their role and completes education and training before commencing fully.

Whilst common to assistant and associate roles in healthcare science, a service may appoint any successful candidate into a trainee role, or use Annex 21 on appointment (NHS Wales Employers, 2023), with a training plan agreed to be undertaken before achieving the full salary for the role. These flexible approaches enable remote or shortage professions in Wales the ability to support the appropriate training route for the individual, the needs of the service and the local workforce.

Particularly where the training is external to or prior to being appointed into the role, such as with a university delivered training programme, there may be need for a preceptorship period when the role is started. Some areas of healthcare science use the graduate "practitioner" role as the preceptorship level, with further training in the specialism incorporated as standard, and the specialist level then being the core role required for effective service delivery.

In others, the preceptorship focuses on competence and professional practice, along with ensuring that the individual is proficient in all pillars of practice to meet their registration requirements. A Supervision Hub is under development by HEIW to support both multi-professional understanding of supervision and mentoring, including for stages of development such as preceptorship, and link to profession-specific frameworks and resources (HEIW, 2025a).

Registration and Professional Standards

As explained, there are multiple registration routes across the healthcare science professions. For those with HCPC registration, i.e. biomedical scientists, radiographers, operating department practitioners and clinical scientists, the HCPC Standards provide the core expectations for all registrants and for the education and training programmes to enable registration. These are in the process of being updated, with the HCPC Standards of Proficiency updated in 2022 and implemented in 2023. The HEIW Digital Capability Framework provides a self-assessment tool to support professionals with digital skills and new technologies, and an Artificial Intelligence (AI) Capability Framework is also in development.

The HCPC Standards of Conduct, Performance and Ethics were also updated and implemented in 2024, the HCPC English language requirements for international registrants updated in 2025 and the HCPC Standards of Education and Training are under review in 2025; all registrants are required to review and reflect on the changes.

Good Scientific Practice was developed by the AHCS to be the healthcare science profession equivalent to Good Medical Practice. Whilst mapped to HCPC Standards, the GSP domains additionally highlight the importance of professional and scientific practice by healthcare science professions alongside clinical activity. Those undertaking training towards AHCS registration or developing portfolios of evidence for the equivalence routes will be familiar with these domains, but other healthcare science professionals may find the scientific nature of the GSP standards of interest and in particular the "scientific practice" domain.

The IBMS also developed Good Professional Practice and Professional Conduct in Biomedical Science as a guide to expectations of the highest standards of professionalism for all members.

Welsh Language Standards

The people of Wales engage with health and care services when they are at their most vulnerable. Therefore, ensuring they can do so in their preferred or native language, is an integral part of health and care to achieve better clinical outcomes. HEIW has recently launched a new training resource, Workforce Planning for the Welsh Language, on the Y Ty Dysgu platform.

HEIW will continue to contribute to "An Active Offer", providing services in Welsh without having to ask. Creating a culture that provides a proactive language offer enables access to care and helps staff to thrive in their workplace, as equal partners, through the medium of Welsh.

Continued Professional Development

Once commenced in the role, all professions are responsible for ensuring quality and safe practice through seeking feedback, sharing knowledge, improving services and developing their understanding and skills. Skills development must continue throughout a career, whether career progression is sought or whether the individual is maintaining the same level of practice.

The HEIW Continuous Professional Development (CPD) Strategy for the NHS Wales healthcare workforce is due to be published this year (HEIW, in press). This supplements profession-specific guidance and standards to support understanding of approach across all professions and provide clarity of responsibility for the individual, service and national bodies in Wales.

Multiprofessional Pillars of Practice

No matter which registration is held or being worked towards, all professionals are required to undertake continuing professional development (CPD) and ensure that they work across all pillars of practice.

This is particularly important by the nature of some of our small healthcare science services in Wales, where few professionals are able to or would be appropriate to move away from clinical roles to be solely a training lead, research lead or quality manager. Instead, individuals "dial up" different pillars of practice whilst maintaining all to some degree; this is dependent on: 1) Job description, 2) Service need and population need, and 3) Areas of strength possessed and/or in relation to the wider team.

Research & audit pillar - Across a small team all should support research to be underway and have experience appropriate to their level of practice. There should be one or a small number of individuals that have strengths in designing and running studies that are bringing UK/Wales studies to the local service, leading on new studies grown from local service challenges, and drawing funding into the service. Others gain experience as a site principal investigator on a national study (relevant for all seeking advanced practice roles and/or clinical scientist registration) and the reminder of the team support with recruiting patients and gathering data.

Education pillar – The same team may include another/others with strengths in training, who may undertake a PGCE and lead local training mentoring, with others leading training elements linked to their other strengths, and cascading their own CPD learning to their peers.

Clinical pillar – Patient or service need and the nature of the centre, such as a specialist tertiary hub versus a community locality, will determine the level of specialist practice undertaken. Clinical and scientific expertise may be broad and balanced with other pillars of practice in a small team, or highly specialised with strategic development, leadership and training of others in that field also. Across most healthcare science professions, clinical and scientific practice is maintained throughout the career pathway where this can be done so appropriately.

Leadership & management pillar – Compassionate and collective leadership is an essential part of all levels and roles, not just for those with management responsibilities. By ensuring a culture where this propagates through peer interactions, speciality leadership, line management and multi-professional development, a safe and supportive environment is enabled. When combined with the scientific knowledge, innovative thinking and problem solving, healthcare science professions are valuable leaders in the NHS now and for the future.

Strategy pillar - Healthcare science professionals contribute significantly to the strategic goals of organisations and to national and international developments, providing advice, intelligence, and expertise in transformation and innovation. This will be more evident in consultant and senior leadership positions, and is essential at head of service level, but development will grow from early professional practice (Wales Healthcare Science Network, 2022).

This approach ensures that a service includes a collective balance across all pillars of clinical and scientific, education, leadership and management, research and audit, and strategy. On a personal level this meets registration requirements and enables good scientific practice, with services better able to gain service accreditation and ensure quality patient care.

Multi-professional levels of practice

The HEIW Professional Framework for Enhanced, Advanced and Consultant Clinical Practice in Wales provides an umbrella framework for career profession in NHS Wales of all nursing, midwifery, allied health professions and healthcare science professions, with professional body career frameworks, such as the significant set of qualifications offered by IBMS, then adding the specifics for the individual profession where available. The framework is relevant to healthcare science professionals that neither access the clinical scientist route nor have detailed professional body career pathways. It is also relevant to clinical physiologists and clinical technologists prior to clinical scientist registration or where advanced practice roles are appropriate in their specialty, as described in the IPEM Manifesto. It also includes that, while clinical scientists are an alternative entry level role in some professions, they are considered to be at an advanced practice level in relation to the whole career framework.

Enhanced, advanced and consultant descriptors should be viewed as levels of practice, with professionals supported in their role to achieve and maintain these. Those at advanced practice and consultant practice levels require job planning, described in further detail in the Healthcare Science Research and Innovation Strategy combined with effective workforce planning.

The role title may refer to the overall level of practice, particularly where this is achieved across all pillars, or may instead use other language such as specialist or principal.

As described above, differing roles and responsibilities, combined with the skills of the individual, will result in variation in the level to which each pillar is required. An individual with a PhD may lead on research and innovation developments to a consultant practice level, whilst providing clinical or scientific activity at an advanced practice level. Professional body requirements or postgraduate and doctoral level registration helpfully enable clear guidance and consistency for our professions, enabling this career framework to be created.

Career Progression

As described, career progression to roles at the different levels of practice in healthcare science combines that akin to nursing and AHP for some professions and routes, with that akin to medical and dental professions for others. In some profession areas, both approaches combine into a single career pathway, in others they co-exist with flexible routes between them. In others, only one or the other approach is available.

For those developing onwards from a graduate (CQFW level 6) registration, the usual levels of enhanced practice, advanced practice and consultant practice apply, and the overarching roadmap is illustrated in the Professional Framework for Enhanced, Advanced and Consultant Clinical Practice in Wales. While some professional bodies have significant qualifications and clear levels of practice, others offer some definitions of expectations at these levels, and there are some that are only now developing scopes of practice.

For those undertaking formal training programmes to postgraduate registered clinical scientists and to doctoral (CQFW level 8) consultant clinical scientists, or the career progression routes are available and clearly mapped, but there is less clarity or illustration of how these integrate in practice with some other routes and professional areas.

Both from the historical development and with intent to enable a flexible approach to healthcare science career progression, both forms of career progression are supported in NHS Wales, including all the routes between. Funding is available for all routes, as described in section C. As a result, there is a particular need in NHS Wales for the career progressions routes to be fully mapped, as detailed in section D, along with the opportunity taken to describe and celebrate the services in Wales provided by these professions.

C. Funding for Healthcare Science Education and Training in NHS Wales

Education funding approach in NHS Wales

Due to the needs of NHS Wales, the principles that underpin funding of healthcare education and training, some of which may be different to those of other UK nations:

- **All healthcare science professions are valued** - All professional roles and registration bodies are supported, with no bias in funding availability between career routes. This is essential for broad access and flexible entry into our professions in Wales. This enables services to attract from across the UK and internationally, and to "grow in Wales" where individuals may join and progress in their career from any entry point, particularly important in rural areas and Welsh language communities.
- **Quality entry routes into the professions** – Quality of education provision with positive training and trainer experience is essential to the pipeline into NHS Wales careers. Robust contract management is undertaken to drive up the quality of pre-registration commissioned programmes.
- **Education as part of clinical practice** – It is essential for NHS Wales to have training and education embedded throughout services and career pathways. For high quality education and training to be an integral part to services, there must be appropriate supervision, preceptorship and mentoring, protected time, and a culture of education. Some may lead aspects of training or take on a specific role, but the whole workforce is responsible for being a continued learner and educator throughout their career.
- **Funding that is flexible to the varying needs across our country** - Our funding approach in Wales is designed to adapt and respond to service need. The mixed model includes commissioned, funded, formal programmes and work based learning to meet the needs of healthcare services (illustrated in Figure 3). This is essential in healthcare science services that may range in size from just two, to many hundreds of professionals.

Mixed model of national funding for education

1. Commissioned education

Graduate programmes are commissioned for all healthcare science professions for whom curricula are available and there is an annual need for the professionals to enter roles in Wales. Through multiple programmes being offered side by side by a small number of universities in Wales, education providers support cohorts in single figures with services ensuring that roles are available on graduation. Even smaller services with less frequent need of new graduates liaise with larger training centres across the UK to support their training and welcome graduates into roles in Wales. Larger workforces such as diagnostic radiographers and operating department practitioners (ODPs) are supported by multiple universities commissioned to provide the degree programmes across Wales.

For the professions that have access to the Healthcare Science Practitioner Training Programmes (PTP) that resulted from Modernising Scientific Careers, these are the programmes commissioned by HEIW. Whilst this approach is changing across the UK, HEIW works closely with the providers and professions in Wales to ensure that workforce needs are met.

Additional education is commissioned where there is a clear case of need. Examples of Higher Education Certificate programmes include audiology and diagnostic radiography, where associate and assistant practitioner roles are embedded in and essential to service provision, with annual need for these roles. Masters level modules are commissioned where a substantial need is present on a regular basis, such as Radiographer Reporting and Genomics Education.

2. Funding streams

In line with the Multiprofessional Enhanced, Advanced and Consultant Practice Framework, each health board and trust in NHS Wales receives an allocation of funding for education additional to their local CPD funding, to enable development into enhanced, advanced and consultant practice (EACP) roles. This includes both profession-specific education, such as a Postgraduate Certification of Sleep Medicine, and multi-professional education such as a Masters in Advanced Clinical Practice.

There are additional requirements for postgraduate and doctoral level registration, with formal training programmes, portfolio submissions and assessments/interviews, and professional body examination and certification throughout the career pathways of most healthcare science professions. In order not to burden other funding sources, HEIW enables separate funding for these alternative routes to registration, also known as the Equivalence Funding.

Some use this to access medical examinations such as those of Fellow of the Royal College of Pathologists (FRCPath) alongside local medical registrars, or for the roles legally required for health boards to handle hazardous equipment such as Medical Physics Expert (MPE), Radiation Waste Advisor (RWA) and Laser Protection Advisor (LPA). It also enables those in employment in Wales to access postgraduate level clinical scientist registration and doctoral level consultant clinical scientist registration through development within their current roles, rather than via the formal training programme routes. These are typically, although not universally, known as Equivalence Routes. Profession-specific details are given in the third section of the framework.

3. Formal programmes

Formal training programmes for postgraduate entry and development towards healthcare science consultant roles have been in place since the 1990s in biochemistry, audiology, medical physics, microbiology and cardiac physiology, and were later developed to incorporate the postgraduate registration of clinical scientist, as detailed earlier in the framework.

This is now available for most healthcare science professionals as either a direct entry route into clinical scientist roles, or as an in-service progression route. In some professional areas such as audiology, the career pathways of practitioner (audiologist) and clinical scientist have merged such that the clinical scientist is now the accepted advanced practitioner role and others such as clinical engineering are now moving towards that approach in Wales. At the other extreme, in some specialties of pathology, the two career pathways remain separate and distinct with clearly defined differences in roles and responsibilities. In clinical computational sciences the only training route currently is via clinical scientist training, in others such as medical Illustration there is no access to clinical scientist registration.

The postgraduate Scientist Training Programme (STP) and doctoral Higher Specialist Scientist Training (HSST) programme are funded by HEIW under a Service Level Agreement with the National School for Healthcare Science. Funding is to the same offer as in England, with the STP trainee supernumerary in the health board on band 6 salary, the MSc programme fees paid, and an additional bursary each year on application where further costs are required to complete the programme. HSST trainees continue employment in the health board or trust whilst training into a consultant role and therefore only a bursary and the DClinSci programme fees are included.

Due to the aforementioned need for flexibility and locality focussed routes, there remains the prior professional body routes, commonly known as "Route 1" and "Route 2" as these predominantly refer to the Association of Clinical Scientists Routes. In Wales, this is supported with the same funding offer as that of the STP trainees, including course fees, supernumerary trainee salary and bursary. Some services have instead developed formal programmes using the Equivalence Route to registration and are also supported in the same way.

4. Work based learning

For the support worker, assistant, assistant practitioner and associate workforce there are two funding streams: apprenticeships via the Welsh Government Apprenticeship Funding, or Health Care Support Worker Funding allocations to health boards and trusts.

Where apprenticeship frameworks are in place for CQFW level 2 to 4 learning, these are accessed via a Welsh Government approved pathway such as the Wales Healthcare Science Apprenticeship Pathway. Services work directly with education providers to develop and enable availability for their workforce. HEIW supports with understanding models of provision, quality assurance understanding and application, and works with awarding bodies in the development of required qualifications. In these "earn as you learn" routes, the individual must be employed, with the apprenticeship funding utilised for the educational elements of the programme. The arrangements for collaborative delivery are dependent upon the education providers' expertise, with various levels of delivery assessment and mentorship by the employing organisation.

Where CQFW level 2 to 4 learning is not available on an apprenticeship pathway, education establishments may have access to alternative funding streams, or the Healthcare Support Worker Funding in health boards may be accessed.

Due to an urgent case of need, HEIW has developed a standalone work based learning Clinical Photography CQFW level 7 programme, training photography graduates into roles in NHS Wales where prior education routes into the profession had ceased.

Commissioning and funding annual plans

The funding for all NHS Wales education and training and additional funding allocations result from the Annual Education and Training Plans developed by HEIW and presented to Welsh Government for consideration each year. These begin from the annual returns submitted by health boards, trusts and strategic health authorities across NHS Wales that describe local strategic workforce plans for the coming years and the associated education/training provision needed. These returns are developed by local workforce planning teams, in consultation with healthcare science service leads. From 2025, additional information on healthcare science professions have been added to aid collation of the multiple training routes into the workforce.

Once received, the commissioning and funding submissions are considered with a national perspective, taking into account Welsh Government priorities, national strategic plans, and system drivers and constraints.

Following funding confirmation from Welsh Government, the Education and Training Plan is announced publicly. Education providers are notified of the commissioned education, and services are consulted to develop placement plans.

Allocation letters are also sent to the Executive Directors of AHP and Health Science in each health board and equivalent professional leads in trusts and strategic health authorities to inform of formal training programme allocations, and service leads are engaged in the healthcare science trainee recruitment processes.

Local education leads are notified of the Enhanced, Advanced and Consultant Practice Funding allocation, and health care support worker leads are informed of allocations to support learning outside of apprenticeships, with professionals applying for access at the start of the new financial year. The Equivalence Funding is managed directly by HEIW with online applications at the start of the financial year.

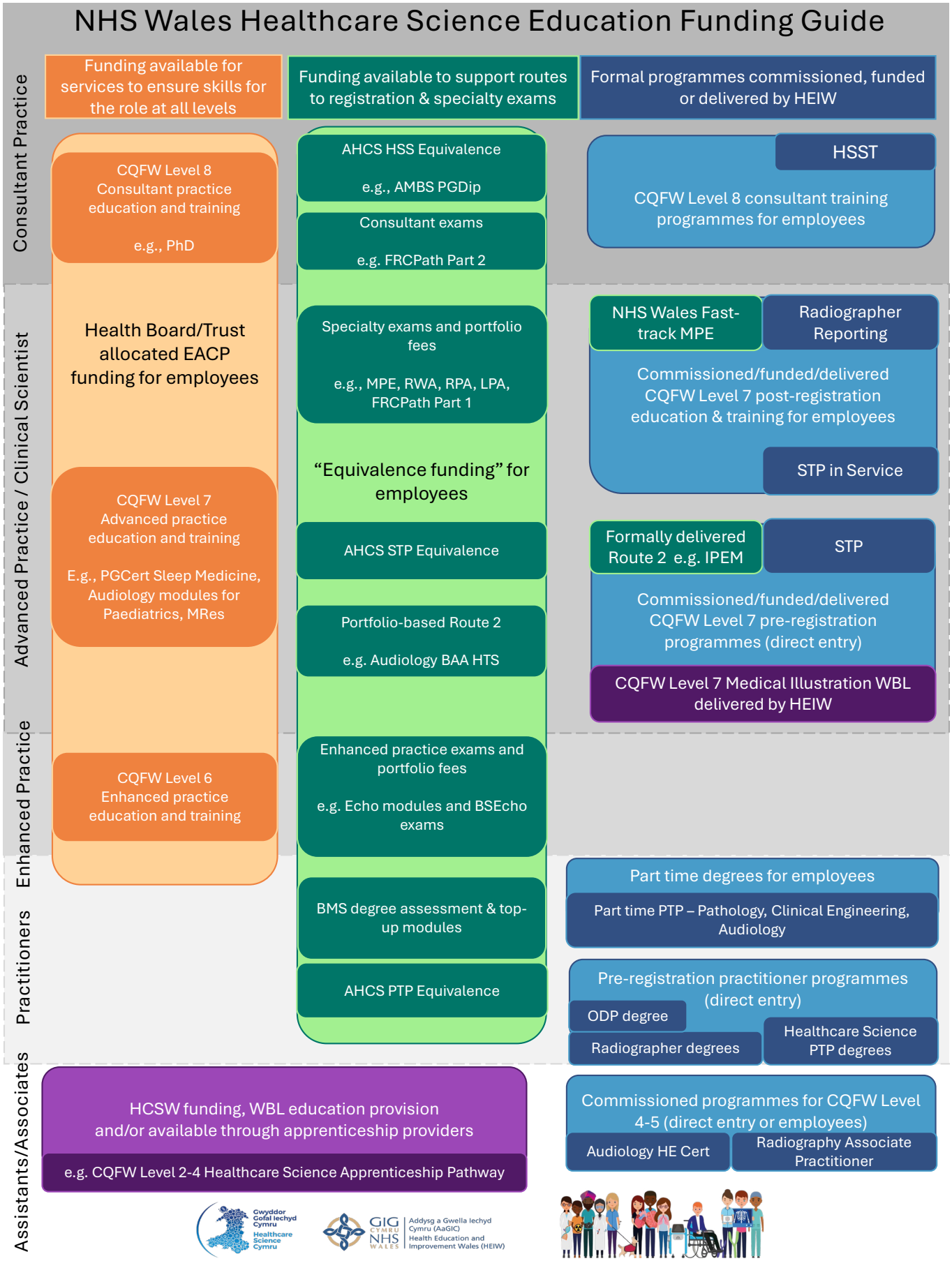


Figure 3: Visualisation of education funding in NHS Wales: Health board/trust allocated funding (orange), HEIW managed funding for routes to registration/specialty examinations (green), Formal programmes ether commissioned or funded (blue), Work based learning (purple).

D. Working in Wales and the Profession Specific Career Pathways

Healthcare Science Services in Wales

The leadership found in NHS Wales brings a unique value to many of our healthcare science professions through connection and strength of voice in strategic developments. This section describes both the services across Wales within each professional area and includes career pathways drawn together by the professions in Wales.

NHS Wales Career Pathways

Visual pathways to illustrate the varied routes through the careers were co-produced with the profession in Wales through the national Healthcare Science Network. These are based upon professional body frameworks (where available), national profession-specific approaches, NHS Employers profiles, service models, and are aligned to multi-professional guidance and approaches. As a result, they will not reflect role titles and pay banding within all services; these are only indicative to enable understanding of the equivalent roles across professions. All career routes and levels of practice that are part of the profession across the UK are included. This will enable professional leads, service managers, and workforce planning leads in health boards and trusts to review aspects of the profession that are not utilised in Wales.

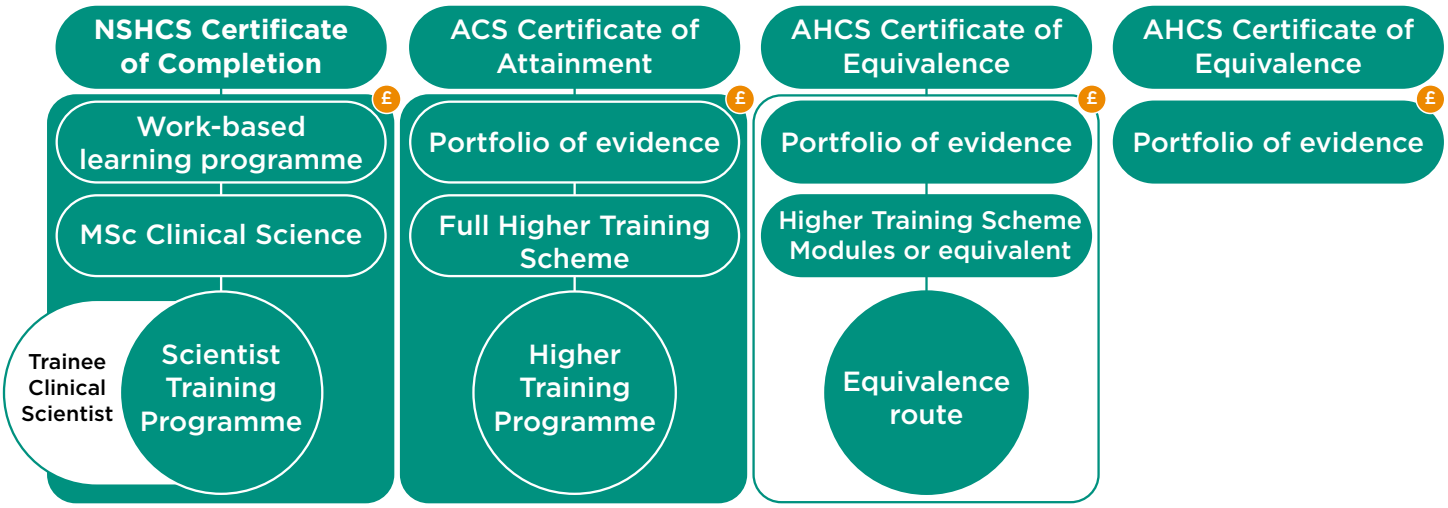
With a focus on education and training, details such as experience required or development related to pillars of practice such as research are not included. These requirements vary, for example, STP graduates will normally need at least one further year of workplace experience before applying to the HSST, but in some professions more extensive experience and progression is appropriate. The nature of varying roles and responsibilities will also result in the training and education varying between essential, desirable or simply available for the different professional areas; the details on the career pathways are intended as guidance only.

All training programmes from the National School for Healthcare Science are available for services in Wales to access by developing training plans and applying for accreditation. Curricula are still in development for some, with training programmes not yet in place. Others have a curriculum, but the profession is too small for NHS England to commission the programme; in the latter, AHCS may open the equivalence route. Of note is the variation in the point at which consultant training programmes, HSST, and their equivalence routes, HSSE, are typically undertaken. This reflects availability of consultant roles rather than differing requirements, and successful application to the HSST will depend on many factors. Likewise, work towards equivalence will start long in advance of submission for both the HSSE and STPE.

Roles described may not necessarily reflect job titles but do refer to protected titles or registration held where appropriate. Where multiple specialisms or professional areas use different tiles and these are grouped together for the purpose of this framework, the name reflects the grouping for these professions and the level of role (e.g. physiologist, advanced practice physiologist). In some cases, the grouping term indicates the NHS Employers profile or ESR job role name (e.g. healthcare science assistant) but the role is still specific to this area.

Focus is given to clinical and scientific roles and related training and education. Additional roles that may be in any professions, i.e. quality manager, quality improvement lead, education lead and education facilitators are not included. Clinical academic, clinical researcher and clinical innovator roles are detailed in the Healthcare Science Research and Innovation Strategy. For some areas, such as physiology and pathology, professions and specialties are grouped to promote overall understanding.

Dotted lines indicate where roles or routes are not available in all specialties or areas. Training programmes are illustrated according to the formality of the programme (shaded for fully formal training programme or scheme, and outline for assessed programme with guidance as to format); the scientist training routes are illustrated below in Figure 4 for one example profession. Further detailed resources will be available via the HEIW Healthcare Science Cymru webpages: https://heiw.nhs.wales/hcs



Scientist Training Programme - Supernumerary training programme	Higher Training Scheme/Route 2 - Develop in role whilst completing scheme	Equivalence route - Develop in a role then demonstrate equivalence	Equivalence portfolio - Already within higher role and demonstrate equivalence
3yr full time formal programme	Scheme of flexible duration	Guidance and assessment only	Assessment only
MSc Clinical Science	Specific M-level modules	M-level modules, MRes, PGCE etc	Reflect and submit STPE portfolio describing: - Career-long education/training - Evidence of advanced practice skills and competence - Evidence of M-level research, leading audits, SI, leadership and professional development
Local workplace training for NSHCS competencies and assessments	Within role, develop as agreed, completing HTS module competencies, portfolio and viva	Within role, develop as agreed, bear in mind requirements for STPE portfolio and interview	
Required to complete M-level research, leading audits, SI, leadership and professional development	Within role, identify and complete M-level research, leading audits, SI, leadership and professional development	Within role, identify and complete research/ innovation, leading audits, SI, leadership and professional development	

Figure 4: Use of postgraduate (level 7) training programmes and schemes and their differences for the example of Audiology. Please note that approaches differ between professions as illustrated in the following pathways, but the same visual meanings are used throughout.

Physiology Professions

Audiology

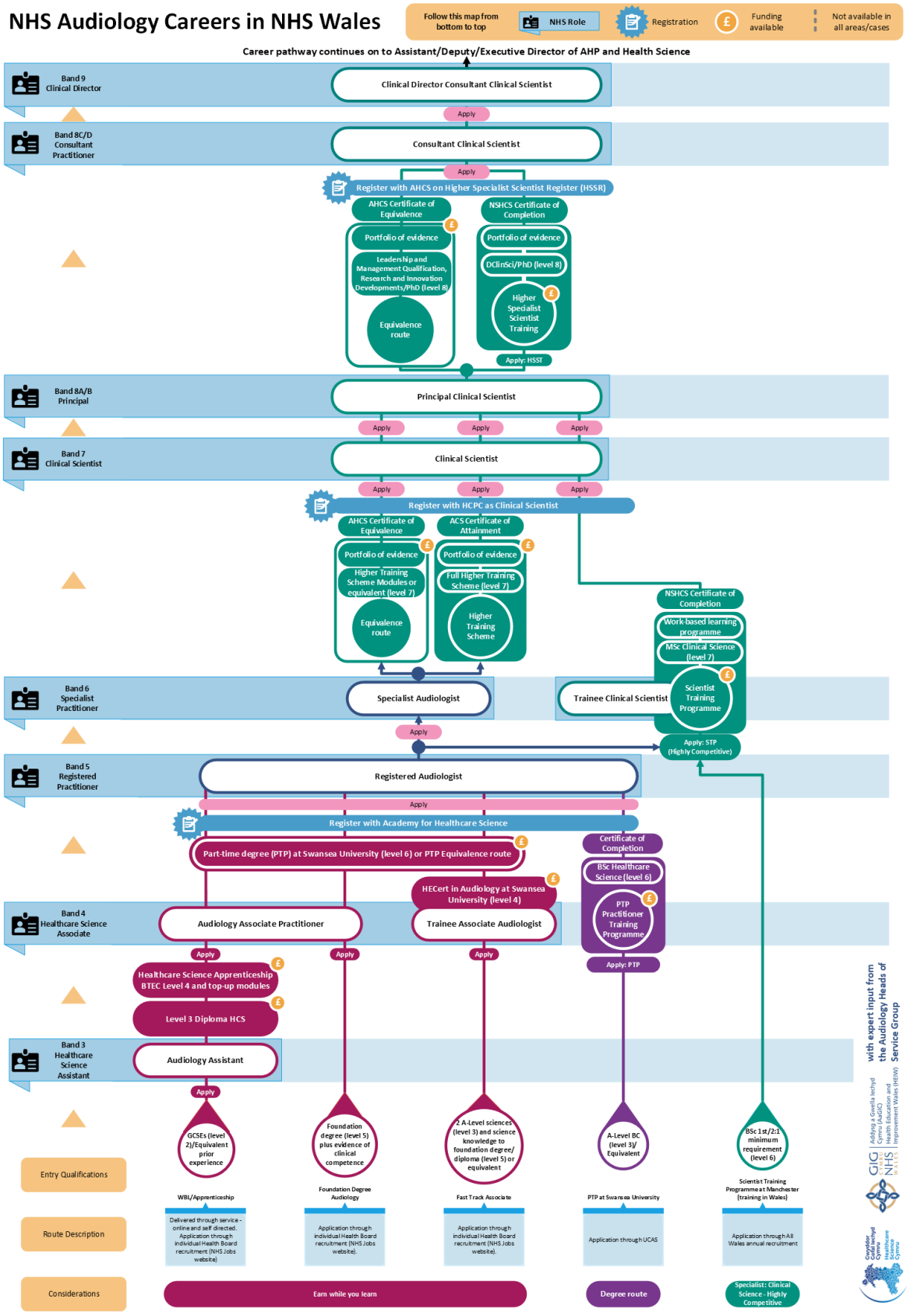
Audiology is dedicated to screening, diagnosing, managing, and treating hearing and balance disorders and associated conditions, across the lifespan. The clinical and patient facing role and expertise reflects the varying needs of the people we serve; from the screening and complex assessment of hearing in newborns using electrophysiological tests, through the person-centred approach to identification of psychosocial needs of adults presenting with hearing and communication difficulties; to the fitting and programming of specialist auditory implants. Audiology provides integrated scientific services across health: engaged in screening programmes; provision of advanced practice first point of contact services in primary care; delivery of specialist assessments and treatments within secondary care, community and hospital; and coordination and delivery of specialist commissioned regional tertiary services for auditory implants.

In additional to the specialist clinical role, audiologists and clinical scientists have a significant role within the other pillars of Good Scientific Practice. Audiology in NHS Wales is at the forefront of research and innovation, involved in a range of research activities, whether as study chief investigators or as recruitment sites for national portfolio studies. We have a reputation as leaders in innovation including, for example, the testing and subsequent implementation of novel service models such as the first point of contact audiology in primary care services or the development and implementation of national quality standards and assurance systems that have made a demonstrable improvement to the quality of audiology care delivered in Wales.

With a single career pathway in place and multiple entry points dependent on previous skills and qualifications, there is a clear route that an assistant practitioner can take on a journey to consultant clinical scientist and beyond. Clear roles and scopes of practice exist at every level including for assistant audiologists, associate audiologists, audiologists, specialist audiologists, advanced practitioner clinical scientists and consultant clinical scientists. Flexible training opportunities are in place to support development at each stage and progression to the next. This includes well-established support for applications for equivalence routes to registration, at appropriate career stages.

Audiology in NHS Wales is committed to the delivery of high-quality evidence based care and to the development of services to ensure they remain the best they can be, as new evidence and scientific technologies emerge. There is a long standing and highly collaborative network within audiology in Wales including an active Head of Service Group, the Welsh Government Audiology Standing Specialist Advisory Group and the Wales Audiology Research Network, along with playing key roles in the professional bodies (British Academy of Audiology and British Society of Audiology). These collaborations enable audiology to take a strategic approach to leadership and development of services. The Framework of Action for Wales, 2017-2023: Integrated framework of care and support for people who are D/deaf or living with hearing loss, developed with audiologists, stakeholders and citizens, provided the strategic direction for delivery of audiology services between 2017 and 2023. All that has been achieved under this Framework is built upon with the new five-year plan for audiology in Wales, that looks to the future audiology services and provision and provides a roadmap to development and delivery.

As a career, audiology in Wales appears to have it all. A scientific clinical role that is patient facing and that includes diagnostic assessment and treatment across the lifespan, as well as opportunities to lead or participate in research and innovation that directly influences service delivery and patient care. There are opportunities to enter at any point in an educational journey, progress to any level, and have a career that is fulfilling for all from assistant to consultant roles.



Cardiac Physiology

Cardiac physiologists/cardiac scientists are a key professional group who play a major role in the diagnosis and treatment of patients with cardiovascular disease. The broad scope of investigations and procedures provided by cardiac physiologists are essential both for the smooth running of hospitals and for the early diagnosis and treatment of patients in community and out-patient settings. Many other specialties particularly general medicine, stroke services, intensive care and acute and elective surgery are dependent on these cardiac investigations for safe, effective, and efficient patient flow.

The scope and complexity of activities undertaken by cardiac physiologists is also widening, and cardiac physiologists have taken on roles which would in the past have traditionally been delivered by medical professionals. In heart valve surveillance clinics, the highly specialist cardiac physiologists provide long term monitoring of patients with valvular heart disease and perform an echocardiogram and clinical assessment without direct medical involvement, referring back only where medical intervention or treatment is required. They deliver more advanced echocardiography procedures such as echo stress testing, bubble studies and contrast studies and provide detailed reports around heart structures and functions. Similarly, the move to implanting complex pacemakers and high voltage devices in local hospitals relies on the expertise of highly specialist cardiac physiologists leading the services. They perform detailed measurements, making decisions and changes to patient's device prescriptions to resolve or improve patient wellbeing, troubleshooting issues, and monitoring device longevity. They work across many settings such as clinical outpatients, wards, primary care and community clinics. They also have an essential role within the theatre environment supporting the implantation of cardiac devices, and cardiac catheterisation procedures including electrophysiology and coronary angiography both for diagnostic and interventional purposes.

The profession benefits from multiple entry routes, via assistant and associate roles supported by Level 3 and 4 diplomas, via the Practitioner Training Programme degree route, and via the postgraduate Scientist Training Programme. Newer postgraduate diploma options are also becoming available for those with other relevant science based degrees such as Sport Science or Physiology. There are essential professional qualifications such as the British Society of Echocardiography and the British Heart Rhythm Society accreditation. The professional body SCST also provides essential certification and examination throughout the career pathway. The introduction of the Higher Specialist Scientific Training programmes is enabling the development of consultant clinical scientist roles to support gaps in the medical workforce by delivering services to specific cohorts of patients, as well as driving research and innovation.

Respiratory and Sleep Physiology

Respiratory and sleep physiologists and clinical scientists provide a diverse range of diagnostic investigations that are integral to healthcare, contributing to patient experiences and health journeys. In addition to their contribution to diagnosis, they manage the treatment of patients with use of medical devices to achieve gas exchange or simulate "normal breathing" and patients with respiratory conditions within advanced practice roles.

Respiratory and sleep physiologists and clinical scientists interact with many specialities as part of the multidisciplinary care team and engage with patients of all ages. They deliver services in a variety of settings, such as hospital wards and departments, community hubs, within primary care, and through virtual clinics and innovative home monitoring services.

The development of this remote technology and connectivity offers exciting opportunities for professionals to find the work balance that suits them and the service.

Innovation in technology has had a significant impact on the way services are provided to patients and enabled enhanced career pathways. With the development of remote technology and connectivity, testing can now also be performed in patients' homes with the respiratory and sleep physiologists using advancing IT systems to test and treat people, often many miles away.

The main functions of respiratory and sleep physiologists include:

- Pulmonary function tests (PFTs) – Investigating the airway function in patients.
- Cardio-pulmonary exercise test (CPET) – To understand how physiologically fit patients are and identify possible reasons for reduced exercise tolerance.
- Sleep studies – A range of tests from simply recording a patient's oxygen levels overnight to measuring a complex array of signals during sleep, including brain and muscle activity.
- Positive airways pressure therapy (PAP and NIV) – Using medical devices to maintain a patient's ventilation, for sleep related disorders or airway disease.
- Aero allergy testing – Including skin prick testing, challenge testing and FeNO testing to investigate potential life-threatening reactions to allergens.
- Hypoxic challenge testing – Testing if it is safe for a patient to travel on commercial aircraft.
- Respiratory muscle strength testing – Testing the ventilation muscles, e.g. the diaphragm.
- Blood gas measurements – Taking blood to check the level of respiratory components, including oxygen, carbon dioxide and pH.

Like other physiological sciences, the career pathway benefits from multiple entry and exit points to suit all skill levels and career aspirations, including level 3 and 4 diplomas for our science assistant roles. Respiratory and sleep physiologists commonly undertake a degree programme that leads to obtaining practitioner registration with the professional body, AHCS.

Practitioners can develop their skills and knowledge within the service or join graduates from other science related degrees onto a master's level graduate entry route, the Scientist Training Programme, enabling registration with The Health and Care Professions Council as a clinical scientist. Exciting opportunities have now become available to undertake the Higher Specialist Scientist Training programme, which is a doctorate level education programme supporting practice at a consultant clinical scientist level. All training programmes are heavily practice based, candidates are either employed and supported by a health board or benefit from significant placement opportunities in health boards across Wales.

These robust education programmes have supported the development of the profession and created exciting opportunities for respiratory and sleep physiologists and scientists to develop advanced practice roles and deliver services that would traditionally be undertaken by the medical profession. The scientists/physiologists led clinics include clinical evaluation and history taking as well as relaying results and diagnosis; in turn creating treatment regimes and continued care of selection of patients for lifespan of their disease/syndrome.

This pathway of clinics is forging forward the way for consultant clinical scientist-led clinics once those in the workforce in Wales have undertaken the HSST programme or gained registration through the equivalence process.

Working in Wales is a rewarding experience. The respiratory and sleep physiologists within Wales are supportive professionals that network and lead developments nationally with an active branch of our professional body the Association for Respiratory Technology & Physiology (ARTP Wales). Although we are separated by expanses of beautiful landscape, the comradery and cohesion of our professional group is such that we may be small, but we are mighty.

Neurophysiology

Clinical neurophysiology diagnostics are an integral part of many clinical pathways for investigations on the nervous system through the recording of bioelectrical activity, whether spontaneous or stimulated. The service interacts with many specialities and sees patients of all ages as routine or urgent, scheduled or unscheduled, outpatient or inpatient, including intensive and neonatal care. Neurophysiology innovation has made remarkable strides in recent years, combining advances in technology with sustainable and enhanced career pathways.

The main functions of neurophysiology are:

- Electroencephalography (EEG) – A recording of the electrical signals from the brain.
- Evoked potentials (EP) – A test of the function of parts of the brain and spinal cord.
- Electromyography (EMG) – A recording of electrical impulses produced by muscles.
- Nerve conduction studies (NCS) – Measuring electrical impulses along a nerve.
- Intra-operative neurophysiological monitoring (IONM) - Monitoring functional integrity during surgery.
- Visual diagnostics including electro-retinography (ERG) and electrooculography (EOG) – Testing the structure and function of the visual pathway, between the eyes and brain.

There are departments in most health boards within Wales; some have management arrangements that span services, directorates or delivery groups, and some also provide regional services that cross health board boundaries. With support from Welsh Government and the Executive Directors of AHP and Health Science, a new service model is being developed to ensure safe and sustainable services, with workforce redesign for staff to reach their full potential.

In 2017, the BSc Healthcare Science (Neurophysiology) PTP programme was commissioned at Swansea University. Since its inception, there has been a steady increase in student enrolment, strengthening the neurophysiology workforce. In Wales, there are also several departments who are STP training centres and, while there is currently a shortage of neurophysiologists across the UK, so job prospects are excellent, most past trainees have chosen to remain in Wales. The first HSST training centre in Wales is now available also.

There have been many advancements in technology being rolled out across Wales. Home video telemetry (HVT) monitoring is used in the diagnosis of epileptic and non-epileptic seizures. Inpatient video telemetry services require up to 5 bed occupancy days, but with HVT the patient accesses the service at home. This reduces the cost of care by 33%, and enables care closer to home, reducing the risk of hospital acquired infection and meeting the needs of the patient.

Intraoperative neurophysiological monitoring (IONM) has seen a gradual expansion over the last decade driven by the growing recognition of its value in reducing neurological complications in surgery. To support the growth of IONM, the National School of Healthcare Science has introduced a dedicated IONM training pathway in the Scientist Training Programme (STP) toward ensuring a well-trained workforce to meet increasing demand for monitoring services.

With the support of the Association of Neurophysiological Scientists, new innovations are emerging. Electroencephalography (EEG) and somatosensory evoked potentials (SSEP) have been recognised for aiding diagnosis of comatose patients after cardiac arrest. Remote access is now available both in real time and for digital recordings. Remote viewing and reporting allow for a more efficient service but also give access to urgent cases with testing in the operating theatre or ITU, or in the home, school, or workplace. Stereo EEG is included as part of the adult epilepsy surgery programme and is the most advanced practice EEG that is offered in Wales.

Neurophysiology is an exciting rewarding career. It explores all aspects of healthcare science combining patient centred care with exciting an innovate technology and science, and is advancing at pace, so now is an excellent time to join this profession.

Vascular Science

We offer non-invasive investigations, assessing arteries and veins around the body as well as physiologic tests. For the most part, this consists of ultrasound scanning. This allows us to create images of the blood vessels and measure velocity, direction and volume of blood flow. These tests are important in the patient pathway, providing diagnosis for people suffering with various conditions: transient ischaemic attack, critical limb ischaemia, deep vein thrombosis, aneurysms, giant cell arteritis, varicose veins, and traumatic injuries. We also assess people for suitability for transplant and for creation of dialysis fistula access. There are vascular laboratories in Aneurin Bevan University Health Board, Cardiff and Vale University Health Board, Swansea Bay University Health Board, and Betsi Cadwaladr University Health Board. We see a mixture of inpatients, outpatients, and emergency department patients.

The most common routes into vascular science are via the STP pathway to HCPC clinical scientist registration, and via accreditation with the College and Society for Clinical Vascular Science to accredited vascular scientist. The latter demonstrates individuals have a minimum of 3 years clinical experience, a high level of theoretical knowledge, have performed an extensive portfolio of over 2000 scans and an in-depth practical assessment of skills. Most vascular scientists are employed at band 7 or 8a, with higher banding roles including management posts or band 8c or above following consultant clinical scientist level training (where STP equivalence has been completed for those that did not complete the STP pathway). There are also band 3 vascular lab assistants who assist with day-to-day duties in the labs.

The profession in Wales is proud to provide high quality, accurate vascular diagnosis. An example of transformation is ultrasound diagnosis for giant cell arteritis. This has reduced the need for invasive and risky temporal artery biopsies.

The profession is still very small in Wales. Vascular labs in Wales may be located in radiology or medical physics departments, with opportunities to cross-train from diagnostic radiography or via the medical physics non-ionising radiation route. The job requires a high level of autonomy, frequently being the only professional present on site with an expertise in this area. The job also requires an ability to work well with the wider multi-disciplinary teams: surgeons, nurses, radiologists, etc. The job is very rewarding, with a direct impact on patient outcomes. There is also an opportunity to get to know surveillance patients very well.

Perfusion Science

As a very small group of scientists in Wales, at the time of writing only 17 in total, perfusion scientists support cardiothoracic surgery and interventional cardiology services across the South Wales regions, based at University Hospital Wales in Cardiff and Morriston Hospital in Swansea. The mid to North Wales population feed into the cardiothoracic services from Liverpool Heart and Chest Centre (predominantly) and the University hospital of North Midlands, Royal Stoke (as it is a major regional trauma centre).

There are only 450 registered, accredited and practicing clinical perfusion scientists in the whole of the United Kingdom. Predominantly our role involves managing the patient's blood volume during open heart surgery; that is, maintaining blood flows, oxygenation, carbon dioxide removal and electrolyte balance etc. This is performed using the heart lung machine and a dedicated sterile circuit known as an extracorporeal custom pack. It is therefore a vital clinical role, one which contributes significantly to the surgical procedure and to the patient's peri and post operative course.

Perfusionists also manage life supporting apparatus that maintain blood flow and cardiac assist devices that support failing hearts. So, it is a very clinical role, on the coal face so to speak. A clinical perfusion scientist must be an excellent communicator, a team player, have significant knowledge of physiology and anatomy and have highly competent technical/clinical skills. It can be a very fast-paced, tense and occasionally stressful role but equally it is a very stimulating, very satisfying and rewarding career. When one sees a patient recovering very well on the cardiac intensive care unit after a big, complex operation, there can be no better feeling!

Trainee positions are very sought after and would be advertised through NHS jobs. One of the criteria to apply for a training position is that the individual must have completed an undergraduate degree programme in either a biomedical or biological science. The two year training programme involves being mentored in the clinical setting to develop skills for all the different types of operations that take place. Alongside the clinical training, the trainee embarks on a block release masters degree programme at Bristol University in Clinical Perfusion Science. Bristol is the only educational provider of the perfusion course in the UK. Typically training and completion of the Masters degree takes two years, sometimes a little longer.

To achieve accreditation the trainee must perform 150 supervised clinical cases. The trainee then takes a practical examination, followed by a viva voce to test clinical knowledge. This process is intertwined with successful completion of the masters degree. We have limited training places as the workforce is quite stable but there are vacancies for reasons including maternity leave, sickness etc. Historically a unit takes on a trainee around every four years.

Qualified perfusionists maintain their accreditation by submitting proof of case management of at least 40 bypass procedures per annum and every three years submit evidence of CPD through teaching, supporting audit and journal clubs, conferences or scientific meetings etc.

The Society of Clinical Perfusion Scientists of Great Britain and Ireland produces laws and codes of conduct etc. The College of Clinical Perfusion Scientists holds the register for reaccreditation of clinical perfusion scientists. The College Council also arranges visits to every Cardiac Centre in the UK, every five to ten years to check on standards, minimum standards of monitoring for patients during cardiopulmonary bypass etc. We work closely with both the Society and College, with excellent representation from Wales on the College Council, as Chairman of the Society, lead assessor for unit reaccreditation and on the Safety Committee.

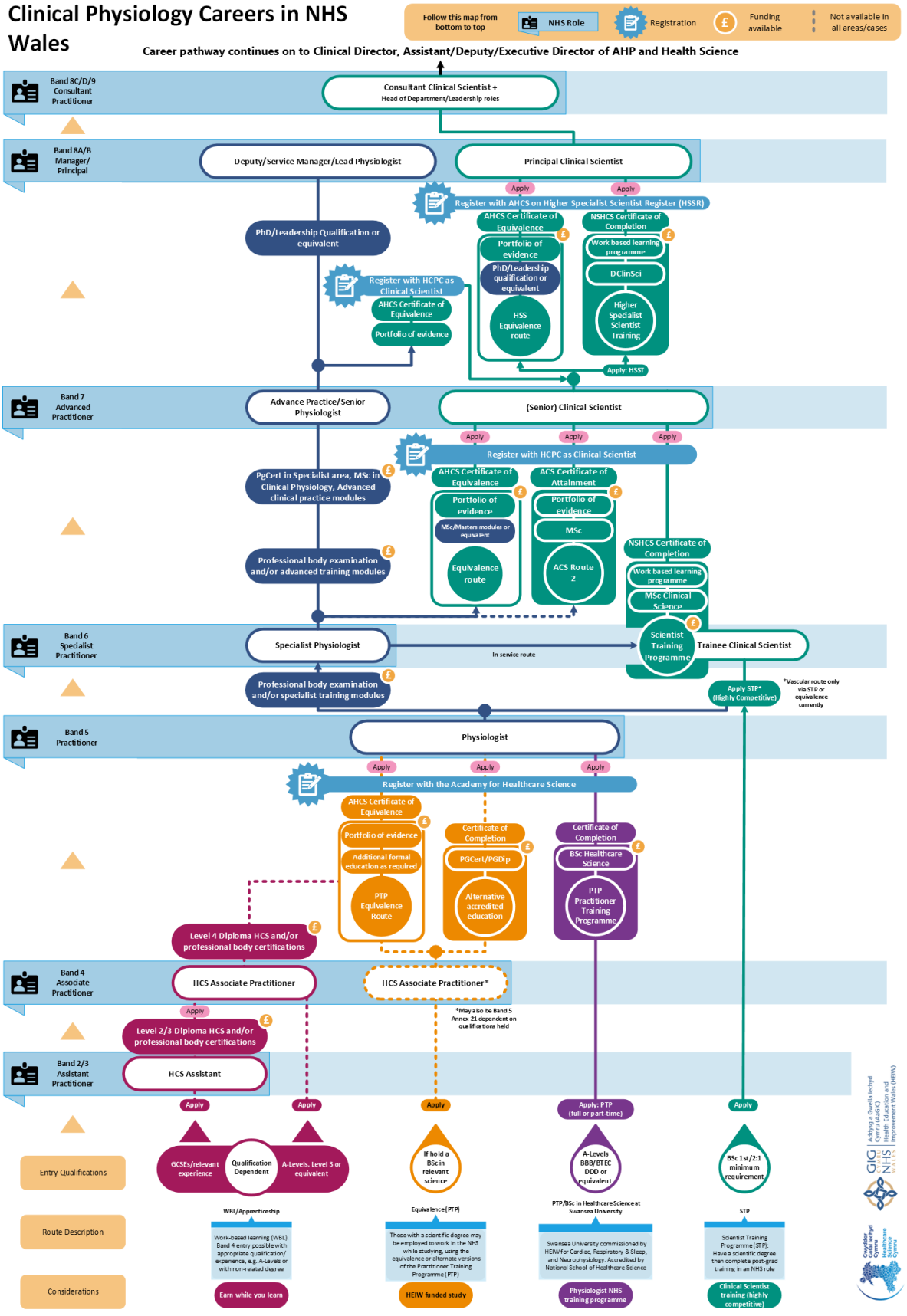
We strive to have a very high standard of clinical practice. Perfusionists are key contributors to the multi-disciplinary team delivering complex heart surgery. Both cardiothoracic units in Wales have excellent results for surgical outcomes, something that we are all proud of.

Vision Science, Gastrointestinal & Urological Physiology, Critical Care Science

There are several physiologies where measurement and diagnostic support is primarily undertaken by the nursing profession. In specialist centres across the UK, there has been development of AHCS registered graduate scientists and HCPC registered clinical scientists with equivalent clinical skills but also bringing scientific skills such as specialist testing (e.g. visual electrophysiology), critical evaluation, quality management and clinical research.

The few individuals currently employed in Wales in these areas have proactively applied for roles. Particularly where recruitment is challenging from the nursing profession or in rural areas, it is recommended that roles are offered both to the nursing profession and to vision scientists, gastrointestinal physiologists, urological physiologists and critical care scientists, by using inclusive job titles and adding options of AHCS registration to graduate roles, and HCPC registration to advanced practice roles.

Where services are confident in training and open to working in collaboration with UK training centres and other healthcare science professions, there is the opportunity to develop training plans and apply for National School of Healthcare Science STP accreditation. Directly training the first healthcare science professional in a service has been shown to be an appropriate way to understand the benefit and value that this alternative professional role brings in these areas.


Clinical Physiology Careers in NHS Wales
Follow this map from bottom to top
NHS Role
Registration
Funding available
Not available in all areas/cases
Career pathway continues on to Clinical Director, Assistant/Deputy/Executive Director of AHP and Health Science
Band 8C/D/9 Consultant Practitioner
Consultant Clinical Scientist + Head of Department/Leadership roles
Band 8A/B Manager/ Principal
Deputy/Service Manager/Lead Physiologist
Principal Clinical Scientist
Apply
Register with AHCS on Higher Specialist Scientist Register (HSSR)
AHCS Certificate of Equivalence
Portfolio of evidence
PhD/Leadership qualification or equivalent
HSS Equivalence route
NSHCS Certificate of Completion
Work based learning programme
DClinSci
Higher Specialist Scientist Training
Apply: HSST
PhD/Leadership Qualification or equivalent
Register with HCPC as Clinical Scientist
AHCS Certificate of Equivalence
Portfolio of evidence
Band 7 Advanced Practitioner
Advance Practice/Senior Physiologist
(Senior) Clinical Scientist
Register with HCPC as Clinical Scientist
AHCS Certificate of Equivalence
Portfolio of evidence
MSc/Masters modules or equivalent
Equivalence route
ACS Certificate of Attainment
Portfolio of evidence
MSc
ACS Route 2
PgCert in Specialist area, MSc in Clinical Physiology, Advanced clinical practice modules
Professional body examination and/or advanced training modules
NSHCS Certificate of Completion
Work based learning programme
MSc Clinical Science
Scientist Training Programme
Band 6 Specialist Practitioner
Specialist Physiologist
In-service route
Trainee Clinical Scientist
Professional body examination and/or specialist training modules
Apply STP* (Highly Competitive)
*Vascular route only via STP or equivalence currently
Band 5 Practitioner
Physiologist
Register with the Academy for Healthcare Science
AHCS Certificate of Equivalence
Portfolio of evidence
Additional formal education as required
PTP Equivalence Route
Certificate of Completion
PGCert/PGDip
Alternative accredited education
Certificate of Completion
BSc Healthcare Science
PTP Practitioner Training Programme
Level 4 Diploma HCS and/or professional body certifications
Band 4 Associate Practitioner
HCS Associate Practitioner
HCS Associate Practitioner*
*May also be Band 5 Annex 21 dependent on qualifications held
Apply
Level 2/3 Diploma HCS and/or professional body certifications
Band 2/3 Assistant Practitioner
HCS Assistant
Apply
Apply: PTP (full or part-time)
Entry Qualifications
GCSEs/relevant experience
Qualification Dependent
A-Levels, Level 3 or equivalent
If hold a BSc in relevant science
A-Levels BBB/BTEC DDD or equivalent
BSc 1st/2:1 minimum requirement
Route Description
WBL/Apprenticeship
Work-based learning (WBL). Band 4 entry possible with appropriate qualification/ experience, e.g. A-Levels or with non-related degree
Equivalence (PTP)
Those with a scientific degree may be employed to work in the NHS while studying, using the equivalence or alternate versions of the Practitioner Training Programme (PTP)
PTP/BSc in Healthcare Science at Swansea University
Swansea University commissioned by HEIW for Cardiac, Respiratory & Sleep, and Neurophysiology. Accredited by National School of Healthcare Science
STP
Scientist Training Programme (STP): Have a scientific degree then complete post-grad training in an NHS role
Considerations
Earn while you learn
HEIW funded study
Physiologist NHS training programme
Clinical Scientist training (highly competitive)

Pathology Professions

Laboratory Sciences - Biomedical Scientists and Clinical Scientists

Pathology services in the NHS are key to the efficient and effective delivery of many patient care and management pathways. In 2021, NICE reported that around 95% of clinical pathways rely on access to pathology diagnostic services. Laboratory sciences, through the Health and Care Professions Council (HCPC) registration and the protected roles of biomedical scientists and clinical scientists, are a key element of pathology services providing laboratory examination of biological samples that are analysed to aid the diagnosis, monitoring, prognosis and prevention of disease, all fundamental to patient care.

In addition, the expert interpretation of results integral to reporting, advising on further testing, clinical significance and patient management, is an essential function of the clinical teams across pathology. In addition to consultant level clinical scientists providing the clinical leadership for their specialty, the scientific workforce contributes to the development of clinical investigative and care pathways, working with many different medical specialties to ensure pathology investigations are undertaken effectively and efficiently.

The science based education and training also enables laboratory scientists to undertake, deliver and support their own research and the research of other healthcare professionals, an essential factor for developing evidence based change and improvement across all the clinical services of the NHS.

NHS Wales, supported by the National Pathology Programme (NPP), seeks to provide the scientific workforce with the right support and infrastructure for every member of staff to reach their full potential, with a career pathway that extends from band 2 laboratory support worker through to band 9 consultant scientist in most disciplines. In 2024, the National Pathology Programme (NPP) published its Workforce and Education Strategy, to help progress the development of a sustainable pathology workforce and careers for the future.

The career pathway for scientists working in pathology provides different entry points and options facilitating seamless progression between all roles. The core professional roles are expressed on the pathway overleaf, but the size of these services enable additional dedicated quality managers, education and training leads, data analytics and specialty leads and managers. The National Pathology Programme and its groups support and facilitate the development of curricula at all educational levels and co-ordinates communications with HEIs, Schools and other external bodies in promoting science careers in pathology.

Through collaborative working between the NPP and HEIW, the ongoing development of a central Wales Pathology Academy, a key strategic objective, will help in sharing best practice and standardised materials in support of training and education of the pathology workforce.

Training for scientific professionals within pathology takes between three to ten years. NHS Wales acknowledges the importance of investment in training and education, which includes support for new trainees post-qualification, through to state registration and continued professional and career development. Training is co-produced between pathology services, HEIW, HEIs and professional bodies to ensure that content, models of education delivery and compliance with professional and accreditation standards are met. It also ensures that new technological advances are incorporated into the educational curriculum.

The Welsh Government Diagnostics Recovery and Transformation Strategy for Wales (2022 – 2025) specifies the aim to "significantly increase the training pipeline of diagnostic specialists, including advanced practice roles e.g., reporting biomedical scientists [...] and consultant grade roles (e.g. consultant clinical scientists) as part of the service and workforce redesign". This is endorsed by the National Pathology Programme in its Workforce and Education Strategy, with the recommendation to develop the availability and funding for this training to grow a modern workforce with blended and complementary skills. This is in addition to continuing to provide staff and trainees seeking to work in the Laboratory, with the training opportunities of the Scientist Training Programme, Higher Specialist Scientist Training and Academy of Healthcare Science equivalence routes.

In specialisms where Practitioner Training Programmes are not currently available (this includes for anatomical pathology technologists, tissue bank technologists, andrologists and embryologists) there is an 'equivalence' route with the AHCS that enables practitioners to gain PSA-accredited registration after demonstrating practitioner competence.

With suitable formal training and education and potential changes in access to patient group directives (PGD), there is also an opportunity, through service and role redesign, to develop patient-facing roles for clinical laboratory staff, to develop their scope of practice and optimise the use of their clinical knowledge.

The many different roles in pathology and its specialist areas have different career pathways with specific entry and career development requirements; for example, the histocompatibility and immunogenetics specialty still have access to the ACS Route 1 via the British Society of Histocompatibility and Immunogenetics diploma. Roles across the profession are flexing and changing to meet the advances in technology, skills and knowledge. Training routes across pathology range from level 2 (apprenticeships) up to level 8 doctoral and Royal College examinations, a pre-requisite for medical trainees and clinical scientists to obtain consultant level posts. Mandatory training and CPD are also integral to career development for all professions and for maintaining registration for the registered workforce. The variety of training routes provides flexibility to train in-house and through formal external academic or experiential routes. Training for consultant level roles and to prepare for senior leadership and managerial roles within and outside pathology is also important for long term career development.

The Welsh Government 'Diagnostics Recovery and Transformation Strategy for Wales (2022 – 2025)' proposed that the pipeline of diagnostic specialists, including advanced practice roles and consultant level roles should be part of service and workforce redesign. The National Pathology Programme has the strategic aim to develop opportunities for advanced practice training and roles. Some health boards have started to adopt advanced practice routes and roles (most notably for histopathology dissection and reporting) but the funding and opportunity for using these routes need to be expanded. Cardiff and Vale University Health Board have piloted a new advanced practice (reduced scope) training course developed specifically for reporting low-grade adenomas from the NHS Wales Bowel Screening Programme and to help address the increase in testing due to the bowel screening optimisation plan. The curriculum has been approved by the Royal College of Pathologists and the Institute of Biomedical Scientists (IBMS), and the pilot training places are being funded by the Moondance Cancer Initiative.

The IBMS have also developed reporting qualifications for HCPC registered biomedical scientists and clinical scientists to report the work generated from cervical screening programmes. These two reporting qualifications and intended scientist roles have been approved by the respective heads of the two screening programmes and will impact significantly on patient care by improving capacity and turnaround times for biopsies.

The Histological Dissection Conjoint Board (colleagues from the IBMS and Royal College of Pathologists) also delivers existing Advanced Specialist Diplomas (ASD) in breast, lower gastrointestinal and urology, with further pathways covering areas such as lung, upper gastrointestinal, gynaecological pathology and ophthalmic pathology being launched and delivered in 2025.

Infection Diagnostics

Our purpose is to enable the wider health system to prevent and/or reduce harm to individuals and the population from infection by providing specialist clinical and diagnostic knowledge and expertise. Our diagnostic laboratories in Wales are divided into (a) bacteriology, virology and infectious serology and (b) routine molecular, parasitology and national specialist reference units that include anaerobic, toxoplasma, cryptosporidium, antimicrobial susceptibility, mycology and pathogenic genomics. Microbiology services are based at 13 sites across Wales with specialist reference departments at Aberystwyth, Cardiff and South-East Wales, Carmarthenshire, North Wales and Swansea Bay area. These provide services such as:

- Laboratory diagnostic services to hospitals and general practitioners.
- Infection management services.
- National programmes relating to infection programmes.
- Support to health protection teams re. outbreaks and community infection control.

Our infection service offers a career pathway from entry level as healthcare support worker and associate practitioners, to HCPC registered biomedical scientists and clinical scientists, and ultimately consultant biomedical or clinical scientists along with operational service managers, functional leads for training, quality and health and safety, and senior leadership and management roles. The underpinning education routes for the scientific workforce are regulated by professional body routes and are funded by HEIW. Optimising these routes has enabled opportunities to grow our own career pathways with adoption of level 4 Healthcare Science Diploma for associate practitioners leading to part time IBMS accredited degree study, IBMS Certificate of Competence and registration as a biomedical scientist. The Scientist Training Programme and Higher Specialist Scientist Training programme support both biomedical scientists and clinical scientists to move into more clinically facing roles within infection services. Equivalence routes are also utilised fully at all levels.

In addition, newer clinical liaison biomedical scientist roles have been added to complement the existing microbiology medical team workforce, producing a rich staff skill mix that complement each other supporting our vision of a multi-professional, clinically focused service delivered using state-of-the-art technology, with a motivated, competent and confident workforce.

Point of Care Testing

Pathology also provides the clinical and managerial oversight of the NHS Point of Care Testing (POCT) services for primary and secondary care and, increasingly, patient self-testing. POCT provides multi-disciplinary services which include clinical biochemistry (e.g. glucose, blood gases, urine/pregnancy testing), haematology (e.g. coagulation), microbiology (respiratory viruses) and genomics.

Point of Care Testing services are at the forefront of evaluating and implementing new diagnostic technologies that can progress testing in the community and closer to the patients' home. POCT is recognised as a key area for development in line with the Welsh Government 'Diagnostics Recovery and Transformation Strategy for Wales (2022 – 2025)', and it will be fundamental in implementing diagnostics hubs and centres.

As POCT develops as a new clinical science discipline, the existing pathology workforce are supporting the development of multi-disciplinary training for a range of professional healthcare roles and career pathways, including laboratory support workers, biomedical scientists and more recently nursing professionals to enable them to deliver safe, effective and sustainable POCT services.

In addition, POCT professionals provide expert training in the use and management of point of care testing devices, therefore training and education skills are an essential part of their role, requiring them to develop their skills in delivering the training and education to many different healthcare professionals. IBMS qualifications are available to support those working in POCT through the Certificate of Expert Practice in Point of Care Testing. A visual pathway is in development for inclusion within the HEIW online resources to accompany this framework.

Anatomical Pathology Technologists

NHS Wales recognises the important contribution that mortuary staff (anatomical pathology technologists) make to pathology service provision as well as crucially supporting the bereavement pathway.

The career framework for this staff group supports clear progression from entry-level positions through professional body registration to advanced clinical and managerial roles. The profession in Wales are actively encouraged in the development of advanced practice competencies to better support medical colleagues, particularly in the field of post-mortem examination. Through the Health Care Support Worker Funding for levels 2 to 4 and Equivalence Funding for alternative routes to registration, anatomical pathology technologists across Wales are forging their pathway of career progression and expect to be able to add further roles and education levels in future editions of this framework.

Phlebotomists

Phlebotomy services are delivered in a variety of different ways across Wales. Many health boards have invested in phlebotomists over recent years through the development of a career framework which recognises aspects of enhanced practice and leadership to provide opportunities for development and career progression. This will be available through further communications, including via the online resources and in future editions of this framework.

Decontamination Science

Across Wales, decontamination services include sterile services but also stretch much wider, working closely with microbiology services and Public Health Wales NHS Trust, and our workforce are included within and identify as a healthcare science profession.

Through our professional body, the Institute of Decontamination Sciences, training and education are available including a level 3 Technical Certification leading to access on a professional directory through AHCS. Further development is underway with HEIW to review level 2 and level 4 apprenticeship training in Wales and enable access to the AHCS Assistant and Associate registers when education providers are in place. A full career pathway will be available via the online resources when agreed for NHS Wales.

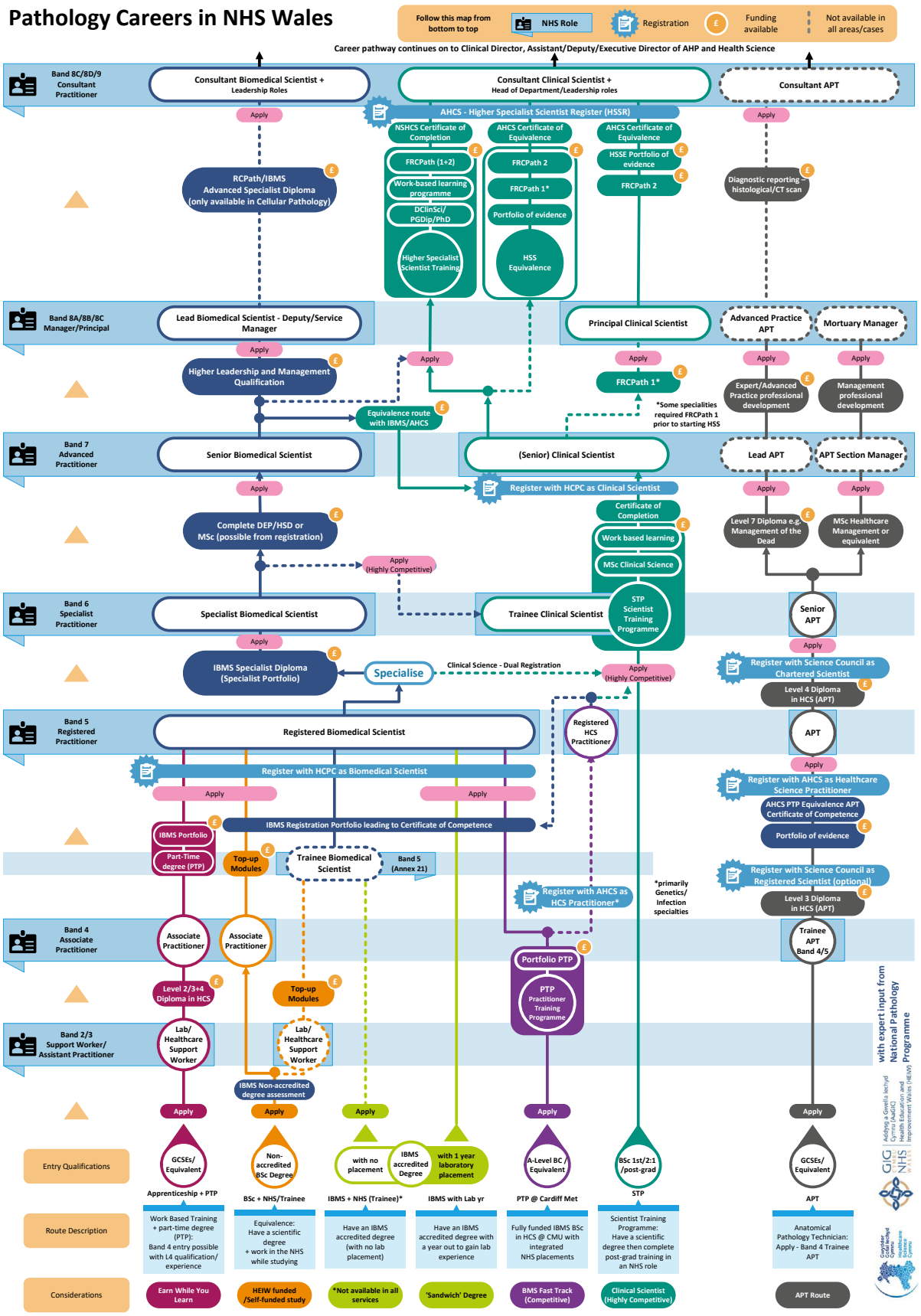
Reproductive Sciences (Andrology and Embryology)

Reproductive scientists work in both diagnostic and treatment domains with andrologists mainly concentrating on diagnostic semen analysis, post vasectomy analysis and, depending on the structure of particular services, cryopreservation of sperm for those patients undergoing procedures that are likely to affect their fertility.

The embryologist's role concentrates on the procurement and processing of gametes, production and culture embryos and their eventual transfer back into a patient or their cryopreservation.

There are several routes to becoming a trained andrologist. The biomedical scientist route caters for those scientists who are already state registered biomedical scientists and wish to specialise by undertaking the IBMS Specialist Portfolio in Andrology. There is also the clinical scientist route, which offers post graduate entry for holders of a qualifying BSc (MSc or PhD) to the STP training programme leading to registration as a clinical scientist.

Currently embryology training is either via the STP route, or via an equivalence submission and assessment with the AHCS, or via Route 2 with the ACS after a period of in-house training. Non-UK trained embryologists may apply for registration directly with the HCPC. The pathway is in development with the professional body and will be available in the online resources.


Pathology Careers in NHS Wales
Follow this map from bottom to top
NHS Role
Registration
Funding available
Not available in all areas/cases
Career pathway continues on to Clinical Director, Assistant/Deputy/Executive Director of AHP and Health Science
Band 8C/8D/9 Consultant Practitioner
Consultant Biomedical Scientist + Leadership Roles
Consultant Clinical Scientist + Head of Department/Leadership roles
Consultant APT
AHCS - Higher Specialist Scientist Register (HSSR)
NSHCS Certificate of Completion
AHCS Certificate of Equivalence
AHCS Certificate of Equivalence
FRCPath (1+2)
Work-based learning programme
DClinSci/ PGDip/PhD
Higher Specialist Scientist Training
FRCPath 2
FRCPath 1*
Portfolio of evidence
HSS Equivalence
HSSE Portfolio of evidence
FRCPath 2
RCPath/IBMS Advanced Specialist Diploma (only available in Cellular Pathology)
Diagnostic reporting – histological/CT scan
Band 8A/8B/8C Manager/Principal
Lead Biomedical Scientist - Deputy/Service Manager
Principal Clinical Scientist
Advanced Practice APT
Mortuary Manager
Higher Leadership and Management Qualification
Equivalence route with IBMS/AHCS
FRCPath 1*
*Some specialities required FRCPath 1 prior to starting HSS
Expert/Advanced Practice professional development
Management professional development
Band 7 Advanced Practitioner
Senior Biomedical Scientist
(Senior) Clinical Scientist
Lead APT
APT Section Manager
Register with HCPC as Clinical Scientist
Certificate of Completion
Work based learning
MSc Clinical Science
STP Scientist Training Programme
Complete DEP/HSD or MSc (possible from registration)
Level 7 Diploma e.g. Management of the Dead
MSc Healthcare Management or equivalent
Band 6 Specialist Practitioner
Specialist Biomedical Scientist
Trainee Clinical Scientist
Senior APT
IBMS Specialist Diploma (Specialist Portfolio)
Specialise
Clinical Science - Dual Registration
Register with Science Council as Chartered Scientist
Level 4 Diploma in HCS (APT)
Band 5 Registered Practitioner
Registered Biomedical Scientist
Registered HCS Practitioner
APT
Register with HCPC as Biomedical Scientist
Register with AHCS as Healthcare Science Practitioner
AHCS PTP Equivalence APT Certificate of Competence
IBMS Portfolio
Part-Time degree (PTP)
IBMS Registration Portfolio leading to Certificate of Competence
Portfolio of evidence
Top-up Modules
Trainee Biomedical Scientist
Band 5 (Annex 21)
Register with Science Council as Registered Scientist (optional)
Level 3 Diploma in HCS (APT)
Register with AHCS as HCS Practitioner*
*primarily Genetics/ Infection specialties
Band 4 Associate Practitioner
Associate Practitioner
Associate Practitioner
Trainee APT Band 4/5
Portfolio PTP
PTP Practitioner Training Programme
Level 2/3+4 Diploma in HCS
Top-up Modules
Band 2/3 Support Worker/ Assistant Practitioner
Lab/ Healthcare Support Worker
Lab/ Healthcare Support Worker
IBMS Non-accredited degree assessment
Apply
Entry Qualifications
GCSEs/ Equivalent
Non-accredited BSc Degree
with no placement
IBMS accredited Degree
with 1 year laboratory placement
A-Level BC / Equivalent
BSc 1st/2:1 /post-grad
GCSEs/ Equivalent
Apprenticeship + PTP
BSc + NHS/Trainee
IBMS + NHS (Trainee)*
IBMS with Lab yr
PTP @ Cardiff Met
STP
APT
Route Description
Work Based Training + part-time degree (PTP): Band 4 entry possible with L4 qualification/ experience
Equivalence: Have a scientific degree + work in the NHS while studying
Have an IBMS accredited degree (with no lab placement)
Have an IBMS accredited degree with a year out to gain lab experience
Fully funded IBMS BSc in HCS @ CMU with integrated NHS placements
Scientist Training Programme: Have a scientific degree then complete post-grad training in an NHS role
Anatomical Pathology Technician: Apply - Band 4 Trainee APT
Considerations
Earn While You Learn
HEIW funded /Self-funded study
*Not available in all services
'Sandwich' Degree
BMS Fast Track (Competitive)
Clinical Scientist (Highly Competitive)
APT Route
with expert input from National Pathology Programme

Genomics Professions

Human Genomics

The All Wales Medical Genomics Services (AWMGS) is an NHS specialist health service covering the whole of Wales for patients who have or who may be at risk of developing a genetic condition, or who have an acquired disease (cancers and haematological malignancies). The scientific laboratory staff, consisting of scientific staff from health care support worker to consultant clinical scientist and laboratory director roles, work closely with clinical staff including clinical genetics doctors and genetic counsellors as well as broader roles such as leaders in quality, training, IT and project management. The diagnosis of genetic conditions can be a complex process and genetic testing can occur at any point in a patient's life, from the prenatal period until advanced age and through a variety of access routes such as through a GP, specialist clinic or even emergency care. Increasingly in recent years, genetic testing has been used to help guide patient treatment; this is a key part of 'Precision' or 'Personalised Medicine', also known as 'Advanced Therapies'. This is most seen in cancer conditions and is a rapidly growing field of medicine.

Entry into the genomics laboratory is typically through the laboratory based practical "wet work" services or through the desk based "dry work" analysis, interpretation and reporting of genomic results; individuals may pursue a career path in either stream. Some staff also move from the laboratory-based services to the analysis and reporting focused services. Both aspects of the laboratory work closely together with a shared aim to deliver a quality service for patients.

Practitioner Training Programme: the laboratories support the 3-year undergraduate programme that leads to an approved and accredited BSc in Healthcare Science. It is an integrated approach including both academic learning and workplace learning, with 50 weeks of workplace-based training in the NHS over the three years. Applicants into roles are also welcomed as graduates from all IBMS accredited BSc (Hons) Biomedical Science programmes as suitable routes into this profession. It should be noted that the IBMS Certificate of Competence by Equivalence HCPC approved route to registration as a biomedical scientist is also open to those experienced employees in genomics. Career progression is then open to accessing the IBMS Specialist Portfolio in Genomics and Molecular Pathology.

Scientist Training Programme: In genomics, the Scientist Training Programme work-based learning is delivered via structured training programme with additional lectures locally and a wide variety of experiences incorporated, including research projects with the local service.

We also recruit to and employ many staff through an Equivalence Route, an alternative way to clinical scientist registration that is directly comparable in outcome that of the STP pathway. A portfolio of work-based evidence is submitted to the Academy of Healthcare Science, followed by an interview where you are assessed against the domains of Good Scientific Practice.

Higher Specialist Scientific Training programme is also delivered by the services in Wales for senior or experienced clinical scientists. Candidates graduate with a Doctorate in Clinical Science (DClinSci) as the academic component, register on the Higher Specialist Scientist Register (HSSR) and are eligible to apply for our consultant clinical scientist posts.

The All Wales Genomics Laboratory play a pivotal role in the strategy for delivering genomic testing and works closely with other NHS departments, industry, academia and Welsh Government partners to ensure that genomics is embedded into and aligned to national strategies to support improvements in the health of the Welsh population. Most recently we have been honoured to share achievements in the field of cancer through the collaborative QuicDNA project which enables faster testing and access to targeted treatments for lung cancer patients via gene panel screening of a "liquid biopsy" and in the world of rare disease, delivery of Wales Infants and Children's Genome Service (WINGS), a rapid whole genome testing service for babies born with congenital disorders.

Pathogen Genomics

The Pathogen Genomics Unit looks at the genome of pathogens. We currently sequence HIV, clostridium difficile, mycobacteria, influenza, SARS Cov2 and antimicrobial resistant bacteria. The information from these genome sequences can help us determine patient treatments by identifying resistance to antimicrobials, relatedness of the pathogens for outbreak management, and helps with vaccine development. Our laboratory is in Cardiff, but we receive samples from all over Wales via the Public Health Wales NHS Trust network of laboratories. We also have some samples from England that come via our service users.

Our pathogen genomics workforce is made up of individuals who have taken many different pathways. Some have taken the IBMS/HCPC route of becoming a biomedical scientist, some of these with accredited degrees and some who have done top-up modules and training portfolios.

Others have degrees in other relevant biology-based subjects and are employed as healthcare science practitioners with registration via the AHCS. Further developments are underway with the IBMS to improve career progression.

For bioinformaticians working in pathogen genomics, the main route currently is from those already trained in bioinformatics. Whilst there is no current access to an STP programme, in Wales there is the opportunity to recruit HEIW funded trainees to go through an equivalence process using the bioinformatics genomics curriculum. Earlier career entry to the profession is also under development, to increase opportunities for a more diverse workforce.

The pathogen genomics profession in Wales are proud to have achieved:

- 4 UKAS accredited services
- First in the UK to offer full HIV resistance testing to include Integrase.
- Developed the initial pipeline that became the main pipeline for processing Illumina SARS-CoV-2 data by the COG consortium and was used internationally.
- We were also the first ISO accredited SARS CoV2 service in the UK.

We now have a joint genomics workspace at the Wales Genomic Health Centre, combining human and pathogen genomics services in Wales in one location.

Genetic Counsellors

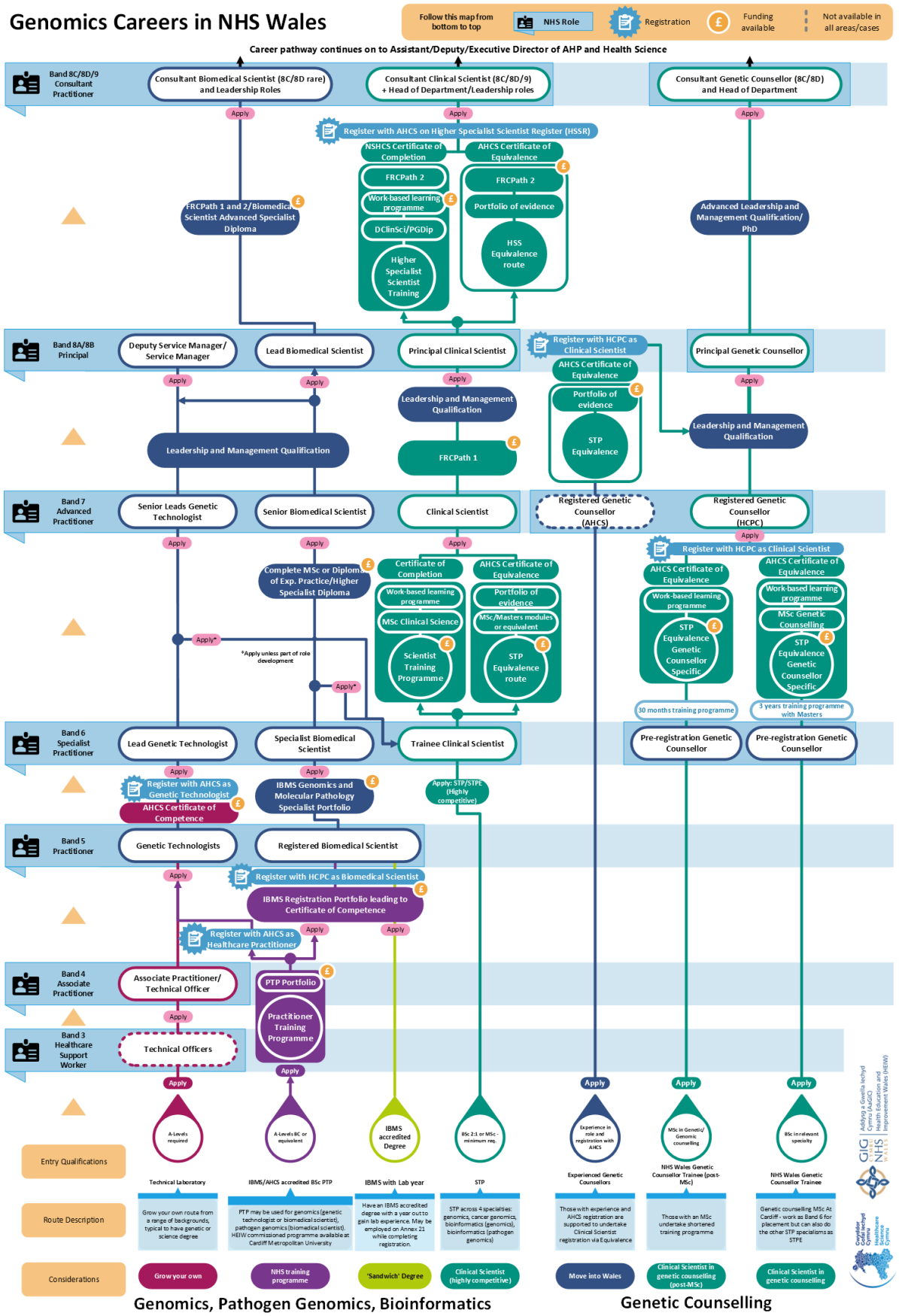
Genetic counsellors play a crucial role in supporting patients to understand genetic conditions within the family. The role of a genetic counsellor (GC) is multi-faceted, focused on helping individuals and families understand genetic conditions, assess risks for the individual and the wider family, and make informed decisions about their health. GCs work as part of the wider healthcare team, collaborating closely with other healthcare professionals, such as clinical geneticists, laboratory teams, and various specialists, ensuring that patients receive the most accurate, comprehensive care possible, tailored to the unique needs of the individual patient and their family. In addition, GCs analyse and convey complex genetic results to patients in a manner that is both clear and empathetic.

Furthermore, GCs actively contribute to multidisciplinary teams, offering valuable education and training to healthcare professionals to enhance the accessibility of genomic testing. Their expertise is particularly vital in specialised areas such as cancer, where they facilitate genetic testing that can impact a patient's treatment choices, including chemotherapy and surgical options. Furthermore, they engage with couples planning families, providing comprehensive discussions on the array of available options when assessing the risks associated with passing on genetic conditions within the family unit.

A recent notable achievement was the establishment of the All Wales Psychiatric Genomics service (AWPGS), with genetic counsellors playing a pivotal role in its development. The principal genetic counsellor for AWPGS ensured the cohesion and collaboration of specialists from the All Wales Medical Genomics Service, the MRC Centre for Neuropsychiatric Genetics and Genomics and the National Centre for Mental Health to deliver patient centred multidisciplinary clinics. This resulted in the first psychiatric genomics service in the UK to be recognised as an exemplar for both its design and delivery by the Royal College of Psychiatrists.

The principal genetic counsellor's strategic leadership and dedication were instrumental in shaping this pioneering service that has set a new standard in psychiatric genomics care.

Currently the profession in Wales consists of pre-registration genetic counsellors, registered genetic counsellors, principal genetic counsellors and consultant genetic counsellors. The current training within NHS Wales is via an accredited masters programme in Genetic and Genomic Counselling and work-based learning. Professional registration for GCs is currently evolving and there are several different routes to gain professional registration either with the Academy for Healthcare Science or the Health and Care Professions Council. Pre-registration genetic counsellors are then able to apply for registered genetic counsellor posts at band 7 level. Further structured and accredited career development for GCs is currently being developed UK wide for the profession, to align with clinical scientist training through to consultant level.


Genomics Careers in NHS Wales
Follow this map from bottom to top
NHS Role
Registration
Funding available
Not available in all areas/cases
Career pathway continues on to Assistant/Deputy/Executive Director of AHP and Health Science
Band 8C/8D/9 Consultant Practitioner
Consultant Biomedical Scientist (8C/8D rare) and Leadership Roles
Consultant Clinical Scientist (8C/8D/9) + Head of Department/Leadership roles
Consultant Genetic Counsellor (8C/8D) and Head of Department
Apply
Register with AHCS on Higher Specialist Scientist Register (HSSR)
NSHCS Certificate of Completion
AHCS Certificate of Equivalence
FRCPath 2
Work-based learning programme
DClinSci/PGDip
Higher Specialist Scientist Training
FRCPath 2
Portfolio of evidence
HSS Equivalence route
FRCPath 1 and 2/Biomedical Scientist Advanced Specialist Diploma
Advanced Leadership and Management Qualification/ PhD
Band 8A/8B Principal
Deputy Service Manager/ Service Manager
Lead Biomedical Scientist
Principal Clinical Scientist
Register with HCPC as Clinical Scientist
AHCS Certificate of Equivalence
Portfolio of evidence
STP Equivalence
Principal Genetic Counsellor
Leadership and Management Qualification
Leadership and Management Qualification
FRCPath 1
Leadership and Management Qualification
Band 7 Advanced Practitioner
Senior Leads Genetic Technologist
Senior Biomedical Scientist
Clinical Scientist
Registered Genetic Counsellor (AHCS)
Registered Genetic Counsellor (HCPC)
Register with HCPC as Clinical Scientist
AHCS Certificate of Equivalence
Work-based learning programme
STP Equivalence Genetic Counsellor Specific
MSc Genetic Counselling
STP Equivalence Genetic Counsellor Specific
Complete MSc or Diploma of Exp. Practice/Higher Specialist Diploma
Certificate of Completion
Work-based learning programme
MSc Clinical Science
Scientist Training Programme
AHCS Certificate of Equivalence
Portfolio of evidence
MSc/Masters modules or equivalent
STP Equivalence route
*Apply unless part of role development
30 months training programme
3 years training programme with Masters
Band 6 Specialist Practitioner
Lead Genetic Technologist
Specialist Biomedical Scientist
Trainee Clinical Scientist
Pre-registration Genetic Counsellor
Pre-registration Genetic Counsellor
Register with AHCS as Genetic Technologist
AHCS Certificate of Competence
IBMS Genomics and Molecular Pathology Specialist Portfolio
Apply: STP/STPE (Highly competitive)
Band 5 Practitioner
Genetic Technologists
Registered Biomedical Scientist
Register with HCPC as Biomedical Scientist
IBMS Registration Portfolio leading to Certificate of Competence
Register with AHCS as Healthcare Practitioner
Band 4 Associate Practitioner
Associate Practitioner/ Technical Officer
PTP Portfolio
Practitioner Training Programme
Band 3 Healthcare Support Worker
Technical Officers
A-Levels required
A-Levels BC or equivalent
IBMS accredited Degree
BSc 2:1 or MSc - minimum req.
Experience in role and registration with AHCS
MSc in Genetic/ Genomic counselling
BSc in relevant specialty
Entry Qualifications
Technical Laboratory
IBMS/AHCS accredited BSc PTP
IBMS with Lab year
STP
Experienced Genetic Counsellors
NHS Wales Genetic Counsellor Trainee (post-MSc)
NHS Wales Genetic Counsellor Trainee
Route Description
Grow your own route from a range of backgrounds, typical to have genetic or science degree
PTP may be used for genomics (genetic technologist or biomedical scientist), pathogen genomics (biomedical scientist). HEIW commissioned programme available at Cardiff Metropolitan University
Have an IBMS accredited degree with a year out to gain lab experience. May be employed on Annex 21 while completing registration.
STP across 4 specialties: genomics, cancer genomics, bioinformatics (genomics), bioinformatics (pathogen genomics)
Those with experience and AHCS registration are supported to undertake Clinical Scientist registration via Equivalence
Those with an MSc undertake shortened training programme
Genetic counselling MSc At Cardiff - work as Band 6 for placement but can also do the other STP specialisms as STPE
Considerations
Grow your own
NHS training programme
'Sandwich' Degree
Clinical Scientist (highly competitive)
Move into Wales
Clinical Scientist in genetic counselling (post-MSc)
Clinical Scientist in genetic counselling
Genomics, Pathogen Genomics, Bioinformatics
Genetic Counselling

Physical Sciences Professions

Clinical Engineering

Clinical engineering is proud to have a complete career pathway in NHS Wales, where those at any career stage can access training and education to support their progression between all roles through to consultant clinical scientists, Directors of Medical Physics and Clinical Engineering (MPCE) and beyond to Executive Director of AHP and Health Science (EDAHPHS). At national UK meetings and those with the professional body the profession in Wales regularly expresses pride in the support for continued professional development and career progression.

Since the publication of the Wales Healthcare Science Network Consultant Clinical Scientist Guidance the number of pre-requisite clinical scientist registrations has increased significantly, with clinical engineers across Wales using either the AHCS Equivalence route or ACS Route 2 to achieve HCPC registration, funded by HEIW. To provide additional workforce into the profession, trainees with suitable education but no prior NHS experience are also funded in the same way as the STP trainees, with supernumerary roles and additional funding as required.

Clinical engineering services vary in size from less than ten to more than fifty staff, some of which do not provide direct patient services but underpin the development and management of technology used across the NHS (a fuller description of which may be found via the Institute of Physics and Engineering in Medicine website; Others provide rehabilitation through clinical assessment/prescription and innovation/ development of bespoke equipment such as complex posture and mobility solutions and assistive technologies, or by providing complex patient testing and data analysis.

The main areas of clinical engineering services are:

- Medical Equipment Management Services (MEMS - sometimes referred to as Electronic and Biomedical Engineering, EBME)
- Rehabilitation Engineering

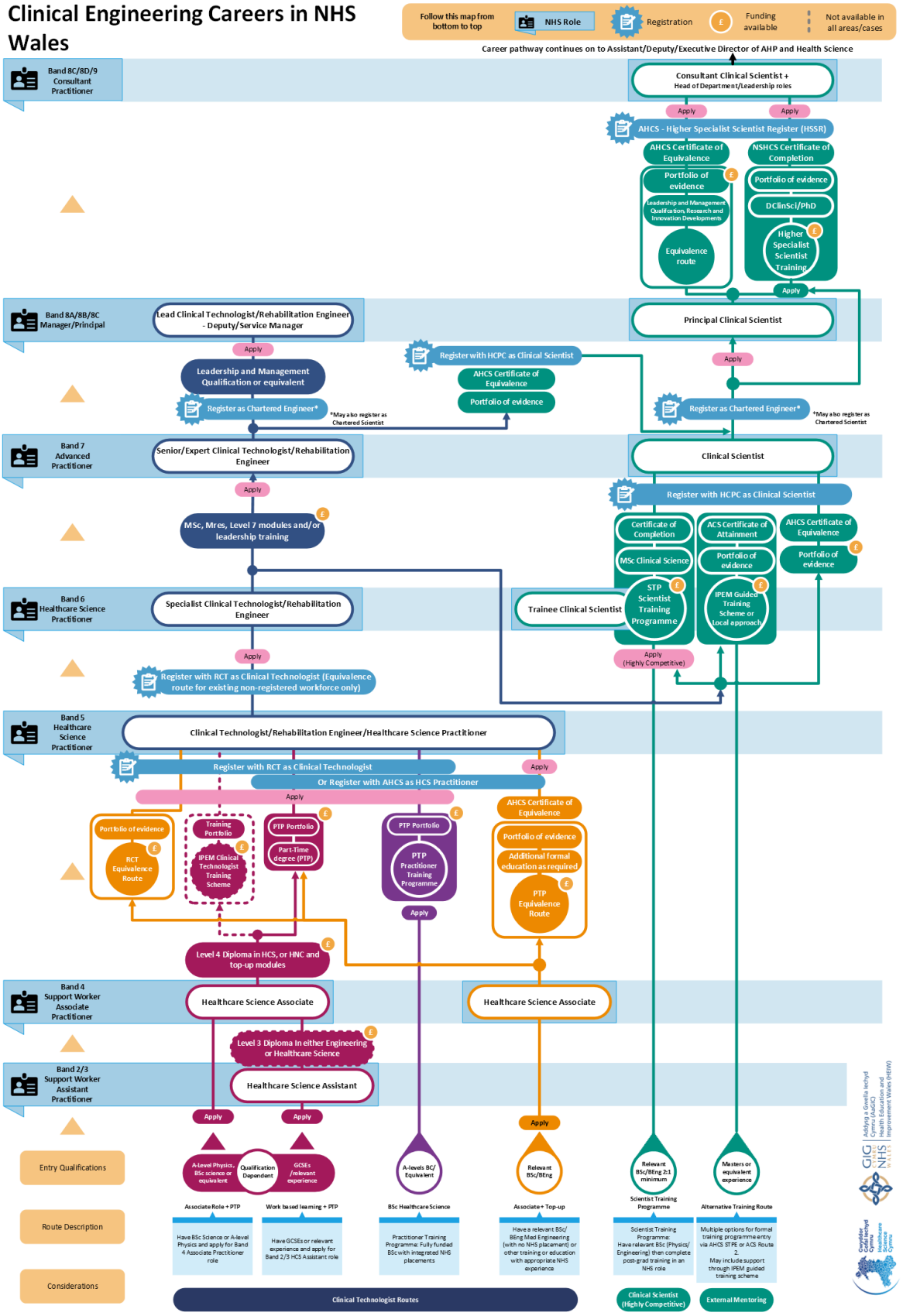
Clinical engineering professions may provide specialist services commissioned by the NHS Wales Joint Commissioning Committee (JCC), provide core NHS services, and/or have management arrangements that span services, directorates or delivery groups; some also provide regional services that cross health board boundaries.

Clinical engineering services lead or contribute significantly to health board/ trust governance compliance and quality and safety procedures, including quality management systems and adherence to legislation such as the Medical Device Regulations (MDR) via associated standards and guidance.

Clinical Engineering also provides advice to Welsh Government via subcommittee and groups (MPCE, AWMEMG, AWREPG) of the Welsh Scientific Advisory Committee (WSAC), to EDAHPHS Peer Group, and Wales Healthcare Science Network and National Clinical Engineers Network.

The clinical engineering profession is driving innovation and development across NHS Wales. From their core services they are fundamental in the move to enhanced community care (including ‘virtual wards’) through application and management of remote monitoring and home-based medical devices. In secondary care, they have developed specialist services, such as functional electrical stimulation services and clinical gait analysis.

The profession has also spearheaded innovation and research centres including the TriTech Institute and the Centre for Healthcare Evaluation, Device Assessment and Research (CEDAR). Supported by IPEM, developments are also underway for new roles of Clinical Engineering Expert and Medical Device Safety Officer across all services, which will embed and enhance the quality and safety aspects of clinical engineering into the future.



Medical Physics

Medical physics services are also proud to have a complete career pathway in NHS Wales, where those at any stage of the career path access training and education for progression between all roles through to consultant clinical scientists, Directors of Medical Physics and Clinical Engineering and beyond to Executive Director of AHP and Health Science.

The main areas of Medical Physics services are

- Nuclear Medicine
- Radiation Safety and Diagnostic Radiology
- Radiotherapy Physics
- Imaging with non-ionising radiation (including Vascular Science)

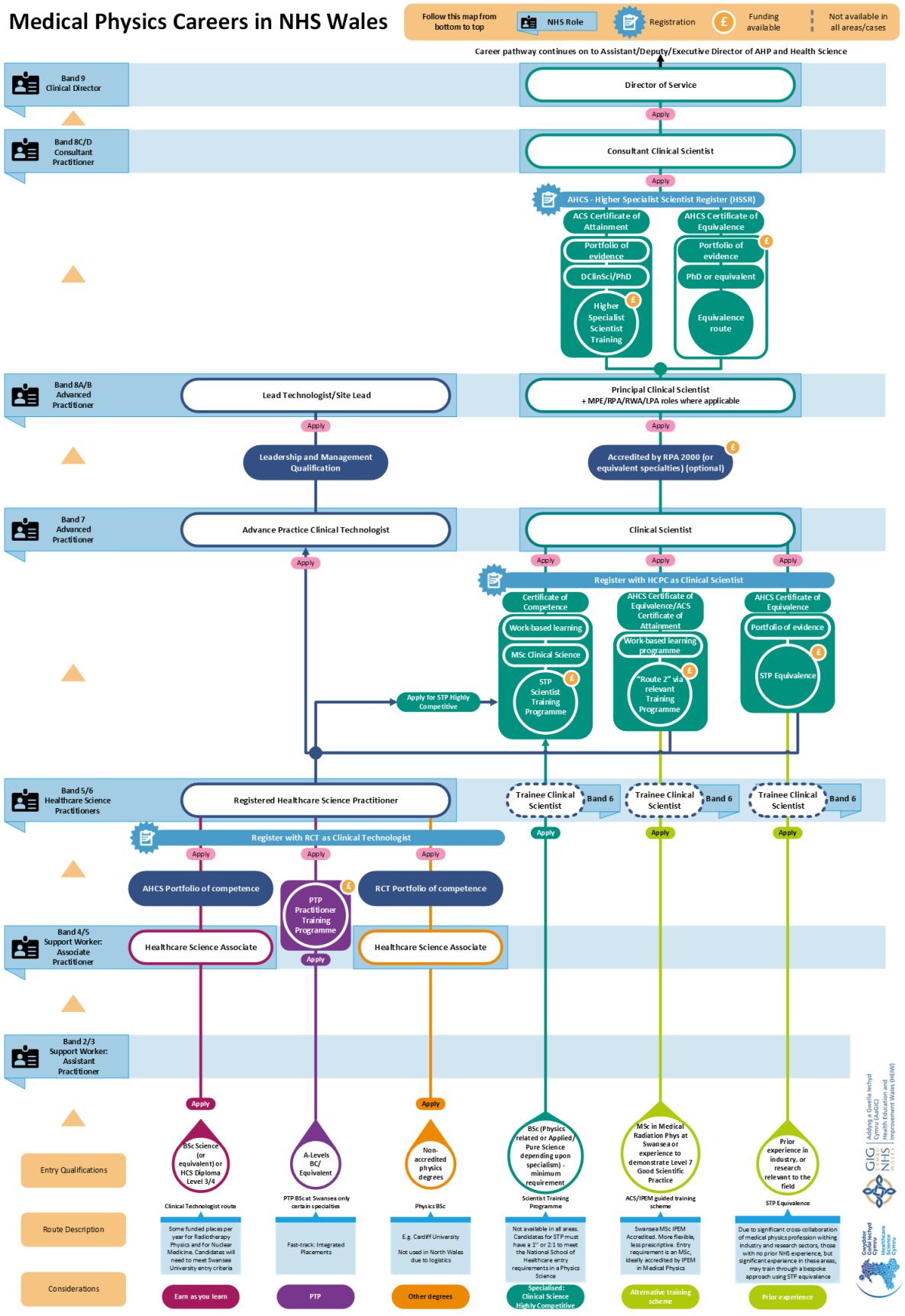
Medical physics services are generally characterised by small teams of highly specialised, highly qualified and strictly regulated staff groups; some provide direct patient services and some do not. All services, however, act as crucial members of a wider team, where their contribution has a significant impact on patients or service users. Most medical physics services lead or contribute significantly to health board/ trust governance compliance and quality and safety procedures (e.g. IRMER, IRR, EPR, AOR, MDR and AORD regulations) particularly with radiation governance compliance.

The services in Wales are committed to work-based training for clinical technologists, clinical scientists and consultant clinical scientists. Delivering training is challenging in addition to routine service provision, and the profession network at an NHS Wales level to ensure robust training, recognition and equity for Wales based trainees.

The medical physics services in Wales mainly feed into the Welsh Government advisory committee structure (NHS Wales Act (2006), Section 190 and Schedule 14) as Professional Specific Groups into Welsh Scientific Advisory Committee (WSAC) sub-committees (MPCE, COSC, etc), along with the DAHPHS Peer Group and the Healthcare Science Network. Radiotherapy Physics has some operational support (alongside Clinical Oncology and Radiotherapy) via the National Strategic Clinical Network for Cancer.

As part of their regulatory framework, employers are required to appoint and consult with certified experts in radiation protection including Radiation Protection Advisers, Radioactive Waste Advisers, and Laser Protection Advisers. The role of Medical Physics Expert (MPE) is defined in IR(ME)R and these regulations require employers to appoint sufficient MPEs to ensure that the appropriate workforce is in place for all ionising radiation-based services. Further work could be undertaken across the non-ionising imaging sciences in Wales to explore similar roles for services not governed by radiation regulations, e.g., development of the MR Safety Expert role, as well as minimum staffing guidelines for the wider service skill mix and workforce optimization.

Medical physics services improve patient care and outcomes at all levels, from direct provision of diagnostics, clinical assessments and therapies, to being the responsible services for all equipment purchasing and ongoing quality assurance to directly delivering cancer treatments. These services need to be recognised in their own right, rather than seen as ‘just a support’ service to other services; this may enable reduced risk through improved service planning and resourcing. There are many exemplar services in Wales (e.g. PET Programme, PRRT, Advanced Practice target delineation in Radiotherapy Physics, and DEXA reporting).


Medical Physics Careers in NHS Wales
Follow this map from bottom to top
NHS Role
Registration
Funding available
Not available in all areas/cases
Career pathway continues on to Assistant/Deputy/Executive Director of AHP and Health Science
Band 9 Clinical Director
Director of Service
Band 8C/D Consultant Practitioner
Consultant Clinical Scientist
AHCS - Higher Specialist Scientist Register (HSSR)
ACS Certificate of Attainment
Portfolio of evidence
DClinSci/PhD
Higher Specialist Scientist Training
AHCS Certificate of Equivalence
Portfolio of evidence
PhD or equivalent
Equivalence route
Band 8A/B Advanced Practitioner
Lead Technologist/Site Lead
Principal Clinical Scientist + MPE/RPA/RWA/LPA roles where applicable
Leadership and Management Qualification
Accredited by RPA 2000 (or equivalent specialties) (optional)
Band 7 Advanced Practitioner
Advance Practice Clinical Technologist
Clinical Scientist
Register with HCPC as Clinical Scientist
Certificate of Competence
Work-based learning
MSc Clinical Science
STP Scientist Training Programme
AHCS Certificate of Equivalence/ACS Certificate of Attainment
Work-based learning programme
"Route 2" via relevant Training Programme
AHCS Certificate of Equivalence
Portfolio of evidence
STP Equivalence
Apply for STP Highly Competitive
Band 5/6 Healthcare Science Practitioners
Registered Healthcare Science Practitioner
Trainee Clinical Scientist
Band 6
Register with RCT as Clinical Technologist
AHCS Portfolio of competence
PTP Practitioner Training Programme
RCT Portfolio of competence
Band 4/5 Support Worker: Associate Practitioner
Healthcare Science Associate
Healthcare Science Associate
Band 2/3 Support Worker: Assistant Practitioner
Apply
Entry Qualifications
Route Description
Considerations
BSc Science (or equivalent) or HCS Diploma Level 3/4
Clinical Technologist route
Some funded places per year for Radiotherapy Physics and for Nuclear Medicine. Candidates will need to meet Swansea University entry criteria
Earn as you learn
A-Levels BC/ Equivalent
PTP BSc at Swansea only certain specialties
Fast-track: Integrated Placements
PTP
Non-accredited physics degrees
Physics BSc
E.g. Cardiff University
Not used in North Wales due to logistics
Other degrees
BSc (Physics related or Applied/ Pure Science depending upon specialism) - minimum requirement
Scientist Training Programme
Not available in all areas. Candidates for STP must have a 1" or 2:1 to meet the National School of Healthcare entry requirements in a Physics Science
Specialised: Clinical Science Highly Competitive
MSc in Medical Radiation Phys at Swansea or experience to demonstrate Level 7 Good Scientific Practice
ACS/IPEM guided training scheme
Swansea MSc IPEM Accredited. More flexible, less prescriptive. Entry requirement is an MSc, ideally accredited by IPEM in Medical Physics
Alternative training scheme
Prior experience in industry, or research relevant to the field
STP Equivalence
Due to significant cross-collaboration of medical physics profession withing industry and research sectors, those with no prior NHS experience, but significant experience in these areas, may train through a bespoke approach using STP equivalence
Prior experience

Medical Illustration – Medical Illustrators and Clinical Photographers

The profession in Wales primarily consists of clinical photographers and medical illustrators at graduate/postgraduate levels, with an effective route into the profession in Wales for photography graduates with further NHS training provided through HEIW. Assistant and associate roles are available in some departments, accessing either in house training or ophthalmic imaging support worker training, but there is interest in the Welsh Government Healthcare Science Apprenticeship Pathway for these developing roles.

There have, however, been significant technical and scope of practice developments in medical illustration and clinical photography over recent years, for example in ophthalmic imaging and 3D dental imaging, that now warrant the need for advanced practice roles with appropriate registration and point towards the need for consultant practice roles in the future. As this was not part of the historical vision, the profession was not included in HCPC clinical scientist registration, unlike their close colleagues in vascular science and vision science. The crossover with other scientist roles and expertise may provide an opportunity for registration for some professionals in the interim period via the scientist training programme or equivalence route, while further considerations are progressed with HCPC and the professional bodies for this essential and rapidly growing profession.

In recent years clinical photography departments have become more and more integrated in diagnostic services, teledermatology being one of these since it was rolled out via the Welsh Government Planned Care Programme.

This supports the Welsh Government priorities of: Care closer to home, Reducing waiting times, and Right care, right place and has allowed clinical photography departments to expand both in staffing and skill set. Some departments have developed further 'tele' services such as telelids (lid lesions within ophthalmology), telemax (intra-oral lesions within maxillofacial) and teleENT (outer and middle ear/ear drum imaging via an otoscope).

Clinical photography is taken of the area of concern, images uploaded to a secure database and then reviewed by the consultant. The consultant then reports on the images, and a letter is sent to the patient letting them know the outcome (discharge, follow-up or outpatient appointment).

ABUHB 'tele' services, considered to be leading in this area across the UK, see discharges rates of over 50% due to the area of concern being benign or treatable with a prescription from the GP, therefore saving time and money, ensuring those patients that really need to be seen are seen in a timely manner. This model that has been rolled out across Wales and has also been the basis for several departments in England when structuring their service.

There is work within IMI (Institute of Medical Illustrators) to provide a 'toolkit' for clinical photography departments running or trying to establish 'telederm' services, with the lead from Wales providing advice.

We are also very fortunate in Wales to have the HEIW funded trainee posts. This enables departments to recruit fixed term contracts for students to learn on the job. England do have the postgraduate qualification via Staffordshire University, but the structure is very different to the HEIW course and departments often must fund the qualification themselves.

Looking forward, we expect AI to creep into our role. It is being trialled at the moment, especially within dermatology/teledermatology. It is an exciting time and we will be embracing the new technology to ensure we are not left behind!

Reconstructive Science – Reconstructive Scientists and Clinical Scientists

Reconstructive science/maxillofacial prosthetics is a specialised field of healthcare manufacturing, providing life-changing medical devices for patients who require complex restorative treatments. This is a clinical healthcare science profession that deals with the specialist rehabilitation of patients requiring treatment after traumatic injury, cancer surgery or defects from birth causing malformation. Dedicated teams work closely with patients as well as medical clinicians and surgeons, fostering a holistic approach to patient recovery that not only addresses physical restoration but also promotes emotional and psychological wellbeing.

The main role of the reconstructive scientist/maxillofacial prosthetist (both terms are used interchangeably, and both are healthcare science professionals) is in restoring of function and appearance to patients who have acquired a facial difference through trauma, ablative surgery, or congenital anomalies. The treatment involves the manufacturing of life-like prosthetics to improve appearance and function, improving quality of life and facilitating social integration. The service also covers a range of treatments, from custom body prosthetics design and manufacture, intricate craniofacial surgery planning, and the manufacture of post burns therapeutic splinting devices, all tailored to the individual unique needs of patients. Within NHS Wales, the focus is on delivering patient-centred care; this has led to international recognition.

The educational pathway for reconstructive science/maxillofacial prosthetics equips trainees with practical and clinical expertise. This historically evolved from undergraduate training in dental technology, and this is still one of the routes into the profession via postgraduate study to enable the delivery of direct clinical rehabilitation and care. Other recognised qualifications will be considered in the future.

Aspiring reconstructive scientists from a Dental Technology training programme or background instead apply for an NHS training post on the National School of Healthcare Science (NSHCS) postgraduate programme. This Scientist Training Programme (STP) combines academic study with hands-on clinical training in NHS facilities. The practical element of the programme develops competencies in designing and fabricating medical prosthetics, craniofacial implants, and other reconstructive solutions. At the same time, trainees study for an MSc at Kings College London and Manchester Metropolitan University. On completing the STP, graduates can apply for HCPC registration as clinical scientists and permanent roles in Wales.

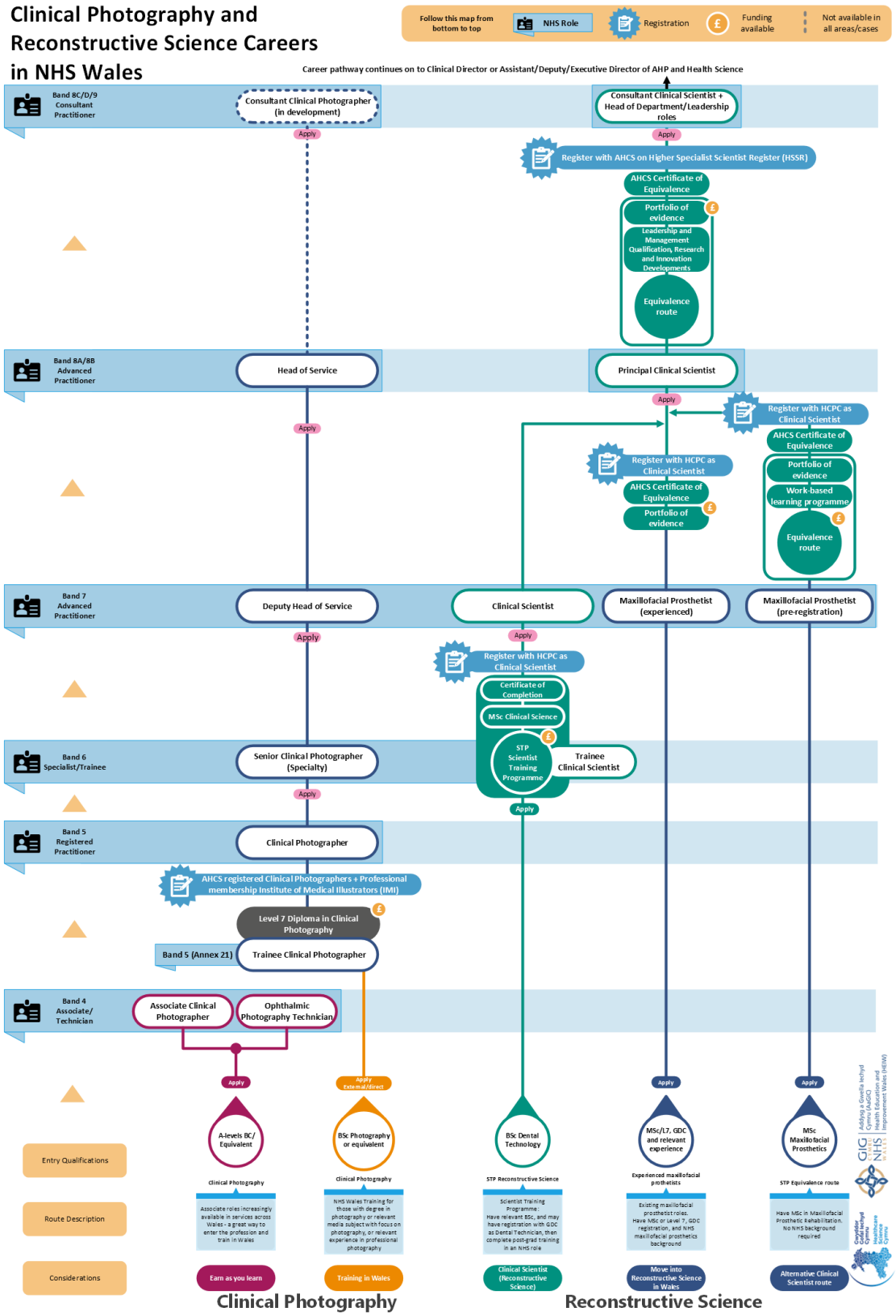
In Wales and the rest of the UK, the same role may be undertaken by a maxillofacial prosthetist who has completed a full-time degree at Kings College London.

Whilst clinical scientist registration is not mandated at this level, those wishing to progress onwards in their career are funded and supported to undertake the STP Equivalence Route to clinical scientist registration.

For all those developing on to consultant clinical scientist roles, a Higher Specialist Scientist Training curriculum is available, which enables access to the Higher Specialist Scientist Equivalence route for those with clinical scientist registration; at the current time the HSST formal programme is not run in the UK due to the small size of the profession.

Also in Wales is the opportunity for research and innovation contributing to cutting-edge developments.

With a commitment to research and innovation, reconstructive science and maxillofacial prosthetics are continually improving patient care; indeed, many of the research and innovations created in Wales are UK firsts. The career pathway is demanding but immensely rewarding, preparing professionals to transform lives through innovative solutions and compassionate care in Wales.



Pharmaceutical Science – Science Manufacturing Technicians and Clinical Scientists

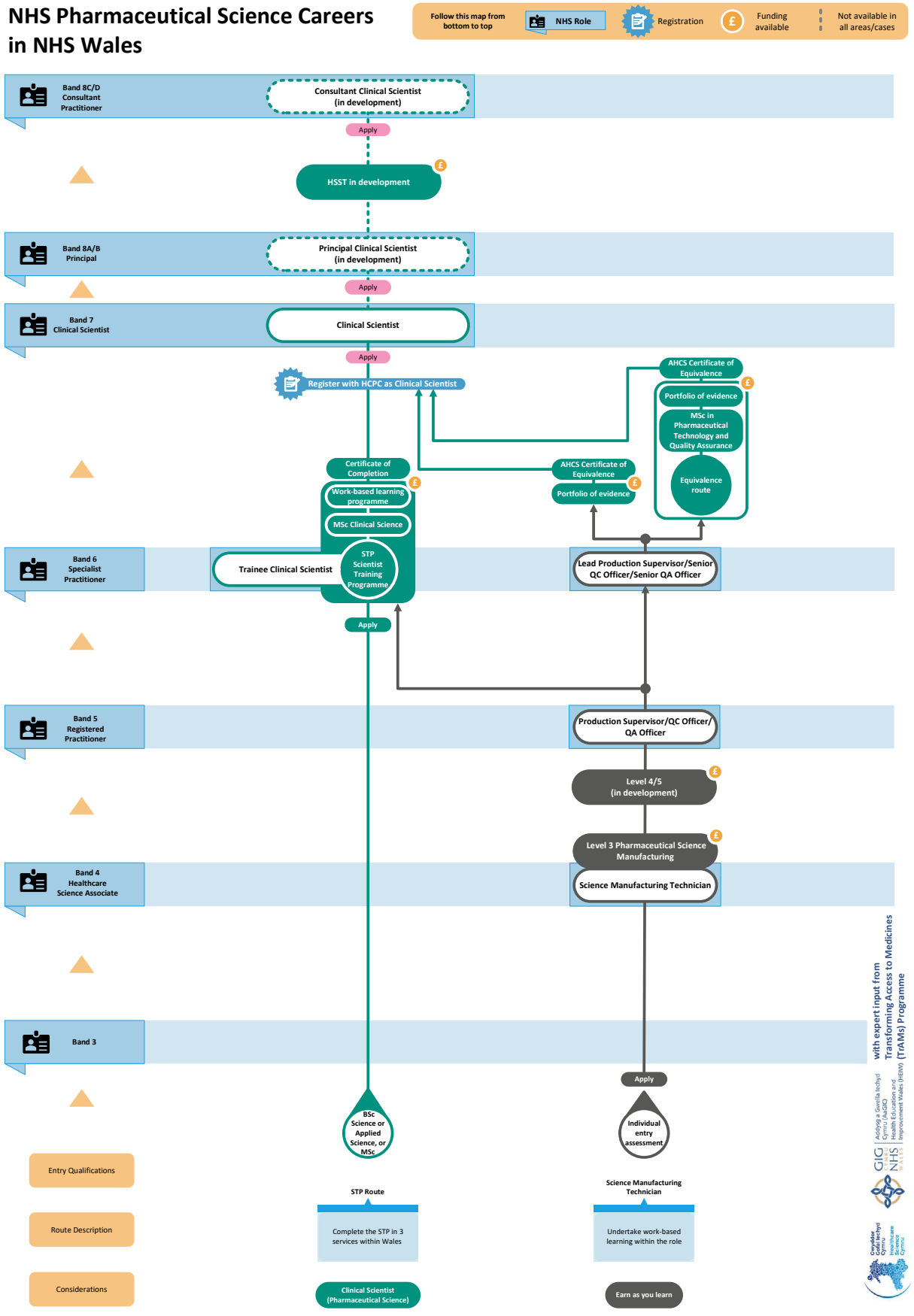
Our science manufacturing technicians and clinical scientists deliver pharmacy technical services across Wales. We have created new roles to formulate, manufacture or prepare, test and quality assure the pharmaceutical products we make for a variety of patient groups, principally systemic anti-cancer treatments along with other high risk injectable medicines including parenteral nutrition, radiopharmaceuticals and advanced therapy medicinal products. These products are made within a highly specialised, regulated and quality assured clean room environment as mandated by the Medicines and Healthcare Products Regulatory Agency (MHRA) or through Welsh Government Health Circulars and necessary guidance, standards and legislation.

There are currently 12 separate facilities making these medicines across Wales, and we are now in the process of transforming the way in which we deliver these services to be able to treat more patients as demand increases. With 3 state of the art hubs across the region being built through the Transforming Access to Medicines Programme (TrAMs), we will relocate the majority of our services to these brand-new facilities in south east wales, south west wales and north wales, hosted by NHS Wales Shared Services Partnership.

This will enable the manufacturing process to be more efficient and cost-effective, utilising semi automation and robotic systems.

The creation of our new professional scientific roles at operational and postgraduate levels to support our services has been has endorsed through UK NHS Workforce groups (NHS Technical Specialist Education and Training) and Welsh Government, with TrAMs and HEIW. These roles have been evaluated as being highly successful and innovative in its approach to our changing workforce needs. Work is underway locally and nationally to develop robust career pathways to support personal development from bands 3 to 9. These pathways utilise a variety of accredited courses and programmes e.g. CQFW level 3 Diploma in the Principles of Aseptic Pharmaceuticals Processing and the CQFW level 7 Postgraduate MSc through the Scientist Training Programme in Pharmaceutical Science, to advance expertise in this area of practice. These transformative changes will benefit our patients access to these specialist medicines, with the aim to help speed up treatment times and reduce waiting lists.

NHS Pharmaceutical Science Careers in NHS Wales



Clinical Computational Sciences

Clinical computational sciences is made up of four distinct professions: clinical scientific computing, clinical informatics, bioinformatics human genomics, and bioinformatics pathogen genomics. These professions are expert at the application of computer science to local, service level population and individual level clinical data.

Bioinformaticians (Human Genomics and Pathogen Genomics)

Bioinformaticians are an essential part of genomics services, understanding complex biological datasets using computational, statistical and programming techniques. The All-Wales Medical Genomics Service (AWMGS) and Public Health Wales Pathogen Genomics Unit (PenGU) are the primary employers of bioinformaticians.

Clinical Informaticians

Clinical Informaticians provide leadership, advice, and clinical expertise on digital and data science topics such as: best practices in record sharing, interoperability, business intelligence, the application of artificial intelligence and machine iearning in clinical services, end user experience and clinical safety, and explaining complex data to lay audiences. Clinical informaticians are employed in various locations in NHS Wales and do not form a service by themselves, they are employed as a role within other services.

Clinical Scientific Computing Professionals

Clinical Scientific Computing Professionals provide technical leadership, advice and expertise on the development and implementation of computer science techniques. They specialise in developing solutions for specific clinical services and solve clinical and technical problems for services or individual patients. They are expert in the development lifecycle of clinical software. Clinical scientific computing professionals are employed in various locations in NHS Wales and do not form a service by themselves but are employed within other services.

With current advances in technology outpacing rates of adoption in the NHS it is prudent that proper consideration is given to utilising the most appropriate professions in the most appropriate roles to adopt and adapt technologies. Recent commissions and publications have highlighted the deficiencies within the NHS regarding adoption of technologies including artificial intelligence and machine learning, including the lack of skills required for success and lack of national standards and guidance of how these should be used in a clinical setting.

For all four of the professions within the clinical computational sciences ‘family’ you can start your career as a trainee clinical scientist and complete the Scientist Training Programme with the aim of going on to become a registered clinical scientist. Within bioinformatics you can also enter the profession directly after completing an associated degree. Clinical scientific computing professionals can come from a range of backgrounds but are usually suited to individuals with an interest or background in the clinical area that the clinical scientific computing role is situated, and some background in computer science.

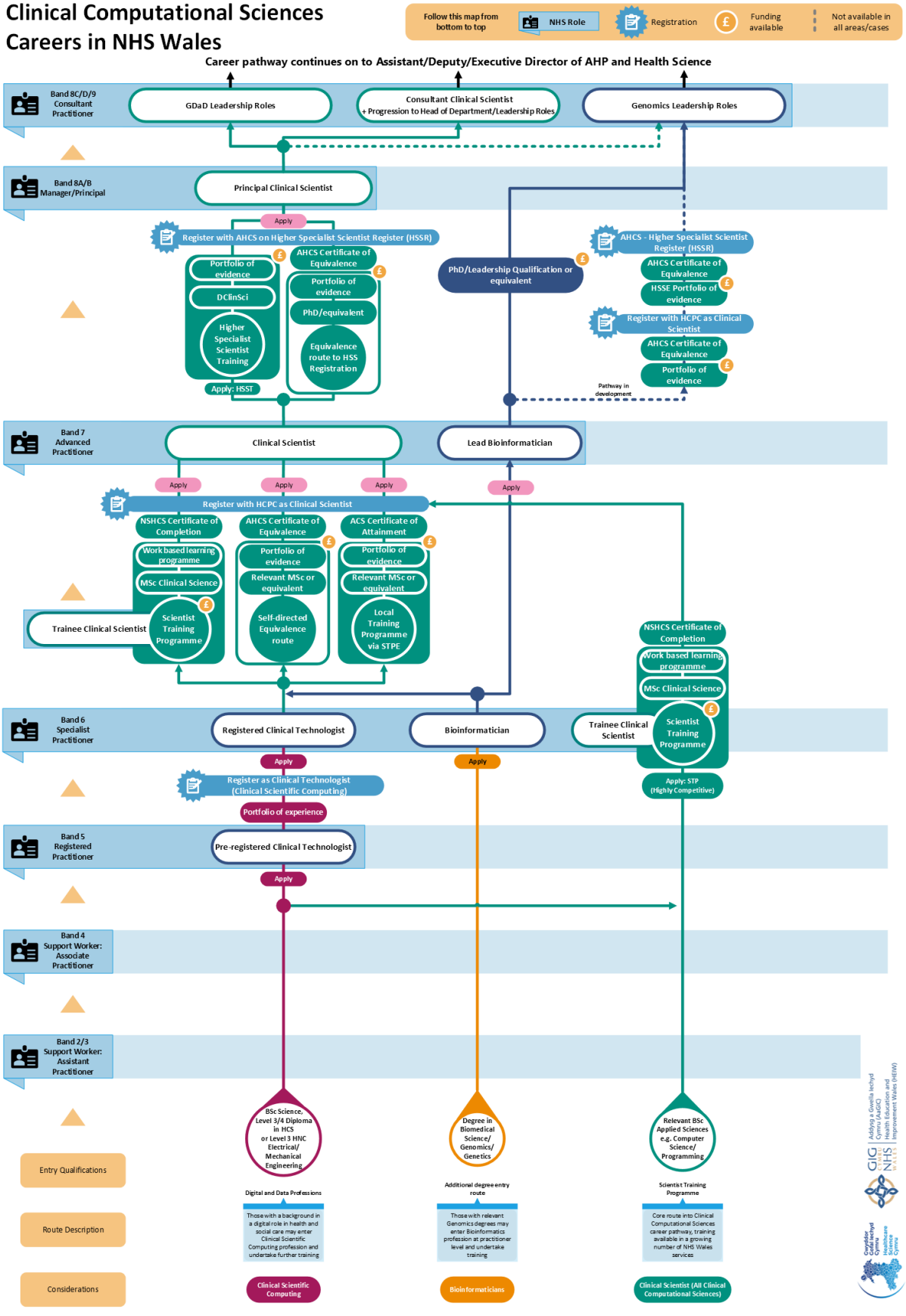
There are opportunities for professionals from other healthcare science areas to train in clinical informatics either through the Clinical Data Science Postgraduate Certificate programme, the Scientist Training Programme or Higher Specialist Scientist Training, depending on their current level of practice. This allows people to develop their knowledge in the fields of computer science and the application of technologies such as AI and machine learning in their current speciality, rather than necessarily becoming a registered clinical scientist in clinical informatics.

Professionals working in the clinical computational sciences in Wales are already:

- Developing digital literacy within the NHS.
- Raising awareness of clinical computational scientists to the NHS and academic, government and industry sectors.
- Leading on implementation of new technologies and identifying barriers to adoption.
- Working across networks to deliver the high standard of training required to produce the next generation of outstanding clinical computational scientists.
- Contributing to development of safe and effective software as a medical device (SaMD), ensuring standard procedures and industry best practices are followed in development.
- Collaboratively and rapidly developing new services in response to changing needs across the UK, to improve health outcomes for patients and the public.

The lack of understanding of clinical computational scientists has led to the under-utilisation of these professionals, with around 20 roles in place across Wales in 2025 and many of these being funded training roles, preventing the profession from reaching its potential. An expansion of the role of clinical computational scientists along with wider professional recognition would enable rapid and safe adoption of new and emerging healthcare technologies across the NHS.

Clinical Computational Sciences Careers in NHS Wales



Radiography Professions

Diagnostic Radiography

Diagnostic radiography services utilise various imaging technologies to visualise the internal structures of the body, assisting with the diagnosis of a wide range of conditions such as cancer, broken bones, damage to internal organs and much more. The most well-known Imaging services are X-rays, CT scans, MRI scans, fluoroscopy, ultrasound, interventional radiography, nuclear medicine and positron emission tomography (PET). Images from these modalities are produced by assistant practitioners and radiographers and interpreted by specialist radiographers as well as consultant radiologists to determine patient diagnosis and the most appropriate treatment. Diagnostic radiography is primarily based in secondary care sites such as district general hospitals with some limited services such as X-ray and ultrasound being offered within community sites and settings.

Radiology departments are essential to the vast majority of clinical pathways and patient care with most patients entering the Radiology department when they are admitted to hospital. Patients are referred from A&E, GPs, paediatrics, outpatients and in-patient wards for imaging. The radiology service interacts with clinicians and specialist practitioners from all specialities to allow for patient diagnosis, as well as providing therapeutic treatments under X-ray or ultrasound guidance – known as interventional radiology.

All-Wales role documentation has been produced to support equality and optimisation of roles across Wales. As part of this work, the education and training required has also been reviewed with recommendations made to strengthen the career pathway. Progression from radiology clinical support worker to assistant practitioner is only via the Assistant Radiographic Practice (Clinical Imaging) course at Cardiff University. Options for assistant practitioners in Wales to progress into registered radiographer roles are now being developed via collaborative working between HEIW, the National Imaging Programme and radiology service leads.

The career pathway for registered radiographers is varied, which is one of the reasons that makes radiography such an attractive career choice. There are options to progress into enhanced and advanced practice available within all imaging modalities as well as progression into management and professional lead roles. There are also opportunities in screening (particularly mammography or breast screening), research, or education roles. Some radiographers work in more than one speciality area and hold joint posts across organisations.

Demand for diagnostic radiography services is increasing, requiring increasing numbers of staff at all levels. There is an increased need for enhanced, advanced and consultant radiographers to undertake specialist examinations, treatments and reporting to support the consultant radiologist workforce. There are many initiatives and innovative ways of working undertaken across Welsh diagnostic radiology departments, the scope and range of images radiographers can report on has significantly expanded across the modalities such as CT, MRI and nuclear medicine. With new roles such as radiographer-led discharge, quality, practice educators and cancer navigator roles being additional examples of where the workforce is rising to meet the challenge of increasing demand whilst optimising the skills and abilities of the radiographer workforce.

Diagnostic radiography is also a service which is rapidly evolving through digital technologies, with images stored via digital systems and reports undertaken via speech to text recognition software, supporting home-based reporting via integrated PACS systems.

The potential for AI to support diagnosis and service efficiencies is also being investigated, with AI already being integrated into much of the imaging equipment staff are using right now. AI technologies assist with reduction in radiation dose delivered to patients, to assisting accurate measurement taking on live images and ensuring a streamlined approach to patient worklists. The all-Wales RISP project is now in the final stages which will include the ability for health boards and trusts to share and review images from across Wales, making it easier to access timely, specialist opinion to facilitate patient diagnosis.

The National Imaging Programme aims to support all diagnostic radiography services across Wales through collaboration with clinical stakeholders, professional, and strategic bodies. diagnostic radiography in Wales is in a unique situation, being aligned with healthcare science as opposed to the rest of the UK where it sits within allied health professions. Whilst this can be challenging, it also provides unique opportunities that benefit education and training pathways.

A career in diagnostic radiography and imaging is extremely rewarding and challenging, using state of the art technologies, utilising your scientific knowledge whilst providing excellent patient care. The working environment is such that continuous learning is a given, where the ability to adapt to the improving technologies and environments is essential. The roles and responsibilities of radiographers has significantly expanded over the last 20 years, with the thinking that career options and opportunities will continue to emerge and develop within this speciality.

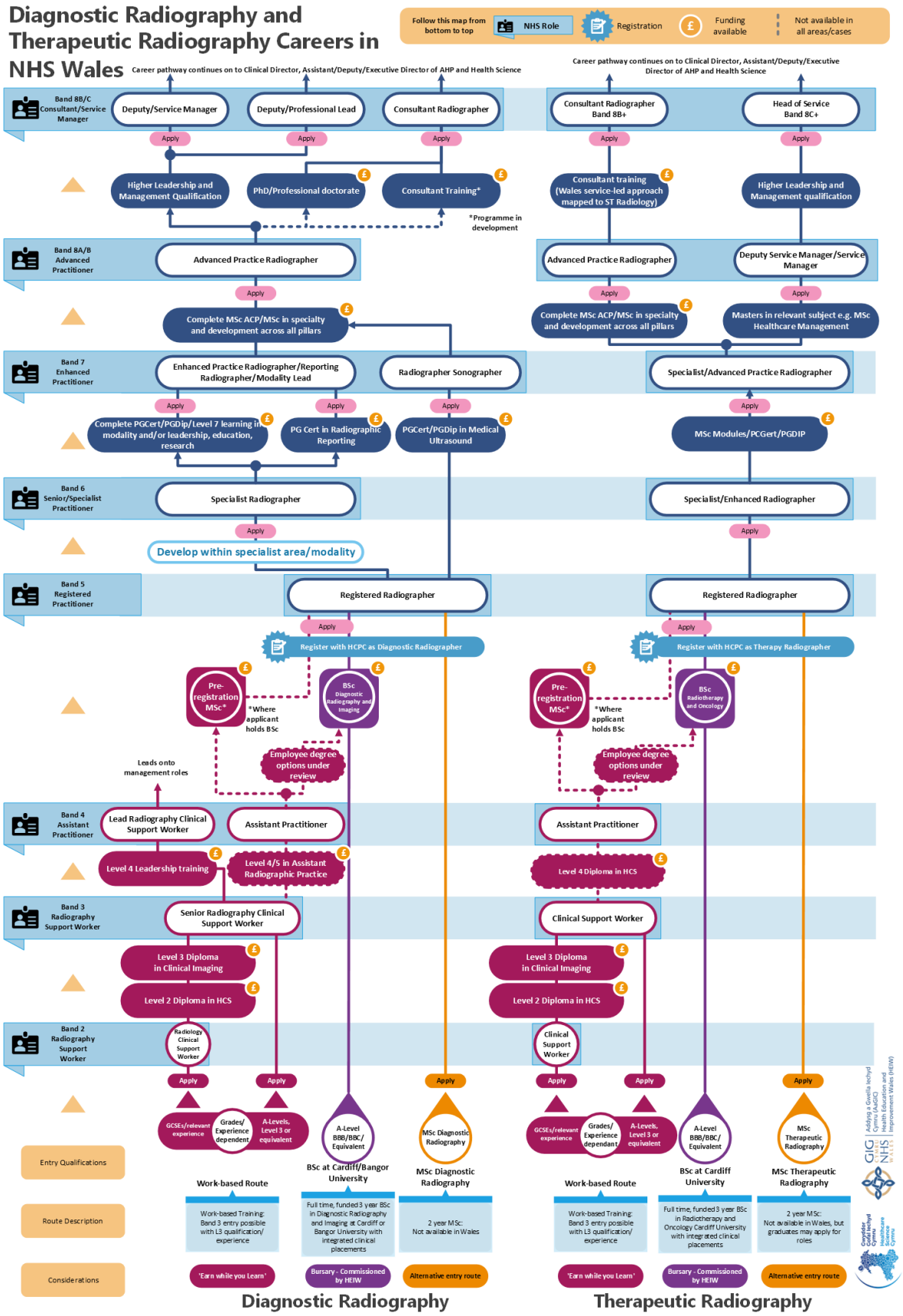
Therapeutic Radiography

Radiotherapy is the safe use of controlled doses of ionising radiation to treat people who have cancer and some benign conditions. The aim of radiotherapy is to deliver as high a dose of radiation as required to destroy cancerous tumours, whilst sparing the surrounding normal tissues. Radiotherapy services are an integral component of modern cancer care with approximately 50% of all cancer patients receiving radiotherapy as part, or the whole, of their treatment plan, which may also include surgery and drug therapy (Systemic Anti-Cancer Therapy, SACT). By 2025, this is expected to increase to 60%. Radiotherapy is given as the first primary treatment to around 15% of cancer patients in Wales.

Radiotherapy service provision in Wales is delivered across three specialist cancer centres. One is a University NHS Trust servicing four health boards, one is a regional centre servicing three health boards, and one is a regional health board centre serving its own population.

The current path for registration is via a 3 year BSc or postgraduate masters qualification, and there is a great deal of work being undertaken to establish further options. The career pathway is under development, there are many options of career progression in radiotherapy, supported by appropriate education. The pre-registered workforce play an important role in the patients' pathway and should be supported to obtain specific education in line with the profession; work is ongoing to ensure a funded All Wales approach.

All sites across Wales now have a consultant radiographer in post along with a number of advanced practice roles. The development and innovation is an ongoing process to ensure we provide the people of wales with a high quality, technologically advanced radiotherapy service. Several innovations across Wales display innovative practice e.g. one of the first in the UK to provide tattoo-free treatment. With only 3 sites in Wales the radiotherapy community is tight knit, supporting and mentoring each other to achieve excellence for all.


Diagnostic Radiography and Therapeutic Radiography Careers in NHS Wales
Follow this map from bottom to top
NHS Role
Registration
Funding available
Not available in all areas/cases
Career pathway continues on to Clinical Director, Assistant/Deputy/Executive Director of AHP and Health Science
Band 8B/C Consultant/Service Manager
Deputy/Service Manager
Deputy/Professional Lead
Consultant Radiographer
Consultant Radiographer Band 8B+
Head of Service Band 8C+
Apply
Higher Leadership and Management Qualification
PhD/Professional doctorate
Consultant Training*
*Programme in development
Consultant training (Wales service-led approach mapped to ST Radiology)
Higher Leadership and Management qualification
Band 8A/B Advanced Practitioner
Advanced Practice Radiographer
Deputy Service Manager/Service Manager
Complete MSc ACP/MSc in specialty and development across all pillars
Masters in relevant subject e.g. MSc Healthcare Management
Band 7 Enhanced Practitioner
Enhanced Practice Radiographer/Reporting Radiographer/Modality Lead
Radiographer Sonographer
Specialist/Advanced Practice Radiographer
Complete PGCert/PGDip/Level 7 learning in modality and/or leadership, education, research
PG Cert in Radiographic Reporting
PGCert/PGDip in Medical Ultrasound
MSc Modules/PCGert/PGDIP
Band 6 Senior/Specialist Practitioner
Specialist Radiographer
Specialist/Enhanced Radiographer
Develop within specialist area/modality
Band 5 Registered Practitioner
Registered Radiographer
Register with HCPC as Diagnostic Radiographer
Register with HCPC as Therapy Radiographer
Pre-registration MSc*
*Where applicant holds BSc
BSc Diagnostic Radiography and Imaging
BSc Radiotherapy and Oncology
Employee degree options under review
Leads onto management roles
Band 4 Assistant Practitioner
Lead Radiography Clinical Support Worker
Assistant Practitioner
Level 4 Leadership training
Level 4/5 in Assistant Radiographic Practice
Level 4 Diploma in HCS
Band 3 Radiography Support Worker
Senior Radiography Clinical Support Worker
Clinical Support Worker
Level 3 Diploma in Clinical Imaging
Level 2 Diploma in HCS
Band 2 Radiography Support Worker
Radiology Clinical Support Worker
Clinical Support Worker
GCSEs/relevant experience
Grades/ Experience dependent
A-Levels, Level 3 or equivalent
A-Level BBB/BBC/ Equivalent
MSc Diagnostic Radiography
MSc Therapeutic Radiography
Entry Qualifications
Route Description
Considerations
Work-based Route
BSc at Cardiff/Bangor University
MSc Diagnostic Radiography
BSc at Cardiff University
MSc Therapeutic Radiography
Work-based Training: Band 3 entry possible with L3 qualification/ experience
Full time, funded 3 year BSc in Diagnostic Radiography and Imaging at Cardiff or Bangor University with integrated clinical placements
2 year MSc: Not available in Wales
Full time, funded 3 year BSc in Radiotherapy and Oncology Cardiff University with integrated clinical placements
2 year MSc: Not available in Wales, but graduates may apply for roles
'Earn while you Learn'
Bursary - Commissioned by HEIW
Alternative entry route
Diagnostic Radiography
Therapeutic Radiography

Operating Department Practitioners

Operating department practitioners (ODPs) work in a variety of services and departments, but predominantly across operating theatres, emergency departments, critical care settings and other specialist areas. Working alongside a range of professionals, including surgeons, anaesthetists, nurses and other healthcare practitioners, ODPs deliver comprehensive patient care with specialist training specifically for these environments. Their impact on patient care and pathways is significant; an exemplar of this is in operating theatres, where they are highly skilled and essential members of the perioperative team. ODPs provide care and support to patients undergoing operative procedures across three interconnected phases of perioperative care: the anaesthetic phase, the surgical phase, and the post-anaesthetic care phase.

The current ODP career pathway enables those with the required education to access BSc degrees, available in each region of Wales, with placement opportunities and bursary funding. The course enables student ODPs to develop their knowledge and experience within a clinical setting, fostering experiential learning to provide optimum exposure to meet the requirements of the ODP curriculum.

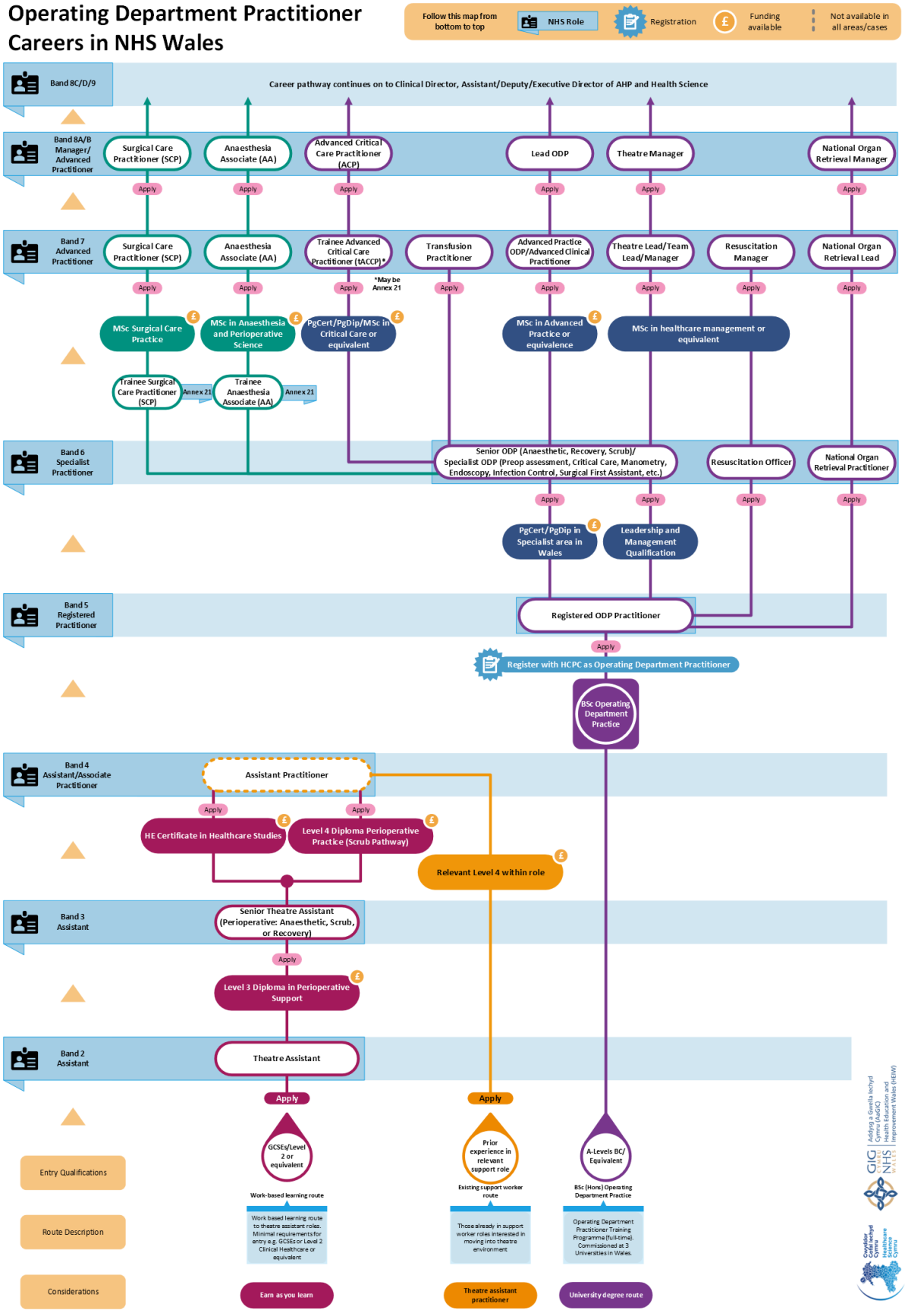
Once qualified and registered with the Health and Care Professions Council as an ODP, the career pathway has a wide variety of development opportunities in the NHS. Supported through postgraduate education, ODPs can work in clinical specialty fields (orthopaedics, cardiothoracic, robotic surgery etc.) or advanced roles such as surgical care practitioner, anaesthesia associate, advanced critical care practitioner, or roles outside of the operating theatre (e.g. simulation or resuscitation training). Or there are opportunities to progress into managerial roles, education, or research. As well as attending formal education programmes, there are a wide range of learning opportunities delivered in the workforce, which includes simulation training, interprofessional learning and bespoke opportunities to meet the needs of the role/ service, to promote continuous professional development throughout.

The ODP profession in Wales are proud of the steps it has made to develop the role. Historically, ODPs did not often take up employment outside of the operating theatre department, but it is now clear to see that ODPs are working in many different clinical and non-clinical roles, making a positive impact and demonstrating the value of the unique skills, knowledge and experience ODPs possess. Health boards in Wales have employed ODPs in the advanced roles mentioned above, recognising their expertise and need for workforce transformation.

Those aspiring to work as an ODP in Wales should feel reassured of the positive steps the profession is taking. We are keen to test boundaries and explore opportunities to develop the role further, particularly in relation to enhanced, advanced and consultant practice. Similarly, the profession is keen to embed standardisation across Wales, to share best practice, promote collaboration and develop accessible, flexible and equitable professional development opportunities to meet the current and future needs of the ODP workforce.

Working as an ODP can be immensely satisfying, as it enables you to make a significant difference in a patient's life during their vulnerable moments. By providing skilled care and support throughout the patient journey, you often act as a patient advocate. This hands-on, team-oriented role presents diverse challenges and offers the immediate reward of positively impacting patients' experiences.

Operating Department Practitioner Careers in NHS Wales



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