The Royal College of Pathologists
Pathology: the science behind the cure

THE UK CLINICAL VIROLOGY NETWORK

The clinical virology workforce: current situation and recommendations

A Meeting Pathology Demand briefing

Introduction

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.

The Royal College of Pathologists (RCPath) works with pathologists at every stage of their career across 17 pathology specialties, including virology. The RCPath set curricula, organise training and run exams, publish clinical guidelines and best practice recommendations, and provide continuing professional development. RCPath engages a wide range of stakeholders to improve awareness and understanding of pathology and the vital role it plays in everybody's healthcare. Working with members, RCPath runs programmes to inspire the next generation to study science and join the profession.

The UK CVN and RCPath have worked together to survey the current clinical virology workforce, building on a previous survey that closed in February 2020 when SARS-CoV-2 pandemic activities increased. The updated survey was simplified, with aims to define the current workforce, identify any workforce shortfalls or imbalances, and support workforce planning proposals. When designing this survey, there was the intention to capture microbiologists' recognised contributions to clinical virology provision.

This report contains the findings of our survey, which was open between March and May 2021, and sent to representatives of each of the known specialist virology centres (SVCs) and units in

the UK. In the absence of a survey response, direct contact was made to facilitate a survey return. The CVN and College thank the clinical virology community for the excellent response rate of 98%.

Who are clinical virologists?

Clinical virology is delivered by different groups of professionals working together to provide a comprehensive service. A specialist virology service typically includes medical and academic virologists, clinical scientists, biomedical scientists and many other grades of supporting staff. Such services are increasingly closely related to a microbiology and/or infectious diseases service, creating an infection science team, which itself may be embedded within a multidisciplinary pathology centre. It can be confusing as the term ‘clinical’ is used widely, but the staff member may be medically qualified and have carried out academic work too, or they may be laboratory based with a training background in science. Biomedical scientists are also part of the multidisciplinary team, delivering laboratory testing, advising on test result interpretation, and supporting the development of new technology and other forms of research.

The provision of a clinical virology service is a mixed picture; for example, medical virologists may be involved in test development and clinical scientists may provide clinical advice. Not all hospitals have laboratories or staff dedicated to virology; most hospitals have medical microbiology laboratories that are able to carry out standard diagnostic tests for viral infections. These laboratories are run by microbiologists, doctors and scientists. These laboratories will refer samples to specialised virology laboratories for more sophisticated virological diagnosis.

The nature of the workload of virology laboratories means that they are all specialists. However, some laboratories – especially those that are part of the UK Health Security Agency, Public Health Scotland, Public Health Wales and the Health and Social Care Public Health Agency in Northern Ireland – have additional responsibilities and capabilities. These include genome sequencing of viruses and diagnosis of high consequence infectious disease agents, such as Ebola virus. Some of these laboratories have an international responsibility. For example, the reference laboratory in London is a World Health Organization (WHO) global specialised measles and rubella laboratory and contains WHO-accredited national laboratories for influenza and poliovirus.

What do clinical virologists do?

Over the last 40 years, clinical virology, a specialty within medical microbiology, has kept pace with technological advances and is at the forefront of modern diagnostics. Within the infection departments of SVCs and units, and large tertiary referral and smaller hospitals, virologists are interested in clinical as well as laboratory-based activities. They are responsible for diagnosing viral infections, providing advice on the treatment and management of people with viral infections, and supporting investigations of viral outbreaks in the community and in hospitals. Medically qualified virologists may also be trained in the management of infectious diseases and their work may extend into seeing patients in clinics, hospital wards and the community. They may undertake specialist clinics for patients with HIV or hepatitis B and C.

Many clinical virologists are active in research, teaching, national and international guideline production, and provision of specialist advice for policy makers. For example, clinical virologists are key to advisory groups such as the Expert Advisory Group on the Safety of Blood, Tissues and Organs (SaBTO), the National Strategy Group for Viral Hepatitis (NSGVH), UK Advisory Panel for Healthcare Workers Infected with Bloodborne Viruses (UKAP), and New and Emerging Respiratory Virus Threats Advisory Group (NERVTAG). In addition, clinical virologists have facilitated responses to previous emerging infection threats such as avian influenza, viral haemorrhagic fevers, MERS and Zika, as well as providing essential support to the SARS-CoV-2 pandemic.

Training in clinical virology

Virology is one of four infection specialties – the others being medical microbiology, infectious diseases and tropical medicine. Virology training can be undertaken either as a single or dual specialty training programme with infectious diseases training. Either route requires trainees to first complete two or three years of internal medical training and attainment of the Membership of the Royal College of Physicians examination. All trainees entering the infection specialties must undertake two years of combined infection training (CIT). After CIT, the four specialties have their own separate higher specialty training programmes (two years for single specialty programmes, e.g. virology, or three years for dual programmes, e.g. virology and infectious diseases), leading to a Certificate of Completion of Training (CCT) in one or two specialties. During specialty training and before the awarding of the CCT, virology trainees must obtain Fellowship of the Royal College of Pathologists (FRCPath) by examination.

The Scientist Training Programme (STP) is a three-year programme of work-based learning, supported by a university-accredited master's degree. Trainees are employed by an NHS trust or NHS foundation trust for the duration of the programme and spend time in a range of settings, before specialising in the last two years of the programme.

The aim of the STP is to produce graduates who possess the essential knowledge, skills, experience and attributes required of a newly qualified clinical scientist in the NHS. They will be competent at undertaking complex scientific and clinical roles, defining and choosing investigative and clinical options, and making key judgements about complex facts and clinical situations within a quality assurance framework. They will be involved, often in lead roles, in innovation and improvement, research and development, and/or education and training.

The Higher Specialist Scientist Training (HSST) programme is a bespoke, five-year workplace-based training programme supported by a doctorate-level academic award. The HSST provides opportunities for clinical scientists to train to become eligible to apply for consultant clinical scientist posts. Completion of HSST requires FRCPath by examination.

Findings

The survey (see Appendix) was sent to laboratory clinical directors and heads of virology departments in the UK. The CVN comprises 27 SVCs and 16 specialist virology units (SVUs), although the definitions are changing as more centralisation and amalgamation of clinical laboratory services takes place.

Responses were received from 49 departments, including 25 SVCs and 16 SVUs as well as one equivalent of an SVC and seven SVU equivalents. Of these, 44 were in England, one in Northern Ireland and four in Scotland.

Workforce in virology departments

Specialist virology centres

Looking at the SVCs (Table 1), there were 77 consultant medical staff in total, of whom 71 were consultant medical virologists, with 56 full-time posts and 15 part-time posts ranging from 0.4 to 0.8 full-time equivalent (FTE). The remaining six were consultant medical microbiologists, two of whom were full time.

Overall, there were 20 consultant clinical scientist virologists, of whom 5 were part time.

Focusing on the 39 training posts, 27 were infectious disease/virology trainees, two were medical virology trainees and ten were clinical scientists.

Table 1: Current workforce in SVCs.*

Title	Posts	Full-time posts	Part-time posts	Retirement date							
				2021	2022	2023	2024	2025	2026–30	2031–40	≥2041
Consultant medical virologist	71	56	15	4	3	5	3	2	11	19	24
Consultant medical microbiologist	6	2	4	0	1	0	0	1	1	4	1
Consultant clinical scientist 8a	1	1	0	-	-	-	-	-	-	-	-
Consultant clinical scientist 8c	9	7	2	0	0	0	0	0	0	0	9
Consultant clinical scientist 8d	10	7	3	0	2	0	0	0	1	2	5
	Posts	**CCT completed training date**									
		CCT 2021	**CCT 2022**	**CCT 2023**	**CCT 2024**	**CCT 2025**	**CCT 2026**	**CCT 2027**	**CCT 2028**		
Infectious diseases virology trainee	27	4	3	6	2	7	2	2	1		

Medical virology trainee	2	1	0	0	0	1	0	0	0
Clinical scientist trainee	10	3	1	2	0	2	1	1	0

*One SVC equivalent sent a response that there were six consultants and 20 trainees in infection.

Specialist virology units

In the SVUs (Table 2), there were 43 consultant medical staff and four staff, associate specialist and specialty (SAS) staff grade doctors. The staff included 38 consultant medical microbiologists, 25 of whom were full-time posts, five full-time consultant medical virologist staff and one part-time post (0.6 FTE).

Overall, there were three consultant clinical scientist virologists, of whom one was part time. There were five trainee clinical scientist posts, three of whom were based in an SVU.

Table 2: Current workforce in SVUs.

Title	Posts	Full-time posts	Part-time posts	Retirement date							
				2021	2022	2023	2024	2025	2026–30	2031–40	≥2041
Consultant medical virologist	5	4	1	0	0	0	0	0	1	2	2
Consultant medical microbiologist	38	25	13	1	1	3	2	2	7	17	5
SAS (staff grade)	4	3	1	0	0	0	0	0	0	1	1
Consultant clinical scientist 8c	1	1	0	0	0	0	0	0	0	1	0
Consultant clinical scientist 8d	2	0	2	0	0	0	0	0	0	1	1
	Posts	**CCT completed training date**									
		CCT 2021	**CCT 2022**	**CCT 2023**	**CCT 2024**	**CCT 2025**	**CCT 2026**	**CCT 2027**	**CCT 2028**		
Infectious diseases virology trainee	0	-	-	-	-	-	-	-	-		
Medical virology trainee	0	-	-	-	-	-	-	-	-		
Clinical scientist trainee	5	1	0	3	0	0	1	0	0		

Other

One department was neither an SVC nor SVU and the respondent answered the survey by stating that there were six consultants and about 20 trainees in infection.

Finally, there was no specific question about consultants in infectious disease and virology. However, looking at the comments received, there are at least five postholders, all of whom were appointed in the last two years.

Vacancies

At the time of survey completion, 25 vacant posts were reported, divided into one academic post, three clinical scientist grade 8d, one microbiology/virology/infectious disease, 11 medical microbiology and nine clinical virology posts. Total vacancies were approximately 17 FTEs.

In addition, multiple respondents indicated that their service demands warranted additional clinical virology time, but funding had not been provided.

Retirements and trainee numbers

Between 2021 and 2025, 17 medical clinical virologists, two band 8d clinical scientists and 11 medical microbiologists will have retired. However, 22 medical virology and infectious disease trainees, two medical virology trainees and six clinical scientist trainees will have gained their training certificate over that period (Table 3).

Table 3: Predicted vacancies, retirements, trainees and CCTs in virology, 2020–2025.

	Retired by 2025	CCT by 2025
Consultant medical virologists	17	-
Consultant medical microbiologists	11	-
Medical virology and infectious disease trainees	-	22
Medical virology trainees	-	2
Consultant clinical scientist virologists band 8c	0	-
Consultant clinical scientist virologists band 8d	2	-
Clinical scientist trainees	-	6

Predicted workforce requirements

Widespread changes are taking place, including joint ventures to run pathology departments between private companies and parts of the NHS. Many of these either have, or are planning, what are termed essential service laboratories on-site. The aim is to test samples requiring rapid results on-site while the rest of the work is carried out off-site at a much larger laboratory.

This, together with the advent of CIT and medical virology and infectious disease training programmes replacing standalone medical virology, will change the current work environment and infrastructure. Result authorisation may increasingly be carried out remotely and non-medical staff will be more likely to be based away from the hospital, further differentiating roles and responsibilities. Many medical consultant virologist posts may become combined medical consultant virologist and infectious disease posts.

Clarification of the roles of medically qualified and clinical scientist staff is critical to ensure that the population receives a comprehensive clinical diagnostic and patient management service. There must be continued medical virology input into the management of patients and the operational aspects of laboratory services. Workforce planning is required now, factoring in these future changes.

Summary

The SARS-CoV-2 pandemic has reinforced the key role clinical virology plays in infection science, public health and healthcare in general. The pandemic has also shone a light on the need to have scientists who are able to develop and maintain tests that are not commercially available, as well as innovate in other areas.

The clinical virology service is being delivered by a relatively small workforce, which has not significantly changed during the SARS-CoV-2 pandemic. This is very cost effective, but there is predicted to be a reduction in the senior workforce, given the intentions of those in post, and trainee numbers. This will coincide with the clearly stated intention of the UK government to expand capability in this area (including infectious disease health security).

Our survey provided respondents with the option to make individual comments, and these illustrate the concerns colleagues have. Many respondents made it clear that most felt that laboratories are understaffed, with few or no applications from qualified individuals to fill vacant posts. One respondent wrote:

'I think that planning a virology service with the changes in medical training to infectious disease and virology and the changing platforms is very difficult. There is a lot of blurring and merging of this specialty and I think serious thought needs to be given to what is specialist virology, what is infection diagnostics and what is a virology and infectious disease clinical service. We are so far away from the specialty I joined as a consultant 20 years ago and if this isn't done then I think that virology will just be integrated within infectious diseases/microbiology. As we have seen in the pandemic, there are many who feel they understand virology in specialties such as general medicine, immunology and genomics, but few who clearly understand the diagnostic service. Perhaps virologists should be asking why we were not at the forefront of the decisions making and planning for a viral pandemic and therefore what we need to do to redefine our service.'

Two other respondents also made the following observations:

'This questionnaire is very difficult to answer. We operate a collaborative, fully integrated model of infection service delivery, including laboratory work, clinics, ward-based consults and in-patient work, where no one individual functions solely as a virologist. We have two consultants with specific expertise in virology who take the lead for complex virology laboratory and clinical issues. However, all consultants within microbiology are able to support the day to day running of the laboratory and specialist registrars are all trained in virology. We are unlikely to consider recruitment of further specific clinical virology expertise – but would potentially value pluripotential clinical scientist support for roll-out of whole genome sequencing of a wide array of pathogens, utilising our existing high molecular capacity laboratory built up during COVID, for example.'

and

'Many trusts have consolidated over many years and there have been no consultant medical virologists in such trusts despite clinical workload requirements, even before COVID-19. I think the trusts need be given a directive of a mandatory consultant virologist on-site, more so for trusts which have consolidated. The survey appears to be more focused on existing consultant medical virologist vacancies, which is correct, however there is a desperate need for a clinical virology service in many trusts. Currently the trusts have been making good with help from neighbouring larger university trusts.'

This is a time of transition, with the medical virology training programme having moved to training in medical virology and infectious diseases. The predicted numbers completing training could fill gaps created by those vacating posts, but consultant vacancies already exist. In 2021, there were 25 vacant posts reported. This means there will be a continuous deficit in workforce. Clinical scientist trainees will complete the HSST programme and will be ready to apply for a Certificate of Completion of HSST (CCHSST). However, there will not be sufficient consultant clinical scientist positions in the immediate future to accommodate this.

Recommendations

To support the specialty, the College will work with relevant authorities such as Health Education England, governments of the UK, departments of health, the General Medical Council, healthcare commissioners and other royal colleges. The College has identified the following as being critically important.

Recommendation 1: Lobby for an expansion in clinical virology training posts.

We will liaise with Health Education England to lobby for an expansion of training posts to meet the known and predicted shortfall in posts and to meet population needs.

Recommendation 2: Create new consultant-level clinical virology posts.

We will liaise with the relevant authorities to create new consultant-level posts that are needed in recognition of the reported number of necessary but unfunded posts and to match the increased number of trainees achieving CCT/HSST completion. It is recognised that there is a need to ensure provision of additional public health virology services and pandemic threat response.

Recommendation 3: Undertake a review of the HSST curriculum for virology.

We recognise the need to review the current training programme, according to the National School for Healthcare Science timetable, in light of the move towards separating laboratories into on-site essential services laboratories and off-site hubs. The training programme must reflect the changing workforce environment and infrastructure.

Recommendation 4: Improve retention of consultant-level staff.

We support fair, equitable retire and return legislation and we will press for the implementation of a long-term UK-wide solution to the NHS pension tax issue.

Recommendation 5: Collaborate with relevant organisations to promote virology.

We will build on increased awareness of and interest in the specialty during the COVID-19 pandemic.

Recommendation 6: Promote virology in undergraduate education.

This is included as a core part of the RCPath undergraduate curriculum, in the new undergraduate lecture series and in small grant funding for electives that are match-funded by the Microbiology Society.

Recommendation 7: Promote pathology as a career for foundation doctors.

We will continue to use our current initiatives to promote pathology to foundation doctors, such as the RCPath Foundation Fellowship scheme. We will also consider new initiatives and offer a range of relevant activities and experiences.

Appendix: Virology workforce data collection survey

The RCPath and UK CVN conducted a survey to produce a robust report on the current workforce in the UK. All data has been anonymised.

Questions that appeared in online survey

Q1. Name. Enter your name.

Q2. Position. Enter your position/role.

Q3. Email address. Enter your email address. This will enable us to contact you if we have any questions.

Q4. Hospital/organisation.

Q5. Details relating to each consultant contributing to the clinical virology service. Position (clinical virologist, clinical scientist (Bands 8c, 8d, 9)/microbiologist medical/infectious diseases/other). Has FRCPath in Virology Y/N, estimated year of retirement.

Q6. Following on from Q5 relating to consultant posts, please specify FTE: (e.g. medical consultant 1xFTE = 10 PA = 40 hours (37.5 hours in Wales); 0.6xFTE = 6 PA = 24 hours; clinical scientist 1xFTE = 37.5 hours per week).

Q7. If you have any fully funded consultant posts, which include time dedicated to the clinical virology service, which are currently vacant, please fill in the following data: Position (clinical virologist, clinical scientist (Bands 8c, 8d, 9)/microbiologist medical/infectious diseases/other).

Q8. Following on from Q7 relating to vacant consultant level posts, please specify FTE specifically dedicated to clinical virology

Q9. Details relating to each SAS doctor level (i.e. specialty and associate specialist non-consultant career grade) contributing to the clinical virology service. Position (clinical virologist, clinical scientist (Bands 8c, 8d, 9)/microbiologist medical/infectious diseases/other). Has FRCPath in Virology Y/N, estimated year of retirement.

Q10. Following on from Q9 relating to SAS doctor posts, please specify FTE.

Q11. For each person training in clinical virology in your hospital, please fill in the following data: Training programme (virology alone/joint training, e.g. Virology-ID), microbiology – infection science). Medical: expected year of CCT/completion of training – FRCPath. Clinical scientists: expected year of completion of STP.

Q12. If you have any fully funded training posts which are currently vacant, please specify number of: medical trainees, clinical scientist trainees.

Q13. If funding permitted, how much additional consultant time do you think would be necessary to provide the service you would like to see for your laboratory? Consultant time: clinical virologist FTEs, clinical scientist FTEs.