"First in, Last out" Infection services during recovery from the COVID-19 pandemic.

Infectious diseases (ID) is a small and heterogeneous speciality. Large tertiary centres typically offer specialist services including in-patient HIV care, hepatitis, tuberculosis, imported diseases and are often linked to academic centres. In non-tertiary hospitals ID services are usually offered in conjunction with general / acute medicine or microbiology. In these centres ID specialists typically deliver a range of inpatient and outpatient services overlapping with services offered by specialists in acute emergency medicine, genitourinary medicine / HIV medicine, hepatology, respiratory medicine and microbiology/virology.

Constraints on service delivery caused by COVID

- Displacement of normal activity
  - in acute trusts where infectious diseases inpatient wards exist these have often become the designated areas for patients with proven or suspected COVID.
  - Clinics / assessment areas out of use
  - Clinics moved to on-line only
- Increased demand on clinical time
  - Infectious diseases teams have been asked to expand inpatient responsibility – increased beds, covering weekends and evenings
  - Tertiary centres have flexibility of academic appointments, secondary centres will usually not have this
  - Increased demand for infection prevention and control activity
  - New COVID services (e.g. follow up clinic) required
  - Establishment and delivery of COVID research portfolio
  - In some centres, participation in the delivery of staff testing

- Staff absences through COVID / shielding
- Laboratory testing facilities diverted to COVID-19. Long-term requirement for NHS diagnostic laboratories to maintain COVID diagnostic response capacity alongside return to business as usual activity.
- Access to bronchoscopy limited
- Need to delivery COVID research. Many acute trusts are delivering 10 or more different patient facing studies in COVID delivered predominantly by infection teams

Challenges of returning to 'normal'

The return of NHS services to 'normal' creates unique challenges for infection medicine

- Unlike other specialties where COVID prevented much specialist inpatient activity the issue in infection medicine has been the need to greatly expand inpatient activity.
- As other services return to normal any remaining COVID activity will be increasingly focused on infection teams and continue to take up most or all their staff and physical resources. Infection teams will be the 'first in and last out' of the COVID response.
- Follow-up of COVID patients will fall largely to ID teams
- Other disciplines returning to "normal' will exacerbate pressure on ID services as demand will be driven up by e.g. oncology, haematology, transplantation

- Lasting consequences of COVID e.g. ongoing nosocomial transmission, consequence of antibiotic overuse, outbreaks of bacterial pathogens will incur a lasting increase in demands on infection control, consultation work and antibiotic stewardship activity
- Unprecedented challenges and demand for Infection Prevention and Control advice in planning of the recovery of normal NHS services.

In consideration of these issues we have banded our table of staged return to normal activity based on the burden falling by <50%, 50-75%, 75-95% or >95% compared with peak levels. Really only when very substantial falls in activity are seen will infection medicine services be able to deliver the range and volume of work delivered before the pandemic without substantial increases in staffing which cannot be achieved with current training numbers.

There is likely to be a surge in demand for consultants with CCTs in the infection specialities including Infectious Diseases which will exceed supply.

Table of core services and delivery by fall in burden of COVID-19. There will be considerable variation between centres depending on availability of e.g. specialist nurse/pharmacist support and existing relationships between Infection and other services.

	Percent fall in burden placed by COVID on ID services			
Service	**<50%**	**51-75%%**	**76-95%**	**>95%**
Inpatient direct care	Focused on COVID patients only	Focused on COVID patients only	Potential for shared care outside COVID areas	Resumption of non-COVID ID activity
Inpatient consult services	Not deliverable	Telephone based Targeted	Targeted	Resumed
ID outpatients	Online only Ward follow-ups	Online only New referrals	Limited face to face	Hybrid needs-based model
Radiology MDT	Focused on COVID patients only	Focused on COVID patients only	Resumed	Resumed
*Antimicrobial Stewardship	Not deliverable	Resumption of management activity	Targeted bedside stewardship	Extended bed-side stewardship
*Infection control	Focused on COVID HCAI database returns maintained (C diff, MRSA, GNBSI, MSSA)	Focused on COVID with capacity to manage other significant outbreaks	Significantly increased demand for risk-based advice in planning the resumption of normal NHS services plus some recovery of business as usual.	Increased demand for risk-based advice in planning resumption of normal NHS services plus resumption of new 'post-COVID' normal infection control work
*Outpatient antibiotic services	Reduced demand and limited capacity	Growing demand with limited capacity	Usual demand with limited capacity	Resumed
Travel clinics	Not deliverable Low demand	Not deliverable Growing demand	Online only Growing demand	Hybrid needs-based model. Increased

				advice/guidance approach
Core and specialist (trust-dependent) infection activities				
*Bacteraemia service, ICU/HDU rounds. Specialty specific rounds e.g. cardiothoracic, endocarditis, neonatal, transplant	Not deliverable	Telephone based	Targeted / diminished frequency	Resumed
Teaching and training activity	Not deliverable	Contribution to online learning	Limited face to face / hybrid teaching possible	Delivery and development of novel, post-covid approaches

*these activities are typically shared with microbiology colleagues