Evidence Brief: Pathology

Contents

Produced by the Knowledge Management team Evidence Briefs offer an overview of the published reports, research, and evidence on a workforce-related topic.

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- Haematology
- Healthcare Science

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Where a report/ journal article or resource is freely available the link has been provided. If an NHS OpenAthens account is required this has been indicated. It has also been highlighted if only the abstract is available. If you do not have an OpenAthens account you can self-register here.

Key publications – the big picture

Workforce census spotlight 1: response rate, retirements and working patterns
Royal College of Pathologists, June 2025
The 2025 RCPath Workforce Census provides a vital snapshot of the current state of the pathology workforce across the UK. This first spotlight highlights several emerging challenges: a significant proportion of pathologists are working beyond their contracted hours; there are looming retirement cliff edges among consultants; and widespread concern remains about the profession's ability to sustain services in the face of persistent workforce shortages. These insights, drawn from robust data, demonstrate the significant and growing pressures facing the pathology workforce across the UK.

Workforce Strategy 2025-2028
Royal College of Pathologists, January 2025
This RCPath Workforce strategy seeks to address the factors that can affect the viability of pathology services across the UK. It looks beyond the task of workforce data collection and sets out the actions we will take to influence the changes required for pathology. These changes are vital in ensuring that high-quality care is provided to patients and high standards are upheld.

The infection sciences workforce: challenges and solutions
Royal College of Pathologists and British Infection Association, May 2023
This briefing contains the findings of the survey, open between April and August 2021, which was designed to be completed by 1 individual for each acute NHS organisation in the UK by the service lead for microbiology, virology or infectious diseases, or the medical director. The results of the survey highlight the challenges facing medical microbiology. We have made recommendations for solutions to those challenges and set out the commitments the College is making to help alleviate the problems facing medical microbiologists.

Strategy 2024-26: Improving lives in the haematology community
British Society for Haematology, 2023
Our new strategic plan builds on achievements made since 2019, on multi-disciplinary (MDT) membership support and engagement, knowledge sharing and advocacy and partnerships. We will expand into a fourth strategic aim, "Advancing the Society" which will oversee our sustainability, to create the infrastructure needed to manage our growing ambition.

Clinical Virology Workforce report
Royal College of Pathologists, October 2022
Clinical virology is an integral and essential part of the pathology landscape in the UK. The current SARS-CoV-2 pandemic and previously emerging viral infections have demonstrated the ongoing need for clinical virology expertise. The UK Clinical Virology Network (CVN) is a professional interest group with membership drawn from laboratories throughout the UK and Ireland. The network provides practical, evidence-based virological advice on all aspects of viral infections. It helps to establish and maintain the standards of practice among virologists and provides a rapid and considered response to virological emergencies. CVN has responsibilities for centrally agreed protocols for the management of viral infections and best laboratory practice, aiding standardisation and acting as an education and training resource.

Pathology GIRFT Programme National Specialty Report
Getting Right First Time, September 2021
What is pathology? Pathology is the study of disease. Staff working in pathology study cells, tissues, blood and other fluids from patients' bodies to investigate, diagnose and monitor

disease, and to guide clinicians in treatment. Pathology tests are requested by providers in primary care, the community, and secondary care. Pathology labs in England carry out 1.12 billion tests per year – roughly 20 tests per person in England each year – representing £2.2 billion of NHS funding.1 Current service organisation In England, 141 trusts include a pathology lab. Most hospitals have a pathology lab; others are supported by labs within a pathology network. Most hospital labs include the 'major' pathology specialties of haematology (including blood transfusion), clinical biochemistry, microbiology and cellular pathology (also called histopathology), which are the focus of this report. The pathology workforce is primarily made up of medically qualified pathologists, clinical scientists and biomedical scientists, working in multidisciplinary teams (MDTs) across the pathology specialties.
See p. 114 for Workforce

Diagnostics: Recovery and Renewal
NHS England, October 2020
Professor Sir Mike Richards was commissioned to undertake a review of NHS diagnostics capacity (NHS Long Term Plan). The independent report, Diagnostics: Recovery and Renewal, recommends the need for a new diagnostics model, where more facilities are created in free standing locations away from main hospital sites, including on the high street and in retail locations, providing quicker and easier access to tests to a range of tests on the same day, supporting earlier diagnosis, greater convenience to patients and the drive to reduce health inequalities.
p. 12 There should be a major drive to expand the pathology workforce, specifically histopathologists, advanced practitioners and other healthcare scientists, with an emphasis on skill mix. The establishment of training academies/schools should be considered. [Page 41]
See p. 40 "The Pathology workforce"

p. 41 Recommendation 16: There should be a major drive to expand the pathology workforce, specifically histopathologists, advanced practitioners and other healthcare scientists, with an emphasis on skill mix. The establishment of training academies/schools should be considered.
p. 47 Recommendation 22: Regions should oversee work to complete the establishment of the imaging and pathology networks and to develop endoscopy networks and cardiorespiratory networks across the country
See Appendix 5: Pathology (p. 73)

Haematology workforce survey 2019
The Royal College of Pathologists, 2020
As part of the Royal College of Pathologists' Meeting Pathology Demand series, we carried out a survey of the haematology laboratory workforce, to help determine whether there is the right number of staff with the right skills in the right places to ensure safe and effective high-quality patient care and support. Like many pathologists, haematologists have a role in the direct management and treatment of patients as well as undertaking diagnostic work in the laboratory. This briefing contains the findings of our survey, which was sent to clinical directors and heads of haematology departments across the UK between December 2018 and September 2019. In particular, it focuses on the laboratory, rather than clinical, commitment of haematologists. The British Society of Haematology carried out its own review of the UK haematology clinical workforce over a similar period and we welcome the results of that report.

Diagnostic cytopathology in the UK 2020
Royal College of Pathologists, 2020
To gain a better understanding of the practice and reporting of all types of diagnostic cytopathological specimens in the UK, the College carried out a survey at the request of the Cytopathology Sub-Committee (SC), with input and support from the British

Association for Cytopathology (BAC), Institute of Biomedical Science (IBMS) and the Conjoint Board for Cytology (CJB). This briefing contains the findings of the survey, which was sent to 145 lead cytologists or heads of cellular pathology departments in hospital trusts or similar institutions in the UK between 30 June 2020 and 31 October 2020. (The original deadline of 1 September 2020 was extended owing to the COVID-19 pandemic.) Individuals were identified from the College's membership database.

Workforce report
British Society for Haematology, March 2020
The British Society for Haematology's review of the UK haematology clinical workforce undertaken in 2019 is the most comprehensive since the 2008 report by RCPath. Our findings show that clinical haematologists, nurses, laboratory scientists, pharmacists and specialist managers are under increasing pressure to deliver for patients in the NHS as the burden of doing more with less staff impacts the rates of work-related stress, sickness and absence. Review the key points to understand in more detail the needs and challenges faced by today's multidisciplinary haematology professionals.

Science in healthcare: delivering the NHS Long Term Plan – The Chief Scientific Officer's Strategy
NHS England, March 2020
Healthcare is entering the era of personalised medicine and prevention. Patient care is improving through maximising use of new technology and digital innovations, provision of diagnostics, and treatment closer to the patient. Digital advances, medical technology and diagnostic innovations will continue to change pathways and improve outcomes, with the potential to completely transform how we deliver care. Innovation in diagnostics and scientific services has revolutionised care over the years, from the first vaccine, to in- vitro fertilisation, to the advanced imaging that underpins man of today's clinical services. NHS scientific services are at the heart of this innovation; services that deliver changes to help patients and keep the NHS at the forefront of health innovation. Our ambition is to use the latest digital and technological innovations to embed new ways of delivering scientific services to improve patient care; delivered by a digitally enabled and intelligence-led healthcare science profession driving change.

NHS Long Term Plan
NHS, January 2019
The NHS Long Term Plan was developed in partnership with those who know the NHS best – frontline health and care staff, patients and their families and other experts.
p. 105 " Delivering pathology and imaging networks to improve the accuracy and turnaround times on tests and scans will make best use of the expanding workforce, and reduce unit costs. In 2018, seven Genomic Laboratory Hubs were established with mobilisation towards consolidated provision.
By 2021, all pathology services across England will be part of a pathology network and, by 2023, we will have introduced new diagnostic imaging networks. The pathology networks will mean quicker test turnaround times, improved access to more complex tests at a lower overall cost and better career opportunities for healthcare scientists and clinicians."

Meeting pathology demand: Histopathology workforce census
The Royal College of Pathologists, September 2018
In 2017, the Royal College of Pathologists carried out a workforce survey of histopathology departments in the UK. Of the three-quarters who responded, only 3 per cent reported they had enough staff to meet clinical demands. For those departments where staffing was inadequate, different ways of coping were used – including employing locums, outsourcing or overtime. If these figures were extrapolated, it could mean that

137 of 158 departments in the UK don't have enough consultant histopathologists to be able to provide the service we expect. Yet workloads have increased and will continue to do so. Pathologists play a critical role in preventing, diagnosing, treating and monitoring cancer. This increasing workload is a particular concern. Large-scale NHS screening initiatives, such as those for breast and bowel cancers, place rising demands on histopathology services. In addition, the complexity of caseloads is growing, with genomics and molecular predictive tests guiding new therapies. Adding to the list of pressures is an approaching retirement crisis. Currently, a quarter of all staff in histopathology are aged 55 or more, with 9 per cent aged at least 60. It can take up to 15 years to train a pathologist and experienced consultants typically report up to twice as much as newly qualified consultants. The cost of staffing gaps runs into millions of pounds. The survey results show around £9.8m a year is spent on locum posts. This covers 77 posts at an annual average of £127,000 each. In addition, outsourcing could be costing as much as £10m a year. This report looks at the issues, recommends some actions that could help to alleviate the difficulties – both now and in the longer term – and includes comments and case studies from histopathologists working in different areas of the UK.

See also "The Pathology Workforce"

Histopathology workforce survey 2018
Royal College of Pathologists, 2018
Through our survey, we sought to obtain a realistic idea of the number of vacant posts in the UK in this specialty, and will use the resulting data to influence organisations with the potential to address the problems identified, working towards finding solutions. Ensuring diagnostic services can cope with current and future demand is vital if we are to improve experience and outcomes for patients.

Medical Workforce Planning Report
Royal College of Pathologists, June 2018
The College Workforce Department aims to maintain standards in pathology by:
- reviewing and approving consultant level job descriptions,
- monitoring appointments and
- supporting workforce planning.

Workforce planning enables the College to influence the planning of an efficient, high quality pathology service through the census for individuals and direct surveys, triangulating the data with the results of the Advisory Appointment Committees (AACs).

Case Studies

Case study: improving turnaround times in pathology
NHS England, 2024
Turnaround time is often used as a key performance indicator in pathology, and as a quality marker of the service. Turnaround times are often a challenge where capacity, volume and staffing requirements may be exceeded. A key challenge is the overuse of urgent requests, which results in:
- blocked flow from emergency departments
- additional pressure on ward and laboratory staff
- a high volume of phone calls from those chasing results
- genuinely urgent requests being delayed

Dr Emily Leach at the Eastern Pathology Alliance recently embarked on a project to review turnaround time challenges, and this case study shares the learning more widely.

Robert Cast talks about working in Anatomical Pathology
NHS England National School of Healthcare Science

Robert is an Anatomical Pathology Technologist (APT) at King's College Hospital NHS Foundation Trust in the Mortuary Department.

The following are taken from the Pathology Getting It Right First Time report
See p. 108 Case Study: A successful network development
See p. 117 Case Study: Biomedical scientists undertaking advanced practice in sample dissection
See p. 146 Case Study: Drive-through phlebotomy

National Apprenticeship Week 2023 Ioannis (Yannis) Theofanous
Greater Manchester Imaging Network, 2023
This week is National Apprenticeship Week, which is week dedicated to celebrating the skills and achievements of apprentices. In this case study we hear from Ioannis (Yannis) Theofanous who works in the Department of Clinical Virology at Manchester University NHS Foundation Trust as a biomedical scientist. Yannis completed his level 6 Health Care Science degree at Manchester Metropolitan University as an apprenticeship. Manchester University NHS Foundation Trust is part of the Greater Manchester Pathology Network.

The Star for workforce redesign

More resources and tools are available by searching for "pathology" in the Star

Statistics

You can find relevant statistics on the Health and Care Statistics Landscape under **"Health and Care"**

National Data Programme

Workforce, Training and Education staff can look at the National Data Warehouse (NDL) SharePoint site to find out more about datasets and Tableau products.

Published Peer Reviewed Research

Advanced practice

Advanced practitioner in anatomic pathology: The time has come.
Item Type: Journal Article
Authors: Sweeney, Brenda J. and Wilbur, David C.
Publication Date: 2018
Journal: Cancer Cytopathology 126(4), pp. 229-231
Appropriately trained cytotechnologists have been shown to have the skills necessary to safely assist the pathologist in nontraditional tasks. These advanced-level individuals may be necessary to stem the leakage of traditional pathology services to other specialties or even prevent them from not being done at all. The time has arrived to move this concept forward.

Apprenticeships

Conference abstract: Mind the Gap: Providing Transferrable Skills Training for NHS Pathology Apprentices (Conference

Proceeding)
Archives of Disease in Childhood. Conference: Annual Great Ormond Street Hospital Conference, GOSH 2022. Virtual. 108(Supplement 1), 2023
Apprenticeship programmes allow employers to grow their own talent and support progression for their employees. In NHS pathology services, healthcare science apprenticeships give staff the opportunity to complete BTECs in healthcare science, a BSc in biomedical science and gain HCPC registration. The education and technical components of apprenticeships are covered by the education provider and employer respectively, however, some transferrable skills are not easily supported in the workplace. This has been exacerbated during the COVID-19 pandemic when pathology laboratories have experienced a significantly higher workload. A funding proposal was successfully submitted to NHS England - London for a 19,000 grant to run three free training days for pathology apprentices in London. These sessions were mapped to the healthcare science apprentice standards and focussed on providing apprentices with evidence for their portfolios and networking opportunities with other apprentices from different Trusts. The three training days were*Science Communication: covering the science of storytelling and patient experience.*Leadership: covering leadership pathways and inclusive NHS healthcare.*Professional Practice/Research & Innovation: covering constructive feedback, research questions and duty of candour. Training days were well attended by level 2, 4 and 6 apprentices, with two of the three fully booked. In the evaluation 89% of respondents were happy with the structure of the day and all reported that the sessions fulfilled their expectations. Attendees left positive comments about the ability to network with other apprentices. Strong themes throughout the feedback were the commitments of attendees to apply the skills they'd learned in their workplace, but also a lack of prior awareness of these skills. This shows the vital importance of courses like these and providing leadership and communication training to healthcare scientists at all stages of their career.

Education and Training

Advancing outbreak simulation training: a collaborative pilot study for dual-specialty medical trainees and infection prevention and control professionals Abstract only*
Journal of Hospital Infection 147, 2024
Background: In response to identified gaps in infection prevention and control (IPC) training within Scotland, a Short Life Working Group initiated an innovative outbreak simulation training programme.
Aim(s): To enhance the knowledge and confidence of medical microbiology and infectious diseases trainees and IPC professionals in managing healthcare-associated infection (HAI) outbreaks, employing the National Infection Prevention and Control Manual guidelines.

A Review of Clinical Laboratory Education, Training and Progression: Historical Challenges, the Impact of COVID-19 and Future Considerations
British Journal of Biomedical Science 80, 2023
The COVID-19 pandemic had a wide global impact on society, including the clinical laboratory workforce. This historically underrepresented group of highly skilled professionals have now started to gain the attention they deserve. There had already been dramatic changes to laboratory training over the past 2 decades resulting from advances in technology, changes to service needs, and as a consequence of Pathology reform initiatives. The pandemic has had an additional impact. Higher education institutions and students adapted to emergency remote teaching. Clinical laboratories faced unprecedented challenges to meet COVID-19 testing demands and adjust to new ways of working whilst maintaining their usual high quality

service provision. Training, assessment, and development arrangements had to convert to online platforms to maintain social distancing. The pandemic also had a global impact on mental health and wellbeing, further impacting learning/training. Despite these challenges, there have been many positive outcomes. This review highlights pre- and post-pandemic training and assessment for clinical laboratory professionals, with particular emphasis on Biomedical Scientists, outlining recent improvements among a history of challenges.

Evaluation of two Massive Open Online Courses (MOOCs) in genomic variant interpretation for the NHS workforce
BMC Medical Education 23(1), 2023
BACKGROUND: The implementation of the National Genomic Medicine Service in the UK has increased patient access to germline genomic testing. Increased testing leads to more genetic diagnoses but does result in the identification of genomic variants of uncertain significance (VUS). The rigorous process of interpreting these variants requires multi-disciplinary, highly trained healthcare professionals (HCPs). To meet this training need, we designed two Massive Open Online Courses (MOOCs) for HCPs involved in germline genomic testing pathways: Fundamental Principles (FP) and Inherited Cancer Susceptibility (ICS).

Higher Specialist Scientific Training in pathology: an overview
College Bulletin (The Royal College of Pathologists) 193, 2021
The five-year, work-based Higher Specialist Scientific Training (HSST) programme is the most senior-level training provision for healthcare scientists. It is open to the four countries of the UK, is managed and delivered by the National School of Healthcare Science (NSHCS), and funded by Health Education England (HEE). It is designed to prepare healthcare scientists for the challenging role of consultant scientist in the NHS, and is supported by an underpinning part-time, doctoral-level programme.

Teaching, research or balanced? An exploration of the experiences of biomedical scientists working in UK medical schools.
FEBS Open Bio 11(11), 2021
Driven by demand for high standards in university education, efforts have been made in the UK to address the perceived imbalance between teaching and research. However, teaching is still perceived by many as having less credibility and is attributed less importance. The purpose of our research was to explore how distinct types of academic job profiles ('research' or 'education' focused, or 'balanced') impact on biomedical scientists' perceptions of the lecturer role. Specifically, we investigated the experiences of biomedical scientists in 'post-1990' medical schools, which are known for their commitment to excellence in both research and education.

Training the Next Generation of Pathologists: A Novel Residency Program Curriculum at Montefiore Medical Center/Albert Einstein College of Medicine.
Academic Pathology 6, 2019
Pathology residency training is currently a time-intensive process, frequently extending up to 6 years in duration as residents complete 1 or 2 fellowships following graduation. Innovative training curricula may help address the impending changes in the health-care landscape, particularly future shortfalls in pathology staffing and changing health-care models that incorporate more work within interdisciplinary teams. Montefiore has created a novel residency training program aimed at accelerating the acquisition of competency in pathology, preparing residents for independent practice at the completion of residency training, and providing residents with the requisite adaptability and consultative skills to excel wherever

they choose to practice. We describe the implementation of this novel pathology residency training curriculum at Montefiore Medical Center/Albert Einstein College of Medicine and the perception of residents in both the old curriculum and the new curriculum.

Time for change: a new training programme for morpho-molecular pathologists?
Journal of Clinical Pathology 71(4), 2019
The evolution of cellular pathology as a specialty has always been driven by technological developments and the clinical relevance of incorporating novel investigations into diagnostic practice. In recent years, the molecular characterisation of cancer has become of crucial relevance in patient treatment both for predictive testing and subclassification of certain tumours. Much of this has become possible due to the availability of next-generation sequencing technologies and the whole-genome sequencing of tumours is now being rolled out into clinical practice in England via the 100 000 Genome Project. The effective integration of cellular pathology reporting and genomic characterisation is crucial to ensure the morphological and genomic data are interpreted in the relevant context, though despite this, in many UK centres molecular testing is entirely detached from cellular pathology departments. The CM-Path initiative recognises there is a genomics knowledge and skills gap within cellular pathology that needs to be bridged through an upskilling of the current workforce and a redesign of pathology training. Bridging this gap will allow the development of an integrated 'morphomolecular pathology' specialty, which can maintain the relevance of cellular pathology at the centre of cancer patient management and allow the pathology community to continue to be a major influence in cancer discovery as well as playing a driving role in the delivery of precision medicine approaches. Here, several alternative models of pathology training, designed to address this challenge, are presented and appraised.

Training in molecular cytopathology testing Abstract only*
Source: Cytoptahology 29(1), 2018
Training in molecular cytopathology testing is essential in developing and maintaining skills in modern molecular technologies as they are introduced to a universal health care system such as extant in the UK and elsewhere. We review the system in place in Northern Ireland (NI) for molecular testing of solid tumours, as an example to train staff of all grades, including pathologists, clinical scientists, biomedical scientists and equivalent technical grades. We describe training of pathologists as part of the NI Deanery medical curriculum, the NI training programme for scientists and laboratory rotation for Biomedical Scientists. Collectively, the aims of our training are two-fold: to provide a means by which individuals may extend their experience and skills; and to provide and maintain a skilled workforce for service delivery. Through training and competency, we introduce new technologies and tests in response to personalised medicine therapies with a competent workforce. We advocate modifying programmes to suit individual needs for skill development, with formalised courses in pre-analytical, analytical and postanalytical demands of modern molecular pathology. This is of particular relevance for cytopathology in small samples such those from formalin-fixed paraffin-embedded cell blocks. We finally introduce how university courses can augment training and develop a skilled workforce to benefit the delivery of services to our patients.

Equality, Diversity, and Inclusion

Current and historical trends in diversity by race, ethnicity, and sex within the US pathology physician workforce
Journal of Clinical Pathology 154(4), 2020

Objectives: This study assessed historical and current gender, racial, and ethnic diversity trends within US pathology graduate medical education (GME) and the pathologist workforce. Methods: Data from online, publicly available sources were assessed for significant differences in racial, ethnic, and sex distribution in pathology trainees, as well as pathologists in practice or on faculty, separately compared with the US population and then each other using binomial tests. Results: Since 1995, female pathology resident representation has been increasing at a rate of 0.45% per year (95% confidence interval [CI], 0.29-0.61; P < .01), with pathology now having significantly more females (49.8%) compared to the total GME pool (45.4%; P < .0001). In contrast, there was no significant trend in the rate of change per year in black or American Indian, Alaskan Native, Native Hawaiian, and Pacific Islander (AI/AN/NH/PI) resident representation (P = .04 and .02). Since 1995, underrepresented minority (URM) faculty representation has increased by 0.03% per year (95% CI, 0.024-0.036; P < .01), with 7.6% URM faculty in 2018 (5.2% Hispanic, 2.2% black, 0.2% AI/AN/NH/PI). Conclusions: This assessment of pathology trainee and physician workforce diversity highlights significant improvements in achieving trainee gender parity. However, there are persistent disparities in URM representation, with significant underrepresentation of URM pathologists compared with residents.

Career Pathways and Development

A cross-sectional survey of Scottish combined infection trainees: Career aspirations and expectations (Conference abstract)
Clinical Infection in Practice. 25(Supplement), 2024
Background: Combined infection training (CIT) was introduced in the UK in 2015, integrating the training of postgraduate doctors in infectious diseases (ID), medical microbiology (MM) and medical virology (MV). At the time, the truncation of the original training programmes was felt by some to pose a challenge to training and service delivery. Many years later, medical microbiology is facing 'a workforce crisis', with 20 % of consultant posts unfilled. Despite combining infection training, many consultant job adverts and job plans retain single speciality focus. We surveyed current infection trainees across Scotland to explore their career aspirations and expectations as future infection specialists.

Promoting consultant clinical scientist roles in haematology and transfusion Conference abstract
British Journal of Haematology. Conference: 63rd Annual Scientific Meeting of the British Society for Haematology. Birmingham United Kingdom. 201(Supplement 1), 2023
Higher Specialist Scientific Training (HSST) prepares healthcare scientists for the role of Consultant Clinical Scientist within the NHS. This 5 years work based program with a part time doctorate is funded by Health Education England (HEE) and delivered by the National School of Healthcare Science (NSHCS). HSST programs for life sciences are implemented with the Royal College of Pathologists (RCPath) and trainees are required to gain Fellowship through FRCPath examinations. There are currently 12 life science curricula including Haematology and Transfusion Science. The training includes skills essential for senior scientific roles within Trusts or blood services such as leadership, innovation, research with higher specialist scientific and clinical knowledge. The funded academic aspects include a Professional Doctorate (DClinSci) and a Postgraduate Diploma (PgDIP) in Leadership and Management. The Scientist Training Programme (STP) for Haematology and Transfusion Science provides eligibility for entry to either of the two HSST programs with the STP curriculum updated in 2022. Suitably qualified and experienced biomedical scientists are also now eligible to apply allowing greater inclusion within these HSST programs with support from all four UK nations. We

undertook a review of HSST candidates enrolled in Haematology and Transfusion Science and for the STP program over the past 5 years which showed the following results: STP Haematology and Transfusion: 2018 n = 9; 2019 n = 4; 2020 n = 2; 2021 n = 2; 2022 n = 8. Haematology HSST: 2018 n = 1; 2019 n = 2; 2020 n = 2; 2021 n = 2; 2022 n = 3. Transfusion Science HSST: 2018 n = 4; 2019 n = 1; 2020 n = 1; 2021 n = 0; 2022 n = 6. These are still low numbers but widening the eligibility criteria may help support greater recruitment from Clinical Scientists and Biomedical scientists to complete HSST and join the Higher Specialist Scientist register at the Academy of Healthcare Sciences. It is encouraging to see that emerging Consultant Clinical Scientists, after completion of HSST training, are taking up roles within Trusts and UK blood services with significant clinical and scientific responsibilities. Two reports published in 2019 and 2020 by RCPath and BSH defined challenges facing the haematology workforce with increased clinical workload, and reduction in consultant numbers, impacting on leadership of laboratory services. A report in 2022 by HEE outlined the potential of HSST trained Consultant Clinical Scientists in supporting these services. The current low number of HSST posts in Haematology and Transfusion Medicine indicate that this is a highly under-utilised resource with increased numbers needed as a potential solution to significant and imminent haematology workforce issues.

Why Choose a Pathology Career? A Survey of Australian Medical Students, Junior Doctors, and Pathologists
College of American Pathologists, 2022
Context.-There is a global decline in medical graduates pursuing pathology careers, resulting in a broadening gap between workforce demand and supply. Objective.-To determine causes of low popularity of pathology as a career and develop strategies to avoid a workforce crisis.

Views of young dentists on choosing oral pathology specialist as their lifelong career.
Journal of Dental Sciences 16(4), 2021
BACKGROUND/PURPOSE: Currently, very few young dentists in Taiwan are willing to choose oral pathology specialist as their lifelong career. This study reported the views of young dentists on the profession of oral pathology.

The impact of a brief clinical experience in pathology on medical student interest and understanding of careers in pathology
Abstract only*
Canadian Journal of Pathology 13(4), 2021
Introduction: There is a shortage of pathologists in Canada. With only 1-3% of medical students pursuing a pathology residency, this trend is predicted to continue. Studies have shown that students tend not to consciously reject pathology as a career, but rather fail to recognize it as an option. Current approaches to introducing medical students to pathology careers are not well reported. This study assessed student interest and understanding of pathology careers, before and after the Pre-clerkship Residency Exploration Program (PREP) elective at Dalhousie University.

Clinical scientists' early career choices and progression: n exploratory mixed methods study.
BMC Health Services Research 21(1059), 2021
BACKGROUND: Understanding the influences on healthcare professionals' career choices and progression can inform interventions to improve workforce retention. Retention of health professionals is a high priority worldwide, in order to maintain expertise and meet the needs of national populations. In the UK, investment in clinical scientists' pre-registration education is high and the need to retain motivated scientists recognised.

Covid-19

Impact of COVID-19 on the practice of breast pathologists: a survey of breast pathologists in the UK and Ireland.
Journal of Clinical Pathology 76(4), 2023
Abstract: AIMS: There is little information on the impact of COVID-19 on breast pathologists. This survey assessed the effect of the COVID-19 pandemic on UK and Ireland-based breast pathologists to optimise working environments and ensure preparedness for potential future pandemics. METHODS: A 35-question survey during the first wave of COVID-19 infections in the UK including questions on workload, working practices, professional development, training, health and safety and well-being was distributed to consultant breast pathologists and responses collected anonymously. RESULTS: There were 135 responses from breast pathologists based in the UK and Ireland. Most participants (75.6%) stated that their workload had decreased and their productivity dropped. 86/135 (63.7%) were given the option of working from home and 36% of those who did reported improved efficiency. Multidisciplinary team meetings largely moved to virtual platforms (77.8%) with fewer members present (41.5%). Online education, including webinars and courses, was utilised by 92.6%. 16.3% of pathologists reported shortages of masks, visors or gowns as the the most common health and safety concern. COVID-19 had a significant negative impact on the physical and mental health of 33.3% of respondents. A small number of pathologists (10.4%) were redeployed and/or retrained. CONCLUSION: The UK and Ireland breast pathologists adapted to the rapid change and maintained service delivery despite the significant impact of the pandemic on their working practices and mental health. It is important to apply flexible working patterns and environments that improve productivity and well-being. The changes suggested should be considered for long-term shaping of breast pathology services.

The future of the autopsy: will nano-robots replace pathologists?.
Abstract only*
Diagnostic Histopathology (pagination), 2023
Abstract: Autopsy practice requires an excellent level of knowledge and understanding of human anatomy, pathology, pathophysiology and clinical correlation, in order to establish the cause of a death. Interpretation of findings during an autopsy is a complicated task, currently limited to a pathologist, but with a severely stretched pathologist workforce in the UK, autopsy practice is under pressure. Accepting these challenges, does future technology make it possible to assist, augment or even replace a pathologist? Can a CT scanner make a pathologist redundant? Can a robot perform an autopsy? Are there better ways to make use of the limited resource of autopsy pathologists? This article discusses the potential of current and future technological developments, alongside some changes to systems of death investigation and employment arrangements that could establish autopsy practice as a professionalised service and a sought after career choice.Copyright © 2023

How Are We Facing It? Dispatches From Pathology Residents in a COVID-19 Lombardy Hospital.
Frontiers in Public Health 8, 2020
Abstract: At the end of February, the Italian National Health Service reported a hot spot of Coronavirus disease in the Lombardy region. COVID-19 is a highly pathogenic viral infection which poses some challenges for healthcare workers. Indeed, Pathology Departments are involved in reorganizing samples' management, from their delivery until their processing, according to National and WHO guidelines. Since Lombardy has been declared COVID-19 hot spot, due to decreasing number of surgical procedures, our Department adopted a policy to reduce personnel, allowing pathologists to work remotely during the outbreak. Lacking clear information about viral load on tissue samples, all human specimens must be considered potentially

infectious, as well as patients during post-mortem examinations, and clinical information on COVID-19 status is mandatory. It is also important that Pathology staff receive an adequate training, and adherence to rules should be always accompanied by common sense. Copyright © 2020 Cieri, De Carlo, Valeri, Belsito, Lancellotti, Roncalli and Colombo.

Cellular pathology in the COVID-19 era: a European perspective on maintaining quality and safety.
Journal of Clinical Pathology, 2020
Abstract: COVID-19 is a zoonotic viral infection that originated in Wuhan, China, in late 2019. WHO classified the resulting pandemic as a 'global health emergency' due to its virulence and propensity to cause acute respiratory distress syndrome. The COVID-19 pandemic has had a major impact on diagnostic laboratories, particularly those handling cell and tissue specimens. This development carries serious implications for laboratory practice in that safety of personnel has to be balanced against high-quality analysis and timely reporting of results. The aim of this article is to present some recommendations for the handling of such specimens in the preanalytical, analytical and postanalytical phases of laboratory testing and analysis in an era of high COVID-19 prevalence, such as that seen, for example, in the UK, Spain, Italy and France.

Leadership

Enhanced model for leadership development for trainees and early career health professionals: insights from a national survey of UK clinical scientists. Abstract only*
BMJ Leader 6(3), 2022
INTRODUCTION: The importance of shared or distributed leadership in healthcare is recognised; however, trainees, early career professionals and others for whom the exercise of leadership is a recent development report being underprepared for leadership roles. Trainee clinical scientists exemplify such groups, being both early in their career and in a profession for which clinical leadership is less well established. Their insights can inform understanding of appropriate forms of leadership development for health professionals.

The Association of Pathology Chairs' Pathology Leadership Academy: Experience From the First 2 Years.
Academic Pathology 6, 2019
Leadership development and succession planning are critical to ensure continued strength of academic pathology. The Association of Pathology Chairs developed the Pathology Leadership Academy to prepare future academic leaders. The purpose of this report is to describe: (1) Pathology Leadership Academy's development and curriculum, (2) how Pathology Leadership Academy has met leadership development needs for individuals and academic departments in its first 2 years, (3) Pathology Leadership Academy's future directions based on program feedback.

New Ways of Working

UHS SHINE service: Haematology is looking to establish a novel MDT approach for the Management of Elderly non-Hodgkin's patients Abstract only*
Age and Ageing 54(Supplement 1), 2025
Introduction: In conjunction with Roche, an 18-month project was proposed to facilitate a more holistic approach in managing this patient cohort post-diagnosis and in turn improve outcomes, reduce length of stay and improve patient experience.

Quality improvement project to reduce beta-D-glucan turnaround times in an NHS pathology network
BMJ Open Quality 14(2), 06 May 2025
Beta-D-glucan (BDG) is a cell wall component of many fungi, detecting this in patients' serum permits early diagnosis of

invasive fungal infections, particularly in patients with haematological malignancy. In critically ill patients in an intensive-care unit, where the prevalence of invasive fungal infection is lower, the high negative predictive value of BDG facilitates withholding or discontinuation of empirical antifungal therapy, contributing to antifungal stewardship. However, for the results of BDG testing to impact patient management, they need to be available within a clinically useful timeframe. The South West London Pathology (SWLP) network routinely sent samples for BDG testing from hospital trusts in our area to the UK Health Security Agency Mycology Reference Laboratory (MRL) at Bristol for analysis. In 2021, the mean turnaround time (TAT) was more than two times the 5-working-days standard stated in the SWLP user handbook. In this quality improvement project (QIP), we identified that the greatest delay was the MRL posting hardcopy reports. We investigated electronic reporting, first for all patient samples, and then only for intensive-care patients. However, we found that information technology (IT) and staffing limitations meant this was not viable. We then investigated commercial solutions and identified an innovative assay, which enabled the implementation of in-house BDG testing that was a good fit with our available staffing resource and laboratory environment. Our aim was to achieve at least 90% of BDG results authorised within 5 working days of sample receipt. Our QIP improved performance on this from 0.88% to 92.8% and reduced the mean TAT from 11.6 to 2.5 days and at lower unit cost. The change has been well received by our laboratory staff, and our pathology operational leads have had very positive feedback from our clinical teams and our antifungal steward.

The introduction of a dedicated cardiology clinic including a clinical scientist led pathway for women with turner's syndrome
Abstract only*
European Heart Journal. Conference: European Society of Cardiology Congress, ESC 2024. London United Kingdom. 45(Supplement 1), 2024
Background: There are more than 15,000 women living with Turner's Syndrome (TS) in the UK, over 700 of whom are cared for within our linked Endocrinology services. Mortality is predominantly related to cardiovascular disease therefore close cardiology review with a focus on aortopathy is essential (1). However appropriate surveillance is challenging with growing pressures on all aortopathy services across the United Kingdom. Purpose(s): To audit our current practise according to current international guidelines (2) and seek methods to improve the pathway for our growing population of TS patients including the feasibility of a Clinical Scientist led clinic, aiming to improve capacity and efficiency of our service.

The role of multidisciplinary team meeting histopathology review and its impact on revised reports: Analysis of a national quality improvement program
American Journal of Clinical Pathology 161(6), 2024
Objectives: We conducted the first Irish national study assessing the value of multidisciplinary team meeting review in pathology practice and its impact on error detection before treatment. Conclusion(s): The multidisciplinary team meeting review process plays a valuable role in pathology error detection. A pathologist's participation in the review process comes with a clinically significant workload that needs to be recognized for future workforce planning. This study highlighted the positive role pathologists play in enhancing patient safety.

Delivery of a national prenatal exome sequencing service in England: a mixed methods study exploring healthcare professionals' views and experiences
Frontiers in Genetics 15, 2024
Introduction: In October 2020, rapid prenatal exome sequencing (pES) was introduced into routine National Health Service (NHS) care in England, requiring the coordination of care from specialist

genetics, fetal medicine (FM) and laboratory services. This mixed methods study explored the experiences of professionals involved in delivering the pES service during the first 2 years of its delivery in the NHS.

Test Harmonisation Is a Key Enabler of Pathology Transformation (Conference abstract)
Clinical Chemistry. Conference: American Association for Clinical Chemistry Annual Scientific Meeting and Clinical Lab Expo, AACC 2023. Anaheim, CA United States. 69(Supplement 1), 2023
BACKGROUND: In April 2021 a new joint venture was formed to deliver and transform services across South East London. Two large NHS Foundation Trusts (Guy's and St Thomas', and King's College hospitals) partnered with SYNLAB who are specialist pathology providers, bringing extensive global experience and expertise in setting up, transforming and running diagnostic services. The Trusts had been working in partnership for many years but were operating in numerous areas as two separate entities. There was duplication of services and tests, with different analytical platforms and very different ways of working, which led to variations in resulting and reporting. Our aim was to establish a single consolidated service, with a harmonised test catalogue, facilitating the provision of consistent results regardless of the origin of sample, and to have a single governance framework to drive improved accountability and optimisation of resources. Our view was that test harmonisation was essential to enable the deployment of a common core Laboratory Information Management System (LIMS) from the 24 legacy systems, and that the harmonisation process should be clinically led.

Consolidation of pathology services in England: have savings been achieved?
BMC Health Services 18(862), 2018
Background: During the last decade, pathology services in England have undergone profound changes with an extensive consolidation of laboratories. This has been driven by some national reviews forecasting a national reduction of costs by £250–£500 million ($315–$630 million) a year as a result. The main aim of this paper is to describe the financial impact of such consolidation, with a specific focus on the forecasted savings. A secondary aim is to describe the development of private sector involvement in laboratory services in a traditionally publicly funded healthcare system and the development of pathology staff size.

Recruitment and Retention

Detecting residents at risk of attrition - A Singapore pathology residency's experience.
Academic Pathology 10(2), 2023
The SingHealth Pathology Residency Program (SHPRP) is a 5-year postgraduate training program in Singapore. We face the problem of resident attrition, which has a significant impact on the individual, program and healthcare providers. Our residents are regularly evaluated, using in-house evaluations as well as assessments required in our partnership with the Accreditation Council for Graduate Medical Education International (ACGME-I). We hence sought to determine if these assessments were able to distinguish residents who would attrite from residents who would graduate successfully. Retrospective analysis of existing residency assessments was performed on all residents who have separated from SHPRP and compared with residents currently in senior residency or graduated from the program.

Measuring the Efficacy of Pathology Career Recruitment Strategies in US Medical Students
Archives of Pathology & Laboratory Medicine 146(4), 2021

Multiple articles and surveys in the literature suggest that medical students find a career in pathology undesirable and believe it is disproportionately focused primarily on the autopsy. OBJECTIVE.-: To measure the effect of applied interventions on medical student attitudes about the field of pathology.

On Pathology Laboratory Recruitment and Retention Abstract only*
American Journal of Clinical Pathology, 2021
OBJECTIVES: The specific aims of the study are to analyze relationships between the personality traits of laboratory professionals and choice of profession and preferred work settings.

Laboratory Staff Turnover: A College of American Pathologists Q-Probes Study of 23 Clinical Laboratories
Archives of Pathology & Laboratory Medicine 144(3), 2020
CONTEXT.-: Knowledge of laboratory staff turnover rates are important to laboratory medical directors and hospital administrators who are responsible for ensuring adequate staffing of their clinical laboratories. The current turnover rates for laboratory employees are unknown. OBJECTIVE.-: To determine the 3-year average employee turnover rates for clinical laboratory staff and to survey the types of institutional human resource practices that may be associated with lower turnover rates.

Research

Cytotechnologists as coinvestigators in anatomical pathology research.
Cancer Cytopathology 126(4), 2018
BACKGROUND: The amount of time available to pathologists with which to perform research is becoming limited due to an increasing manpower shortage in pathology, decreased reimbursement, and increased workload. This is occurring at the same time as demands escalate for pathologists to develop new companion tests, correlate the molecular findings with traditional methods, and assist in the development of individualized medicine. This study examined whether cytotechnologists may be integrated into a research team that uses their expertise in understanding pathology and clinical disease to provide interpretations of experiments that traditionally were performed by pathologists.

Staff Experience and Perspectives

"I'm quite proud of how we've handled it": health professionals' experiences of returning additional findings from the 100,000 genomes project
European Journal of Human Genetics, 2024
Participants in the 100,000 Genomes Project (100kGP) could consent to receive additional finding (AF) results, individual variants relating to genes associated with susceptibility to cancer and familial hypercholesterolemia (FH). In the study reported here, qualitative interviews were used to explore the experiences of National Health Service (NHS) professionals from across England who were tasked with returning over 80,000 "no AF" results and 700 positive AF results to 100kGP participants.

Survey of UK histopathology consultants' attitudes towards academic and molecular pathology
Journal of clinical pathology 72(6), 2019
Objective Academic pathology is facing a crisis; an ongoing decline in academic pathology posts, a paucity of academic pathologist’s in-training and unfilled posts at a time when cellular pathology departments are challenged to deliver increasing numbers of molecular tests. The National Cancer Research Institute initiative in Cellular & Molecular Pathology commissioned a survey to assess attitudes of cellular pathology

consultants towards research in order to understand barriers and identify possible solutions to improve this situation. As cellular pathology is encompassing an increasing number of diagnostic molecular tests, we also surveyed the current approach to and extent of training in molecular pathology.

Technology and Digitisation

Exploring the roles of extended reality technologies in advancing colorectal surgical training Full text available with NHS OpenAthens account*
Frontline Gastroenterology, 2025
Extended reality (XR) is an umbrella term for technologies that incorporate digital and physical elements to alter a user's experience, namely: augmented reality (AR), virtual reality (VR) and mixed reality (MR). With National Health Service waiting lists at record levels, a shortage of trained endoscopists within the UK, and a greater likelihood of non-standard training outcomes following the COVID-19 pandemic, there is a requirement for significant developments in colorectal surgical training. AR has useful applications within both simulation training and intraoperative guidance, such as image overlays and conceptualisation. Both AR and VR offer three-dimensional reconstruction of radiological images, thereby allowing for enhanced appreciation and visualisation of anatomical structures. There is, however, a much greater evidence base for the validity of VR within the sphere of colorectal surgical training; primarily for simulation with respect to endoscopy, laparoscopy and robotics. MR is a developing field with technological advancements allowing for a combination of AR and VR. Potential advantages of XR teaching over conventional approaches include integration with artificial intelligence; objective assessments; immediate feedback; a wider exposure to pathologies and procedures and potential downstream safety benefits to patients. Environmental and socioeconomic factors require further evaluation, with the potential for meta-conferences or meta-hospitals. Disadvantages may include a lack of focus on patient communication skills and the lack of standardised XR training protocols. These technologies have an exciting future in serving as adjuncts to colorectal surgical training.

Public Awareness of and Attitudes Toward the Use of AI in Pathology Research and Practice: Mixed Methods Study
Journal of Medical Internet Research 27, 2025
Background: The last decade has witnessed major advances in the development of artificial intelligence (AI) technologies for use in health care. One of the most promising areas of research that has potential clinical utility is the use of AI in pathology to aid cancer diagnosis and management. While the value of using AI to improve the efficiency and accuracy of diagnosis cannot be underestimated, there are challenges in the development and implementation of such technologies. Notably, questions remain about public support for the use of AI to assist in pathological diagnosis and for the use of health care data, including data obtained from tissue samples, to train algorithms.

Can artificial intelligence replace biochemists? A study comparing interpretation of thyroid function test results by ChatGPT and Google Bard to practising biochemists Abstract only*
Annals of Clinical Biochemistry 61(2), 2024
Background: Public awareness of artificial intelligence (AI) is increasing and this novel technology is being used for a range of everyday tasks and more specialist clinical applications. On a background of increasing waits for GP appointments alongside patient access to laboratory test results through the NHS app, this study aimed to assess the accuracy and safety of two AI tools, ChatGPT and Google Bard, in providing interpretation of thyroid function test results as if posed by laboratory scientists or

patients.

The Nomadic Digital Pathologist. Validation of a simple, dual slide scanner with remote reporting for a regional upper gastrointestinal specialist multidisciplinary meeting
Journal of Pathology Informatics 14, 2023
Background: This article describes how a simple slide scanner with remote viewing software enabled a remote "nomadic" pathologist to continue his role as specialist lead for a regional gastrointestinal multidisciplinary team meeting (MDTM) after relocating to another site in the 5 hospital Southwest UK Peninsula cancer network just prior to the COVID-19 pandemic.

Computational pathology in 2030: a Delphi study forecasting the role of AI in pathology within the next decade
eBioMedicine (part of the Lancet Discovery Science) 88, 2023
Background: Artificial intelligence (AI) is rapidly fuelling a fundamental transformation in the practice of pathology. However, clinical integration remains challenging, with no AI algorithms to date in routine adoption within typical anatomic pathology (AP) laboratories. This survey gathered current expert perspectives and expectations regarding the role of AI in AP from those with first-hand computational pathology and AI experience.

Artificial intelligence as a tool for diagnosis in digital pathology whole slide images: A systematic review
Journal of Pathology Informatics 13, 2022
Abstract: Digital pathology had a recent growth, stimulated by the implementation of digital whole slide images (WSIs) in clinical practice, and the pathology field faces shortage of pathologists in the last few years. This scenario created fronts of research applying artificial intelligence (AI) to help pathologists. One of them is the automated diagnosis, helping in the clinical decision support, increasing efficiency and quality of diagnosis. However, the complexity nature of the WSIs requires special treatments to create a reliable AI model for diagnosis. Therefore, we systematically reviewed the literature to analyze and discuss all the methods and results in AI in digital pathology performed in WSIs on H&E stain, investigating the capacity of AI as a diagnostic support tool for the pathologist in the routine real-world scenario.

The need for measurement science in digital pathology.
Journal of Pathology Informatics 13, 2022
Background: Pathology services experienced a surge in demand during the COVID-19 pandemic. Digitalisation of pathology workflows can help to increase throughput, yet many existing digitalisation solutions use non-standardised workflows captured in proprietary data formats and processed by black-box software, yielding data of varying quality. This study presents the views of a UK-led expert group on the barriers to adoption and the required input of measurement science to improve current practices in digital pathology.

Digitisation will transform the future of pathology
British Journal of Healthcare Management 26(4), April 2020
Technology has become an increasingly vital aspect of healthcare, but its impact on pathology has been particularly profound. Gemma Harris discusses these developments and their potential to transform the nature of the field.

A narrative review of digital pathology and artificial intelligence: focusing on lung cancer
Translational Lung Cancer Research 9(5), 2020
Abstract: The emergence of whole slide imaging technology allows for pathology diagnosis on a computer screen. The applications of digital pathology are expanding, from supporting remote institutes suffering from a shortage of pathologists to

routine use in daily diagnosis including that of lung cancer. Through practice and research large archival databases of digital pathology images have been developed that will facilitate the development of artificial intelligence (AI) methods for image analysis. Currently, several AI applications have been reported in the field of lung cancer; these include the segmentation of carcinoma foci, detection of lymph node metastasis, counting of tumor cells, and prediction of gene mutations. Although the integration of AI algorithms into clinical practice remains a significant challenge, we have implemented tumor cell count for genetic analysis, a helpful application for routine use. Our experience suggests that pathologists often overestimate the contents of tumor cells, and the use of AI-based analysis increases the accuracy and makes the tasks less tedious. However, there are several difficulties encountered in the practical use of AI in clinical diagnosis. These include the lack of sufficient annotated data for the development and validation of AI systems, the explainability of black box AI models, such as those based on deep learning that offer the most promising performance, and the difficulty in defining the ground truth data for training and validation owing to inherent ambiguity in most applications. All of these together present significant challenges in the development and clinical translation of AI methods in the practice of pathology. Additional research on these problems will help in resolving the barriers to the clinical use of AI. Helping pathologists in developing knowledge of the working and limitations of AI will benefit the use of AI in both diagnostics and research.

Digital pathology in the NHS: Experience from a novel digital pathology training and validation study
Journal of Pathology 243, 2017
Histopathologists are faced with an increasing workload, in terms of case number and case complexity, whilst the specialty is in a period of recruitment and retention crisis. Digital pathology offers a flexible platform for new modes of working, and wider transformational service change. It is increasingly apparent that digital pathology does not just represent the replacement of one diagnostic modality with another, but provides the key to the broader transformation of pathology services. It serves as a platform to enable novel and flexible working patterns to attract, retain and optimize use of staff, allows rapid access to second opinion, MDT referral and case collaboration, and brings us a step closer to a paperless NHS. Against this background of emergent need, Leeds Teaching Hospitals NHS Trust, in collaboration with the University of Leeds and Leica Biosystems, has completed a novel training and validation study of digital pathology for the primary diagnosis of breast histopathology specimens. Our innovative protocol incorporates early exposure to live digital reporting with the opportunity to gain experience and competence in specialty specific digital diagnosis in a risk mitigated environment. Our breast pathology team have amassed real world digital reporting experience of over 600 cases, in an NHS diagnostic department which ranks amongst the largest in Europe. As a result of this work, our department is now embarking on a pandepartmental, research led digital pathology deployment, in which we hope to demonstrate the benefits of large scale digital pathology adoption in an NHS setting.

Upskilling

Next-generation nephrology: part 2-mainstreaming genomics in nephrology, a global perspective
Pediatric Nephrology, 2025
Kidney genetic services are being created worldwide, revolutionising the way in which we manage families with suspected monogenic kidney disease. There is potential to learn from one another, whether one is just embarking on this journey or within an established kidney genetics service model with

aspirations to optimise it further. This concluding portion of our two-part educational review explores the global efforts to integrate genomics into nephrology. We discuss key considerations for establishing kidney genetics services and share insights from successful implementation in Australia, India, the United Kingdom (UK) and the United States (US), through case studies. Widespread integration of genomics within nephrology still faces barriers including limited genomics education among clinicians, high costs and ethical concerns. Educational strategies including workshop-based, online resources and clinical decision tools are aiming to address the genomic literacy gap among nephrologists. Multidisciplinary kidney genetics clinic models comprising nephrologists, geneticists, clinical scientists and counsellors are proving to be an effective model of delivering this diagnostic tool. Data of how kidney genetics clinics can foster collaboration with registries to facilitate research and shared learning to optimise care for patients are becoming evident. We also explore the importance of equitable access to genomics services across diverse populations, advocating for policies that address disparities in access to healthcare and genetic data representation. We hope to highlight the importance of upskilling the nephrology workforce to fully leverage the advances in genomic medicine and ensure comprehensive, accessible and personalised care for patients with genetic kidney diseases.

Workforce

Tackling the infection specialty workforce crisis; the Royal Devon University Healthcare NHS Foundation Trust (RDUH) approach
(Conference Abstract)
Clinical Infection in Practice 25, 2025
Introduction: Infection specialities are experiencing a crisis in workforce and succession planning, with hospitals struggling to fill consultant posts; 17.5 % of all funded FTE consultant-level posts are currently vacant. There needs to be improved recruitment into training to enable expansion of both training and consultant posts. On a national level, the Royal College of Pathologists (RCPath) sought to engage medical students by increasing their pathology exposure in the undergraduate curriculum, establishing the RCPath Foundation Fellowship Scheme and promoting recruitment of clinical scientists. However, there is a need for a local recruitment drive, especially for less favoured parts of the country outside London. The RDUH Microbiology and Infection department was amongst the first to have microbiology F2s; of whom a large percentage choose to pursue an infection career, with five consultants to date. Prospective medical students on an annual work experience week are invited to join the clinical team and view the laboratory; one has successfully pursued a microbiology career. Our presentation will focus upon the different ways in which we have successfully enhanced interest and recruitment within these trainee groups.

The Wellbeing of the Haematology Workforce in the UK
Journal of Multidisciplinary Healthcare 18, 2025
Purpose: Globally, haematology is recognised as a highly specialised field of practice that deals with the diagnosis, treatment, and management of blood disorders. To meet the demand of increased service delivery, the workforce needs to be able to adapt and respond to challenges. Specialists and organisations require specific intelligence to understand their workforce, the demand for labour, and plan for the future. This study aimed to understand wellbeing among the haematology workforce across the multidisciplinary team.

Mapping of anatomical pathologist workload via epic beaker flag function
(Conference Proceeding)

Pathology. Conference: PATHOLOGY UPDATE 2024 ABSTRACTS SUPPLEMENT. 56(Supplement 1), 2024
Measurement of anatomical pathologist workload is necessary for ensuring equity of case allocation and for longer term workforce planning, however methods based on Medicare complexity are inaccurate. Allocation of workload points based on actual specimen type is a more accurate way of determining true workload, however most laboratory information systems in Australia are incapable of integrating this form of workload point measurement. During recent optimisation of Epic Beaker we utilised the 'flag' function to attach specific workload points (based on the RCPath (UK) system) to each of >400 different specimen 'protocols', including Frozen Sections, Histology, Cytology, FISH and molecular cases. A Workbench Report was built to provide a running daily tally of allocated 'points' per pathologist, which is on permanent display at the laboratory allocations bench. Point allocations over a longer time period can be extracted via another Workbench Report with editable date field. The implementation of this system has increased confidence in the equity of work distribution between pathologists and has enabled more accurate mapping of departmental workload over time. Adoption by a wider number of laboratories using Epic Beaker would allow more accurate benchmarking than is possible with tools based on Medicare complexity level.

The current troubled state of the global pathology workforce: a concise review
Diagnostic Pathology 19(1), 2024
The histopathology workforce is a cornerstone of cancer diagnostics and is essential to the delivery of cancer services and patient care. The workforce has been subject to significant pressures over recent years, and this review considers them in the UK and internationally. These pressures include declining pathologist numbers, the increasing age of the workforce, and greater workload volume and complexity. Forecasts of the workforce's future in numerous countries are also not favourable - although this is not universal. Some in the field suggest that the effects of these pressures are already coming to bear, such as the financial costs of the additional measures needed to maintain clinical services. There is also some evidence of a detrimental impact on service delivery, patient care and pathologists themselves. Various solutions have been considered, including increasing the number of training places, enhancing recruitment, shortening pathology training and establishing additional support roles within pathology departments. A few studies have examined the effect of some of these solutions. However, the broader extent of their implementation and impact, if any, remains to be determined. In this regard, it is critical that future endeavours should focus on gaining a better understanding of the benefits of implemented workforce solutions, as well as obtaining more detailed and updated pathology workforce numbers. With a concentrated effort in these areas, the future of the pathology workforce could become brighter in the face of the increased demands on its services.

Impact of changing from autopsy to post-mortem CT in an entire HM Coroner region due to a shortage of available pathologists
Abstract only*
Clinical Radiology 78(Special Issue Section: Post Mortem Imaging.), 2023
A significant problem facing routine medicolegal coroner-referred autopsies is a shortfall of pathologists prepared to perform them. This was particularly acute in Lancashire, where the coroner decided to initiate a service that relied on post-mortem computed tomography (PMCT). This involved training anatomical pathology technologists (APTs) to perform external examinations, radiographers to perform scans, and radiologists to interpret them. The service started in 2018 and now examines over 1,500 cases per year. This study outlines the PMCT process using NHS staff, with CT equipment and logistics managed by the

commercial sector. It compares the demographics and outcomes of PM investigations for two 6-month periods: the autopsy service prior to 2018, and then the PMCT service. These data were then compared with previous UK PMCT data. Referrals for adult non-suspicious deaths were made in 913 cases of which 793 (87%) had PMCT between 01/10/2018 and 31/03/2019.

An occupational health survey of the UK's mortuary workforce
Occupational Medicine 73(4), May 2023
Background: Mortuaries are predominantly staffed by anatomical pathology technologists (APTs) and pathologists, and the work they undertake carries implicit health risk due to its nature. Until now there has not been a nationwide assessment of the occupational health of these essential workers in the UK. Aims: To assess the current occupational health status and needs of the mortuary workforce in the UK.

Strong Job Market for Pathologists: Results From the 2021 College of American Pathologists Practice Leader Survey.
Archives of Pathology & Laboratory Medicine 147(4), 2023
There has long been debate about whether and when there may be a shortage of pathologists in the United States. One way to assess this is to survey the hiring experiences of pathology practices. A 2018 survey revealed a strong demand for pathologists, with expectations of continued strength. This study updates that prior analysis using data from a 2021 survey of pathology practice leaders. OBJECTIVE.-: To assess the US pathologist job market and examine implications.

Pathologists' assistants, an essential healthcare workforce: the experience of a surgical pathology department in Italy Full text available with NHS OpenAthens account*
Journal of Clinical Pathology 75(7), 2022
Aims The progressive increase of both the workload and the complexity of laboratory procedures, along with shortage of staff, has made evident the need to increase the efficiency in the pathology departments. To support the pathologists, a new technical professional role, the pathologists' assistant (PA), has been introduced.

Human Sustainability in Pathology Medical Laboratory Workforce. Abstract only*
Journal of Allied Health 51(3), 2022
Abstract: While having a dedicated and productive workforce is the cornerstone of a functioning society, the key is sustainability. Allied health laboratory burnout, characterized by mental exhaustion which negatively affects workplace performance, has worsened during the COVID pandemic. For purposes such as these, the issue must be addressed to ensure that the US will have an adequate workforce to meet the laboratory testing needs of an aging population and any potential future pandemics that may arise. The answer to reducing toxic or challenging workplace environments and improving human workforce sustainability is through transparency and anonymous reporting mandates so the data collected from individual laboratories can be reported as a single "human sustainability" score that reflects the health measure of the laboratory. The 10 laboratories with the highest scores could be listed in the laboratory professional magazine's version of "America's Most Admired Laboratories" and the worst performers in the "Improvements-Needed" listing. Companies are inherently competitive, and this forces laboratories to be more cognizant of workforce well-being and the rate of burnout and work-related chronic conditions. This article outlines how the human sustainability advocacy plan can be implemented using ideas gleaned from Bardach's eight-fold path paradigm.

Number of pathologists in Germany: comparison with European countries, USA, and Canada.
Virchows Archiv 478(2), 2021

Abstract: The rapid development of pathology is in contrast to a shortage of qualified staff. The aims of the present study are to compile basic information on the numbers of German physicians in pathology and to compare it with the situation in Europe and overseas. In addition, model calculations will shed light on the effects of part-time working models. Various publicly accessible databases (EuroStat) as well as publications of medical associations and professional associations of European countries and the USA/Canada were examined. In addition, a survey was carried out among the institutes of German universities

Enhancing the Pipeline of Pathologists in the United States.
Academic Pathology 8, 2021
Abstract: The shortage of pathologists in the United States has been a topic of discussion for the past 2 decades. At the 2014 Association of Pathology Chairs (APC)/Program Directors Section (PRODS) meeting, a Pipeline Subcommittee (PSC) of the APC Advocacy Committee was formed with the charge of investigating ways to increase the number of highly qualified United States Medical Graduates entering into pathology. Several online surveys were developed to identify the strengths, weaknesses, opportunities, and threats to recruitment into pathology. Two general pipeline surveys were completed; one was issued in 2014 and is discussed in this article. In 2018, the Medical Education Working Group surveyed the Undergraduate Medical Education Directors Section on the state of undergraduate medical education for pathology; pipeline issues are included in this article from the 2018 survey. Medical schools that reported 2% to 5% or more of their graduates going into pathology were compared with schools where less than 1% went into pathology. About one-third of schools producing more pathology residents had Post-Sophomore Pathology Fellowships. Schools that had a faculty member on the curriculum committee that felt they had little or no control were more likely to have fewer graduates going into pathology. Schools having students view an autopsy as a requirement of graduation were more likely to produce graduates going into pathology. However, none of these characteristics achieved statistical significance. Continued incorporation of best practices for exposure of pathology as a medical specialty as well as outreach to students will be necessary for the future pipeline.

Reevaluation of the US Pathologist Workforce Size.
Network Open 3(7), 2020
Abstract: Importance: There is currently no national organization that publishes its data that serves as the authoritative source of the pathologist workforce in the US. Accurate physician numbers are needed to plan for future health care service requirements. Objective: To assess the accuracy of current pathologist workforce estimates in the US by examining why divergency appears in different published resources.

Conference abstract: Reclaiming the Autopsy as the Practice of Medicine: A Pathway to Remediation of the Forensic Pathology Workforce Shortage? (Conference Abstract)
American Journal of Forensic Medicine and Pathology, 2020
Abstract: The historically constricted forensic pathology workforce pipeline is facing an existential crisis. Pathology residents are exposed to forensic pathology through the American Council of Graduate Medical Education autopsy requirement. In 1950, autopsies were conducted in one half of the patients dying in American hospitals and 90% in teaching hospitals, but they have dwindled to fewer than 5%. Elimination of funding for autopsies is a major contributor to the lack of support for autopsies in departments of pathology. Funding may require reclaiming the autopsy as the practice of medicine. Funding of autopsies would rekindle interest in hospital autopsies and strengthen the forensic pathology workforce pipeline.

The evolution from cardiac physiologists to clinical scientists in the UK: A guide to attaining equivalence.
Echo Research and Practice 6(4), 2019
Abstract: At its inception, transthoracic echocardiography (TTE) was employed as a basic screening tool for the diagnosis of heart valve disease and as a crude indicator of left ventricular function. Since then, echocardiography has developed into a highly valued non-invasive imaging technique capable of providing extremely complex data for the diagnosis of even the subtlest cardiac pathologies. Its role is now pivotal in the diagnosis and monitoring of heart disease. With the evolution of advanced practice and devolving care, ordinarily performed by senior doctors, to the cardiac physiology workforce in the UK, significant benefits in terms of timely patient care and cost savings are possible. However, there needs to be appropriate level of accountability. This accountability is achieved in the UK with statutory regulation of healthcare professionals and is a crucial element in the patient protection system, particularly for professions in patient facing roles. However, statutory regulation for staff practising echocardiography is not currently mandatory in the UK, despite the level of responsibility and influence on patient care. Regulators protect the public against the risk of poor practice by setting agreed standards of practice and competence and registering those who are competent to practice. Regulators take action if professionals on their register do not meet their standards. The current cardiac physiology workforce can be recognised as registered clinical scientists using equivalence process through the Academy for Healthcare Science, and this review aims to describe the process in detail.

Pathologist's assistant (PathA) and his/her role in the surgical pathology department: a systematic review and a narrative synthesis Abstract only*
Virchows Archiv 472(6), 2018
Abstract: In recent decades, various highly qualified individuals have increasingly performed tasks that have historically been handled by physicians with the aim of reducing their workload. Over time, however, these "physician assistants" or "physician extenders" have gained more and more responsibilities, showing that specific tasks can be performed equally skilfully by specialised health care professionals. The pathologist's assistant (PathA) is a highly qualified technician who works alongside the pathologist and is responsible for the grossing and autopsies. This profession was developed in the USA, with formal training programmes starting in 1970 when Dr. Kinney, director of the Department of Pathology of Duke University, Durham, NC, started the first dedicated course. Most institutes in the USA and Canada currently employ these technical personnel for grossing, and numerous papers published over the years demonstrate the quality of the assistance provided by the PathA, which is equal to or sometimes even better than the performance of pathologists. The PathA can be employed to carry out a wide range of tasks to assist the pathologist, such as grossing (the description and reduction of surgical specimens), judicial autopsies and administrative and supervisory practices within the laboratory or assistance in research, although the diagnosis is always the pathologist's responsibility. Since this role has already been consolidated in North America, part of the relevant literature is altogether out of date. However, the situation is different in Europe, where there is an increasing interest in PathA, mainly because of the benefits of their inclusion in anatomic pathology laboratories. In the UK, biomedical scientists (BMS, the British equivalent of PathA) are involved in many tasks both in surgical pathology and in cytopathology, which are generally performed by medically trained staff. Several papers have been recently published to highlight the role of BMS with the broader public. This report aimed to conduct a systematic review of all the articles published about the PathA/BMS and to perform a narrative synthesis. The results may contribute to the evidence

for including the PAthA/BMS within a surgical pathology laboratory organisation.

Clinical roles in clinical biochemistry: a national survey of practice in the UK.
Annals of Clinical Biochemistry 54(3), 2017
Abstract: Background Using an online survey, we collected data to present a picture of how clinical authorization is performed in the UK. Methods A 21-question survey was uploaded to www.surveymonkey.com , and responses were invited via the mail base of the Association for Clinical Biochemistry and Laboratory Medicine. The questionnaire examined the intensity and function of the duty biochemist role and how different types of authorization are used to handle and release results.

Competency Frameworks

Pathology Competencies for Medical Education (PCME)
Academic Pathology, July 2025
The Pathology Competencies for Medical Education were created by pathology chairs and course directors to serve as a national standard identifying the core content for teaching pathology in three basic competencies: disease mechanisms, integration of disease mechanisms into organ system pathology, and application of pathology to diagnostic medicine. Each competency includes learning goals and objectives to assess the acquisition, integration and application of knowledge to demonstrate the development of competency. Educational cases are being developed to highlight key teaching points of the learning objectives of the three competencies and clinical thinking.

Pathology Competencies in Medical Education and Educational Cases: Update 2023
Academic Pathology 10(3), 2023
Pathology is a core component of medical school curricula because understanding the pathogenesis of the disease is foundational both for diagnostic efficiency and optimal use of ancillary resources in patient care. The Pathology Competencies for Medical Education (PCME) were developed as a national resource of expectations of pathology knowledge for medical students. The PCME are composed of three competencies: disease mechanisms and processes, organ system pathology, and diagnostic pathology and therapeutic pathology. The learning goals and learning objectives of the PCME that were first published in 2017 have been carefully revised and updated. Significant additions were made to fill gaps of the original PCME objectives, and some learning objectives have been retired or moved to more appropriate locations within the competencies. As curricula and the practice of medicine change, the PCME will continue to be revised and updated periodically. They have and will continue to serve as the organizing principle for the growing number of educational cases published by *Academic Pathology*. Nomenclature in the original and revised PCME will allow for continued linking of previous and new educational cases to the revised learning objectives. PCME and the educational cases can be adapted into any type of curricula. Having a widely accepted resource of learning objectives in pathology will help students and medical educators focus on essential components of pathology for the future practice of medicine.

Development of a core competency framework for clinical informatics
Source: BMJ Health & Care Informatics 28
Publication date: 2021
Objectives Until this point there was no national core competency framework for clinical informatics in the UK. We report on the final two iterations of work carried out in the formation of a national core competency framework. This follows

an initial systematic literature review of existing skills and competencies and a job listing analysis. Methods An iterative approach was applied to framework development. Using a mixed-methods design we carried out semi-structured interviews with participants involved in informatics (n=15). The framework was updated based on the interview findings and was subsequently distributed as part of a bespoke online digital survey for wider participation (n=87). The final version of the framework is based on the findings of the survey. Results Over 102 people reviewed the framework as part of the interview or survey process. This led to a final core competency framework containing 6 primary domains with 36 subdomains containing 111 individual competencies. Conclusions An iterative mixed-methods approach for competency development involving the target community was appropriate for development of the competency framework. There is some contention around the depth of technical competencies required. Care is also needed to avoid professional burnout, as clinicians and healthcare practitioners already have clinical competencies to maintain. Therefore, how the framework is applied in practice and how practitioners meet the competencies requires careful consideration.

Assessment of management and leadership competencies – chemical pathology

Source: The Royal College of Pathologists

Appropriate formal examination methods for assessing management competencies include selected response items such as Multiple Choice Questions and Extended Matching Questions, which are used in other pathology specialties, and the Short Answer Questions (SAQs) and Essays used in Chemical Pathology.

Pathology competencies for medical education and educational cases

Academic Pathology, July 2017

Current medical school curricula predominantly facilitate early integration of basic science principles into clinical practice to strengthen diagnostic skills and the ability to make treatment decisions. In addition, they promote life-long learning and understanding of the principles of medical practice. The Pathology Competencies for Medical Education (PCME) were developed in response to a call to action by pathology course directors nationwide to teach medical students pathology principles necessary for the practice of medicine. The PCME are divided into three competencies: 1) Disease Mechanisms and Processes, 2) Organ System Pathology, and 3) Diagnostic Medicine and Therapeutic Pathology. Each of these competencies is broad and contains multiple learning goals with more specific learning objectives. The original competencies were designed to be a living document, meaning that they will be revised and updated periodically, and have undergone their first revision with this publication. The development of teaching cases, which have a classic case-based design, for the learning objectives is the next step in providing educational content that is peer-reviewed and readily accessible for pathology course directors, medical educators, and medical students. Application of the PCME and cases promotes a minimum standard of exposure of the undifferentiated medical student to pathophysiologic principles. The publication of the PCME and the educational cases will create a current educational resource and repository published through Academic Pathology.