# Infection Prevention and Management in the UK

## THE INFECTION-SPECIALIST WORKFORCE

### A report from the leading UK infection societies

2026

**“Infectious diseases are the oldest enemy of human health. We need to keep our capacity to prevent and respond to infections up between events rather than wring our hands and wish we had done so when they occur.”**

**~ Professor Christopher Whitty, Chief Medical Officer for England. ‘Foreword’ to the *Chief Medical Officer’s Annual Report 2025: Infections*.**[1]

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# Contents



# Executive Summary

Infectious diseases pose a growing challenge to the UK's health system, from everyday infections which are becoming increasingly resistant to current antimicrobials, to the threat of global pandemics and new infections. A strong infection-specialist workforce is critical for protecting patients and the public. Infection specialists have deliberately broad training which enables flexible deployment across clinical care, diagnostics, infection prevention and control (IPC), public health, and system leadership.

Infection specialists are a multidisciplinary workforce which include infectious disease (ID) physicians, clinical microbiologists, mycologists (fungi), parasitologists and virologists, infection-control doctors and specialised nurses, antimicrobial pharmacists, biomedical scientists and clinical scientists as core members. This workforce provides the expertise to diagnose, manage, prevent and contain infections wherever they arise.

All healthcare systems are under increasing pressure from rising patient complexity and multi-morbidity, more routine use of immunosuppressants, an ageing population, and the impact of antimicrobial resistance (AMR) and emerging pathogens. The infection-specialist workforce is critical in the response to these systemwide threats and pressures.

Workforce gaps are common, and without intervention the Royal College of Pathologists warns of a 'pending workforce crisis' in infection specialties.[2] This report outlines a plan to strengthen and support the infection-specialist workforce and modernise infection services in line with NHS long-term priorities. With the recently published NHS 10 Year Plan,[3] we recommend changes in line with the three shifts across all areas: moving care from hospital to community, shifting focus from sickness to prevention, and accelerating analogue to digital innovation. By embedding infection expertise in all care settings, prioritising preventive measures, and harnessing data and technology, we can improve outcomes, resilience and cost-effectiveness across the UK health system. This will enable suitable patients to receive excellent care in their own homes, using less carbon by reduction in hospital attendances - better for them and better for the environment.

**The recommendations in this report will enable the infection-specialist workforce to work more productively through embracing new digital technology, sharing data through networks, and working as multiprofessional teams innovatively and effectively.**



# Participating Organisations



The Association of Clinical Pathologists

BASHH

Association for Laboratory Medicine

BHIVA British HIV Association

BIA British Infection Association

BPAIIG

BRITISH SOCIETY FOR ANTIMICROBIAL CHEMOTHERAPY

Chiva

IBMS Institute of Biomedical Science

Healthcare Infection Society

IPS Infection Prevention Society

Royal College of Physicians

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

UK Clinical Pharmacy Association

MICROBIOLOGY SOCIETY

THE UK CLINICAL VIROLOGY NETWORK

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## Editors' Comments

The concept for this report arose from the Joint Specialty Committee at the Royal College of Physicians. It is a collaborative effort celebrating the diversity of those people that make up the workforce of infection specialists in the UK.

The development of this document has highlighted the extensive scope and complexity of the infection specialty workforce. This report seeks to reflect the diversity of roles and contributions across the field; however, it is not intended to be exhaustive, and so some areas may be less well represented and not all perspectives accounted for.

We hope that this document nevertheless reflects, at least in part, the breadth and value of the infection-specialist workforce.

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# Infection-Specialist Recommendations for Policy Makers, Educators and Employers

**In the next decade, the infection-specialist workforce must be empowered to prevent and treat infections more effectively, whether in hospitals, clinics, care homes, or the community. Strengthening this workforce is an investment in safer patient care, better pandemic preparedness, and the nation's health security. The following sections detail the roles of infection specialists across key domains – from antimicrobial stewardship and diagnostics to research and emergency response – and the specific actions required to support the three strategic shifts in each area.**

The infection specialist workforce supports the three shifts. In order to achieve the ambitions of the 10 Year Plan, there are two broader considerations:

### 1. Education and training in infection for all healthcare professionals

All healthcare professionals across UK healthcare systems should be able to: prevent infections and outbreaks, identify sepsis, consider travel, identify imported infections and apply antimicrobial stewardship (AMS) principles in their day-to-day practice. National workforce strategies highlight the need to shift care beyond acute hospitals and strengthen integration with community services, public health, and integrated care systems (ICSs).[2,4] Training programmes should provide broad educational opportunities that equip clinicians for practice across these settings, while infection teaching should be strengthened from undergraduate education through to postgraduate training, with greater consistency in content and quality nationally.

### 2. Expand the infection-specialist workforce

We need increased infection-specialist capacity, which should include increasing training capacity in the areas where doctors will be needed to work in the future, and increasing the numbers of clinical scientists in infection, advanced nurse practitioners and infection-specialist pharmacists.

Innovative work plans and joint appointments across providers, with universities and with UK Health Security Agency (UKHSA) must be supported to retain talent and shared system learning and leadership. Multiprofessional training, educational support and leadership development should be supported so that the next generation of infection specialists are equipped to work across traditional boundaries and support colleagues to manage infection in their own specialties.

## Recommendations in line with the Three Shifts:

### 1. Hospital to Community

**1.1. Shift care closer to home with specialist-supported community pathways**

**1.2. Embed IPC, diagnostic governance and laboratory expertise into new neighbourhood models of care**

**1.3. Make outpatient parenteral antimicrobial therapy (OPAT)/Complex Outpatient Antimicrobial Therapy (COpAT) a core, equitable component of every healthcare system**

**1.4. Either prioritise intravenous (IV) -to-oral antimicrobial switch (IVOS) as a systemwide improvement or prioritise IV-to-oral antimicrobial switch**

**1.5. Strengthen community HIV and sexual health delivery**

**1.6. Expand neighbourhood infection care through primary care, pharmacy and community models**

**1.7. Support TB and imported-infection care through regional networked models closer to home**

**1.8. Extend preparedness and health protection fully into community settings**

**1.9. Design infection research around where people receive care**

### 2. Sickness to Prevention

**2.1. Commission prevention-focused AMS services, including penicillin allergy delabelling**

**2.2. Invest in proactive surveillance, IPC and stewardship to prevent infection, AMR and outbreaks, with strengthened diagnostics and liaison input**

**2.3. Protect workforce time and embed prevention activity in routine care pathways**

**2.4. Strengthen vaccination, vaccine confidence and specialist-prevention leadership**

**2.5. Expand HIV and sexual health prevention through integrated, accessible community pathways**

**2.6. Maintain specialist-prevention capacity for tuberculosis (TB), imported infection and AMR control**

**2.7. Fund always-on preparedness, surveillance and early-control systems**

**2.8. Ensure training and research are explicitly prevention focused**

### 3. Analogue to Digital

**3.1. Make interoperable digital infrastructure the foundation of infection services**

**3.2. Embed digital AMS, diagnostics and decision support into routine care**

**3.3. Scale digital surveillance, automation, artificial intelligence (AI) and genomics across infection and pathology services**

**3.4. Use digital systems to extend specialist expertise and reduce inequity across sites**

**3.5. Build digitally-enabled virtual and community pathways across infection services**

**3.6. Scale up digital services to involve patients in their care, while maintaining equity**

**3.7. Make real-time interoperable infection data the default for preparedness, imported infection and health protection**

**3.8. Align workforce, training and research with digital transformation**





# Report: The Infection Specialist Workforce

# 1. Antimicrobial Stewardship (AMS)

## What is AMS?

The National Institute for Health and Care Excellence (NICE) defines AMS as 'an organisational or healthcare-system-wide approach to promoting and monitoring judicious use of antimicrobials to preserve their future effectiveness'.[5] AMS seeks to optimise antimicrobial usage in several ways, with the intention of improving patient outcomes: using the right drug for the right patient at the right time, the right route and the right duration.

This is achieved by having structures in place to guide antimicrobial use in common infections, monitoring prescriptions to identify areas for stewardship interventions, and efficient diagnostics for detection of resistant organisms. This is optimised by implementing infection-specialist-led ward rounds and education with expert advice available to manage the treatment of patients with infections due to resistant pathogens, or who require restricted or difficult to dose antimicrobials.

In 2019 the UK Government launched the 20-Year Vision for Antimicrobial Resistance (AMR), and May 2024 saw the publication of the second UK 5-Year National Action Plan for AMR 2024 to 2029.[6,7] The National Action Plan sets out five key targets for human health, given below, which NHS providers and healthcare professionals, particularly infection specialists, have a responsibility to achieve:

- **Target 1a:** Prevent any increase in a specified set of drug-resistant infections in humans from the 2019 to 2020 financial year (FY) baseline.
- **Target 1b:** Prevent any increase in Gram-negative bloodstream infections in humans from the 2019 to 2020 FY baseline.
- **Target 2a:** Increase UK public and healthcare professionals' knowledge on AMR by 10%, using 2018 and 2019 baselines, respectively.
- **Target 4a:** Reduce total antibiotic use in human populations by 5% from the 2019 baseline.
- **Target 4b:** Achieve 70% of total use of antibiotics from the Access category (new UK category) across the human healthcare system.

## Who are AMS Specialists?

All healthcare professionals involved in the care of a patient with an infection must be aware of AMS principles, as the problems of increasing and inappropriate antimicrobial use drive AMR.[8,9] However, strategic leadership and clinical expertise for AMS is provided by infection specialists, with teams traditionally formed of clinical microbiologists, and/or infectious disease (ID) physicians and specialist pharmacists. Increasingly, pharmacy technicians, specialist nurses, and data analysts are important roles within the AMS team.

The Scottish Antimicrobial Prescribing Group, in conjunction with NHS Education Scotland, have recently published the 'Antimicrobial Resistance and Stewardship Zone', a 'knowledge and skills framework for containing and controlling AMR' for the (non-infection specialist) health and social care work force. This emphasises that AMS is 'everyone's business'. This framework is applicable to the workforce across the four UK nations and beyond.[10] Historically, in England, AMS specialists have been concentrated within secondary care settings, but

recent transformation to systemwide working has seen AMS specialists working across healthcare systems. This is crucial given the majority (>80%) of antimicrobial prescribing occurs in primary care, with a significant proportion of prescribing being managed by advanced nurse practitioners, pharmacists and via Patient Group Directions in the rapidly expanding Pharmacy First initiative. In Scotland, since 2008, Health Board antimicrobial management specialist teams have established AMS responsibilities across both primary and secondary care.

## What do AMS Specialists Do?

AMS specialists work across the four pillars of NHS enhanced, advanced and consultant-level practice. In summary, AMS specialists:

- Provide clinical expertise regarding the optimal management of infections and use of antimicrobial medicines, collaborating across services and sectors to do so.
- Provide leadership to organisations and systems to optimise the use of antimicrobials (including the prevention, diagnosis, and management of infections) and manage complex governance issues relating to antimicrobials.
- Provide education to other health professionals, patients, and the public on infections and prudent use of antimicrobials.
- Undertake surveillance, quality improvement, and research on antimicrobial use, infection management, and microorganisms to improve care.[11]

The infection workforce are key to embedding and driving timely IVOS of antimicrobials, particularly to manage complex and resistant infections. The carbon footprint of IV antimicrobials can be up to

## Case Studies: Innovative AMS Practice

**1.** In the UK, seven hospitals have achieved accreditation through the Global AMS Accreditation Scheme; four have achieved the highest level of accreditation, which requires robust and innovative practice, while three have been designated as AMS Centres of Excellence.[14]

**2.** The Pharmacy First scheme in England delivered over five million consultations in the first year across seven clinical pathways, allowing patients to receive high-quality clinical advice and be treated for simple infections without the need for a General Practitioner (GP) appointment. The NHS England AMR Programme Board has oversight of the strategic planning and operational delivery of the Pharmacy First Service to minimise the risk of inappropriate supply of antimicrobials. Integrated Care Boards (ICBs) can view data on consultation volume, types of consultations, outcomes, and medicines supplied to monitor the success and safety of the service.[15,16]

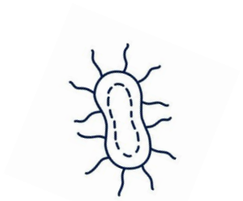
**3.** The Royal Cornwall Hospitals NHS Trust implemented an Antimicrobial Review Kit (ARK), which demonstrated a significant improvement in 72-hour clinical review of antimicrobial therapy (93 vs. 81%) and up to 21% of antimicrobials were stopped. The success of the study with paper drug charts has led the ARK study team to launch SPEED-UP ARK; the team will work with stakeholders and electronic Prescribing and Medicines Administration (ePMA) manufacturers directly to develop tools to embed ARK principles into ePMA systems.[17,18]

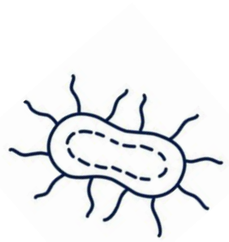
4. Almost 60% of patients in hospital prescribed an antibiotic receive an IV preparation;[19] data collected at The Royal Free London NHS Foundation Trust showed that only 17% of patients were switched from IV to oral antibiotics within 24 hours of meeting the national antimicrobial IVOS criteria. Following the implementation of a pharmacist-led review this improved to 58% of patients being switched from IV to oral antibiotics within 24 hours of meeting the criteria. Switching antibiotics from IV to oral where appropriate can expedite the hospital discharge process by reducing length of stay,[20] increases nursing capacity and reduces the risk of infections associated with IV catheters.

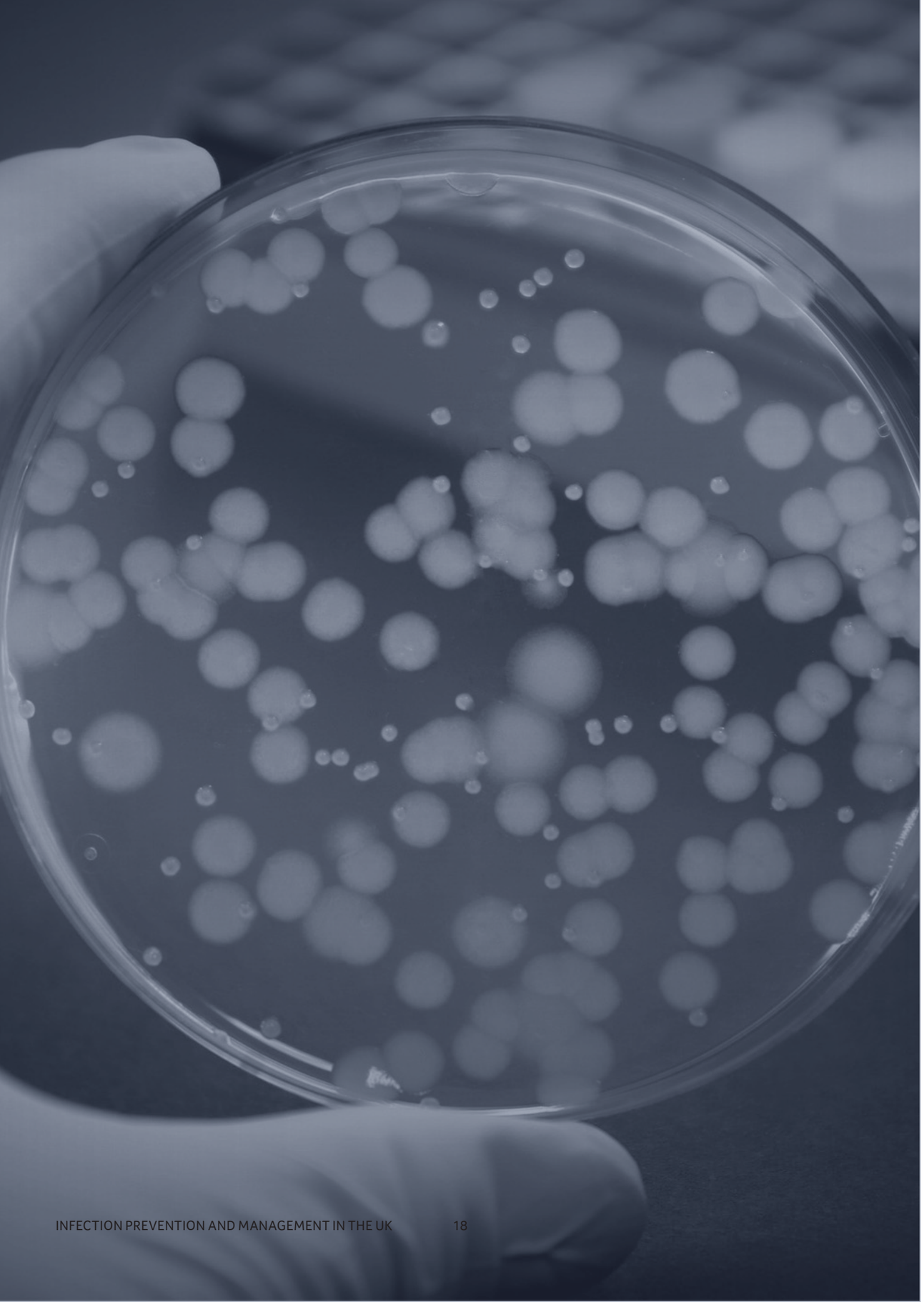
**5.** Neonatal Oral Antibiotics at Home (NOAH) is an evidence-based approach that safely switches eligible newborns from IV to oral antibiotics after 36 hours, helping families go home sooner while maintaining high-quality care. The team at Royal Devon University Healthcare NHS Foundation Trust completed an evidence synthesis to understand the impact of IVOS on neonates (submitted for publication). In 2025/2026, the team are sharing data and learning from nine Trusts across the UK who have adopted NOAH or similar projects, and are evaluating the impact on readmission and further episodes of sepsis as well as developing understanding of how best to promote this practice through education and policy.[21]

**6.** Northumbria Healthcare NHS Foundation Trust penicillin allergy challenge programme. It is reported that 15–20% of hospital inpatients have a penicillin allergy label, but research suggests that 90% of patients tolerate penicillin when formally tested.[22] Incorrect and inaccurate penicillin allergy labels result in increased adverse events from antimicrobial therapy including *C. difficile* infection and are ultimately a driver of AMR.[23] The Challenging Antibiotic Allergy Status programme (CATALYST) at Northumbria is a pharmacist-led initiative aiming to proactively assess and 'delabel' spurious penicillin allergies. With oversight from the AMS pharmacist (supported by the wider clinical infection team), non-specialist pharmacists have independently assessed, consented and prescribed direct oral penicillin challenges for over 400 patients in north-east England, improving safety and quality of care provided.[24] Since inception, the service has expanded to include AMS-pharmacist led penicillin allergy outpatient clinics receiving referrals from primary care, secondary care and allergist services, and has supported implementation of ICB-wide guidelines on delabelling penicillin allergies in primary and secondary care settings. Although not a 'funded' service, it would not be possible without an appropriately-resourced AMS workforce who are responsible for idea inception, evidence collation, clinical oversight and governance. There is also evidence that delabelling penicillin allergy can be cost effective, for example due to cheaper antibiotic prescriptions and shorter inpatient stays.[25,26]

60 times greater than oral options[12] and further reduces pressure on NHS resources through reduced ancillaries associated with IV drug administration, drug administration errors and adverse events, secondary infections, length of hospital stary, and nursing time. A 10% reduction in IV doses could save the NHS over £10 million per year.[13]









# 2. Infection Prevention and Control (IPC)



**Who Are IPC Specialists?**

IPC professionals work in multidisciplinary teams including clinical microbiologists and virologists, ID physicians, IPC nurses (IPCNs), biomedical scientists, clinical scientists, epidemiologists and pharmacists. They also work closely with engineers, behavioural scientists, and data scientists.

**What do IPC Specialists Do?**

IPC specialists focus on preventing infections before they occur. They operate on the interface between clinical care, public health, infection and healthcare systems. They generate and interpret diagnostic data on infections that underpins surveillance, AMS, and outbreak management, ensuring infection prevention is timely, evidence-based, and systematically applied across care settings. Their work includes monitoring infection trends, identifying outbreaks, and implementing control measures across hospitals, care homes, and community services. Digital surveillance systems linked to electronic patient records enhance early detection of outbreaks and AMR patterns.

In addition, IPC teams ensure the safety of all patients and staff from infections from the built environment in many specialised areas such as ventilation, water, wastewater, sterilisation, decontamination and cleaning. They advise on and apply IPC principles to healthcare building projects, refurbishments and maintenance. These are key elements in upholding the safety as well as the reputation of healthcare organisations and the wider NHS.

Laboratory specialists, clinical microbiologists and virologists, specialist biomedical and clinical scientists, support IPC by delivering high-quality diagnostics, developing and governing point-of-care testing, and interpreting microbiological results.

IPC specialists embed infection prevention into everyday care through workforce training, system design, behavioural interventions, and leadership. In addition, they work closely with occupational health teams to support staff safety. Many IPC departments are research-active and support the generation of evidence-based interventions.

The key expertise of IPC specialists is in risk management. They provide organisational oversight and accountability for infection risk, with direct lines to Trust Boards and executive leadership.

**Vaccines and Preventing Infection**

Vaccination programmes remain integral in infection prevention. They have been shown to reduce major or debilitating disease in the elderly, and lower levels of vaccine coverage in young children results in outbreaks of potentially fatal diseases such as measles. Winter pressures that are driven by complications from respiratory viruses could be reduced by increasing influenza vaccine coverage across all age groups. Improving access and supporting individual decision-making around vaccines is a vital AMS and infection prevention tool and needs to be supported across the NHS and public health system.[1]

**Why IPC Matters**

The UK AMR plan reinforces IPC as a core strategy: it calls for a ‘whole-systems’ approach to IPC, improved diagnostics and treatment in different settings’.[7]

IPC is essential to protect patients, health and care workers, and the wider community from avoidable infections. It is a critical component of patient and

occupant safety and service resilience, helping to safeguard vulnerable populations by reducing healthcare-associated infections, preventing outbreaks, and limiting the spread of AMR.

IPC requires national coordination and local clinical leadership to drive innovation to ensure consistent standards, equitable access, and robust governance. Investment in skilled professionals, training pathways, and digital infrastructure is imperative.

Effective IPC reduces pressure on the NHS by lowering hospital admissions, shortening lengths of stay, and reducing treatment costs.[31] In addition, it is a legal and regulatory requirement ensuring healthcare providers meet national safety standards and deliver high-quality care, overseen by bodies such as the Care Quality Commission, the Department of Health and Social Care (DHSC), NHS England (NHSE), and is supported by UKHSA.[31]

## Case Studies: Innovative IPC Practice

1. 14 acute NHS hospital groups took part in a trial during the COVID-19 pandemic, in which IPC specialists collaborated with bioinformaticians and data scientists to use whole genome sequencing for the surveillance of COVID-19. By identifying transmission clusters, distinguishing community-acquired from healthcare-associated infections, the sequencing data supported IPC teams to apply targeted IPC measures.[27]

2. Digital IPC surveillance systems at Frimley Health NHS Foundation Trust integrate microbiology results and electronic patient records to track infections, AMR, and risk factors such as central lines or catheters in real time.[28]

3. Review of the use of influenza point-of-care testing in an emergency department (ED) in Leeds identified significant cost savings per patient compared to traditional laboratory-based testing through a reduction in lengths of stay, facilitation of targeted treatments and promotion of correct isolation.[29]

4. South East Coast Ambulance Service's IPC team won a national Ambulance Leadership Forum award in March 2026 for developing a digital IPC app that gives frontline clinicians rapid access to real-time guidance on personal protectice equipment (PPE), decontamination, risk assessment and national guidance at the point-of-care.[30]

5. In Sussex, a team is developing and implementing a data-driven model of IPC that integrates pathogen genomics and predictive analytics into routine clinical practice. Through the genomic surveillance programme, pathogen genomics is being used alongside epidemiological investigation to identify transmission events with greater precision, distinguish between healthcare- and community-associated infections, and support more targeted, timely IPC interventions. In parallel, they are leveraging linked regional healthcare data across hospital and community settings to develop AI-enabled prediction tools for *C. difficile* infection, aiming to identify patients at highest risk and enable earlier, preventive action. Together, this work represents a shift from reactive to proactive IPC, embedding advanced diagnostics and population-level analytics into frontline care to reduce transmission, improve patient outcomes, and support more efficient use of healthcare resources.



# 3. From Bench to Bedside:

## Infection Specialists in Diagnostics and Liaison Work



**Who are the Infection Specialists Providing Diagnostics and Liaison Input?**

Infection specialists comprise clinical microbiologists, medical mycologists, medical parasitologists, clinical virologists, ID physicians, clinical and biomedical scientists, specialist nurses, such as IPCNs, and pharmacists. Working across hospitals, laboratories, and community settings, they support the management of infection across all ages and specialties.

**Diagnostics as a Core Function**

Diagnostics underpin over 85% of patient pathways regardless of speciality and are central to infection services.[32] Rapid accurate diagnostics are essential for patients management, IPC and discharge decisions, both in hospital and in the community. Laboratory specialists including those listed above are highly trained to design, perform, validate, quality-assure and deliver much of the diagnostic pipeline that enables safe and effective clinical decision-making at scale. They typically handle huge numbers of specimens for processing at all hours, ensuring that specimens are processed safely and accurately; assays are verified and validated; quality control, external quality assurance and governance are maintained; and results are interpreted within clinical context. Interpretation of results in the light of the clinical information provided by the requestor and the resulting comments for management that are returned to the requestor can impact significantly on patient outcomes and encourage good AMS.[33] Laboratory specialists also guide 'diagnostic stewardship' to avoid unnecessary tests and ensuring positive results lead to the right treatments, supporting appropriate antimicrobial use, and improving sustainability. As demand for testing grows, this leadership is critical to keep services safe and efficient. Digital innovation is rapidly progressing, with new methods such as molecular diagnostics and genomics aiding faster and more accurate diagnoses. Automation is increasingly requiring re-working of traditional laboratory workflows. Oversight is required to ensure such innovative methods are available nationally and patients are not disadvanted by a lack of services in the hospital to which they present. Point-of-care testing is increasing and offers rapid results at the bedside, whether that be in hospital or in community settings and requires infection-specialist oversight.

**Liaison and Consultative Expertise**

Infection specialists provide consultative advice across the NHS for all patients regardless of specialty or age. This supports sepsis and complex infection management, ambulatory complex/OPAT services, AMR, outbreaks, and high-consequence infectious diseases (HCIDs). They interpret laboratory results in real time, liaising directly with all clinical teams and participating in multidisciplinary meetings including, for example, with oncology, haematology, surgery, intensive care, paediatrics and transplant specialists. AMS rounds led by infection specialists reduce the use of antibiotics and reduce length of stay,[34] thereby reducing cost. Infection-specialists are responsible for training and education on infections at an undergraduate and postgraduate level, as well as within hospitals to other healthcare professionals. In addition to consultative advice, infection specialists develop guidelines and policies

on antimicrobials, clinical infective conditions, bloodstream infections and other aspects of infection. Infection specialist advice extends beyond hospitals, supporting GPs, community services, and public health colleagues in managing notifiable diseases, outbreaks, and infections associated with global travel and climate change.

## Case Studies: Innovative Practice

1. Clinical decision support systems have been routinely implemented by NHS pathology and laboratory services to improve test requesting, automate interpretation, and enhance productivity. AI-supported systems are increasingly being introduced; for example, automated platforms that can prepare agar plates for antimicrobial susceptibility testing and then interpret them.[35]

2. Dedicated point-of-care testing (POCT) teams, led by laboratory scientists, support virtual wards, hospital-at-home services, and community diagnostics, providing governance and quality assurance outside hospital settings. The COVID pandemic highlighted the utility of POCT in a multitude of settings including community testing centres, home testing, hospital admission pathways and NHS staff testing programmes. These pathways were established by infection specialists who provided advice and oversight of validation, verification, implementation, connectivity of results, IPC management and clinical treatment. Lessons learnt from these innovative diagnostic strategies continue to be used for respiratory viral diagnosis and management, which in turn will provide future pandemic resilience.[36]

3. Innovative workforce models include expanded roles for clinical scientists in microbiology and virology to support AMS and IPC, helping to mitigate consultant shortages while strengthening prevention.[37,38] National professional learning platforms established by the Association for Laboratory Medicine (ALM) provide accessible continuing professional development (CPD), data tools, and guideline summaries, improving productivity and harmonising practice. The creation of AI special interest groups has enabled upskilling in data science and safe AI deployment, supporting digital transformation across pathology and infection services.



# 4. Directly Caring for Patients with Infection



### 4a. Inpatient Care

Infection specialists also deliver direct patient care (where patients are directly under the care of an infection team).[39] In these settings, ID inpatient care is delivered by multidisciplinary infection-specialist teams working across the whole hospital, not only on dedicated ID wards. This includes ID consultant physicians, resident doctors training in Combined Infection (ID with medical microbiology, virology or Internal Medicine and those in single specialty training), infection-specialist pharmacists, IPCNs and other IPC practitioners, and specialist nurses. Together, they deliver inpatient care of patients with infections, including those with sepsis. They look after patients across their hospital episode of care, often from admission via emergency pathways through to discharge. As the general population ages, with multiple comorbidities, it is important to maintain general medical skills for the workforce in this setting.

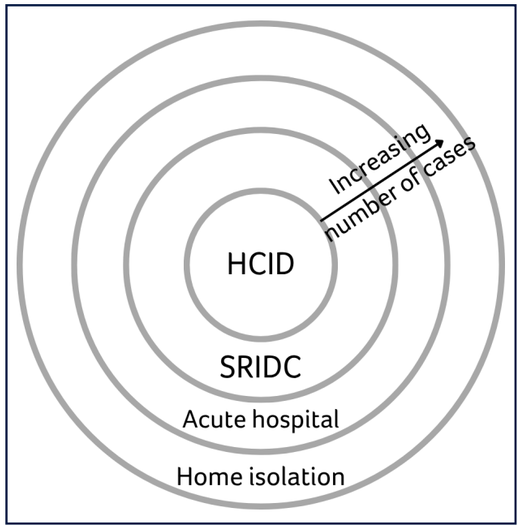



Figure 1: Graphic to show the decision layered containment strategy in event of a rare disease outbreak, from the 2025 NHSE Report *Specialised Services for Infectious Diseases (Adult).*[42]

The burden of infection in hospitals is much higher than the number of specialist ID unit beds: more than one in five occupied acute hospital beds are primarily due to an infectious disease diagnosis, and around 7% of inpatients have a healthcare-associated infection at any given time.[19,40]

Routinely across secondary care, infection-specialist teams are providing rapid diagnostic and bedside advice, optimisation of antimicrobial therapy, and leading IPC and outbreak management. This is critical to the support of safe care for patients with complex infection throughout the hospital – on medical or surgical wards, maternity units or critical care settings.

Research shows that involving infection specialists in patient care is associated with improved outcomes and more appropriate investigations and treatments for serious infections, such as *S. aureus* bloodstream infections.[41] This underscores that infection specialists are central to educating and supporting the wider clinical workforce – ensuring every clinician in every setting has the skills and guidance to manage infection safely and effectively.

#### Commissioned Highly-Specialist Services

Specialist inpatient infection care also includes commissioned regional and national capability. Specialist Regional Infectious Diseases Centres (SRIDCs) provide 24/7 access for GPs and acute Trusts to specialist advice, assessment and admission pathways, and participate in coordinated network responses during outbreaks. There are 24 of these SRIDCs in England providing around 520

inpatient beds under infection teams. Confirmed HCID cases in England should be transferred to designated HCID Treatment Centres, requiring highly-trained IPC, laboratory and clinical teams.[42]

### 4b. Caring for Patients in the Community: Outpatient Parenteral Antimicrobial Therapy

**Hospital-led, Community-delivered Infection Services**

OPAT and COpAT are hospital-led, community-delivered infection services that enable patients with serious infection to receive IV (and, where appropriate, complex oral) antimicrobials in the community. These services also serve an important AMS gatekeeping function ensuring appropriate use of the service with lower-risk oral antimicrobials used whenever appropriate. Services are delivered by multidisciplinary infection-specialist teams, typically including: an infection consultant (ID and/or microbiology/virology), specialist nurses/advanced practitioners, antimicrobial pharmacists, vascular access expertise, and close partnership with community nursing, homecare providers and primary care teams.[43] The team retains responsibility for patient selection/vetting, regimen choice, safety monitoring, review and escalation – while care is delivered in the most appropriate setting (ambulatory clinic, intermediate care facility, or home, including self-administration).

Figure 2: UCLH OPAT@home service administering intravenous (IV) antibiotics in patients' homes and recording observations and blood tests on shared electronic patient record.



## Case study: Community Outreach in Action. Find & Treat

Proactive screening and treatment of infection – including imported infection – in the community for underserved populations is well demonstrated by University College London Hospitals' (UCLH) 'Find & Treat' Service. Delivered by a multidisciplinary team including consultants, nurses, outreach workers and others, Find & Treat is a pan-London integrated inclusion health outreach team which provides active case-finding using mobile digital radiology and rapid diagnostics in non-traditional settings. They focus on early detection and treatment of tuberculosis (TB), blood-borne virus (BBV) screening, and vaccine-preventable diseases. These services are delivered via a small fleet of vehicles: the Mobile Health Unit for chest radiology, a van for BBV testing, and a powered tricycle for pop-up clinics.[45]


Figure 3: The UCLH 'Find & Treat' service

**Proven Impact with Variation in Access**

OPAT/COpAT improves patient experience and system flow by supporting admission avoidance and earlier discharge, with clinical outcomes comparable to inpatient therapy when delivered within robust governance structures. It also reduces exposure to healthcare-associated harms associated with prolonged hospitalisation. From a cost-effectiveness perspective, NHSE guidance cites evidence that OPAT can be 23–56% cheaper than equivalent inpatient treatment, depending on model of care and diagnosis.[44]

Despite this, access remains variable by geography and population, with less equitable provision for children and young people and for housebound patients. In 2020–2021, OPAT services in England were reported to have treated almost 16,000 patients, avoided an estimated 280,000 bed-days and generated £35–45 million in efficiency savings. Such capacity gains directly support key NHS priorities including improved A&E and planned elective care waiting times. These data illustrate the opportunity cost of under-provision.[44]

## 4c. Caring for Children with Infections

Infection accounted for 15% of all child deaths in England (approx. 1,507) between April 2019 and March 2022. In 37% (n=553) of these deaths, the infection was thought to be a complete and sufficient explanation of death (6% of all child deaths). In England, there are 12 hospitals with Paediatric Infectious Diseases (PID) services providing for a population of 12 million (21% of the total population).[46]

### Who Cares for Children with Infections?

Children require paediatric infection specialists as they experience a different pattern of infections to adults as their immune systems mature. Some secondary care general paediatricians have additional credentialling in ID. However, children with complex and rarer infections receive care from PID specialists based at tertiary centres including children's hospitals. In England, the 12 hospitals with PID services consult and look after patients across tertiary settings, as well as providing specialist advice to secondary paediatric services in their region. In most hospitals infection specialists in liaison roles such as clinical microbiologists will provide advice to GPs and paediatricians caring for children.

### Case Study of Good Practice

The NHSE HCID (Airborne) Network illustrates good practice in integrating paediatric and adult care within one specially-commissioned network. It has proved invaluable in recent years as England experienced its first cases of paediatric HCID cases, when the children's parents also had the same infection, requiring co-located admission with coordinated care from both adult and paediatric infection specialists.

### Training in PID

The three-year specialist training in PID (which is also combined with immunology) begins after a four-year core programme common to all paediatric subspecialties. This highly specialised training builds on the holistic breadth of earlier experience enabling paediatricians working in PID to competently cover a wide range of clinical areas.

### What do PID Teams Do?

PID subspecialists work in multidisciplinary teams with Clinical Nurse Specialists (CNSs) and PID pharmacists. They are usually also specialised in paediatric immunology. Much work by PID specialists is preventive in nature, working with IPC teams and through paediatric AMS. Increasingly, this involves supporting preventive efforts in secondary and primary care, through education, governance and advice. The work of PID specialists is highly diverse and complex and includes:

- Caring for children with severe, unusual or complex infections.
- AMS with other specialties.
- Prevention and management of perinatal infection.
- Pandemic preparedness and care of children with an HCID.
- Prevention and treatment of viral hepatitis.
- Prevention and management of paediatric HIV.
- Care for children exposed to and infected with TB.
- Testing and treatment of migrant children with infection.
- Management of autoinflammatory conditions (e.g., Kawasaki disease).
- Vaccine support to primary care and public health teams.
- Advice and guidance to primary care and general paediatrics (e.g., for unexplained fever or unusual infections).
- Paediatric OPAT and COpAT.
- Paediatric-specific input to IPC teams.
- Leadership for local and regional clinical guidelines (aligned to NICE where possible).

### Case Studies: The 'Klick' App and the London HIV GP Champion Project

Innovative models are reshaping service delivery. The 'Klick' app at Chelsea and Westminster Hospital NHS Foundation Trust enables nurse-led virtual HIV care with excellent outcomes. Nurses met British HIV Association Standards of Care (documenting vital signs, prescriptions, viral load, etc.) for 40 audited patients, safely managed moderately complex cases (comorbidities, polypharmacy) with zero escalations, and 100% of those patients remained virally suppressed. Digital tools also let patients book appointments, track tests and get reminders, reducing missed visits.[48,49]

The London HIV GP Champions pilot demonstrates how primary care leadership can drive improvements in HIV prevention, testing and long-term care from within primary care settings. Across February 2024 to May 2025, 16 GP Champions helped increase HIV testing, train over 2,000 primary care staff to reduce stigma, and improve collaboration between GPs and HIV specialists, demonstrating the value of sustained investment in community-based HIV care.[50,51]

## 4d. Caring for People with HIV

The care of people with HIV in England is delivered through a broad, multidisciplinary team model that integrates clinical expertise, psychosocial support, and community outreach. Teams include genitourinary medicine (GUM)/sexual health physicians (the most recent curriculum leading to dual-accreditation in HIV and General Internal Medicine), ID consultants, clinical microbiologists/virologists, specialist nurses, pharmacists, psychologists, and peer-support workers. This holistic approach has been instrumental in achieving the UK's world-leading HIV outcomes, including exceeding the UNAIDS 95-95-95 targets with 95% of people living with HIV being diagnosed, 98% of those diagnosed being on treatment and 98% of those on treatment having an undetectable viral load.[47]

Specialist physicians in HIV manage complex treatment plans, co-infections, and lead clinical decision-making. Alongside them, HIV CNSs play a central role in coordinating care. They run nurse-led clinics, provide adherence counselling, and often lead outreach services. Pharmacists ensure safe prescribing of antiretroviral therapy (ART), manage drug interactions, and support medication adherence, including for patients on long-acting injectable regimens, in both in- and outpatient settings. Specialist pharmacists may also deliver clinics in some settings. GPs are increasingly involved through shared-care models in some regions. This approach deinstitutionalises care, reduces hospital pressures, and supports integration with routine

health screening and prevention.

Multidisciplinary care is formalised through multidisclipinary team (MDT) meetings and shared-care plans. Service specifications encourage flexible delivery, including virtual consultations, co-located clinics, and seamless referral pathways to mental health, social care, and other specialties. Programmes like London's Fast-Track Cities and National HIV Testing Week demonstrate how cross-sector collaboration can boost testing, prevention and engagement, particularly in underserved groups.

### 4e. Caring for People with Sexually Transmitted Infections

Sexually transmitted infections (STIs) remain a major and growing public health challenge in the UK, with record new diagnoses recorded in recent years in gonorrhoea, syphilis and chlamydia; increasing AMR; persisting health inequalities affecting young people, men who have sex with men, and ethnic minority communities. Specialists sitting at the interface of individual clinical care, population health, infection prevention and health protection form a key component of the response.

STI care is delivered predominantly through integrated sexual health services, led by GUM consultants, supported by specialty doctors, specialist nurses, sexual health advisers, pharmacists, and clinical scientists, and delivered in close partnership with public health, primary care and community organisations. GUM specialists bring essential expertise in diagnostics, AMS, outbreak response, and partner notification and surveillance, particularly as treatment-resistant organisms and atypical presentations become more common.

## Case Study: Gonorrhoea Vaccination

In response to rising AMR in gonorrhoea, local authorities began rolling out the world's first gonorrhoea vaccination programme in 2025, delivered through specialist sexual health services and putting into practice an intervention long advocated for by the sexual health workforce and voluntary sector organisations.[52] The programme offers a vaccine to people at highest risk of gonorrhoea, through local authority-commissioned sexual health clinics, alongside routine STI testing, treatment and partner notification. The rollout is explicitly positioned as a response to both rising infection rates, the growing threat of antibiotic-resistance, and as a practical example of shifting from treatment of infection to prevention. The programme illustrates how specialist-led sexual health services effectively function as a key part of the UK's AMR and public health infrastructure, but also highlights that they must be consistently provided with resources to do so.

### 4f. Caring for People with TB

**Specialist Networks for Drug-Resistant TB and Complex Mycobacterial Infection**

After several years of decline, TB incidence in England has risen for the past couple of years. The 2025 UKHSA report gives an incidence of 9.4/100,000, an increase of 13.6% on the previous year.[53] The UK is at risk of losing its World Health Organization status as a low TB incidence country (<10 cases per 100,000 population).[53]

Patients with TB are managed in different models of care throughout the UK. Respiratory and ID physicians often work together, supported by CNSs who work across hospitals and in the community, often visiting patients at home to support their treatment. Public health specialists are also involved in IPC and outbreak management. Despite rising numbers of TB cases, many TB and infection services only see a small number of patients, often with complex needs.

While OPAT services enable many patients with serious infections to receive prolonged antimicrobial therapy outside hospital, some infections require access to additional specialist expertise delivered through national collaborative networks. Drug-resistant TB and complex non-tuberculous mycobacterial (NTM) infections are among the most challenging infections managed within the NHS and illustrate how infection specialists support patients and clinicians through coordinated national expertise.

Multidrug-resistant tuberculosis (MDR-TB) remains a complex infection requiring specialist management, laboratory diagnostics and multidisciplinary oversight. Advances in treatment have significantly improved care, with modern regimens now commonly using shorter all-oral treatment courses of around 6–9 months, incorporating newer or repurposed agents such as bedaquiline, linezolid and pretomanid. These regimens avoid the need for prolonged injectable therapy and allow most patients to be managed through specialist outpatient and community TB services. Despite these advances, treatment requires careful monitoring for drug toxicity, adherence and treatment response.

NTM infections are also increasingly recognised in the UK, particularly among patients with bronchiectasis, immunosuppression and complex medical conditions. Extra-pulmonary NTM infections, including skin and soft tissue disease, prosthetic joint infection, bone infection and

## Case Study: British Thoracic Society

The British Thoracic Society MDR-TB Clinical Advice Service provides multidisciplinary expert advice for clinicians treating drug-resistant TB across the UK. Through national case discussions, the service supports treatment regimen design, interpretation of drug susceptibility testing and monitoring of complex antimicrobial therapies, enabling patients to receive specialist input while continuing care locally.[54]

A similar model is being developed for extra-pulmonary NTM infection. The Extra-Pulmonary NTM Working Group within NTM Network UK is establishing a national multidisciplinary advisory service to support clinicians managing complex extra-pulmonary NTM disease. This emerging national MDT will bring together infection specialists, clinical microbiologists and pharmacists to provide expert guidance on diagnosis, antimicrobial therapy and management of these rare infections.

Networked services such as these improve consistency of care, support clinicians managing uncommon infections and allow patients to receive specialist advice while continuing treatment within their local healthcare systems.

disseminated disease in immunocompromised patients, are uncommon but highly complex. Management often requires prolonged multidrug therapy, specialist interpretation of microbiological diagnostics and coordinated input from infection specialists, clinical microbiologists, pharmacists and surgeons.

**National Specialist Advisory Networks**

Because MDR-TB and complex NTM infections are relatively rare but highly specialised, national advisory networks help support clinicians managing these conditions.



# 5. Preventing and Managing Imported Infection



**A Breadth of Specialist Expertise is Required to Manage Imported Infection**

With increased global travel, complex migration routes, and the impacts of climate change, the UK faces a rising influx of imported infections – from common imported infections such as malaria, dengue and typhoid, to the occasional high-consequence threat like Ebola, Lassa or MERS, and increasingly prevalent chronic parasitic infections such as cystic and alveolar echinococcus.

Preparing for and managing these infections requires a breadth of specialist expertise and a coordinated approach. Multidisciplinary infection teams lead this effort, comprising ID or tropical medicine clinicians; clinical microbiologists and virologists; clinical and biomedical scientists; specialist nurses; pharmacists; epidemiologists and public health specialists. These professionals operate across various settings: frontline in ID or GP clinics for initial recognition, in specialist referral centres (e.g., SRIDCs or Tropical Medicine/ Parasitology Centres), and within the Diagnostic and Reference Laboratory Network (e.g., UKHSA's Rare and Imported Pathogens Laboratory (RIPL) and the Malaria Reference Laboratory (MRL)) that enables rapid confirmation of hazardous and other pathogens, develops new diagnostic and surveillance methodology and monitors national epidemiology.

**Keeping Pace with Global Threats**

The UK remains a key setting for diagnosis, management and prevention of imported infection, with new and emerging infections, AMR and rises in immunosuppressed patients increasing both risk and complexity in management. Imported infections include those with a period of latency, such as TB and blood-borne viral infections, but also parasitic infections including malaria, schistosomiasis, strongyloides, Chagas (American trypanosomiasis) and cystic and alveolar echinococcus. For some of these, screening is a key intervention which has its own workforce demands across a range of settings. For others, management via MDT working linked to nationally commissioned specialist services

## Case Study: The Imported Fever Service

The UKHSA Imported Fever Service (IFS) is a national resource providing 24/7 expert clinical advice and diagnostics for clinicians managing returned travellers with fever.[56] IFS provides a rapid, coordinated route for NHS infection specialists to obtain subspecialist advice, risk assessment, diagnostics, IPC, and escalation pathways for suspected high-consequence or unusual imported infections. IFS is the clinical interface of the RIPL, a UK Accreditation Service (UKAS) accredited national diagnostic laboratory providing testing for a broad range of rare, hazardous and imported pathogens, and operating in close partnership with the HCID network and tropical medicine and parasitology centres.[57] Feedback and shared learning delivered at scale through weekly teleconferences and national MDTs supports consistent decision-making across regions and shares expertise beyond specialist centres.

is essential for the optimal management of rare diseases. Variation in outcomes (e.g., in patients presenting with severe malaria) demonstrates the need for resilient, networked expertise and equitable access to best practice and diagnostics.

Climate change is predicted to exacerbate over half of known human IDs, meaning vector-borne diseases such as Dengue or West Nile virus will be able to affect areas of the UK.[55] Adapting to this new reality will require infection specialists to work closely with public health authorities on surveillance, readiness to diagnose and contain outbreaks, and ongoing development of counter measures such as vaccines. This will require adaptation of surveillance systems for vectors and infections, preparedness for outbreaks of disease and continued development of medical countermeasures such as vaccines.[1]

## Case Study: A Pre-travel Service Evolving to Prevent Infections in Immunocompromised Patients at Home and Abroad

Bespoke travel advice on vaccination and other ways to prevent infection is important for the increasing numbers of people on long-term immunocompromising therapy to treat underlying autoimmune conditions, living with cancer or post-transplantation. The UCLH Hospital for Tropical Diseases delivers this for NHS patients. Clear guidance and support to referring clinicians nationally is evolving through networks and national MDTs.

This requires infection-specialist doctors and nurses to deliver care, but also to develop and train the wider infection-specialist and pre-travel workforce on this increasingly complex area.[58]

Figure 4: Expecting mother receiving RSV vaccine at UCLH.

Figure 5: HCID simulation exercise at Newcastle Hospitals NHS Foundation Trust



# 6. Preparing for a Future Pandemic



**The Pandemic Readiness Workforce**

Future epidemics and pandemics are predictable in concept even if their timing is not: the UK has experienced five pandemics in the last 75 years (COVID-19, HIV, and three involving influenza) alongside multiple major epidemics, including Ebola and Mpox. Effective early control depends on controlling the primary route of transmission (respiratory, sexual, oral, direct contact, vector-borne) until diagnostics, drugs and vaccines can be developed and scaled up.[1]

Pandemic preparedness is delivered by a broad infection-specialist team, spanning ID physicians, clinical microbiologists, mycologists and virologists, IPC nurses, clinical scientists and biomedical scientists, specialist pharmacists, epidemiologists and public health specialists, data analysts, and UKHSA and reference laboratory colleagues.

**From Surveillance to Surge Response**

A pandemic remains the top risk on the UK's national risk register; maintaining an ability to respond to at least moderate-sized threats is and always will be prudent. Readiness for the recognised HCID pathogens builds resilience for novel pathogens of uncertain severity while pathogen understanding is developed, as happened early in the COVID-19 pandemic in 2020. Key preparedness functions include: maintaining HCID readiness (so if a novel pathogen appears, staff know how to assess, don PPE, isolate the patient and follow HCID transfer protocols);[59] having consistent IPC standards and PPE guidance across the country to protect staff and patients; ensuring specialist diagnostics and reference laboratory services can handle sudden large volumes of testing; and having robust surveillance systems and genomic sequencing to track the spread and evolution of the pathogen in real time.

The role of the infection specialist in this response is crucial. Expert input from those subspecialised in different infections, including fungi and vector-borne infections, is vital for the specialist leadership which includes disseminating information and training to the wider healthcare providers. System resilience within the NHS and UKHSA is paramount, including innovative staffing models (e.g., joint appointments across multiple sites or organisations), which can spread expertise and allow for surge staffing during outbreaks. It is vital that routine diagnostic laboratories maintain expertise, resource and capacity to scale up when needed. Exercises are a critical part of maintaining this readiness, with national simulation exercises to ensure preparedness and fix gaps before a real event.

## Case Studies: Exercise PEGASUS and The COVID-19 Genomics UK (COG-UK) Consortium

### Exercise Pegasus

Exercise PEGASUS was a UK-wide 'Tier 1' pandemic exercise that ran September–November 2025, led by the DHSC and delivered with UKHSA. Infection specialists working across these agencies and the NHS were key to the delivery of this exercise. It was the largest simulation of a pandemic in UK history to test end-to-end pandemic processes across multiple government agencies and components of the health service including specialist hospitals, diagnostic laboratories and community settings. It aimed to identify where workforce, logistics, and data pathways must be strengthened before a real event. A recovery phase and full evaluation report is due in 2026.[60–62]

### The COVID-19 Genomics UK (COG-UK) Consortium

COG-UK was a collaborative effort between 16 academic institutions, the UK's four public health agencies of England, Scotland, Wales, and Northern Ireland, the Wellcome Sanger Institute, four Lighthouse Labs and 79 NHS Trusts. It was established to provide UK ability to sequence and understand different variants of SARS-CoV-2 and their impact, to inform policy and public health decisions. The linkage of genomics data to epidemiological and patient outcomes data informed medical innovation efforts, public health policy, evaluations of vaccine efficacy and COVID therapeutics. COG-UK builds on the UK's strengths in pathogen genomics, population health sciences and health informatics, and its impact extends beyond the UK's borders, with the potential to significantly bolster the UK's ability to prepare and respond to future ID threats.[63]



# 7. Training the Next Generation of Infection Specialists



### Doctors Training as Infection Specialists

The infection-specialist workforce needs doctors with the breadth of skills required to work across hospital, community, laboratory, and public health settings.[2]

UK postgraduate doctors wishing to become infection specialists apply to enter Combined Infection Training (CIT) after Internal Medicine training or equivalent. CIT is designed to produce specialists competent across ID, medical microbiology and medical virology by integrating clinical and laboratory training into all programmes.[64] After CIT, trainees branch into Higher Specialty Training (HST) in their chosen dual or single specialty to gain their Certificate of Completion of Training (CCT). There are several training pathways reflecting different combinations, including ID with Internal Medicine, ID with Medical Microbiology, ID with Medical Virology, or single specialty training in Medical Microbiology or Medical Virology.[64] A small number of ID doctors pursue further training to gain a Tropical Medicine CCT, combined with Internal Medicine, Medical Microbiology or Medical Virology, which provides specialist training in the UK and overseas after completing additional competencies.[66] It is also possible to become an infection specialist as a SAS (specialty, associate specialists and specialist) doctor via the General Medical Council (GMC) portfolio pathway.[67]

For doctors training to become paediatric infection specialists there is a joint-training pathway for allergy, immunology and infectious diseases following core paediatric training, with trainees having one primary area of interest, but gaining their CCT in all three areas.[68]

There is currently no recognised training pathway or specialist sub-accreditation in IPC, unlike in the USA and Canada, and now emerging across parts of the EU. In the UK, most IPC expertise is still acquired informally through ID and microbiology training curricula.[69]

Doctors wishing to become GUM and HIV specialists need to complete three years of General Internal Medicine (GIM) Training Stage 1 (IMT 1-3) and then apply for and enter GUM/GIM Higher Specialty Training at ST4. GUM and GIM Training Stage 2 is four years (ST4-7). GUM or STI care is delivered by those with a CCT in GUM. HIV care can also be delivered by those with a CCT in GUM or ID.

Many infection trainees anticipate working less than full time (LTFT) as consultants.[65] Training design and consultant roles must accommodate LTFT working to support retention, wellbeing, and long-term service resilience.[70] Additionally, modern training should prepare doctors for greater career flexibility – for instance, combining clinical practice with research, education, or informatics roles.

One of the central ambitions of the NHS 10 Year Plan is to reduce inequalities in health outcomes. Infection disproportionately affects populations living in areas of higher deprivation. Yet these same areas frequently face the greatest challenges in recruiting infection specialists and are less likely to host training posts. This misalignment results in inequitable access to on-site infection expertise, further widening variation in infection management and outcomes.

To address this, consideration should be given to the strategic redistribution of training opportunities. Expanding infection training placements beyond traditional tertiary centres into district general hospitals, particularly those serving underserved

populations, would help mitigate workforce disparities, strengthen local specialist provision, and promote more equitable standards of care.

### Infection Scientist Training

In the UK, Clinical Scientists that have completed the Scientific Training Programme (STP) are eligible to apply for the Higher Specialist Scientific Training (HSST) programme to progress to consultant-level practice.[38] Senior biomedical scientists can also apply if they fulfil certain criteria.[38] Trainees can apply to Microbiology, Virology or Molecular Pathology of Infection to complete the HSST programme and gain a Certificate of Completion of Higher Specialist Training, entering the Higher Speciality Scientific Register (HSSR). The HSST is a doctorate-level qualification combining a postgraduate diploma in Healthcare Leadership and Management, with original doctorate-level research and Royal College of Pathology examinations.[38] Training posts for STP are limited, and frequently oversubscribed, with 675 applications for five posts in 2024.[71]

Laboratory diagnostic services are largely delivered by biomedical scientists, with services in England delivered through consolidated networks. Biomedical scientists are increasingly reporting laboratory results in line with agreed algorithms to improve patient care.[72] However, it is important to note that there has been a widespread loss of specialised scientists in pathology due to cost and efficiency savings which reduces the number of available scientists who could develop their careers in a clinical direction.[73]

### Infection Pharmacist Training

Curricula and credentialling-frameworks for pharmacist post-registration education and training are available, but they are not embedded within the NHS in the same was as physician training pathways; thus, their use is often driven by enthusiastic individuals and managers. The Royal College of Pharmacy (previously Royal Pharmaceutical Society)[74] has established credentialling pathways for enhanced, advanced, and consultant-level practice which offer a structured approach to overall professional development.[75] However, there is currently no established infection-specialist route like there is for Critical Care and Mental Health. This lack of uniform approach means that competency and capability development differ between individual pharmacists and organisations. While diverse and flexible career opportunities are positive and allow pharmacists to move to different specialist areas, the lack of embedded professional development and career pathways for pharmacists poses a risk of unstructured development of those starting in infection roles. Infection-specialist pharmacists are vital for optimising the use of antimicrobial therapies in increasingly complex clinical scenarios, while leading on important governance, particularly with regards to AMS.[76]

### Specialist Pharmacy Technician Training

Pharmacy technicians have worked within ID and AMS services for many years, but professional development and training frameworks and programmes are lacking; more so than they are for pharmacists. There is a national competency framework for primary care pharmacy technicians,[77] but no established framework for those working in infection services. That said, pharmacy technicians are capable of working to high levels of practice, acting as service managers for pharmacy departments and aseptic dispensing units.

### Infection-Specialist Nurse Training

There are several routes within infection for experienced nurses to expand their roles: registered nurses who develop their knowledge, skills and behaviours in a particular speciality can progress to different levels of nursing up to Nurse Consultant.[78] Within infection, these specialist roles include, for example, IPC nurses, AMS nurses, OPAT nurses, BBV nurses, TB nurses, paediatric infection nurses and HCID nurses.

While there is a more formal training programme developed for IPC nurses,[79] progression into nurse specialist roles in infection are not well defined and are usually also driven by enthusiastic individuals and managers. Their roles are central to infection teams providing experienced clinical support and continuity of care to patients. Nurses play a key

#### ST6: Infectious Diseases with Medical Microbiology

I hope to work as a consultant in a tertiary centre with an HCID unit, with a patient-facing ID role, in addition to a laboratory associated medical microbiology role. I would like part of my role to be as an educator in medical education, and in an NHS adjacent role within public health.

#### ST5: Infectious Diseases and General Medicine

My ambition is to work as an infection and acute medicine consultant in a centre with strong academic links, continuing an academic training pathway with a PhD and hopefully subsequent clinical lectureship. My interests are in understanding host-pathogen interactions, and tailoring diagnostics and therapeutics using ‘omics technologies.

#### ST7: Infectious Diseases with Medical Microbiology

I’m keen to find a consultant post where I can utilise both areas of my training, assessing the patient clinically as an Infectious Diseases specialist while liaising closely with the lab as a Medical Microbiologist. I’m interested in working in a district general hospital where there are plenty of opportunities for antimicrobial stewardship, OPAT development and infection consults. Outreach to marginalised groups is a passion of mine and I hope my future job can include the development of clinics and services to improve patient care, while continuing my interests in medical education.

role in AMS through care given to our hospital inpatients, observing and alerting to clinical changes (deterioration or improvement) and ordering investigations and administering treatments (including IV antimicrobials). Increasingly, nurses have gained specialist roles, notably in OPAT/COpAT and in acute care delivery in both hospital and community care. Specialist nurses as independent prescribers are prescribing a significant proportion of antibiotics in the community as well as in hospital practice: nurse prescribing accounts for around 15% of community prescribing in Scotland. Nurses also administer antibiotics widely as part of Patient Group Directions. Despite their extensive involvement in the antimicrobial prescribing process, there is little national recognition of the need to develop specialist nursing AMS roles across Trusts or in ICBs. Developing this role nationally would be a key step to engage the wider nursing workforce to enable optimisation of AMS in both hospitals and the community. Specialist AMS nurses are currently a crucial missing part of Trust multidisciplinary AMS teams.

### Innovative Training and Employment Models

Networked pathology and infection service models, operating across regions rather than single organisations, reflect NHS service transformation and workforce priorities to modernise training, support collaboration, and improve sustainability.[2] Regional infection training and the development of CIT for infection physicians allows trainees to gain experience across microbiology, virology, IPC, and specialist ID services, preparing them for consultant roles spanning clinical care, diagnostics, leadership, and systemwide infection management.

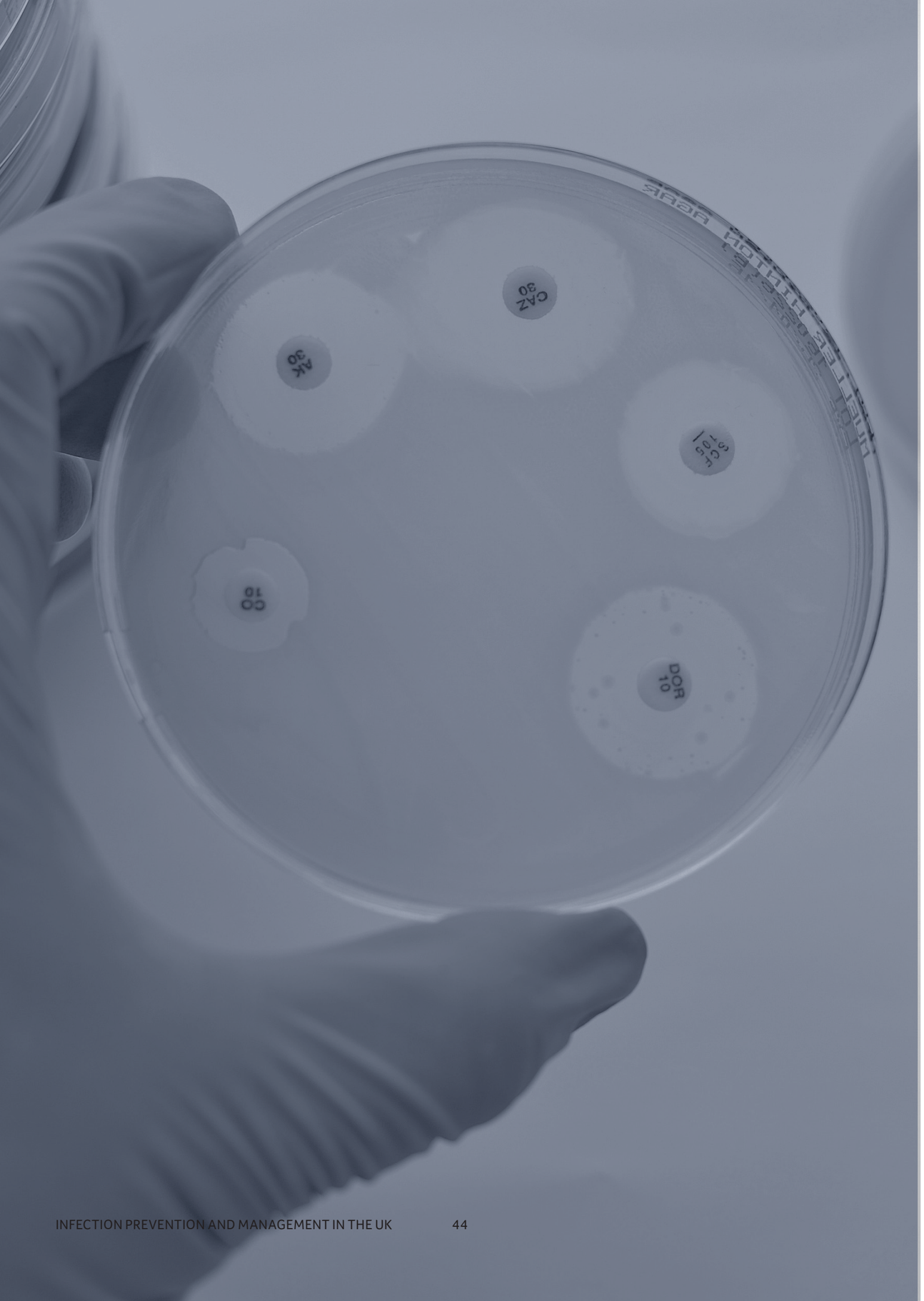
## Case Studies

1. With challenges in recruitment of clinical microbiologists to district general hospitals within the South Yorkshire and Bassetlaw Pathology network (SYBP), an innovative consultant role was drawn up in partnership with the regional ID unit based in Sheffield. Two joint consultant posts were advertised in late 2024, rotating between the microbiology department in Rotherham DGH and the ID unit in Sheffield. The successful candidates had completed joint training in ID and medical microbiology, and now work as consultants in both departments, alternating every two months. A further consultant microbiology post has since been appointed at Rotherham, expanding the consultant capacity to two whole-time posts. There is enthusiasm to replicate this model both from other hospitals within the SYBP network, and from trainees who value the opportunity to continue to use all the clinical skills developed during their training in infection.

2. The NHSE capability framework (Figure 6) for AMS specialists provides a professional development and career pathway for all professional groups, from their first day in an AMS role through to consultant-level practice, regardless of sector of practice.[80] While developed for NHSE, this framework will be applicable to healthcare professionals across all UK nations.

3. The Healthcare Infection Society (HIS) and UKHSA developed a Foundation Course in IPC aligned to the NHSE IPC Education Framework for infection trainees and other medical professionals to develop their knowledge in IPC. This is available on demand and with live sessions to improve accessibility.[81]


Figure 6: The Capability Framework for AMS Specialists. The development was led by the British Society for Antimicrobial Chemotherapy (BSAC), and commissioned by NHSE England. Figure provided by BSAC, and also appears at page 182 of the ESPAUR2025.





# 8. Infection Specialists in Research



### Staying Ahead of Evolving Infections

Infections are an evolving threat, with pathogens adapting to existing treatments and prevention measures and new infections emerging. Maintaining a research-active infection workforce is essential to drive innovation and protect patients and public health. The UK has a strong track record in ID research and practice across diverse settings, and this capability will be increasingly important for UK health security in the coming years.[1]

### Clinical Academia in Infection

Nearly 13% of doctors training in infection specialties are working as clinical academics.[82] Time out of programme to complete research (OOPR) is common, with around 12% of trainees out of programme at any moment, and more than half of those do so without holding a formal academic training number. This reflects deliberate academic integration: infection-specialist doctors often pursue research (higher degrees or fellowships), with dual clinical–academic roles funded by the National Institute for Health and Care Research (NIHR) and university posts. Such hybrid posts help rapidly translate research into practice and accelerate innovation. For example, during COVID-19 the UK led globally in genomic sequencing and clinical trials aided by academic networks embedded within frontline infection expertise. The Chair and other members of the Joint Committee on Vaccination and Immunisation (JCVI) were paediatric infection vaccine experts, and led the majority of UK-funded and commercial COVID vaccine trials during the pandemic period (with the associated development of a new national network of vaccine-trial capable centres that led to the NIHR Vaccine Innovation Pathway).

Clinical Scientists have a significant academic component to their training, with consultants possessing PhD or doctorate-level qualifications. As such, they are often deeply involved in infection research, both at a laboratory level, but also in contributing to more clinical aspects. Integration of academic roles into clinical pharmacist jobs is not established and many infection-specialist pharmacists report barriers to supporting and undertaking research – including undertaking formal research training or qualifications. A small number of infection pharmacists hold academic posts but mainly in teacher practitioner roles within which research time is not allocated, or expected. NIHR now recognises pharmacists as an under-supported group and is focusing on this profession for several funding streams (see below). The UK Clinical Pharmacy Association (UKCPA) Infection Network is now undertaking national evaluation projects to upskill the workforce, while the National AMS Pharmacy Education group is undertaking research to improve infection, AMR, AMS and IPC education at a national level.

### Strengthening Infection Research Capacity Across the Whole Workforce

Infection research forms a substantial component of NIHR delivery research,[83] representing substantial efforts from a whole research team (nurses, pharmacists, laboratory support). Formal research time or career posts remain rarer for many nurses, midwives, allied health professionals, psychologists, pharmacists and healthcare scientists (NMAHPPs).[84] We support expansion of academic careers across the country in all professional groups, encouraging and funding more nurses, pharmacists and clinical scientists to take on Principal Investigator roles or

pursue further degrees or advanced fellowships in line with DHSC and the Academy of Medical Sciences national policy calls.[85,86]

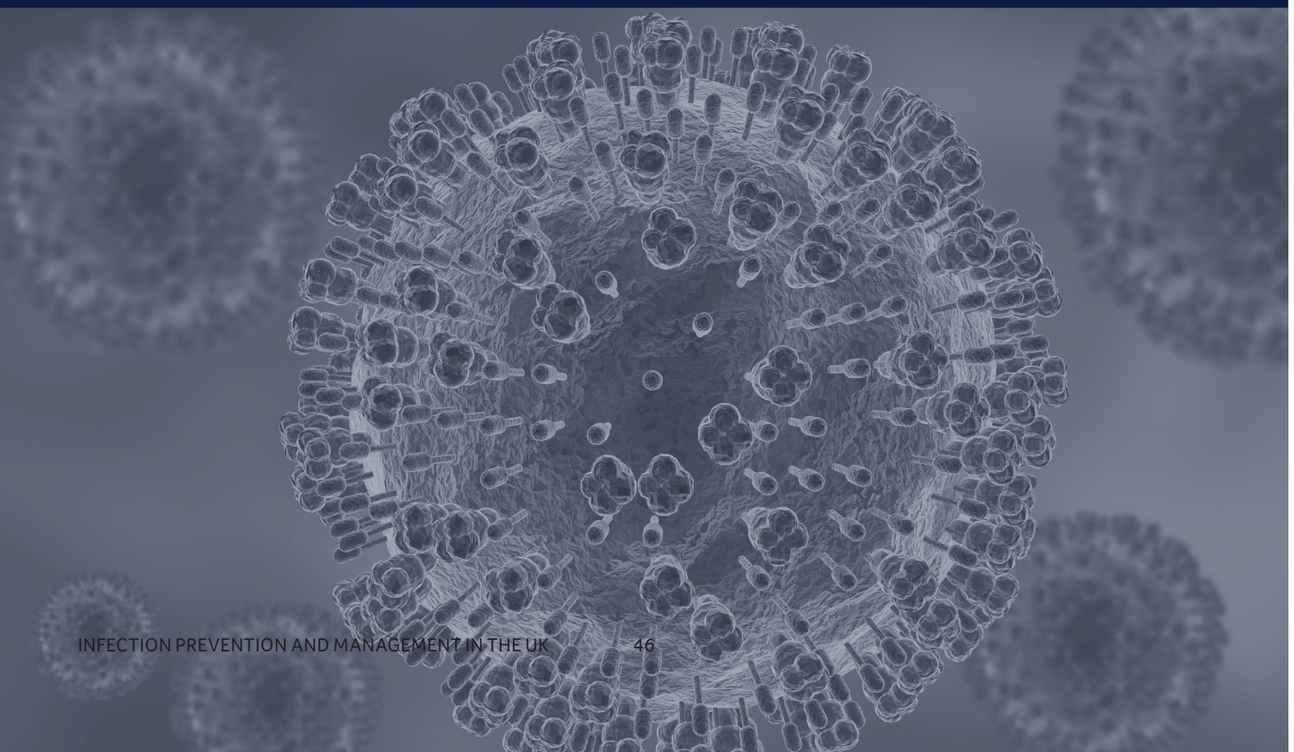
## Case Studies: The RECOVERY Trial and the SNAP Trial

### The RECOVERY Trial

The RECOVERY trial epitomises successful NHS–academic collaboration. Led by Oxford academics, including ID physicians wih the NIHR, it enrolled tens of thousands of hospital patients with COVID-19, producing practice-changing results within months. At its height RECOVERY involved many thousands of doctors, nurses and pharmacists at 176 UK hospitals.[87] The RECOVERY partnership linked hospital Trusts, the NIHR Clinical Research Network and public health agencies, demonstrating how research embedded in routine care (e.g., using NHS digital records for outcome data) can swiftly improve treatment – within months dexamethasone showed a mortality benefit which was estimated to save over one million lives worldwide.[88]

### The SNAP Trial

SNAP is a global trial on *S. aureus* bloodstream infection currently recruiting in the UK and funded by the NIHR. 22 Sites across 32 hospitals in the UK are participating across both paediatric and adult settings. Results have been presented internationally and are expected to change the first-line choice of antibiotic in this common disease. The mortality of this condition is unacceptably high and working together as infection specialists has enabled collaboration and engagement.[89]





# 9. Infection Specialists Working in Public Health

### The Infection-Specialist Workforce behind UK Health Security

The UKHSA is the government agency dedicated to protecting the public from IDs and environmental hazards. UKHSA provides scientific and operational leadership with local, national and international partners to build the nation's health security.[90] Achieving this mission relies on a multidisciplinary workforce, including experts in ID, microbiology, virology, mycology, epidemiology, public health, statistics and data analysts, and many others (including experts in non-human infections and zoonoses). Each specialist role plays a crucial part in detecting threats, analysing data and advising on control measures.

### Delivering Health Protection Locally through Integrated Teams

UKHSA works closely with NHS services and local authorities. In each region, UKHSA's Health Protection Teams (HPTs) lead outbreak response and prevention locally. HPTs provide specialist support 'to prevent and reduce the impact of infectious diseases, chemical and radiation hazards',[91] maintaining disease surveillance and alert systems. They investigate outbreaks and liaise with NHS Trusts and councils to implement control measures (for example, contact tracing or vaccination clinics). UKHSA specialist laboratories likewise support the NHS: they offer advanced diagnostics, reference testing and surge capacity during outbreaks, and their clinical scientists advise hospital microbiologists on infection control, important and emerging pathogens and outbreaks. In practice, UKHSA epidemiologists, analysts and laboratory teams work alongside NHS clinicians to run screening and surveillance programmes, vaccination campaigns and infection-control protocols in both community and hospital settings.

### Academic Partnerships and Joint Roles

UKHSA amplifies its impact through strong links with academia and flexible job plans that allow cross-fertilisation of ideas. It co-leads NIHR Health Protection Research Units (HPRUs). These partnerships with universities are NIHR-funded centres focusing on priority topics such as AMR, emerging infections, or vaccine-preventable disease. Findings from HPRUs flow back into UKHSA operations, driving innovation in surveillance and response. Many UKHSA infection consultants hold joint or honorary appointments in NHS Trusts and universities, ensuring research is rapidly translated into practice, and flexibility in working allows for surge capacity during outbreaks. UKHSA encourages its staff to pursue academic development, with many taking up NIHR fellowships or higher degrees, keeping the workforce at the cutting edge of science.

## Case Studies: Mpox and Measles Outbreak Responses

### Mpox

UKHSA was the first in the world to detect the emerging mpox cluster in 2022 and immediately alerted global health partners. Clinical cases were initially managed within the specialised HCID network. A multidisciplinary team of UKHSA epidemiologists, laboratory scientists, infection-control experts and communications specialists then rapidly characterised transmission and disease progression, plus secured vaccine supplies. Meanwhile, NHS sexual health and community services partnered with UKHSA to deliver vaccines and targeted advice to at-risk groups. As UKHSA noted, the 'public… the NHS, public health professionals and third sector organisations… sprang into action and worked hard to bring down mpox cases'.[92]

### Measles Outbreak Response

The UK is currently facing a significant threat from a resurgence of measles. Outbreaks continue to pose significant challenges and require close partnership between UKHSA and NHS services to respond. A prior outbreak in a paediatric ED department in Birmingham led to 366 patients attending ED for measles testing, 161 confirmed cases, and 2,397 exposures. Once this was announced as a national incident by UKHSA, support for the response included enhanced diagnostics, patient information and communications/ messaging resources, community vaccination initiatives, and expertise in the understanding of social deprivation and poverty influences on the outbreak. The ability to deliver health protection locally through integrated teams with national support is imperative to respond to such a highly infectious pathogen.[93]



# 10. Infection Specialists Working in Scotland

While the 10 Year Plan is an NHSE project, the context in the devolved nations of the UK is equally relevant to this report. In Scotland, the infection-specialist workforce sits at a particularly critical juncture. The ambitions of the Scottish Health and Social Care Service Renewal Framework align closely with the UK-wide vision for healthcare shifts to community-based care, focusing on prevention while capitalising on digital developments.[94] Within Scotland however, service structures, workforce capacity and training integration have not progressed sufficiently to meet these strategic goals.

Infection services in Scotland remain too fragmented across clinical care, diagnostics, IPC and public health. These functions collectively draw on the same limited pool of highly-trained specialists but are often governed, planned and resourced separately. This lack of integration limits the system's ability to prioritise effectively, adapt to increasing demand and fully utilise the broad skillset of the infection workforce.

Training pathways have evolved significantly, particularly with the introduction of CIT, producing clinicians with capabilities spanning clinical and laboratory practice. However, there has been inadequate parallel development of integrated service models delivering opportunities for dual-trained individuals. As a result, there is uncertainty around future workforce deployment, underutilisation of skills and a risk that Scotland may not fully benefit from its investment in training. Aligning service design with modern clinical and scientific training pathways is essential.

Workforce sustainability is a particular concern.[95] Numerous and prolonged vacancies with consequent service restrictions further hinder progress with reforms. Infection specialists in Scotland work across multiple domains, often with unclear role boundaries and increasing workload. Combined with the legacy impact of the pandemic, this has affected wellbeing, retention, the attractiveness of the specialty and ultimately impeded the necessary service reforms.

National coordination of activity represents a further area of inconsistency. OPAT services in Scotland have expanded in a coordinated way with substantial impact in line with renewal framework ambitions.[96] On the other hand, HCID capability represents a considerable concern owing to absence of both infrastructure and a fit-for-purpose network in Scotland.[97] Comprehensive national oversight of the infection workforce is lacking; current workforce data and activity measures do not adequately reflect the breadth and complexity of infection-specialist roles, particularly non-patient-facing contributions such as system advice, outbreak management and service leadership. This contributes to under-recognition of workforce pressures, and again serves to limit effective strategic planning.

To deliver on Scotland's ambitions for healthcare reform, infection services must be re-envisioned as an integrated, systemwide core component. This requires:

- Nationally directed and coordinated expansion and restructuring of the workforce to reflect the full multidisciplinary infection workforce, including medical, scientific, nursing and pharmacy roles.
- Alignment of training and service models, incorporating diversity into roles such that those

completing infection training can fully utilise their skills across clinical, diagnostic and preventive domains.

- Development of integrated infection service networks across NHS Boards and Partnerships with clearer governance and prioritisation, e.g., HCID infrastructure/ capability.
- Investment in workforce wellbeing and retention, recognising the sustained pressures on infection services.
- Improved data and metrics to capture the true scope and impact of infection specialists' work.

Without urgent and coordinated action, there is a risk that workforce constraints and structural fragmentation will undermine Scotland's ability to respond to current and future infection threats. Conversely, a strategic, integrated approach to infection training and service transformation is fundamental to building a resilient, modern system capable of delivering systemwide benefits of optimal infection care.



# Recommendations

## What the Infection-Specialist Workforce Needs to Support the Ambitions of the 10 Year Plan

**The infection-specialist workforce supports the three shifts. In order to achieve the ambitions of the 10 Year Plan, there are two broader considerations:**

### 1. Education and training in infection for all healthcare professionals

All healthcare professionals across UK healthcare systems should be able to: prevent infections and outbreaks, identify sepsis, consider travel, identify imported infections and apply AMS principles in their day-to-day practice. National workforce strategies highlight the need to shift care beyond acute hospitals and strengthen integration with community services, public health, and ICSs.[2,4] Training programmes should provide broad educational opportunities that equip clinicians for practice across these settings, while infection teaching should be strengthened from undergraduate education through to postgraduate training, with greater consistency in content and quality nationally.

Infection and AMS teaching within undergraduate and in-work training programmes is widespread but variable and often focused on knowledge rather than skills, behaviour, and capabilities.[98–100]

While there are online training packages, the evidence suggests infection and AMS training is more impactful when focusing on real-life practice and delivered face-to-face.[99] Currently, the infection specialist workforce spends a significant amount of time developing local electronic and in-person teaching for the local workforce.

A nationally coordinated suite of synchronous (e.g., live online and in-person) and asynchronous (e.g., eLearning in own time) materials should be developed, which can be deployed as is by organisations or adapted to the local context by infection specialists. As well as reducing duplication of effort and variability across organisations, this national approach to developing education resources should ensure they are underpinned by the latest education and behaviour change theories.

### 2. Expand the infection-specialist workforce

We need increased infection-specialist capacity, which should include increasing training capacity in the areas where doctors will be needed to work in the future, and increasing the numbers of clinical scientists in infection, advanced nurse practitioners and infection-specialist pharmacists.

Innovative work plans and joint appointments across providers, with universities and with UKHSA must be supported to retain talent and shared system learning and leadership. Multiprofessional training, educational support and leadership development should be supported so that the next generation of infection specialists are equipped to work across traditional boundaries and support colleagues to manage infection in their own specialties.




# Recommendations In Line with The Three Shifts

## 1. Hospital to Community

### 1.1. Shift care closer to home with specialist supported community pathways

The shift of safe infection care from hospital to community must be supported by robust commissioning, infection-specialist oversight, and clear clinical governance, so that AMS, diagnostic quality, IPC, and patient safety are not weakened by service redesign. Policy should support commissioning of virtual wards, 'Hospital-at-Home' models, Same Day Emergency Care for infection presentations, and GP advice lines, in ways that embed AMS, diagnostic support, and IPC measures. These services should be designed to prevent unnecessary admission, support early discharge, and avoid inappropriate use of intravenous and broad-spectrum antimicrobial therapy.

### 1.2 Embed IPC, diagnostic governance and laboratory expertise into new neighbourhood models of care

Community-based infection care requires strong IPC capability, robust governance of POCT, and access to high-quality laboratory expertise. Policy should ensure that IPC teams, infection specialists, laboratory specialists and clinical scientists are embedded within community services, including virtual wards and hospital-at-home models, so that testing, surveillance, quality assurance, stewardship, and patient safety are maintained across integrated care pathways. These services must be properly commissioned and funded to remain viable and sustainable.

### 1.3 Make OPAT/COpAT a core, equitable component of every healthcare system

OPAT/COpAT must be commissioned as a core pathway in every integrated healthcare system, with minimum service standards (seven-day service, defined clinical governance, equity impact assessment, paediatric/housebound pathways) and explicit workforce plans spanning infection clinicians, nurses/advanced clinical practitioners (ACPs), pharmacists and community partners. Different staff groups should be encouraged to train together, and system leaders should seek to break down siloed working that impedes effective and productive community working. Where applicable and according to local need, these services should be co-located with other 'neighbourhood health services' to support joined-up working and improve patients' experience and outcomes. Infection-specialist vetting of referrals is associated with substantial savings in healthcare resources.[101]

### 1.4 Either prioritise IVOS as a systemwide improvement or prioritise IV-to-oral antimicrobial switch

Currently, approximately one in three hospital inpatients are prescribed IV antibiotics, and many children remain in hospital for IV antibiotics despite there being appropriate oral options. Secondary care providers should be incentivised to deliver timely antibiotic review and earlier IVOS. This should be treated as a core quality, productivity and sustainability priority because it can reduce length of stay, improve nursing capacity, lower the risk of IV catheter-associated infection, reduce healthcare expenditure, and decrease the carbon footprint of care.[24] National and local leadership should

ensure programmes are coordinated, consistently implemented, and supported by infection-specialist input. A national framework should be developed for regional paediatric infection networks to support AMS, leading to earlier IVOS antimicrobial switch and facilitating earlier discharge, and OPAT-led virtual wards where this is not possible.

### 1.5 Strengthen community HIV and sexual health delivery

GP shared-care schemes and outreach roles for HIV CNSs must be expanded, and should include home visits and mobile services where appropriate, ensuring that patients have access to GP expertise and input for primary care issues. HIV screening should be integrated into general practice, including opt-out testing in GP practices in high-prevalence areas, following on from successful implementation of the ED opt-out scheme. Peer-support workers and community pharmacy-led HIV and pre-exposure prophylaxis (PrEP) services should be supported to reduce barriers to access and tackle stigma amongst underserved groups. In sexual health, rising demand and workforce pressures means trusted community access points are increasingly important. To support this shift formal pathways between community pharmacies, primary care and specialist sexual health services should be strengthened, with clear mechanisms for referral, escalation and feedback so that community-based provision genuinely complements specialist-led STI care.

### 1.6 Expand neighbourhood infection care through primary care, pharmacy and community models

Building on Pharmacy First, neighbourhood infection care should be expanded through community pharmacy, primary care and point-of-care diagnostics. Diagnostic capabilities will have to increase and develop to provide fast and accurate tests, often available at the point of contact. Consideration must be given to commissioning these, including an expansion of laboratory-based/allied infection specialists to develop and oversee these services as well as provide appropriate clinical support where needed.

### 1.7 Support TB and imported-infection care through regional networked models closer to home

Regional Infection Groups must be resourced and developed to be able to manage imported infection across areas, building on existing and evolving networks of SRIDCs and tropical medicine centres, to create shared-care pathways for complex diseases like tuberculosis, hepatitis and echinococcus, integrating community outreach, rapid referrals and primary care follow-up. Advances in MDR-TB treatment mean that most patients can now be managed with shorter all-oral regimens delivered largely through outpatient and community TB services. National advisory networks allow specialist expertise to be accessed without requiring transfer to tertiary centres, supporting care closer to home. Community outreach is particularly important for imported infections and teams should include inclusion-health specialists to reach migrants, refugees, or travellers who might not access to mainstream services.

### 1.8 Extend preparedness and health protection fully into community settings

We must invest in regional infection preparedness networks that ensure clear pathways to 24/7 access to specialist advice across primary and secondary care. We must continue to conduct regular multi-agency exercises involving NHS hospitals, GPs, care homes and local authorities to practice pandemic scenarios, ensuring that community settings (e.g. care homes, services for children) are a core part of the plan. Expand joint consultant roles across UKHSA, ICSs and local public health teams to strengthen outbreak response capacity, and embed health protection more consistently into local system leadership.

### 1.9 Design infection research around where people receive care

Infectious diseases research should routinely be designed to operate across the settings in which people access care, including general practice, community nursing, care homes, prisons and pharmacies, rather than relying solely on hospital-based delivery. Policy should support infection-specialist teams to function as a networked backbone for research delivery across the system, in keeping with the "right research, right setting" approach. This will increase participant diversity and ensure innovations are applicable across the whole health system.

## 2. Sickness to Prevention

### 2.1 Commission prevention-focused AMS services, including penicillin allergy delabelling

By decoupling patients from inaccurate penicillin allergy labels, it is possible to administer narrower spectrum antibiotics, reduce the risk of antibiotic associated side effects and reduce hospital stay – not just at the point of delabelling, but at every subsequent hospital admission involving the administration of antibiotics. In the vast majority of cases penicillin allergy delabelling can be delivered by non-allergy specialists within healthcare settings.[102] Current provision varies across the country and in many cases is not commissioned. Provision of service is therefore often at the expense of other AMS activity or funded as a short-term project. These services must be commissioned as part of AMS activities to allow infection specialists to remove penicillin allergy labels in a timely manner and support communication of the de-label across the healthcare system.

### 2.2 Invest in proactive surveillance, IPC and stewardship to prevent infection, AMR and outbreaks, with strengthened diagnostics and liaison input

IPC is inherently preventive: surveillance systems including monitoring trends in infection, antimicrobial, diagnostic and built environment stewardship, reduce infections, hospital admissions, and outbreaks. Prevention of healthcare-acquired infections, including the transmission of AMR pathogens, is increasingly recognised to be influenced by poor hospital design and the built environment. This emerging science is proving to be a new and effective strategy in addressing the growing threats and trends in AMR.[103] We must invest in proactive infection surveillance and stewardship using digital tools across hospitals and community services. Timely, accurate diagnostics and clinical liaison support clinicians across specialties to make informed decisions that prevent the spread of infection.

### 2.3 Protect workforce time and embed prevention activity in routine care pathways

Prevention activity requires protected staffing, funded time and explicit recognition in job planning. Protect funded time and staffing for IPC and AMS (including pharmacists and IPC nurses) to deliver ward-based stewardship, rapid outbreak response, and hospital vaccination/screening programmes. Pathways should also ensure that the consequences of infection, such as sepsis, deconditioning in older adults, stroke and myocardial infarction, are anticipated and mitigated by clinicians retaining generalist skills, particularly as increasingly multimorbid and older patients are managed outside acute settings. Each patient interaction should be an opportunity to review allergy status, consider delabelling where appropriate, and reduce the risk of downstream consequences of infection, building prevention into routine care.

### 2.4 Strengthen vaccination, vaccine confidence and specialist-prevention leadership

As vaccination rates continue to fall and admissions with vaccine-preventable diseases rise, policy should strengthen the clinical, public health and academic contribution of infection specialists to vaccination strategy. Paediatric infection specialists work at the intersection of clinical care, public health and systems improvement. UK paediatric infection specialists include global/national research leaders in vaccinology. Clinical and clinical–academic roles in supporting national and regional vaccine confidence, education of professionals and the public and supporting further vaccine research should be developed.

### 2.5 Expand HIV and sexual health prevention through integrated, accessible community pathways

Prevention must be strengthened through integrated pathways for PrEP and post exposure prophylaxis (PEP), and sexual health education. PrEP and PEP delivery should be expanded through diverse settings (GPs, pharmacies, community organisations). Joint clinics should be developed (e.g., HIV-diabetes, HIV-mental health, cardiology, frailty, etc.) to address comorbidities early. Enhance routine testing outreach (digital campaigns, at-risk community events) to diagnose HIV earlier and link people to treatment. Prevention remains a central and defining pillar of STI services. Effective STI services combine early diagnosis, vaccination, behavioural interventions, and partner notification to reduce transmission, prevent reinfection and address inequalities. Strengthening this shift requires investment in proven, preventive approaches such as opt-out testing, targeted outreach for underserved groups, vaccination delivery, and rapid partner management.

### 2.6 Maintain specialist prevention capacity for TB, imported infection and AMR control

Specialist mycobacterial and infection services play an important preventive role in national TB control and AMR strategies by ensuring effective treatment of drug-resistant disease and reducing the risk of treatment failure or onward transmission. Prevention programmes must be funded and standardised (e.g., targeted screening for latent/imported infections in high-risk communities), and these must be recognised as core infection-specialist outputs in commissioning and job plans.

### 2.7 Fund always-on preparedness, surveillance and early-control systems

'Always-on' surveillance and early-control capacity aligned to World Health Organization International Health Regulations core capabilities (prevent, detect, assess, report and respond) must be funded, including trained outbreak staff, vaccination delivery infrastructure, and rapid implementation of route-specific measures in the first weeks of an event.

### 2.8 Ensure training and research are explicitly prevention focused

Training curricula should continue to embed prevention-focused competencies, including AMS, surveillance, vaccine strategy and outbreak response, and recognising that prevention is central to modern infection services. Research policy should also prioritise pragmatic trials and implementation studies aimed at reducing incidence of infection, such as work on vaccination uptake, household transmission interventions and care-home infection prevention. These studies may focus on the impact of public health measures rather than new drugs and should include significant patient and public involvement.

## 3. Analogue to Digital

### 3.1 Make interoperable digital infrastructure the foundation of infection services

Digital modernisation and interoperable systems should be treated as essential to safe, effective infection care. Electronic patient records, laboratory systems, prescribing systems and vaccination records should work across primary, secondary and community care so that critical information moves reliably across the system. This includes ensuring that changes such as penicillin allergy delabelling are reflected across all electronic records. Improved interoperability of child health and vaccination records, including digitalisation of the 'Red Book' (the Personal Child Health Record), should be prioritised to improve safety, continuity of care and rapid identification of opportunities for ad hoc vaccination. Improve interoperability between different requesting systems in primary and secondary care to enable better transfer of clinical information and embedding some diagnostic stewardship through implementation of agreed care bundles. Nationally scale digital infection and pathology systems, supported by interoperable IT, workforce training, protected time for innovation, and governance.

### 3.2 Embed digital AMS, diagnostics and decision support into routine care

Electronic prescribing systems need to be developed so that antibiotic review is embedded into daily practice in secondary care. Real-time dashboards monitoring antimicrobial use down to prescription level should be available to stewardship teams in every healthcare organisation to identify variation in prescribing quality and support targeted education and improvement. AI-guided decision-aid tools need to be developed to encourage adherence to local guidelines and support the antimicrobial review process.

### 3.3 Scale digital surveillance, automation, AI and genomics across infection and pathology services

Digital surveillance, AI-supported decision

tools, and automated laboratory workflows can improve speed, accuracy, and productivity. These technologies free specialist time and support decision-making, delivering the NHS's 'big bets' on data, AI, and predictive analytics. Digital IPC innovations must be scaled nationally while maintaining local adaptability, with AI-driven support, predictive analytics, integrated records and workforce training. Advances in molecular diagnostics and genomic sequencing are improving detection of drug resistance and supporting more targeted treatment for both TB and NTM infections and should be supported.

### 3.4 Use digital systems to extend specialist expertise and reduce inequity across sites

Implement interoperable EPR-laboratory connectivity and decision support (e.g., digital sepsis 'alert and action' systems, real-time surveillance dashboards, remote consult platforms) to extend specialist cover across sites and reduce inequity in access to infection-specialist input. This will reduce inequity in access to specialist advice, improve diagnostic stewardship, support agreed care bundles, and enable regional and national expert input for complex infections including TB and NTM disease.

### 3.5 Build digitally-enabled virtual and community pathways across infection services

Digital infrastructure should support safe expansion of virtual care models to treat suitable patients at home. These approaches should maintain outcomes while freeing hospital capacity, and support rapid deployment of virtual care models while maintaining infection-specialist input during future pandemics.

### 3.6 Scale up digital services to involve patients in their care, while maintaining equity

Patient-facing digital tools allow for higher-quality remote consultation and diagnosis, including patient-facing messaging and results access. For HIV care, digital services should be scaled up, including virtual clinics, digital access to PrEP (including through the NHS app), self-management tools, and shared electronic care plans. Digital training for clinicians and support for patients should be provided to improve engagement and equity. In sexual health, by combining asymptomatic digital pathways with in-person, trusted community support, STI services can improve access, maintain quality and confidentiality, and focus specialist face-to-face capacity on those with complex needs, symptoms or resistant infection. To accelerate this analogue-to-digital shift, high-quality online sexual health services – including test-and-post self-sampling, digital results delivery and remote clinical advice – should be expanded so that asymptomatic individuals can access timely support without needing to attend clinics in person.

### 3.7 Make real-time interoperable infection data the default for preparedness, imported infection and health protection

Routine real-time interoperable infection data should become the default for day-to-day infection control, preparedness and emergency response. The COVID-19 response showed that rapid, open data sharing and integrated UK datasets can deliver timely, meaningful insights; this approach should become routine beyond emergencies. Investment in digital tools like telemedicine, interoperable health records, and tools that can track global and local infection trends that are interoperable between regional borders, travel clinics and hospital systems can give early signals of imported infections presenting in the UK. A more integrated data resource linking disease notifications and other reference laboratory diagnoses with agreed care quality measures would help SRIDCs support wider catchment areas which have less direct access to imported-infection expertise. Improving automated data feeds from NHS (hospitals, labs, GP surgeries) into UKHSA's surveillance systems can provide earlier warnings of unusual illness clusters. Secure data-sharing platforms across the NHS and UKHSA need continuous refinement – frontline clinicians should rapidly get feedback from UKHSA analyses. This two-way street of data is what will allow swift, evidence-based action.

### 3.8 Align workforce, training and research with digital transformation

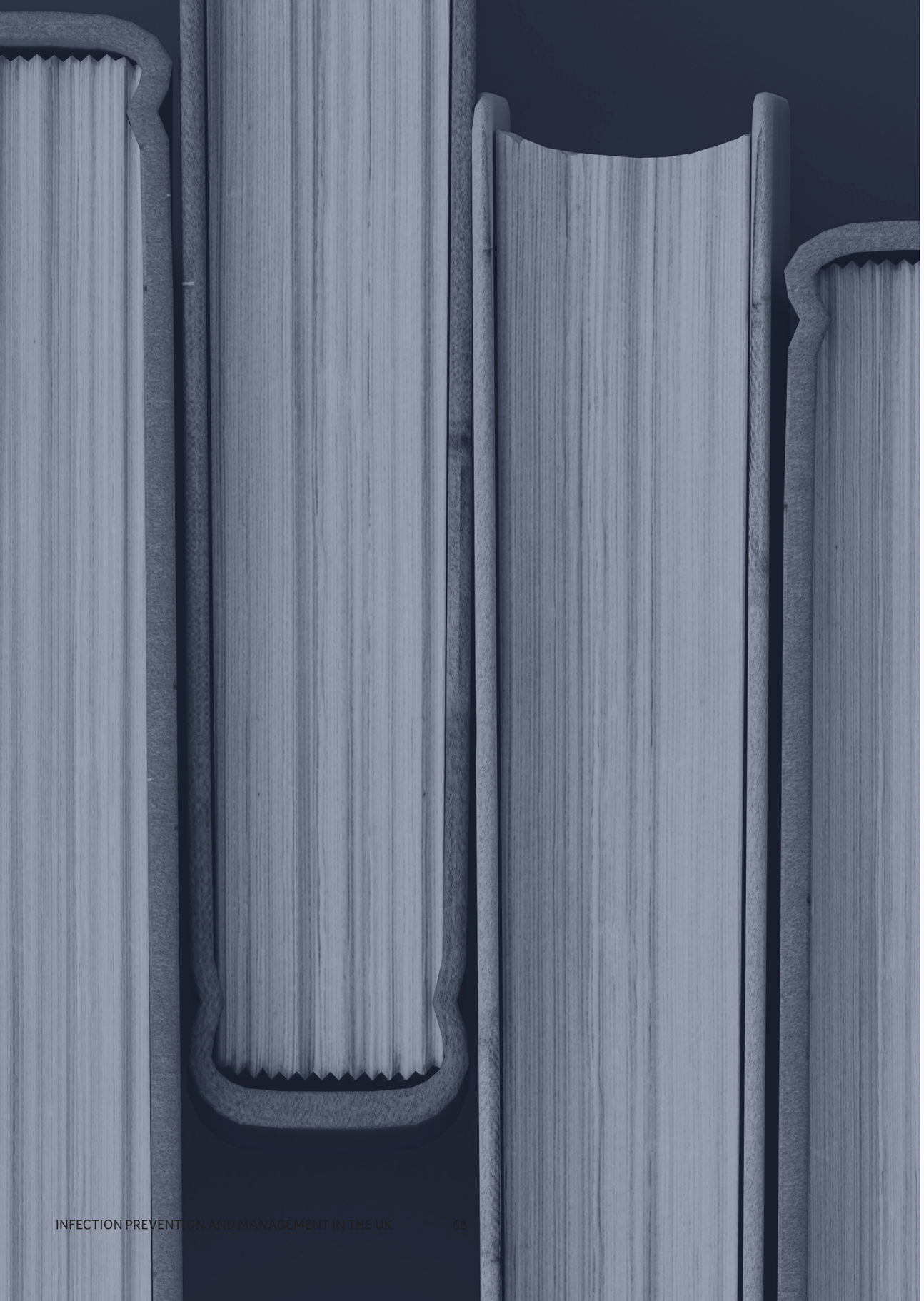
Digital transformation in infection services requires skilled staff, robust infrastructure and supportive training. Workforce planning and training curricula should prioritise investment in the development of specialist confidence and competence in digital tools, and support for automation, informatics, genomics and data-enabled diagnostics. Genomic sequencing capacity should be maintained and expanded post-COVID, since having real-time genomic data for pathogens is immensely powerful for targeting interventions. Digital infrastructure should also be used to enable real-time surveillance and research, linking clinical data with pathogen and human genomics and biobank resources so that rapid, open and meaningful data sharing becomes routine and strengthens service improvement, policy development, and national and international collaboration.



# Table of Abbreviations

| | |
|---|---|
| ACP | Advanced Clinical Practitioners |
| AI | Artificial intelligence |
| ALM | Association for Laboratory Medicine |
| AMR | Antimicrobial resistance |
| AMS | Antimicrobial stewardship |
| ARK | Antimicrobial Review Kit |
| ART | Antiretroviral therapy |
| BBV | Blood-borne virus |
| BPAIIG | British Paediatric Allergy, Immunity and Infection Group |
| BSAC | British Society for Antimicrobial Chemotherapy |
| BTS | British Thoracic Society |
| CATALYST | Challenging Antibiotic Allergy Status programme |
| CCT | Certificate of Completion of Training |
| *C. difficile* | *Clostridioides difficile* |
| CIT | Combined Infection Training |
| CNS | Clinical Nurse Specialists |
| COG-UK | COVID-19 Genomics UK Consortium |
| COpAT | Complex Outpatient Antimicrobial Therapy |
| COVID/COVID-19 | Coronavirus disease 2019 |
| CPD | Continuing professional development |
| DGH | District General Hospital |
| DHSC | Department of Health and Social Care |
| ED | Emergency department |
| ePMA | Electronic Prescribing and Medicines Administration |
| EPR | Electronic Patient Record |
| ESPAR | English Surveillance Programme for Antimicrobial Utilisation and Resistance |
| EU | European Union |
| FY | Financial Year |
| GIM | General Internal Medicine |
| GMC | General Medical Council |
| GP | General Practitioner |
| GUM | Genitourinary Medicine |
| HCID | High-consequence infectious diseases |
| HIS | Healthcare Infection Society |
| HIV | Human immunodeficiency virus |
| HPRU | Health Protection Research Units |
| HPT | Health Protection Teams |
| HSSR | Higher Speciality Scientific Register |

| | |
|---|---|
| HSST | Higher Specialist Scientific Training |
| HST | Higher Specialty Training |
| IBMS | Institute of Biomedical Science |
| ICB | Integrated Care Boards |
| ICS | Integrated Care System |
| ID | Infectious disease |
| IFS | Imported Fever Service |
| IMT | Internal Medicine Training |
| IPC | Infection prevention and control |
| IPCN | IPC nurses |
| IT | Information technology |
| IV | Intravenous |
| IVOS | Intravenous-to-oral switch |
| JCVI | Joint Committee on Vaccination and Immunisation |
| JRCPTB | Joint Royal Colleges of Physicians Training Board |
| LTFT | Less than full time |
| MDR-TB | Multidrug-Resistant Tuberculosis |
| MDT | Multidisciplinary team |
| MERS | Middle East respiratory syndrome |
| MRL | Malaria Reference Laboratory |
| NHS | National Health Service |
| NHSE | NHS England |
| NICE | National Institute for Health and Care Excellence |
| NIHR | National Institute for Health and Care Research |
| NMAHPP | Nurses, midwives, allied health professionals, psychologists, pharmacists and healthcare scientists |
| NOAH | Neonatal Oral Antibiotics at Home |
| NTM | Non-tuberculous mycobacteria / non-tuberculous mycobacterial |
| OOPR | Out of Programme for Research |
| OPAT | Outpatient Parenteral Antimicrobial Therapy |
| PCPA | Primary Care Pharmacy Association |
| PEP | Post-exposure prophylaxis |
| PHW | Public Health Wales |
| PID | Paediatric Infectious Diseases |
| POCT | Point-of-care testing |
| PPE | Personal Protective Equipment |
| PrEP | Pre-exposure prophylaxis |
| RCP | Royal College of Physicians |
| RCPath | Royal College of Pathologists |
| RCPCH | Royal College of Paediatrics and Child Health |
| RCPharm | Royal College of Pharmacy |
| RECOVERY | Randomised Evaluation of COVID-19 Therapy |
| RIPL | Rare and Imported Pathogens Laboratory |
| SARS-CoV-2 | Severe acute respiratory syndrome coronavirus 2 |
| SAS | Specialists and specialist |
| *S. aureus* | *Staphylococcus aureus* |
| SNAP | *Staphylococcus aureus* Network Adaptive Platform trial |
| SRIDC | Specialist Regional Infectious Diseases Centres |
| ST4/ST5/ST6/ST7 | Specialty training year 4/year 5/year 6/year 7 |
| STI | Sexually transmitted infections |
| STP | Scientific Training Programme |
| SYBP | South Yorkshire and Bassetlaw Pathology |
| TB | Tuberculosis |
| UCLH | University College London Hospitals |
| UK | United Kingdom |
| UKAS | UK Accreditation Service |
| UKCPA | UK Clinical Pharmacy Association |
| UKHSA | UK Health Security Agency |
| UNAIDS | Joint United Nations Programme on HIV/AIDS |
| USA | United States of America |





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Healthcare Infection Society

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