

## COVID-19

### Effects on health from non-COVID-19 conditions and moving forward to deliver healthcare for all

May / 2020

During the COVID-19 pandemic there has been a need to change the way clinicians prioritise patients who would normally be attending for diagnosis, investigation and management of both new and long-term conditions. This affects children and adults including pregnant women; those with physical and mental health conditions. It also applies to both primary and secondary care.

There is a recognised pre-pandemic prioritisation process on the basis of those in most clinical need being seen and treated first. This strategy has not changed but delays will inevitably be longer for routine / elective or even more urgent work due to resources being re-directed to deal with the epidemic. In addition there has been a delay in patients accessing urgent and emergency care due to a combination of service re-organisation to deliver urgent care to those suffering from COVID-19, the population not wishing to place a perceived unnecessary burden on the NHS and patients being anxious about making appointments at healthcare facilities due to concerns about becoming infected with coronavirus.

In an epidemic the negative effects on those suffering from other conditions are well known to be significant. The effects can be considered as immediate, short, medium and long term. This is already well recognised in this COVID-19 epidemic and steps are now being taken to mitigate and, as much as possible, reduce indirect harm to the population created by the COVID-19 outbreak and response, as well as acknowledging that the presence of the virus in asymptomatic and minimally affected patients means that pathways and services will need to reflect this in order to provide safe care and patient confidence.

There is also a need to recognise the deficiencies within the system before the pandemic and a need to embed innovations that have been of benefit or could be of potential benefit rather than simply returning to business as usual. COVID-19 is unlikely to “go away” and may become endemic. Some thought is now being given to how to manage certain services e.g. UGI endoscopy, deep cleaning when the risk is reduced but not negligible as we move on to the next stage of the epidemic. It is likely we will still be coping with the sequelae of COVID-19 in 12 - 18 months.

The following table and text consider not only the impact of Coronavirus on the healthcare system but also includes ways in which various stakeholders can act to mitigate this impact. Particular consideration is given to the roles that Colleges must play in the recovery and return to business as usual that recognises a backlog, the presence of a new infectious challenge and incorporation of lessons learned in the delivery of care.



	Immediate/ emergency	Urgent and short term care	Medium to longer term care	Longer term / anticipatory care
<b>The problem</b>	<p>There has been a reduction in patients seeking immediate care and fewer emergency interventions are being reported. This may be due to a combination of issues including fewer people going to work and fewer physical activities being undertaken. It may also be in part due to the public adhering strictly to the 'stay at home' and choosing not to seek help so as not to burden the health system during the crisis or due to fears of contracting Coronavirus.</p> <p>Patients who are seriously ill, at risk of death or loss of organ/ limb function and will benefit from treatment must always be able to access urgent care and will continue to be prioritised as emergencies.</p>	<p>There are several conditions that must continue to be prioritised whenever possible during the COVID-19 outbreak response — this includes patients with confirmed or suspected cancer (and the government has made it clear that cancer treatment should continue to be prioritised) and life or organ saving interventions. In addition the management of some unstable long term conditions also falls into this category.</p>	<p>There are patients with less severe or more slowly progressive conditions where further assessment or treatment can be deferred safely for different periods of time. For some there is no recognised or suggested safe period of deferment although a commitment to case-note review for those already diagnosed and being treated has been made wherever and whenever this is possible. For new patients this time period is based on referral information to secondary care. In primary care it is based on existing knowledge of the patient, history or remote consultation.</p> <p>Patients within this group include those on elective surgery waiting lists as well as older adults and those with chronic illness.</p>	<p>Current population and patient-centred care pathways including work streams that aim to prevent ill health and support good health have also been negatively impacted. Examples include immunisations programmes, screening programmes (including children and ante-natal services), sexual health and contraceptive services, etc. These services have largely been suspended during the early phases of the pandemic for an indefinite period.</p>
<b>The risk of not treating such patients include</b>	<p>Increased premature death rates and increased morbidity requiring long term rehabilitation and care.</p>	<p>Increased premature death and increased morbidity which may require more complex (and possibly less successful) interventions in the long term.</p>	<p>Patients with these conditions could deteriorate resulting in excess morbidity or requiring more extensive interventions. The delay in routine care also results in a build up of delay and a waiting list of those requiring care once the outbreak is under control or past.</p>	<p>Potentially serious for individuals and the populations as a whole.</p>



<p><b>Conditions include [a few examples are listed here, this is by no means an exhaustive list]</b></p>	<p>Myocardial infarctions, acute strokes, status epilepticus, sickle cell crisis, acute mental health presentations including self-harm and suicide attempts, , trauma, sepsis, acute loss of critical organ function, acute presentations within pregnancy including bleeding, reduced fetal movements and commencement of labour.</p>	<p>Cancer care including rapid access 2 week wait pathways, urgent surgery including life or organ saving interventions and the management of some unstable long term conditions also fall into this category.</p>	<p>Chronic illnesses including diabetes mellitus, renal impairment, cardiovascular diseases, respiratory diseases and inflammatory diseases.</p> <p>Elective surgery – all specialties.</p>	<p>Immunisation programmes screening programmes (including children and ante-natal services).</p> <p>Sexual health and contraceptive services.</p>
<p><b>Solutions / Ways to address problems / actions / Interventions to consider</b></p>				
<p><b>Communication with public</b></p>	<p>Improved information and messaging to the public is required making clear that if they or a relative become seriously unwell they must ask for medical assistance.</p> <p>A number of organisations and colleges are already engaging in this work.</p> <p>It is important that the messages are consistent for clear public understanding.</p> <p>Individual specific campaigns are also key so that the most relevant groups can be reached such as messages targeted at parents with sick children and those experiencing symptoms suggestive of strokes and heart attacks.</p> <p>The Academy has also <a href="#">released a statement</a> encouraging the public to present for care as needed. Responsible body - colleges, NHSEI.</p>	<p>Communication with the public regarding seeking advice for the recognised symptoms and signs of early cancer and other concerning symptoms including neurological symptoms is key.</p>	<p>Increase public awareness of the need to seek help should they experience any change in their long term conditions or experience of chronic symptoms.</p> <p>Patients with chronic conditions should be provided with information about how to access their regular services and support during this time and informed of any chances to their usual care pathways.</p>	<p>Communication with the public regarding seeking advice for symptoms and signs that cause them concern.</p> <p>Re-institution of services in out of hospital / 'COVID-free' environments and communicating to the public about the availability of these pathways.</p>



<p><b>Information to clinicians and services</b></p>	<p>Ensure 111 and 999 services are adequate and appropriate for COVID-19 and non COVID-19 cases.</p> <p>Care pathways might need to be reviewed and changed. Any amendments should be communicated out to the system, clearly and in a timely manner.</p> <p>Clinicians should continue to refer patients to services – even if there is some resistance from patients and families.</p>	<p>Care pathways might need to be reviewed and changed. Any amendments should be communicated out to the system, clearly and in a timely manner.</p> <p>Clinicians should continue to refer patients to services – even if there is some resistance from patients and families.</p>	<p>Care pathways might need to be reviewed and changed. Any amendments should be communicated out to the system, clearly and in a timely manner.</p> <p>Clinicians should continue to refer patients to services – even if there is some resistance from patients and families.</p>	<p>Care pathways might need to be reviewed and changed. Any amendments should be communicated out to the system, clearly and in a timely manner.</p> <p>Clinicians should continue to refer patients to services – even if there is some resistance from patients and families.</p>
<p><b>Engagement with affected populations and specific patient groups</b></p>	<p>In an attempt to identify to quantify the scale of the problem NHSEI is undertaking a gap analysis of secondary care performed compared to that over the same time period one year ago.</p>	<p>Where possible identify patients not presenting for these services and target interventions.</p>	<p>Improve self-management and shared-decision making tools to reduce requirements of those who may not need or wish treatment.</p> <p>Where possible identify and provide case based reviews of existing patient caseload specifically targeting patients known to be at risk of clinical deterioration.</p>	<p>Where possible identify patients not presenting for these services and target interventions e.g contacting and prompting patients who have not presenting for scheduled routine cervical smears or follow-up appointments.</p>
<p><b>Pathways and service provision</b></p>	<p>Consider alternative pathways and locations for services for those patients presenting with non COVID-19 symptoms for example in Primary Care use of 'hot hubs' for COVID-19 suspected cases has allowed for routine services to continue with traditional GP settings. Within mental health establishing separate temporary urgent care and</p>	<p>Retain, adopt and improve new ways of working and multi-disciplinary pathways.</p> <p>Reflect on current service delivery models and consider new and transformative approaches to care, e.g. how integrated care can support critical care services.</p> <p>Facilitate the development of</p>	<p>Understanding the extent of work that has been deferred will help plan the measures that need to be taken to reduce the inevitable increase in waiting times and the size of waiting lists that will occur across services such as elective surgical specialties</p> <p>Review of current demand on services and staff to determine options in capacity and whether</p>	<p>Services should create protocols around infection prevention and control and the management of the risk of transmission of COVID-19 within these settings including via asymptomatic patients and staff. Adhere to guidance around social distancing, infection prevention and control, the role of testing of staff and the use of PPE.</p>



<p><b>Pathways and service provision</b></p>	<p>emergency services away from acute hospitals emergency departments has helped to reduce the risk to patients of contracting COVID-19.</p> <p>Ensure there are updated referral and in hospital pathways for safe emergency care that recognises the risk of endemic coronavirus in the asymptomatic population.</p> <p>Consider the needs of vulnerable groups including children and young people.</p> <p>Testing protocols set up as part of emergency care — for patients and staff.</p>	<p>regional surgical and cancer services and networks to sustain the delivery of investigations and interventions in a timely fashion.</p> <p>Consider packages of care [elective surgery, chemotherapy and radiotherapy delivered in a timed, interrelated fashion] and their interdependencies rather than pathways considered in siloes.</p> <p>Monitor service delivery - the national cancer datasets [Systemic Anti-Cancer Treatment [SACT] and the Radiotherapy Treatment Dataset [RTDS]] could provide almost real time indications of service delivery for cancer therapy.</p> <p>Consider alternative pathways and locations for services for those patients presenting with non COVID-19 symptoms.</p> <p>Utilise non COVID-19 sites to support patients with other diseases using local organisation and triage so that those who can be assessed, reassured or treated off site are dealt with in this way and those who must be seen in person can be cared for in a safe environment. This applies to new diagnoses as well as already confirmed cases presenting for surgical and medical care.</p>	<p>staff can be redeployed from COVID-19 response to address the waiting lists. Currently many out-patient appointments are cancelled and there is spare bed and available theatre capacity in many areas – especially those that are not hard hit by COVID-19 cases.</p> <p>Retain, adopt and improve new ways of working and multi-disciplinary pathways.</p> <p>Reflect on current service delivery models and consider new and transformative approaches to care, e.g. how integrated care can support critical care services.</p> <p>Utilisation of remote communication technologies including video conferencing to deliver care to those with chronic conditions for example the use of video conferencing within primary care to provide diabetes and asthma reviews.</p> <p>Consider the needs of vulnerable groups including children and young people.</p> <p>Primary care — increase 111 capacity.</p> <p>Clear testing protocols for all patients to permit safe care with regard to asymptomatic patients and incubation periods.</p>	<p>There may be a need to provide additional services to cope with increased uptake once patients restart accessing these services.</p> <p>Consider alternative pathways and locations for services for those patients presenting with non COVID-19 symptoms.</p> <p>Retain, adopt and improve new ways of working and multi-disciplinary pathways.</p> <p>Consider modifying services in-line with current evidence-based guidance e.g. changes to screening programmes.</p> <p>Consider the needs of vulnerable groups including children and young people.</p> <p>Clear testing protocols for all patients to permit safe care with regard to asymptomatic patients and incubation periods. Staff testing included as part of overall care for covid and covid 'free' environments.</p>
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<p><b>Pathways and service provision</b></p>		<p>Consider the needs of vulnerable groups including children and young people.</p> <p>Place appropriate pathways to take into account all aspects (diagnostics, support staff and services e.g. pre-assessment clinics, radiology, lab services – including tests for coronavirus at this time), safe location etc.</p> <p>Clear testing protocols for all patients to permit safe care with regard to asymptomatic patients and incubation periods. Staff testing included as part of overall care for covid and covid 'free' environments.</p>	<p>Staff testing included as part of overall care for covid and covid 'free' environments.</p>	
<p><b>Infection prevention and control and managing non COVID-19 cases within the context of ongoing transmission of COVID-19 infections</b></p>	<p>Services should create protocols around infection prevention and control and the management of the risk of transmission of COVID-19 within these settings including via asymptomatic patients and staff. Pay due regard to social distancing guidance, infection prevention and control, the role of testing of staff and the use of PPE.</p>	<p>Services should create protocols around infection prevention and control and the management of the risk of transmission of COVID-19 within these settings including via asymptomatic patients and staff. Adhere to guidance around social distancing, infection prevention and control, the role of testing of staff and the use of PPE.</p> <p>Devise and implement a testing strategy for healthcare workers and patients.</p>	<p>Services should create protocols around infection prevention and control and the management of the risk of transmission of COVID-19 within these settings including via asymptomatic patients and staff. Pay due regard to social distancing guidance, infection prevention and control, the role of testing of staff and the use of PPE.</p> <p>Devise and implement a testing strategy for healthcare workers and patients.</p>	<p>Services should create protocols around infection prevention and control and the management of the risk of transmission of COVID-19 within these settings including via asymptomatic patients and staff. Pay due regard to social distancing guidance, infection prevention and control, the role of testing of staff and the use of PPE.</p> <p>Devise and implement a testing strategy for healthcare workers and patients.</p>



<b>Workforce and training</b>	<p>Workforce redeployment to ensure patients can access non COVID-19 services such as 111, 999 and acute and emergency care within Emergency Departments. There is evidence that the usage of emergency departments from non COVID-19 presentations is substantially lower than expected and as such there is currently increased capacity in the system than would normally be expected.</p> <p>Ensure there is a package of support for the workforce both during and after the pandemic. This should include adequate leave to rest and evidence-based mental health and wellbeing support tailored to individual need.</p>	<p>Increase existing capacity through returners and early graduates providing additional human resources to COVID-19 and non COVID-19 services.</p> <p>There is a need to ensure training opportunities are not lost including trainees being able to access opportunities for work-place based assessments where appropriate.</p> <p>Restoration of training support via roles of TPDs, ES and DMEs being re-instated and re-activated to pre COVID levels. Active support for trainees who have had interference with progression of training due to COVID.</p> <p>Ensure there is a package of support for the workforce both during and after the pandemic. This should include adequate leave to rest and evidence-based mental health and wellbeing support tailored to individual need.</p>	<p>Elective and long term management as key areas of training must be included in plans for recovery – the temptation to exclude trainees from the delivery of high volume and optimising services must be resisted.</p> <p>There is a need to ensure training opportunities are not lost including trainees being able to access opportunities for work-place based assessments where appropriate.</p> <p>Restoration of training support via roles of TPDs, ES and DMEs being re-instated and re-activated to pre COVID levels. Active support for trainees who have had interference with progression of training due to COVID-19.</p> <p>Ensure there is a package of support for the workforce both during and after the pandemic. This should include adequate leave to rest and evidence-based mental health and wellbeing support tailored to individual need.</p>	<p>Ensure there is a package of support for the workforce both during and after the pandemic. This should include adequate leave to rest and evidence-based mental health and wellbeing support tailored to individual need.</p> <p>Restoration of training support via roles of TPDs, ES and DMEs being re-instated and re-activated to pre COVID-19 levels. Active support for trainees who have had interference with progression of training due to COVID-19.</p>
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## The role of the Colleges

Colleges have an important role to play in increasing the visibility of this issue as government continues (rightly) to prioritise the pandemic. They have already played an important part in,

- The clinical prioritisation process for conditions and procedures, the specialist clinical knowledge has been vital. NHSE is using these clinical priorities to perform gap analysis to work to support regional restoration of services in a clinically relevant fashion
- Moving forwards there are a number of areas that will require the attention and input from Colleges
- Provide specialist clinical and service knowledge including an understanding of the interdependences required to deliver appropriate care across the patient pathway and across specialties
- Developing guidance around new ways of working
  - Where previous models should be retained
  - How and where additional guidance should be added to accommodate and test for coronavirus in these and new pathways
  - Where new practises that have emerged and become commonplace should continue and where they should be modified for the longer term
- Ensuring the essential training elements to deliver a future workforce pipeline are included in any recovery plan is an important part of College participation. This is likely to involve modifications to curricula and systems to support the progression of trainees, support for trainees to re-enter the training environment with a appropriate reflection and acknowledgment of the learning opportunities presented during the outbreak and response.





## Appendix A: Specialty specific advice

Specialty advice to support continuity of care and to support those patients with non COVID-19 presentations is available and can be found at,

[NHS England specialty guidance](#)

[Royal College of General Practitioners](#)

[Royal College of Obstetricians & Gynaecologists](#)

[Royal College Paediatrics and Child Health](#)

[NHS England Specific Cancer surgery advice](#)

Transplantation surgery in the United Kingdom. [Guidance documents can be found on the British Transplant Society website](#)

### Organ Donation

Severe restrictions because of pressure in critical care beds, length of time for viral testing and presence of COVID-19 patients in ITU's. Still some activity continuing.

### Transplantation

#### *Simultaneous Pancreas Kidney transplantation*

All UK centres have suspended activity.

#### *Islet cell transplantation*

Suspended across the UK.

#### *Kidney Transplantation*

Living donor kidney transplant  
Paired matching scheme has been suspended across the UK All programmes advised against LDKT.

#### *Cadaveric renal transplantation*

At least 10 centres have closed other centres are only performing highly sensitized transplants and other exceptional cases.

### Liver Transplantation

All centres still open but most restricting transplantation of super-urgent and high urgency UKELD  $\geq$  62 patients.

### Lung Transplantation

Suspended.

### Heart Transplantation

Centres are open but prioritizing super urgent and urgent cases.



## Appendix B: Specialty specific prioritisation of procedures and appointments according to time

Time dependent appointments RCOphth

Time dependent appointments RCOG

Time dependent procedures RCOphth, RCOG and RCS

Time dependent appointments RCPsych

Time dependent procedures RCPsych

Time dependent procedures and appointments RCP



## Appendix C: Restoration of clinical services post COVID-19 surge

Dr Jeanette Dickson, President, Royal College of Radiologists

This is a difficult area as different locations will emerge at different rates and local demographics will drive likely presentations and thus demand. The shape of local responses will vary as there are different estate footprint / staffing levels across key groups / kit availability in different areas.

The workstreams are a logical grouping but they are not perfect — there is no perfect way to look at this. However, the main missing component which is cross cutting across all groups is diagnostics. Prior to Covid, the capacity for all diagnostics (endoscopy, imaging and histopathology) was well below where it needed to be to service national demand, as recognised in the Long Term Plan. The actions being taken to address this have, unsurprisingly, not yet fed through. Patients present via many varied pathways — they do not come with a diagnosis (often) and often need redirected to a more optimum pathway after diagnostic tests. Pathways are another way of grouping workstreams but again not perfect.

### Service interdependency

In restoring service provision what strikes me is the interdependency of teams across the different workstreams and along the patient pathways. For example, one can talk about improving 2 week wait presentation by encouraging GP attendance but if the facility to investigate these patients isn't there then you will not restore services. At present most UGI and LGI endoscopy services are operating at emergency levels at best due to concerns about aerosol generation during procedures. So if you resume bowel screening you can get a cohort of patients who need either endoscopy or CT colonography. The aerosol generation needs full PPE and each room / scanner needs a full deep clean in between each patient, limiting throughput. If reliable testing were introduced you may be able to reduce cleaning times, but probably not PPE. Once a biopsy has been taken you need histopathology to interpret it and CT / MRI (or both) to fully stage the lesion. Histopathology is understaffed with much pressure from Corona virus testing and imaging has the same issues with cleaning CT / MRI scanners that you have with endoscopy suites. Once you have a staged cancer and the decision is surgery you have the risks of surgery in Covid positive patients and the risks to staff of operating in a AGP environment. Some cancer may be managed by chemotherapy and radiotherapy in combination without surgery but by no means all. Otherwise you may need chemotherapy and radiotherapy prior to surgery in a precisely timed fashion but may struggle with the AHP staff to deliver the therapies in a Covid rich environment. So, turning on the tap at one end will not necessarily release the flow at the other — there are multiple taps which need released in a sequential fashion. I have used cancer here to illustrate, but it is not a unique diagnostic position to be in.

### Cold sites / Hubs

Treating well members of the public away from significantly Covid positive areas is attractive and has merit. Patients attending cold sites need a uniform agreed protocol to allow the intervention to take place with minimal risk to themselves and staff. Extra shielding for 14 days (maybe 7) and swab testing needs to be done for more invasive procedures such as surgery. This would also decrease the need for deep clean of areas between patients improving throughput. Staffing "cold" sites requires an understanding that staff are people and people have a prevalence of Covid infection, some of it asymptomatic. To minimise risk the capacity to swab staff on a routine (weekly / every 48 hours basis) will be needed to endure the hubs do not become microcosms of greater than R0 virus transmission. If we are looking at endemic Covid prevalence, precautions for high risk procedures for 12 months need to be factored in with consequent reduction in capacity due to deep cleaning equipment between patients.

### Local solutions / networks not co-terminus

NHS E/I have not unreasonably said local needs / capacity / surge position will determine which local solutions are deployed when. However, the local structures vary according to diagnosis / pathway and often have limited sight across silos. An example is the Cancer Alliances working on cancer pathways, which are dependent on imaging which sits in imaging networks which are not



fully mature and not co-terminus, which may need paediatric input which is not aligned. There are numerous locoregional networks for different diseases / pathways but none are co-terminus, many are immature and some are whole pathway focussed and some are one aspect of the pathway focussed.

### Capacity

At present much of the imaging service is not working at capacity due to the reduction in elective work. When restoration is started there will be 2 patient groups — those whose routine imaging has been delayed [cancer patients undergoing chemotherapy and those on non-cancer investigation pathway] and those presenting with symptoms needing urgent investigation. The capacity to deal with this was not sufficient pre-Covid and the negative disincentive in pensions meant the capacity was already reducing. As restoration occurs, pension issues will become an issue again and the flex capacity required to manage excess demand over expected will be reduced below expectation, reducing throughput.

### Empty capacity

Undoubtedly there is currently empty capacity in some areas in some disciplines, but this is variable by location. It could be used now to e.g. restart screening services, but this requires the education of low risk public groups that visit to “health facilities” is a low risk endeavour. If restrictions are to continue for 12 months then screening the HCP workforce x2 per week / every 48 hours to reassure the public that attending for investigations when asymptomatic is not injurious to their health. The longer precautions are needed, the more salient this need will be. The current situation where there is empty capacity is a political minefield were it to be more widely appreciated.

### New models of care

Rapid diagnostic centres (RDCs) are a much-heralded way of facilitating patient pathways, ensuring a more rapid way of delivery care in the same shape to improve outcomes and increase earlier diagnosis. The RDC model is variable but often virtual based around current equipment in secondary care. Currently mobile facilities, come from the IS sector, are being used to support Trusts with limited / old / unreliable scanners. Were these to be deployed as community based RDCs there might be staffing issues but the public would have a “safer” place to go to access healthcare. These could be seen as system levers to develop pathways which do different things more quickly rather than the same again but streamlined e.g. supporting direct referral from primary care to the correct diagnostic test when symptoms are inconclusive (using decision support software), allowing onward referral to the correct pathway by the imaging team, the result flowing from the diagnostic test rather than the rigid construct of a site specific two week wait.

If we assume that Covid restrictions will be in place for 12 or more months, the paradigm will shift from pandemic to endemic Covid. There will be a need to harmonise screening protocols for those undergoing procedures and the staff caring for them. Sites will all be “hot” or at least “warm” so deep cleaning of rooms / equipment will need to be harmonised. Patients may be more willing to attend community rather than acute care sites so RDC models could be adapted. Capacity in all areas of diagnostics needs to be addressed and prioritised.



## Appendix D: COVID-19 testing for future

Professor Jo Martin, President, Royal College of Pathologists

As we move forward from the first wave of the COVID-19 epidemic, the approach to SARS-CoV2 viral detection (PCR or antigen), testing the immune and protective immune responses to it, either serological or cellular is moving rapidly. The settings in which such tests will need to be used have also not yet been fully defined, but we are looking to the future.

Testing will be carried out in many settings from the hospital to the high-street and home, likely using different technologies depending on the clinical, behavioural and public health need. This document sets out a vision for a future strategy around which clinical, scientific and policy stakeholders can align.

### Seasonal and local outbreaks

SARS-CoV PCR (perhaps coupled with or replaced by antigen) screening will be integrated into routine seasonal outbreak testing alongside influenza and other respiratory viruses for patients on admission and potentially during their stay in hospital. This may be near patient or in local laboratories.

We will certainly identify population groups with particular causative or associative risk factors, and their house-hold contacts who need additional screening. This may include staff or routine screening of vulnerable groups such as those attending dialysis, having transplants or immunosuppression and therefore require high throughput testing in local and hub laboratories.

Local track and trace systems in collaboration with infection control teams or public health teams will liaise over identifying these outbreaks or high incidence areas.

Data will be collated for national and global monitoring, as for influenza, and involve genome sequencing with sharing of data and information regarding mutations and emergence of strains potentially with different transmissibility or virulence. This will also inform vaccine development, emergency planning and population wide policies.

### Serological surveillance

Serology may be used as a companion diagnostic alongside viral detection based screening in many of the scenarios outlines above, placement of which will require detailed research review or pilot clinical studies.

Serology also may help with assessing prevalence and herd immunity to identify those who have 'seen the virus' recently or ever and how that translates into protection and if so for how long.

Early data suggest a more limited niche positioning in response to specific clinical needs due to a short lived and variable immune responses, however the refinement of assays and the opportunity for serology or potentially other immunity markers should be recognised.

There is a wealth of expertise in service and research immunology and virology laboratories around the country which will need support for research at pace and scale.

### Staff occupational health screening, antenatal screening and testing prior to immunosuppressive therapy

There is recognition that SARS-CoV2 detections and immune response assessments will extend to many different clinical and healthcare settings. Human resource and occupational health departments will be pressing to set up staff screening programmes to help with decision making on bringing workers back to work.

Including testing as part of routine clinical care pathways to ensure patient safety either prior to treatment that may be influenced by the presence of SARS-CoV2 (eg major surgery,



immunosuppression) or where it may affect others in 'covid free' spaces is a consideration before return of the delivery of routine services

It is important we fill this space with sensible supportive data with accompanying guidance, to prevent unnecessary and potentially harmful untested technologies being employed. Eventually it will be likely that vaccination and assessment of that having happened and the response achieved that will provide the best way forward, as we do for many viral infections.