South London Specialist Virology Centre

VIROLOGY

Laboratory User's Handbook
March 2023 version

www.kch.nhs.uk www.synnovis.co.uk www.synlab.co.uk

www.clinicalvirology.org

South London Specialist Virology Centre
in conjunction with
Department of Medical Microbiology
Prepared by

Dr M Sudhanva, Consultant Medical Virologist
Gulrukh Ahsan, Quality Operation Manager in Virology

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1. General information

Our laboratories are based at Kings College Hospital NHS Foundation Trust. We provide an extensive clinical microbiology service, including infection control services and specialist advice in microbiology, virology, parasitology and mycology to hospitals and General Practitioners. South London Specialist Virology Centre is part of the UK clinical virology network.

Epidemiological data are provided for the Communicable Disease Surveillance Centre in Colindale. Outbreaks of infectious disease are investigated in conjunction with the Consultants in Communicable Disease Control.

South London Specialist Virology Centre is UKAS accredited under the ISO 15189:2012 standards and participates in National Quality Assurance Schemes. The schedule of accredited tests may be found by searching using the accreditation number "9863" at https://www.ukas.com/search-accredited-organisations. All non-accredited tests have a comment stating when they are not accredited.

In October 2010, we joined the KingsPath team having previously been the UK HSA London Regional Laboratory for about 20 years and along with our other colleagues have entered the joint venture with GSTS Pathology who provide pathology services at Guy's & St Thomas's NHS Foundation Trust. This Joint Venture was called Viapath; which is a joint venture between SERCO, Guy's & St Thomas' NHS Foundation Trust and King's College Hospital NHS Foundation Trust.

On 1 April 2021, Guy's and St Thomas' and King's College Hospital NHS Foundation Trusts have joined with SYNLAB UK & Ireland to deliver pathology services across the London 4 region as part of NHSE&I pathology network transformation. On 1 October 2022, Viapath was rebranded as Synnnovis, which is a partnership between SYNLAB UK & Ireland, Guy's and St Thomas' NHS Foundation Trust, and King's College Hospital NHS Foundation Trust. As well as delivering pathology services and in line with the NHS's own clinical vision and strategy, SYNLAB will be responsible for transforming existing hospital-based laboratory and diagnostic services into an integrated hub and spoke pathology network by 2024.

A state-of-the-art 'hub' laboratory is in development at Friars Bridge Court, in Blackfriars Road, London, providing access to improved services and equipment for routine and some specialist testing. On-site hospital laboratories will be turned into essential services laboratories (the spokes), focusing on the rapid turnaround of urgent tests, such as those needed for A&E departments. The hub will become one of the largest, purpose-built pathology laboratories in the UK, capable of processing around 70 per cent of all pathology activity in the region.

Synnovis and its partners benefit from SYNLAB's global laboratory and diagnostic network, which will provide access to a wide range of clinical, scientific and operational expertise, as well as innovative research and development on an international scale.
Synnovis (formerly Viapath) is a founding member of The Association of Independent Pathology Providers (AIPP), which is a trade association representing innovative research-based diagnostic testing companies. The AIPP's aim is to work at the heart of policy development and decision-making to ensure that patients are able to benefit from the latest and most advanced pathology tests and most efficient processes.

1.1 Where to find Virology

Postal addresses

South London Specialist Virology Centre King's College Hospital NHS Foundation Trust Cheyne Wing, 2nd Floor (opposite Liver ITU) Denmark Hill London SE5 9RS	DX address: South London (PHL) Kings DX 6570200 Peckham 90SE

Website contacts:

www.synnovis.co.uk www.clinicalvirology.org www.synlab.co.uk

1.2 Population served

King's College London was founded in 1829. Clinical teaching in the medical faculty was dependent on the Middlesex Hospital until 1839 when King's College London gained its own hospital in Portugal Street, which was rebuilt in 1861. The hospital moved to the Camberwell site in 1913. It became part of the NHS in 1948 as a teaching hospital. The 1960s saw the introduction of a new dental school, maternity block (now the Ruskin Wing) and King's liver unit. This was followed by the Normanby College of Nursing, Midwifery and Physiotherapy. In 1995 the UK's first specialist Motor Neurone Disease Care and Research Centre was established, and the Weston Education Centre was opened in 1997, accommodating the medical school, library and lecture theatres. A new Accident and Emergency Department was opened in the same year. King's College Hospital received Foundation Trust status on 1 December 2006. Following the dissolution of South London Healthcare Trust, King's took over the Princess Royal University Hospital (PRUH) in October 2013.

King's College Hospital NHS Foundation Trust is a large provider of acute and specialist services that serves a population of over 1,000,000 in the economically diverse Greater London boroughs of Southwark, Lambeth and Bromley and Bexley and the county of Kent. The trust operates from 5 sites: Denmark Hill (main) site, Princess Royal University Hospital Bromley, Beckenham Hospital, Queen Mary's Hospital Sidcup and Orpington Hospital. The Princess Royal University Hospital (PRUH) is in Farnborough, near Orpington, Kent. Beckenham Hospital is about 6 miles to the north of the PRUH and provides outpatient services. Orpington Hospital is 3 miles south of PRUH and provides outpatient services and has 40 intermediate care beds.

The trust has 1673 beds including 1050 acute, 125 maternity and 144 critical care beds. The Denmark Hill site has approximately 836 beds including a major critical care service (122 beds) and maternity services (103 beds). Princess Royal University Hospital has 455 acute beds, 22 critical care and 22 maternity beds (plus a midwifery led birthing centre) whilst Orpington provides 29 acute beds. Emergency Department services are provided at both King's College Hospital Denmark Hill and Princess Royal Hospital. The Trust employs in excess of 13,450 staff and receives over 250,000 emergency attendances, 115,000 inpatient spells and 960,000 outpatient attendances

The trust receives over 250,000 emergency attendances, 115,000 inpatient spells and 960,000 outpatient attendances. All core services are provided from King's College Hospital Denmark Hill and Princess Royal University Hospital while outpatient and surgical services are provided from Orpington Hospital. The trust provides services to a population from the significantly deprived boroughs of Lambeth and Southwark and

also the more affluent borough of Bromley. Several specialist units of international reputes offering regional or supra-regional services are located within the Denmark Hill site.

King's College Hospital is renowned for the international reputation of its speciality services. These included the tertiary services for liver disease and transplantation, neurosciences, diabetes, cardiac services, haematology and foetal medicine. For people across southeast London and Kent, King's is the designated major trauma centre, as well as a heart attack centre and the regional hyper acute stroke centre. The new helipad at Denmark Hill, opened in November 2016, has reinforced King's position as a major trauma centre for the south of England. King's provides services to local residents of the London Boroughs of Lambeth, Southwark, Bromley, Bexley and Lewisham from its sites at Denmark Hill, the Princess Royal University Hospital Farnborough Common, Queen Mary's Hospital Sidcup, and Orpington Hospital. These include accident and emergency services, maternity, care of the elderly, orthopaedics, diabetes, ophthalmology, oncology, dermatology, and many more. King's has a reputation as pioneers in medical research, with a record of innovation in a number of key fields. The hospital is home to a number of leading clinical units and research centres, such as the Clinical Age Research Unit, the HIV Research Centre, and the Harris Birthright Centre. Developments have recently begun to build a new leading-edge Haematology Institute. King's College Hospital NHS Foundation Trust has an enviable track record in research and development and service innovation. In partnership with King's College London the Trust has recently been awarded a National Research Centre in Patient Safety and Service Quality. It is also a partner in two National Institute for Health Research biomedical research centres. The first is a Comprehensive centre with King's College London and Guy's and St Thomas's NHS Foundation Trust and the second is a Specialist centre with the South London and Maudsley NHS Foundation Trust and the Institute of Psychiatry. King's College Hospital NHS Foundation Trust has also recently strengthened its research and development infrastructure in order better to support clinical researchers across the organisation.

In 2021-22, the Trust had a total operating income of £1,591,152, with Clinical Commissioning Groups and NHS England activities generating income of £1,432,502.

The regional and supra-regional services include:

- Haemato-oncology (including the UK's largest bone marrow transplantation unit)
- Institute for Liver Studies (providing 30% of UK liver therapy, including transplantation and liver failure) for both adult and paediatric hepatology
- Variety Club Children's Hospital
- Regional Neurosciences and Neurosurgical services
- Renal unit (offering dialysis including HBV, HCV and HIV positive individuals)
- Harris Birthright Centre for Fetal Medicine
- Adult Intensive Care Units, neonatal and paediatric intensive care and high dependency units
- Solid tumour oncology / cancer services (including skin, hepatobiliary, head and neck)
- Cardiac surgery (regional)
- South East London Major Trauma Centre
- Paediatric and adult Accident and Emergency departments
- Obstetrics and gynaecology; assisted conception
- Genito-urinary medicine (Caldecot Centre)
- Reproductive and Sexual Health

1.3 Primary care

The laboratory serves more than 100 fund-holding general practitioners. The response of King's College Hospital to the evolving Primary Care Groups and Trusts has resulted in further demands on the clinical virology service. The King's local Primary Referral Guide reflects general practitioners' expectations of direct access for prompt clinical advice, including virological advice. Specialist virology services and clinical advice are offered by virology to the London Boroughs of Lambeth, Southwark, Lewisham, Bromley, Bexley and

Greenwich. The local authorities serviced by the laboratory are the London Boroughs of Bromley, Southwark, Bexley and Greenwich.

1.4 South London Specialist Virology Centre

The medical virologists include two consultant virologists and one part-time consultant and a specialty trainee, who work closely with a large lab team. This larger team consists of a Principal Clinical Scientist, Clinical Scientist, team of Biomedical Scientists and Scientific Assistant Technical Officers, supported by a Health & Safety Manager, a Quality Manager and Administrative & Clerical team. They in turn report eventually to the Service Delivery Manager and General Manager. Together, the team manages a workload of about 345,000 tests per annum, of increasing complexity and requiring sophisticated laboratory processing and interpretation. The routine diagnostic work includes general serology, hepatitis and retrovirus serology, and an extensive repertoire of molecular based tests which include both qualitative and quantitative assays as well as antiretroviral resistance testing using automated sequence analysis, employing a range of different platforms and technologies underpinned by our Service Development research. General microbiology serological tests which are sent to the combined department are carried out in virology. Virology receives specimens from an increasing number of external microbiology laboratories for investigation. The department also processes >500 dried blood spot cards per week for HIV, HBsAg, HB core total antibody, HCV antibody and HCV RNA.

The current capacity of the laboratory is to process 3000 combined throat and nose swabs for SARS-CoV-2 RNA as routine.

1.5 Research

There are collaborations between clinical research groups and academic partners at Guy's, King's, and St Thomas's School of Medicine, the Institute of Psychiatry, The School of Nursing and Midwifery, King's College London and King's Division of Biomedical Sciences. King's College Hospital Foundation Trust is alongside King's College London, Guy's and St Thomas' and South London and Maudsley Foundation Trusts members of King's Health Partners, an Academic Health Science Centre.

Research interests in the laboratory include:

There is a small team of clinical scientists work in collaboration with medical and biomedical scientist colleagues in a variety of projects including technology transfer to the routine diagnostic service as well as other academic research activities. Work carried out in the both microbiology and virology departments has been published in numerous peer-reviewed journals and presented at local, national and international meetings.

1.6 Surveillance activity in virology:

HIV programme	HIV antiretroviral resistance data sequence for MRC database, HIV avidity for RITA
HCV	Reporting to the National HCV sentinel surveillance study
Norovirus	Diagnosis and outbreak analysis
Influenza	Diagnosis and typing
Pregnancy	Screening in pregnancy

South London Specialist Virology Centre and Department of Microbiology [together as Infection Sciences] provide a full screening service for NHS Infectious Diseases in Pregnancy Screening [IDPS] Programme.

1.7 Key personnel and contact details

Virology direct lines: **Results Phone:** **External 020 3299 6155**
Internal 36155

Medical advice: **External 020 3299 6978**
Internal 36976 / 36977 / 36978

Specimen Reception: **37774**

Microbiology **Phone:** **External 020 3299 33565**
Internal 33565

Virology only - 020 3299 **+ 9000 (switch) or extension**		
Designation	**Name**	**Telephone extension**
Head of Virology - Consultant Medical Virologist Laboratory Director for virology	Dr Mark Zuckerman	36978 / 36970
Consultant Medical Virologist	Dr M Sudhanva	36978 / 36971
Consultant Medical Virologist and Infectious Diseases Physician (Lead for ID clinic)	Dr Temi Lampejo	36978 / 34367
Virology Operational Manager	Dr Colleen Gilkes	36159
Virology Quality Operational Manager	Gulrukh Ahsan	36159
Higher Specialty Trainee or Combined Infection Trainee	Trainee on rotation	36978
Microbiology and Virology common staff - 020 3299 **+ 9000 (switch) or extension**		
Service Delivery Manager	Diana Bate	33549
Principal Clinical Scientist	Dr Melvyn Smith	36155
Departmental Secretary for Medics	Anna Maria Gomez-Danso Noushig Topdjian	33897 33565
Virology Admin team	Lydia Kimotho Julie Kenny Michelle Wallis	36155
Microbiology Operational Manager	Eunice Drakes	33442
Quality Manager	Lucy Chiri	36140

Microbiology only - designation	**Name**
Clinical Director of Pathology and Consultant Medical Microbiologist Lab Director, Infection Control doctor and Consultant Microbiologist	Dr Carmel Curtis
Consultant Medical Microbiologist, Clinical Lead for Infection Sciences, Antimicrobial stewardship lead & Local Faculty Lead for Medical Microbiology and Infectious Diseases	Dr Caoimhe NicFhogartaigh
Consultant Medical Microbiologist and Strategic Clinic Lead Infection Sciences for SE London Synnovis	Dr Silke Schelenz
Consultant Medical Microbiologist	Dr Martin Brown
Consultant Medical Microbiologist	Dr Anita Verma
Consultant Medical Microbiologist & Infectious Diseases consultant	Dr Mauricio Aras
Consultant Medical Microbiologist and Outpatient Parenteral Antibiotic Therapy services lead	Dr Aileen Boyd

Consultant Medical Microbiologist	Dr Jasmin Islam
Consultant Medical Microbiologist & Infectious Diseases consultant	Dr Anjaneya Bapat [from 11 April 2023]
Consultant Medical Microbiologist	Vacant
Consultant Medical Microbiologist (PRUH)	Dr Mustafa Atta
Consultant Medical Microbiologist (PRUH)	Dr Sumati Srivastava
Consultant Medical Microbiologist (PRUH)	Vacant
Consultant Medical Microbiologist (PRUH)	Vacant

1.8 Normal laboratory opening times

Routine specimens are accepted at the virology laboratory from is Monday to Friday: 9 AM to 5 PM

2. Sections within the Specialist Virology Centre

There are two diagnostic sections viz. Virus Identification Section and Virus Serology.

2.1 Virus Identification Section

Virus detection by molecular techniques is now a routine service daily Monday to Friday for many viral infections. Some are also performed during winter over the weekend. Please note we no longer provide virus isolation or direct immunofluorescence (DIF) diagnostic services. Samples for electron microscopy (EM) are referred to another laboratory if needed.

Molecular diagnostics use real time PCR for the detection of viral nucleic acid in clinical samples. Nucleic acid tests performed routinely are for the detection / quantification of:

Viruses in blood (HCV RNA, HIV-1 RNA, HBV DNA, HEV RNA, BKV DNA, adenovirus DNA, CMV DNA and EBV DNA)
Respiratory viruses (influenza viruses, RSV, parainfluenza viruses, rhinovirus, metapneumovirus and adenovirus)
Other body sites/fluids (HSV DNA, VZV DNA, adenovirus DNA, enterovirus RNA, JCV DNA, BKV DNA, HHV6 DNA)
Gastroenteritis viruses (norovirus and rotavirus RNA)
Sexually transmitted infection (*C. trachomatis* & *N gonorrhoea* DNA and HSV DNA)

Multiplex PCR's are available for the following viruses as routine testing of all respiratory samples along with stand-alone adenovirus DNA testing:-

Multiplex 1: influenza A virus, influenza B virus and human metapneumovirus,
Multiplex 2: RSV subgroup A and B, rhinovirus
Multiplex 3: parainfluenza viruses 1, 2 and 3
Multiplex 4: influenza A virus CDC matrix and pandemic influenza A H1N1 (2009)v H1

Diagnosis of atypical bacteria and coronaviruses is by molecular-based GenMark ePlex. SARS-CoV-2 RNA by Cepheid GeneXpert which are available for urgent 24/7 testing of respiratory viruses and atypical bacteria. Its current usage is to exclude pertussis and the occasional virus in the critically unwell patient or respiratory-wise severely ill patients who are scheduled for a transplant.

Antiretroviral resistance testing in HIV by nucleic acid sequencing for resistance testing are also provided.

2.2 Serology

The serology section detects antibodies to viruses and viral antigens in serum using automated assays. In addition, a few bacterial antibodies are also assayed in this section. Automated machines include TECAN, Abbott Architect and VIDAS.

3. Use of the Laboratory

3.1 Test requesting procedure (routine, urgent and out of hours)

Routine requests can be made either by King's EPR system or any virology / microbiology request form. During normal laboratory hours please telephone urgent requests (020 3299 6155 or speak to the medical staff on 36298) to ensure priority processing. See section 3 for use of on-call services.

3.2 Requesting Additional Tests

Sample Type	Time limit for requesting extra tests
Genital and *urine samples for Chlamydia trachomatis + N.* gonorrhoeae	14 days
Non-Blood Samples	
CSF	28 days
Fluids	28 days
Swabs	28 days
Faeces	28 days
Dry tissue (Skin and Nails)	28 days
Respiratory tract samples	28 days
Wet tissue	42 days
Dried Blood Spot Cards	4 months
Plasma	
Medico-legal	30 Years
HIV-1 RNA loads (>20 copies/mL)	30 Years
Whole blood samples	7 days
Other plasma	14 days
Serum	
Other sera	~ 1 Year
Medico-legal	~ 2 Years
Pregnant booking	2 Years
Needlestick injuries	30 Years
Pre-transplantation (donor) sera	30 Years

All post-mortem tissues are returned to histopathology when testing is complete. For specific enquiries please contact the medical staff.

3.3 Completing the request form

Please use labels on all samples

EPR requests:

All Denmark Hill site patient sample requests can be made via EPR (except Caldecot Centre and Occupational Health.) Please free text in the clinical details field if you cannot see an intended test on EPR request.

Please telephone 36298 for specimens to be processed urgently.

Electronic requests from Caldecot Centre / Reproductive and Sexual Health

Since 2018, all requests are electronic

Electronic requests from GPs

Many GP surgeries within the vicinity of King's send samples with electronic forms using T-Quest system.

Please telephone 0203 299 6298 for specimens to be processed urgently.

Types of paper-based request forms:

Multipart single pathology request	GP use (GPs who are not part of T-Quest system)
Dried bloodspot forms	Abbott Alere

Any hand written form should be completed legibly.

Please telephone 36298 or 36155 or 37774 for specimens to be processed urgently.

Minimum Required Data:

Either and EPR-based or a paper-based request must accompany all specimens sent to the laboratory. It should clearly state the following information.

Those in bold are a minimum requirement and without them the sample could be discarded or delayed.

- **Patient name**
- **Unit number/NHS number**
- **Date of birth (age if DOB not known)**
- **Sex**
- **Ward or Address for report**
- **Requesting Medical Officer/GP name and number**
- **Date and time specimen taken**
- **Type of specimen (**Specify anatomical site from which vesicle swab / fluid specimens were taken)
- **Tests required**

Other useful data

- Bleep number or mobile number, in order to phone results both before 5 PM and after 5 PM results
- Patient address
- All relevant clinical details including
  - any antimicrobial treatment (recent, current and intended)
  - History of foreign travel including return dates, countries/regions visited
  - Date of onset and duration of illness, particularly for serology
- Useful epidemiological information, e.g.:
  - Children and suspected influenza - give the name of the school
  - Adults and suspected norovirus - give the place and type of work, (e.g., catering, cruise liner
  - All patients and suspected viral haemorrhagic fever – travel destination, date of return, date of onset of illness, signs and symptoms, malaria smear
- Viral Haemorrhagic Fever Risk status if applicable – MUST BE DISCUSSED WITH MEDICAL VIROLOGY STAFF FOR RISK ASSESSMENT BEFORE SENDING SAMPLE

If uncertain about the exact test and terminology, please give a detailed clinical history as this can help the Virology medical staff to decide the most appropriate investigations.

Incorrectly labelled specimens / forms will not be processed as we cannot guarantee that the sample and form match and that the patient identity.

3.4 Specimen labelling

- Use labels for all samples.
- The specimen must be labelled with the same patient details as those on the request form
- Please ensure the full patient name and the date of sample collection are legible
- Please note that unlabelled specimens do not guarantee authenticity of the sample, and these cannot be processed and will be discarded.

3.5 Specimen collection

The best results are obtained when an appropriate, well-taken specimen is in the proper container, is delivered to the laboratory promptly and relevant clinical information is provided on the request form. Please contact the laboratory if there is any doubt about the best specimen to take or you have questions about any test.

General guidelines on specimen collection include:

- Send specimens in sterile containers
- Collect specimens from the actual site of suspected infection. Please do not send just blood samples for 'viral serology' instead of vesicular fluid or throat swab or CSF, as the case may be.
- Take specimens that are representative of the disease process. For example, respiratory specimens are more appropriate than blood for serology in cases of acute respiratory infection.
- An adequate quantity of material should be obtained for complete examination especially vesicle fluid, CSF and NPA
- Take care to avoid contamination of the specimen by microorganisms normally found on the skin and mucus membranes. Sterile equipment and aseptic technique must be used for collecting specimens, particularly for those from normally sterile sites
- All swabs or material from swabs should be immersed in virus transport medium (VTM) and transported promptly to the laboratory. Viruses including (viral nucleic acid) may not survive prolonged storage at room temperature or may be overgrown by bacteria or fungi.
- In the absence of readily available VTM (laboratory issued or commercial), please immerse the swab tips in 1 mL of sterile saline in a universal container

3.6 Specimen limitations affecting assay performance

Factors that can affect assay performance are as follows

- inherent (age, gender, nutritional status, pregnancy, congenital immunological defects)
- acquired (passively acquired antibody, immune response to immunisation, immunosuppression)
- biological (lipaemic, haemolysed, high bilirubin content e.g., Liver ITU patients)
- collection container (use of correct blood collection tubes – e.g., serum from clotted blood may underestimate HIV-1 RNA load when compared to EDTA plasma)
- Sample volume, collection and transportation
- Time of sample collection to receipt in laboratory

3.6.1 Maximum sample transport times for virology

Sample Type	Maximum Transport time at Ambient Temperature
Genital and *urine samples for Chlamydia trachomatis + N.* gonorrhoeae	30 days
Non-Blood Samples	
CSF	3 days
Fluids	3 days
Swabs in Universal Transport Medium	3 days
Faeces	3 days
Dry tissue (Skin and Nails)	3 days
Respiratory tract samples	3 days
Wet tissue	3 days
Dried Blood Spot Cards	3 days
Whole blood samples	3 days
Other plasma	3 days
EDTA – quantitative and qualitative molecular	3 days

3.7 Transport and receipt of specimens (including courier and postal deliveries)

Samples must be delivered to the department in a way to protect the integrity of the sample. Samples must not be exposed to extreme temperature or prolonged transport. If samples are in danger of being exposed to conditions where sample integrity can be compromised, please contact the laboratory to discuss the most appropriate method of transport.

When receiving samples from an external institution or laboratory, it is the responsibility of the sender to ensure that the samples are packed in accordance with the current postal regulations, contain appropriate paper work and are labelled correctly. Courier / taxi / suitable transport should be arranged by sending institution or laboratory. You may have to contact the on-call BMS staff for out-of-hours' testing to indicate approximate time of arrival of sample at virology. Our experience shows that a considerable amount of time is wasted by our on-call BMS staff just waiting for a sample to arrive because of lack of communication from the test requesting person.

ROUTINE SAMPLES:
During normal working hours, all routine King's specimens should be taken to central specimen reception at King's College Hospital or be sent via Pneumatic Air Tube Transport System (PATTS). There is a RED BOX at virology / microbiology reception which can accept deposits of respiratory samples meant for SARS-COV-2 RNA testing 24/7

The following 'virology' specimens must not be sent via the air tube:

- any respiratory tract specimen (sputum, bronchoalveolar lavage, respiratory aspirates)
- any specimen from patients known to have, or thought to have:
  - transmissible spongiform encephalopathy (CJD, GSS etc.)
  - a viral haemorrhagic fever (e.g., Lassa virus, Ebola virus etc.)
- any difficult to resample or unrepeatable specimen of any type

URGENT SAMPLES:

During working hours: for urgent testing, bring the specimen DIRECTLY to the laboratory reception, which is on the 2nd floor of Cheyne Wing (opposite Liver ITU).
Please telephone 36298 or 36155 for specimens to be processed urgently during working hours.

Urgent SARS-COV-2 RNA by either Cepheid or GenMark ePlex are controlled by Trust consultant-led demand and are controlled by Trust-based protocols.

ED, Cardiac Theatres, transplant teams and ITUs do send samples for urgent SARS-CoV-2 RNA.

All other urgent testing is with discussion with virology medical team on 36298

During out-of-hours: for urgent testing, please bring the specimen DIRECTLY to the laboratory reception, which is on the 2nd floor of Cheyne Wing (opposite Liver ITU).

Do not send samples to Central Specimen Reception for urgent testing.

Please contact the laboratory 37774 for directions to laboratory reception) or the on-call BMS staff (07890 251 939) before arranging urgent transport to laboratory reception.

Urgent SARS-COV-2 RNA by either Cepheid or GenMark ePlex are controlled by Trust consultant-led demand and are controlled by Trust-based protocols.

ED, Cardiac Theatres, transplant teams and ITUs do send samples for urgent SARS-CoV-2 RNA.

All other urgent testing [like HIV serology etc] is with discussion with on call virology medical team via King's switchboard

3.8 Virology Cut-off times for receipt of specimens for a 24-hour TAT

If a sample needs to be processed urgently based on clinical ground, please contact the medical virologist on-call / on duty as detailed in section 3.3.

Specimen type	Assays	Cut-off time for processing	Results available at:	Samples not processed on:
Respiratory samples Respiratory samples (Combined throat and nasal swab, BAL, NPA, ETA etc.)	SARS-CoV-2 Routine Altona Real Star (See section 5.1 below)	24/7	Within 24 hours	None
	SARS-CoV-2 Urgent Cepheid GeneXpert (See section 5.1 below)	24/7	Within 1.5 hours	None
	Cepheid Quadplex for SARS-CoV-2, influenza A virus, influenza B virus and RSV	24/7	Within 1.0 hour	None
	GenMark ePlex panel for 20 viruses and 3 bacteria (See section 5.1 below)	24/7	Within 2 hours	None
	Routine 11-virus panel (not including SARS-CoV-2)	12 noon	4.30 PM	Saturdays in Summer
		2 PM (Winters)	10 AM next day	
Faeces or rectal swab in VTM or vomitus	Adenovirus DNA (faecal) Astrovirus RNA Norovirus RNA Rotavirus RNA Sapovirus RNA	10 AM	3.30 PM	Saturdays when norovirus activity is low.
		3PM (Winters)	10 AM next day	
CSF	HSV DNA [1 & 2] VZV DNA Enterovirus RNA Parechovirus RNA Adenovirus DNA CMV DNA EBV DNA	10 AM	3.30 PM	Weekends and Bank Holidays.
Vesicle fluid	HSV 1 DNA, HSV 2 DNA, VZV DNA, enterovirus RNA, parechovirus RNA	10 AM	3.30 PM	Weekends and Bank Holidays.
EDTA whole blood	CMV DNA, EBV DNA and adenovirus DNA	3 PM	1 PM next day	Weekends and Bank Holidays.
	HSV 1 DNA, HSV 2 DNA, VZV DNA, enterovirus RNA, parechovirus RNA	10 AM	3.30 PM	Weekends and Bank Holidays.
EDTA plasma	HIV-1 RNA, HCV RNA HBV DNA	3 PM	1 PM next day	Weekends and Bank Holidays.
Eye swab	HSV DNA, VZV DNA Adenovirus DNA	10 AM	3.30 PM	Weekends and Bank Holidays.
Any serology	See section 3.1, 3.3 and 5.3	Any time	Varied	Weekends and Bank Holidays, except for On-call work (see 3.1 & 3.3)

3.9 High risk specimens and safety

Pathogens are classified in hazard groups 1 to 4, with hazard group 1 being non-pathogenic to humans and hazard group 4 the most dangerous pathogens to humans.

Samples from patients with suspected viral haemorrhagic fevers, with a history of having returned within 21 days from Africa, Asia and South America are considered high risk. Contact virology medical staff before taking ANY sample. Special transport arrangements of these samples will be made in conjunction with Rare and Imported Pathogens Laboratory (RIPL), UK HSA Public Health England, Porton Down, SP4 0JG

All blood samples are handled safely in the laboratory and consequently **we do not require "DANGER OF INFECTION" labels**. It is the responsibility of the sender to package samples safe enough for transportation according to regulations.

We assume all respiratory samples may potentially contain a hazard group 3 pathogen and treat samples accordingly.

Great care must be taken in obtaining specimens. Equipment such as needles and blades must be immediately disposed of safely in locally approved "sharps" bins and NOT SENT TO LABORATORIES. Specimens should be transported to the laboratory without delay.

3.10 Result availability

Serology		Molecular	
Qualitative	**Quantitative**	**Qualitative**	**Quantitative**
• Positive • Negative • Indeterminate • Insufficient • Confirmed by neutralization	• Quantitation with appropriate units (e.g. mIU/mL) • Less than the lower limit of detection (e.g. <10 mIU/mL)	• Positive • Positive at limit of detection • Negative • Inhibitory • Insufficient	• Quantitation with appropriate units and log value • Less than the lower limit of detection • Positive (unable to quantify) • Inhibitory • Insufficient

As a rule, we do not issue Reactive / Non-reactive / Detected / Not detected / Low positive / High Negative / Equivocal results.

This rule is based on

1. possible misinterpretation of results by clinicians and to prevent Serious Untoward Incidents (see "transplant team had misheard "reactive" as "nonreactive" in reference to the donor testing HIV-positive" http://edition.cnn.com/2011/HEALTH/08/30/taiwan.transplant.hiv/).
2. NHS Organ Donation and Transplantation have also recommended using these terminologies (http://www.odt.nhs.uk/pdf/microbiological_screening_in_organ_donation_an_overview_part2.pdf).

Exporting of reports:

- Electronic reports are exported to EPR and TQuest within seconds of authorising.
- Most GP results are returned via GP links (TQuest) but those not on registered on the system are returned as a printed hard copy.
- Camberwell Sexual Health Clinic results are electronically returned and are available in Cyberlab.

- Third party contract results are available either on results on line, Cyberlab or printed hard copy depending on the negotiated contract.
- South London and Maudsley results are electronically returned.
- Non-EPR reports are printed and dispatched every working day – Monday to Friday. The speed of reporting depends on the frequency of testing and the urgency of the request.
- Copies of printed reports can be obtained by telephoning extension 36155. Reports are never faxed.
- Organ donor test results are emailed as PDF documents by secretaries and On Call BMS.

3.11 Telephoned and emailed results

Significant positive and negative results, urgent requests and rapid requests that may aid the immediate patient management will be telephoned or emailed by medical virologists to clinical teams within the Denmark Hill site. However, for District General Hospitals and GP surgeries, Virology BMS or Clerical Team members will call the corresponding laboratory or nursing staff to convey the results.

Examples include (this is not an exhaustive list):

- Respiratory virus detection by PCR in a respiratory sample
- Faecal norovirus
- CSF nucleic acid test positive result
- Any acute infection diagnosis
- Blood borne virus infection such as new HIV, acute HBV, acute HAV and first HTLV

3.12 Visitors

Visitors should introduce themselves at the laboratory reception (2nd floor, Cheyne Wing, opposite Liver ITU). The person they wish to see will come to meet them. It is best to make appointments in advance to ensure the right person is available.

3.13 Issue of immunoglobulins and vaccines

As of 1 October 2021, the laboratory has stopped having stocks of varicella zoster immunoglobulin (VZIG) and hepatitis B immunoglobulin (HBIG as 500 IU vials).
All requests for VZIG will be on a 'named patient' basis via the Rabies and Immunoglobulin Service RIGS at UK HSA Colindale and if indicated will be issued from the centrally held stock at Movianto through ImmForm.
Before contacting RIGS one has to check if request falls within the Guidance

Routine service for RIGS

RIgS operates between 8am to 5.30pm Monday to Friday. All requests for replacement vaccine and advice about issuing should be directed to this service (Tel: 0330 128 1020).
Requests for immunoglobulin/vaccine Monday to Friday will be ordered through Movianto for delivery to a named responsible clinician to arrive the next working day before 2pm. However, there may occasionally be specific urgent situations where HRIG is needed sooner than this, and in these circumstances, UK HSA can issue immunoglobulin through a more rapid delivery.

Out of hours service for RIGS

Clinical advice is available through the Colindale Duty Doctor service, between 9am and 7pm at weekends and bank holidays. Most calls can wait until the next day, so callers after 5:30pm are encouraged to call back the next morning to speak to RIgS or the Colindale Duty Doctor service (see Table 1). Vaccine should be sourced locally and will be replaced through RIgS the next working day. There is no need to talk to the RIgS team or Colindale before arranging this.
If HRIG is required out of working hours and cannot wait until the next working day, the product may be able to be collected from a local stockholder or be issued out of hours for delivery the next day. Arrangements for urgent delivery on non-working days should be made by calling the Duty Doctor between 9am and 7pm.

Table 1. Clinical advice, ordering and issuing of products from Colindale

	Advice, delivery and administration
Weekday working hours	
Monday to Friday 8am to 5.30pm	Contact RIgS.
Monday to Friday 5.30pm to 7pm	Contact Colindale out of hours Duty Doctor service.
Weekday out of hours	
Monday to Thursday 7pm to 8am	Administer vaccine and contact RIgS the next morning.
Weekend out of hours	
Friday 7pm to Saturday 9am	Administer vaccine and contact Colindale out of hours Duty Doctor service the next morning.
Saturday and Sunday 9am to 7pm	Contact Colindale out of hours Duty Doctor service.
Saturday 7pm to Sunday 9.00am	Administer vaccine and contact Colindale out of hours Duty Doctor service the next morning (after 9am).
Sunday 7pm to 8am	Administer vaccine and contact RIgS the next morning.

4. Out of hours' service

4.1 Out of hours' examinations provided in virology

An on-call service is provided from 5pm to 9am Monday to Friday, all day Saturday, Sunday and bank holidays. For urgent specimen testing, contact the doctor or BMS on-call through the KCH switchboard (020 3299 9000).

Transplant coordinators should contact the King's College Hospital switchboard (020 3299 9000) and ask for the on call biomedical scientist.

Urgent / out of hours' requests in virology

Assays / samples	Specimen type	Turnaround time
HIV 1 & 2 antibody / antigen	10 mL clotted blood [gold-topped]	2 hours
Hepatitis A virus IgM		2 hours
Hepatitis B surface antigen		2 hours
Hepatitis B core total antibody		2 hours
Hepatitis B core IgM antibody		2 hours
Hepatitis B surface antibody		2 hours
Hepatitis C virus antibody		2 hours
HTLV I & II antibody		3 hours
CMV IgG antibody		2 hours
Measles virus IgG		4 hours
Varicella zoster virus IgG		4 hours
Norovirus RNA	Faeces	5-29 hours
Respiratory GenMark ePlex panel for 20 viruses and 3 bacteria [including SARS-CoV-2 and MERS-CoV RNA]	Any respiratory sample	90 minutes
Céphéid limited panel for respiratory viruses ; Cepheid Xpert Xpress SARS-CoV-2/Flu/RSV plus	Any respiratory sample	60 minutes
SARS-CoV-2 RNA only	Any respiratory sample	90 minutes

Other tests can be carried out after discussion with one of the medical virologists. An example of this is the diagnosis of atypical bacteria and coronaviruses by molecular-based GenMark Eplex, which is available for urgent 24/7 testing. GenMark Eplex. It is available at Denmark Hill site. Its current usage is likely to exclude pertussis and SARS-CoV-2 RNA in the critically unwell patient or respiratory-wise ill patients who are scheduled for a transplant. Access to this testing is by discussion with a Consultant Microbiologist or Consultant Virologist.

4.2 Medical advice regarding the diagnosis and treatment of infection

During weekdays from 9 am to 5 pm medical advice on interpretation of virology results, antiviral management, blood borne virus exposure incidents and post exposure prophylaxis or any other relevant clinical circumstance can be sought from the virology specialist registrars or consultants on extension 36298.

Infection control advice can be obtained from the Infection Control Nurses on extension 34374 or the Kings Web. During out of hours, please call the on-call doctor preferably during the day.

Please **DO NOT CALL** 36298 to obtain **RESULTS** (for results please call **36155**).

4.3 Out of hours' advice

An on-call service is provided by the Virology from 5pm to 9am Monday to Friday, all day Saturday, Sunday and bank holidays. To send urgent samples to Virology, please contact the King's College Hospital switchboard (020 3299 9000) and ask for the on call biomedical scientist (**07890 251 939**). It is better logistically to keep the samples in the wards and not use Porters to bring the sample to Virology during the out of hours.

The on-call biomedical scientists will not look up results out of hours unless discussed and agreed with the medical virology staff.

Out of hours - a Specialist Registrar and/or Consultant Virologist can be contacted via KCH switchboard to discuss clinical, diagnostic and therapeutic problems with doctors.

Appropriate specimens for urgent examination on-call include:

- Urgent nasopharyngeal aspirate / BAL investigation for respiratory viruses
- Urgent duplicate combined throat and nasal swabs for avian influenza A H5N1 virus
- Screening of organ transplant donors
- Screening of organ transplant recipients who are urgently listed
- Returning travellers on renal dialysis
- Other tests are available after consultation with medical virology staff
- Faeces or vomitus for norovirus RNA

5. List of examinations performed in virology

5.1 Viral nucleic acid tests on respiratory samples

Table 1 with TECHNOLOGY OPTIONS available for Respiratory viruses			
Specimen type	**Tests performed**	**Availability, capacity and location of testing**	**Maximum TAT**
RESPIRATORY • Combined throat and nose swab in VTM • Broncho-alveolar lavage • Bronchial lavage • Nasopharyngeal aspirate • Nasopharyngeal swab • Endotracheal aspirate	ROUTINE SARS-CoV-2 RNA only (Altona RealStar assay) • SARS-CoV-2 S gene • SARS-CoV-2 E gene	Every day 3000/day capacity Virology Laboratory	24 hours
	URGENT Cepheid GeneXpert SARS-CoV-2 RNA • SARS-CoV-2 N2 gene • SARS-CoV-2 E gene	24/7 10/day capacity Virology laboratory	1.5 hours
	URGENT Cepheid Xpert Xpress CoV-2/Flu/RSV plus Respiratory virus limited panel by Cepheid • **SARS-CoV-2 RNA** • **Influenza A virus RNA** • **Influenza B virus RNA** • **RSV RNA**	24/7 100/day capacity Virology laboratory	1.5 hours
• Primarily Combined throat and nose swab in VTM • Other samples at consultant virologist discretion	URGENT GenMark ePlex panel for 20 viruses and 3 bacteria • Adenovirus DNA • Coronavirus 229E RNA • Coronavirus HKU1 RNA • Coronavirus NL63 RNA • Coronavirus OC43 RNA • SARS-CoV-2 RNA • MERS-CoV RNA • Human Metapneumovirus RNA • Human Rhinovirus/Enterovirus RNA • Influenza A virus RNA • Influenza A virus H1 RNA • Influenza A virus H1-2009 RNA	24/7 125/day capacity Virology Laboratory + In ED currently	2.5 hours

	• Influenza A virus H3 RNA • Influenza B virus RNA • Parainfluenza virus 1 RNA • Parainfluenza virus 2 RNA • Parainfluenza virus 3 RNA • Parainfluenza virus 4 RNA • RSV subgroup A RNA • RSV subgroup B RNA • Bordetella pertussis DNA • Legionella pneumophila DNA • Mycoplasma pneumoniae DNA		
• Combined throat and nose swab in VTM • Broncho-alveolar lavage • Bronchial lavage • Nasopharyngeal aspirate • Nasopharyngeal swab • Endotracheal aspirate	ROUTINE IN-HOUSE panel for 10 Respiratory viruses • Influenza A virus RNA • Influenza B virus RNA • Human metapneumovirus RNA • Parainfluenza 1 virus RNA • Parainfluenza 2 virus RNA • Parainfluenza 3 virus RNA • Respiratory syncytial virus (RSV) subgroup A RNA • Respiratory syncytial virus (RSV) subgroup B RNA • Rhinovirus RNA • Adenovirus DNA	Batched, twice or thrice a day 150/day capacity Virology Laboratory	6 – 15 hours
Any respiratory sample	Influenza A virus Oseltamivir resistance H275Y mutation	Whenever necessary [Sent away]	2 weeks

Possible use case scenarios for Respiratory Viral diagnostics			
Clinical setting	**Yes or No**	**First line**	**Second line**
Immunosuppressed [ED or any other]	Yes	EPLEX	Routine RESP
	No	Cepheid Quadplex	Routine RESP
Severe respiratory illness [ED or any other]+	Yes	EPLEX	Routine RESP
	No	Cepheid Quadplex	Routine RESP
Paediatric ED		EPLEX	Routine RESP
Outpatient respiratory illness not requiring admission		Routine RESP + SARS-CoV-2 Altona	EPLEX
Outpatient respiratory illness requiring admission		Cepheid Quadplex	EPLEX
Inpatient with new onset respiratory illness		Routine RESP + SARS-CoV-2 Altona	EPLEX
Asymptomatic patients going to high-risk ward (haematology, liver, renal)	Ye	Routine RESP + SARS-CoV-2 Altona	Cepheid Quadplex
	No	SARS-CoV-2 LFD	Cepheid Quadplex

January 2023 testing pathway in ED is the following:

- Symptomatic high-risk patients (e.g. immunosuppressed, haematology, paediatrics) get EPLEX
- Symptomatic low risk get Cepheid Quadplex
- Asymptomatic patients not tested for respiratory viruses including SARS-CoV-2 unless going to high-risk ward (haematology, liver, renal) in which case they get a SARS-CoV-2 lateral flow device.

5.2 Viral nucleic acid tests on non-blood [non-respiratory samples] samples

Specimen type	Tests performed	Availability	Maximum TAT from receipt of sample during working week
• Genital swab in VTM • Endocervical swab in VTM • urine in universal • urethral swab	HSV 1 & 2 DNA VZV DNA	Daily (weekdays)	2 days
	HSV drug resistance testing	Whenever necessary [Sent Away]	4 weeks
• Genital swab in APTIMA swab • Endocervical swab in APTIMA • urine (first catch urine) • urethral swab in APTIMA swab	*Chlamydia trachomatis DNA* *Neisseria gonorrhoea DNA* *[Please see Microbiology User Manual for details]*	Daily (weekdays - [Sent Away] to PRUH Microbiology)	5 days
Eye / conjunctival / corneal swab in VTM	Adenovirus DNA, HSV 1 & 2 DNA VZV DNA	Daily (weekdays)	2 days
Eye / conjunctival / corneal Swab in VTM	*Chlamydia trachomatis DNA* *[Please see Microbiology User Manual for details]*	Daily (weekdays)	2 days
CSF	Adenovirus DNA CMV DNA EBV DNA Enterovirus RNA Parechovirus RNA HSV 1 & 2 DNA Parechovirus RNA VZV DNA	Daily (weekdays)	2 days
CSF	JCV DNA HHV 6 DNA HHV 7 DNA	Twice weekly or ad hoc	14 days
CSF	HIV-1 RNA HIV-2 RNA	Daily (weekdays) Sent away	3 days 20 days

Specimen type	Tests performed	Availability	Maximum TAT from receipt of sample during working week
Urine	Adenovirus DNA BK virus DNA CMV DNA	Daily (weekdays)	2 days 2 days 7 days
Skin Swab in VTM	HSV 1 & 2 DNA VZV DNA Enterovirus RNA	Daily (weekdays)	2 days
Skin vesicle swab in VTM	HSV 1 & 2 DNA VZV DNA Enterovirus RNA	Daily (weekdays)	2 days
Tissue / Biopsies	Site specific investigations	Daily (weekdays)	3 days
Mouth swab in VTM Saliva swab	Measles virus RNA Mumps virus RNA Rubella virus RNA	Send away to UKHSA Colindale	7 - 14 days

5.3 Viral nucleic acid tests on blood samples

Molecular assays on blood			
Test	**Specimen type**	**Schedule**	**Maximum turn round time from receipt of sample during working week**
Adenovirus DNA - quantitative	10mL EDTA blood	Daily (weekdays)	2 days
BK virus DNA - quantitative	10mL EDTA blood	Twice weekly	3 days
CMV DNA - quantitative	10mL EDTA blood	Daily (weekdays)	2 days
EBV DNA - quantitative	10mL EDTA blood	Daily (weekdays)	2 days
Enterovirus RNA	10mL EDTA blood	Daily (weekdays)	3 days
HBV DNA - quantitative	10mL EDTA blood	Weekly	7 days
HBV DNA antiviral drug resistance	10mL EDTA blood	Whenever necessary	30 days [Sent away]
HCV RNA - quantitative	10mL EDTA / clotted	Daily (weekdays)	5 days
HCV RNA viral - qualitative	DBS	Daily (weekdays)	5 days
HDV RNA - quantitative	10mL EDTA blood	Sent away	7 days
HEV RNA - quantitative	10mL EDTA blood	Twice weekly	3 days
HHV 6 DNA - quantitative	10mL EDTA blood	Sent away	7 days

HHV 7 DNA - quantitative	10mL EDTA blood	Sent away	7 days
HHV 8 DNA - quantitative	10mL EDTA blood	Weekly	7 days
HIV-1 antiretroviral resistance – Integrase region	10mL EDTA blood	Weekly	14 days
HIV-1 antiretroviral resistance RT and Protease regions	10mL EDTA blood	Weekly	14 days
HIV-1 CCR5 / CXCR4 tropism assay trofile assay	10mL EDTA blood	Weekly	14 days
HIV-1 proviral DNA - qualitative	10mL EDTA blood	Sent away	20 days
HIV-1 RNA - quantitative	10mL EDTA blood	Daily (weekdays)	3 days
HIV-2 antiretroviral resistance	10mL EDTA blood	Sent away	14 days
HIV-2 proviral DNA - qualitative	10mL EDTA blood	Sent away	20 days
HIV-2 RNA - quantitative	10mL EDTA blood	Sent away	20 days
HSV 1 and 2 DNA - qualitative	10mL EDTA blood	Daily (weekdays)	2 days
HTLV proviral DNA - qualitative	10mL EDTA blood	Sent away	20 days
VZV DNA - qualitative	10mL EDTA blood	Daily (weekdays)	2 days

5.4 Virus serology including bacterial serology

Test	Laboratory testing this	Clotted blood [gold-topped]	Alternate samples	Schedule	Maximum TAT during working week
CMV IgG	Virology	10 mL		Daily	3 days
CMV IgG avidity	Virology	10 mL		Daily (weekdays)	3 days
CMV IgM	Virology	10 mL		Daily (weekdays	3 days
EBV VCA IgG	Virology	10 mL		Daily (weekdays)	3 days
EBV VCA IgG avidity	Virology	10 mL		Daily (weekdays)	3 days
EBV VCA IgM	Virology	10 mL		Daily (weekdays)	3 days
Hepatitis A virus IgG	Virology	10 mL		Daily	3 days
Hepatitis A virus IgM	Virology	10 mL		Daily	2 days
Hepatitis B core IgM	Virology	10 mL		As required	3 days
Hepatitis B core total antibody	Virology	10 mL	DBS	Daily	2 days
Hepatitis B e antibody	Virology	10 mL		As required	3 days
Hepatitis B e antigen	Virology	10 mL		As required	3 days
Hepatitis B e antigen confirmation by neutralisation	Virology	10 mL		Daily	3 days
Hepatitis B surface antibody	Virology	10 mL		Daily	2 days
Hepatitis B surface antigen	Virology	10 mL	DBS	Daily	2 days
Hepatitis B surface antigen confirmation by neutralisation	Virology	10 mL		Daily	3 days
Hepatitis C virus antibody/antigen	Virology	10 mL	DBS	Daily	2 days
HEV IgG	Virology	10 mL		Daily (weekdays)	3 days
HEV IgM	Virology	10 mL		Daily (weekdays)	3 days
HIV antibody - confirmation	Virology	10 mL		Daily	2 days
HIV-1 and 2 antibody / antigen	Virology	10 mL	DBS	Daily	2 days
HSV type specific IgG	Barts	10 mL		As required	4 days
HTLV 1 and 2 antibody	Virology	10 mL		Daily	3 days
Measles virus IgG	Virology	10 mL		As required	5 days
Measles virus IgM	UK HSA Colindale	10 mL		As required	14 days
Mumps virus IgG	Virology	10 mL		As required	5 days
Mumps virus IgM	UK HSA - Colindale	10 mL		As required	14 days

Test	Laboratory testing this	Clotted blood [gold-topped]	Alternate samples	Schedule	Maximum TAT during working week
Parvovirus B19 IgM	Virology	10 mL		Daily (weekdays)	3 days
Rubella virus IgG	Virology	10 mL			3 days
Rubella virus IgM	Virology	10 mL			3 days
SARS-CoV-2 IgM (Fortress)	Virology	10mal			3 days
SARS-CoV-2 spike antibody (Abbott)	Virology	10mL			3 days
SARS-CoV-2 spike antibody (Fortress)	Virology	10mL			3 days
Varicella zoster virus IgG (quantitative assay)	Virology	10 mL		Daily	2 days

Bacterial serology – testing service provided by virology, clinical advice by microbiology				
Anti-streptolysin O (ASO)	Virology	10 mL	Daily	5 days
Toxoplasma IgG	Virology	10 mL	Daily	2 days
Treponemal RPR	Virology	10 mL	Daily	3 days
Treponemal total antibody	Virology	10 mL	Daily	3 days

*One 10mL clotted blood [gold-topped] sample is usually sufficient for multiple serology tests

5.5 Serology panel tests

For certain patient groups the following tests will be performed:

Requests	Tests Performed
Acute hepatitis (jaundice, raised / abnormal LFTs)	HAV IgM, HB surface antigen, HB core IgM, HCV antibody – routine. EBV VCA IgM, CMV IgM and HEV IgM – are optional.
Miscarriage / TORCH	CMV IgM, CMV IgG, rubella virus IgM, rubella virus IgG, parvovirus B19 IgM, parvovirus B19 IgG (and CMV IgG avidity if IgG is positive)
Pregnancy screening (booking blood)	Treponemal antibody, HB surface antigen and HIV 1 and 2 antibody (rubella virus IgG testing ceased being antenatal care routine test in April 2016)
Previous / past hepatitis	HAV IgG, HB core total antibody, HCV antibody
Viral screen before transplantation	HCV antibody, CMV IgG, EBV VCA IgG, treponemal IgG, Toxoplasma IgG, HTLV 1 and 2 IgG, VZV IgG, HB surface antigen, HB core total antibody, HIV 1 and 2 antibody /antigen. In addition, HCV RNA and HEV RNA are offered whenever asked.

6. Examinations referred to other laboratories

6.1 Virus sequencing and phenotyping referrals

Test	Sample type	Reference Laboratory	Comments
CMV antiviral resistance testing by sequencing	EDTA blood or DNA extract	UK HSA Birmingham	On request if clinically indicated.
Enterovirus typing	Enterovirus RNA positive sample	Clinical Services Unit, UK HSA, Colindale	Routinely sent to characterise the type of enterovirus
HCV genotyping	EDTA plasma	Liver Unit Hepatitis Testing service	On request if clinically indicated.
HSV antiviral resistance testing by genotyping	HSV DNA positive original sample	Clinical Services Unit, UK HSA, Colindale	On request if clinically indicated. Contact medical staff for advice
HSV antiviral resistance testing by phenotyping	HSV DNA positive original vesicle fluid / swab	Clinical Services Unit, UK HSA, Colindale	On request if clinically indicated. Isolation of HSV in cell culture is required. Contact medical staff for advice
Influenza typing	Influenza virus RNA positive original sample	Clinical Services Unit, UK HSA, Colindale	Routinely sent as part of national influenza surveillance
Rotavirus sequencing	Rotavirus RNA Positive samples	Clinical Services Unit, UK HSA, Colindale	Routinely sent as part of rotavirus surveillance to differentiate wild-type from vaccine-derived strains
SARS-CoV-2 sequencing	SARS-CoV-2 RNA positive [CT <30]	UK HSA Manchester	Routinely sent as per NHSE guidance

6.2 Virus serology and molecular referrals

Virus	Sample type	Laboratory method			Reference Laboratory	Comments
		IgM	IgG	RNA / DNA		
Dengue and other Flaviviruses including WNV	10mL clotted blood	√	√	√	RIPL, Microbiology Services, Porton Down	On request with relevant travel and clinical details. Contact medical staff for advice
Haemorrhagic fever viruses	10mL clotted blood	√	√	√	RIPL, UK HAS, Porton Down	Contact medical staff for advice
Hantaan virus	10mL clotted blood	√	√	√	RIPL, Microbiology Services, Porton Down	On request with relevant travel and clinical details. Contact medical staff for advice
HTLV antibody confirmation	10mL clotted blood	√	√		Clinical Services Unit, UK HSA Colindale	Virology medics code this
HSV type-specific serology	10mL clotted blood		√		Barts Virology	On request with relevant clinical details
Measles virus IgG, IgM and RNA	10mL EDTA blood and CSF	√	√	√	Clinical Services Unit, UK HSA Colindale	On request with relevant clinical details. Contact medical staff for advice
	Saliva swab in VTM GPs, please contact health protection team https://www.gov.uk/guidance/contacts-phe-health-protection-teams	√	√	√	Clinical Services Unit, UK HSA Colindale	
Mumps virus IgG, IgM and RNA	10mL clotted blood	√	√	√	Clinical Services Unit, UK HSA Colindale	On request with relevant clinical details
	Saliva swab in VTM GPs, please contact health protection team https://www.gov.uk/guidance/contacts-phe-health-protection-teams	√	√	√	Clinical Services Unit, UK HSA Colindale	use

Polio	10mL clotted blood		√	√	Clinical Services Unit, UK HSA Colindale	On request with relevant clinical details
Q-fever (C. burnetii)	10mL clotted blood	√	√	√	Rare and Imported Pathogens Laboratory, UK HSA Microbiology Services, Porton	Contact medical staff for advice. On request with relevant clinical details
Rabies	10mL clotted blood	√	√	√		
Rickettsial antibody (Spotted fever group and epidemic typhus group)	10mL clotted blood	√	√	√		
West Nile virus, Japanese encephalitis virus	10mL clotted blood	√	√	√		

6.3 Atypical bacterial serology by CFT

This is no longer offered since 2020

6.4 Antiviral assays

Test	Sample type	Reference Laboratory	Comments
Acyclovir plasma level Ganciclovir plasma levels	10 mL clotted blood Label the specimen containers with time of previous dose.	Antimicrobial Reference Lab, Bristol	On request. Contact medical staff for advice with relevant clinical details

6.5 Zika virus testing by referral

Zika virus testing based on clinical situation	Collect samples	Reference Laboratory
Pregnant woman with current symptoms suggestive of Zika virus infection that began whilst in a country with active Zika virus transmission or within 2 weeks of leaving	Submit 2x blood samples (1x blood sample (gold-topped container) 1x purple topped EDTA container) and 1 urine sample	RIPL, UK HSA Microbiology Services, Porton Down
Male and female with current symptoms or within 2 weeks of resolution of symptoms		
Male and female patients with past symptoms which have resolved beyond 2 weeks of date of collection	Submit 1 blood sample (1x blood sample (gold-topped container) Submit urine if within 21 days of symptom onset	
Aymptomatic or never had symptoms	Samples sent to Virology for storage	NA

6.6 Viral nucleic acid test referrals

Test	Sample type	Reference Laboratory	Comments
HIV-1 proviral DNA	2 - 10mL EDTA blood	Clinical Services Unit, UK HSA Colindale	On request with relevant clinical details.
HIV-1 antiretroviral resistance testing by phenotyping and virtual phenotyping	10mL EDTA blood	Clinical Services Unit, UK HSA Colindale	On request with relevant clinical details. Contact medical staff for advice. (Turnaround time: 4 weeks)
HIV-2 RNA	2 x 10 mL EDTA blood CSF	UCLH	On request with relevant clinical details. Contact medical staff for advice
HIV-2 RNA resistance	10mL clotted blood	UK HSA Birmingham	On request with relevant clinical details
HTLV proviral DNA	10mL EDTA blood	Clinical Services Unit UK HSA Colindale	On request with relevant clinical details. Contact medical staff for advice
MERS CoV RNA	• an upper respiratory tract sample (combined throat and nose viral swabs, or nasopharyngeal aspirate) AND • if obtainable, a lower respiratory tract sample (sputum, or an endotracheal tube aspirate if intubated)	GenMark ePlex tested in DH-site Followed by UK HSA Birmingham	On request with relevant clinical details. Contact medical staff for advice All results on MERS CoV are available the next day by 5 PM
Measles virus RNA	Mouth swab in VTM CSF For GP patients, saliva kit available from HPU 020 3049 4280	Clinical Services Unit UK HSA Colindale Sample posted by patient / clinical staff to Clinical Services Unit, Colindale.	On request with relevant clinical details. Contact medical staff for advice

Test	Sample type	Reference Laboratory	Comments
Monkeypox virus DNA	Lesion swab in VTM [take 2 swabs as primary sample] Throat swab EDTA blood Serum Urine	One lesion swab is tested for HSV DNA and VZV DNA locally in King's. One sample is sent to RIPL UKHSA Porton Down	On request with relevant clinical details. Contact medical staff for advice on non-lesion swab samples
Mumps virus RNA	Mouth swab in VTM CSF Urine Saliva kit available from Health Protection Unit: 020 3049 4280	Clinical Services Unit UK HSA Colindale Sample posted by GP patient to Clinical Services Unit, UK HSA Colindale. Within Kings, this test is available on EPR	On request with relevant clinical details. Contact medical staff for advice Sample posted by patient / clinical staff to Clinical Services Unit, Colindale
Parvovirus B19 DNA	10mL clotted blood	Clinical Services Unit UK HSA Colindale	On request with relevant clinical details. Contact medical staff for advice
Rubella virus RNA	10mL EDTA blood, mouth swab in VTM, urine, amniotic fluid	Clinical Services Unit UK HSA Colindale	On request with relevant clinical details. Contact medical staff for advice
HBV DNA load in Health Care Worker	10mL EDTA blood	Virology at King's primarily and in select cases UK HSA Birmingham	On request with relevant clinical details

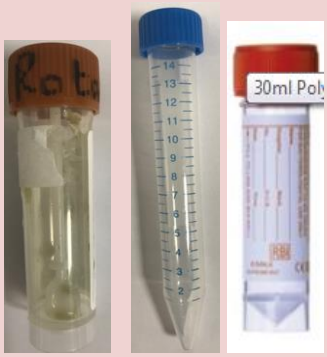
7. Specimen collection material and methods

In the absence of readily available VTM (laboratory issued or commercial), please immerse the swab tips in 1 mL of sterile saline in an universal container

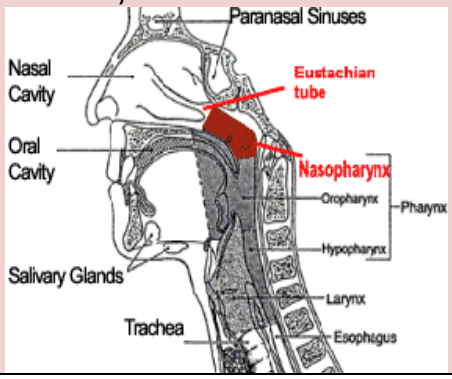
Sample	Material required		Methods
Aspirates from normally sterile sites (joint, ascites, peritoneal and pleural fluids)	Sterile syringe 15 mL or 30 mL sterile universal container		1. Collect the specimen with a sterile syringe. 2. Transfer a maximum of 15 mL into a sterile universal container. 3. Ensure the cap is tightly screwed on.
Biopsies	Biopsy equipment as appropriate 15 mL or 30 mL sterile universal container (not formalin)		1. All biopsies should be placed in sterile saline and not in formalin. 2. Contact medical virology staff for advice with relevant clinical details 3. Please clearly state the clinical diagnosis and the test needed.
Blood Serum	GOLD topped container (adult and paediatric shown here) Please note that Yellow-topped blood is not for infection sciences	 Adult  Paediatric	1. Collect 10 mL of blood in adults and at least 2 mL in children. 2. Serum is used for serological markers for IgG, IgM, total antibody and BBV antigen assays. 3. Heparinised blood (green topped) may cause non-specific reactions in some antigen / IgM assay and so is not recommended.
Blood Whole Blood	Purple / Mauve topped container (EDTA blood) (adult and paediatric shown here)	 Adult	1. Collect 10 mL of blood in adults and at least 2 mL in children in one of these blood collection tubes. 2. EDTA whole blood is used to assess CMV DNA, EBV DNA, adenovirus DNA, HIV proviral DNA
Blood Plasma	Purple / Mauve topped container (EDTA blood) (adult and paediatric shown here)	 Paediatric	1. Collect 10 mL of blood in adults and at least 2 mL in children in one of these blood collection tubes. 2. EDTA plasma is used to assess HIV RNA, HBV DNA, HCV RNA, HIV genotypic resistance testing, HHV 6 DNA and HHV 7 DNA testing.

Sample	Material required		Methods
Bronchial washings	Bronchial wash equipment (as per the specialist protocols) 15 mL or 30 mL sterile universal container		1. A specialist will collect the specimen in a sterile container according to local protocol. 2. Traps containing a specimen should be sealed by the permanent cap. 3. Please do not use the tubing cap itself to seal the tube (because this invariably leaks in transit).
Bronchoalveolar lavage	Bronchial lavage equipment (as per the specialist involved) 15 mL or 30 mL sterile universal container		1. A specialist will collect the specimen in a sterile container according to local protocol. 2. Traps containing a specimen should be sealed by the permanent cap. 3. Please do not use the tubing cap itself to seal the tube (because this invariably leaks in transit).
Cerebrospinal fluid (CSF)	Lumbar puncture equipment 15 mL or 30 mL sterile universal container		An adequate amount is essential - send at least 2-3mL.
Endocervical swabs for *Chlamydia trachomatis and Neisseria gonorrhoea*	*Please see Microbiology User Manual for details* APTIMA Unisex Swab for Endocervical and Male Urethral Swab specimens swab APTIMA swab specimen transport medium. 	1. Remove excess mucus from the Cervical Os and surrounding mucosa using the cleaning swab (white shaft swab in the package with red printing). Discard this swab. Note: To remove excess mucus from the cervical Os, a large-tipped swab may be used. 2. Insert the specimen collection swab (blue shaft swab in the package 3. Gently rotate the swab clockwise for 10 to 30 seconds in the endocervical canal to ensure adequate sampling. 4. Withdraw the swab carefully; avoid any contact with the vaginal mucosa. 5. Remove the cap from the swab specimen transport tube and immediately place the specimen collection swab into the transport tube. 6. Carefully break the swab shaft against the side of the tube at the score line and discard the top portion of the swab shaft; use care to avoid splashing of contents. 7. Re-cap the swab specimen transport tube tightly.

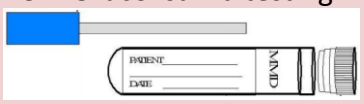
Sample	Material required	Methods
Cervical swabs *for viruses* *(not for human papillomaviruses)*	Copan FLOQSwab (flocked swabs) in UTM (red-topped) or Virocult swab in VTM (green-topped)   	1. Moisten the swab in sterile saline before taking the specimen. 2. Never moisten swab in VTM. 3. Follow procedures as for the Endocervical swab for CT & GC. 4. Snap off the swab tip into VTM.
Dried Blood Spot (DBS)	BD Microtainer®Contact Activated Lancet DBS sample collection card (Whatman card) 	1. After cleansing chosen finger, activate the BD Microtainer®Contact Activated Lancet by pressing it firmly against the puncture site 2. Apply the hanging blood drops within an outlined circle of the DBS sample collection card (Whatman card) 3. Place the DBS collection card on the drying rack to dry completely before sending it to the laboratory.
Ear swab in VTM (vesicles or part of Bell's palsy investigation)	Copan FLOQSwab (flocked swabs) in UTM (red-topped) or Virocult swab in VTM (green-topped)   	1. Place the swab in the ear canal over any vesicle. Rotate gently over the vesicles / ulcers. Place the swab in VTM.
Eye swab for *Chlamydia trachomatis*:	*Please see Microbiology User Manual for details*	
Eye swab in VTM for *viruses*:	Copan FLOQSwab (flocked swabs) in UTM (red-topped) or Virocult swab in VTM (green-topped)   	Moisten the swab in sterile saline before taking the specimen. Never moisten swab in VTM. Snap off the swab tip into VTM.

Sample	Material required	Methods
Faeces Rectal swab in VTM	Spatula 15 mL or 30 mL sterile universal container or sterile container with built in spatula 	1. Send a 2-3 pea-sized portion" or 5-10mL if liquid faeces. 2. Ask the patient to defecate into a clean bedpan or other convenient container if at home. Use the plastic spatula to transfer a portion of faeces into the pot. If spatula is part of the lid, insert the spatula and close the lid. 3. For liquid faeces use a plastic medicine spoon. 4. Rectal swab in VTM is also accepted 5. Take care not to contaminate the outside of the faeces pot.
Genital tract swabs *for Chlamydia trachomatis and Neisseria gonorrhoae*	*Please see Microbiology User Manual for details* APTIMA Unisex Swab for Endocervical and Male Urethral Swab specimens swab (these are thin swabs) APTIMA swab specimen transport medium. 	The aim is to collect epithelial cells and assess nucleic acid by APTIMA (TMA). Scrape from the endothelium and place the swab in APTIMA collection tube, snip off the shaft and screw the cap on
Genital tract swabs in VTM *for viruses*	Copan FLOQSwab (flocked swabs) in UTM (red-topped) or Virocult swab in VTM (green-topped)  	Moisten the swab in sterile saline before taking the specimen. Never moisten swab in VTM. Snap off the swab tip into VTM.

Sample	Material required	Methods
High vaginal swabs for *Chlamydia trachomatis and Neisseria gonorrhoae*	*Please see Microbiology User Manual for details* APTIMA Multi-test swab and APTIMA swab specimen transport medium. 	Introduce the speculum. Roll the swab firmly over the surface of the vaginal vault. Place the swab in APTIMA swab specimen transport medium.
High vaginal swabs in VTM *for viruses*	Copan FLOQSwab (flocked swabs) in UTM (red-topped) or Virocult swab in VTM (green-topped)  	Introduce the speculum. Roll the swab firmly over the surface of the vaginal vault. Place the swab in VTM.
Mouth swabs in VTM	Copan FLOQSwab (flocked swabs) in UTM (red-topped) or Virocult swab in VTM (green-topped)  	For HSV, enterovirus and VZV within any vesicle lesions or ulcers or inflamed areas – swab the ulcer or vesicle For measles, mumps and rubella – ensure the swab is soaked in saliva [see saliva in VTM below] A tongue depressor or spatula may be helpful to aid vision and avoid contamination from other parts of the mouth. Place the swab in the VTM.

Sample	Material required	Methods
Respiratory **Nasopharyngeal Swab (NPS)** A NPS is the optimal upper respiratory tract specimen collection method. However, such specimens cannot be collected from infants and many older patients may not allow an NP specimen to be collected.	Copan FLOQSwab (flocked swabs) in UTM (red-topped) or Virocult swab in VTM (green-topped)   Virus PCR Sample Solution (VPSS)	1. Tilt patient's head back 70 degrees. 2. Insert swab into nostril 3. Swab should reach depth equal to distance from nostrils to outer opening of the ear. 4. Leave swab in place for several seconds to absorb secretions. 5. Slowly remove swab while rotating it. (Swab both nostrils with same swab.) 6. Place tip of swab into sterile viral transport media tube and snap/cut off the applicator stick.
Respiratory **Nasopharyngeal Aspirate (NPA) or Nasal Aspirate** Note: NPA may not be possible to conduct in infants	Suction pump, sterile suction catheter (usually size 10, smaller for infants) 15 mL or 30 mL sterile universal container Traps containing a specimen should be sealed using a loop of tubing 	1. Attach catheter to suction apparatus. 2. Tilt patient's head back 70 degrees. 3. Insert catheter into nostril. Catheter should reach depth equal to distance from nostrils to outer opening of ear. Stop when you feel a resistance (you have reached the posterior nasopharynx). 4. Begin gentle suction. 5. Catheter should remain in nasopharynx no longer than 10 seconds. Remove catheter while rotating it gently. 6. Traps containing a specimen should be sealed by the permanent cap. Please do not use the tubing cap itself to seal the tube (because this invariably leaks in transit). 

Sample	Material required	Methods
Respiratory **Nasopharyngeal Wash or Nasal Wash** Note: NP wash may not be possible to conduct in infants	Sterile suction catheter/suction apparatus Sterile normal saline 15 mL or 30 mL sterile universal container 	1. Attach catheter to suction apparatus. 2. Tilt patient's head back 70 degrees. 3. Insert several drops of sterile normal saline into each nostril. 4. Insert catheter into nostril. (Catheter should reach depth equal to distance from nostrils to outer opening of ear.) 5. Begin gentle suction. 6. Remove catheter while rotating it gently. 7. Place catheter in sterile viral transport media tube or sterile universal container.
Respiratory **Deep Nasal Swab in VTM**	Sterile polyester swab (aluminium or plastic shaft preferred) or Copan FLOQSwab (flocked swabs) in UTM (red-topped) or Virocult swab in VTM (green-topped)   Virus PCR Sample Solution (VPSS)	1. Tilt patient's head back 70 degrees. 2. While gently rotating the swab, insert swab less than one inch into nostril (until resistance is met at turbinates). 3. Rotate the swab several times against nasal wall and repeat in other nostril using the same swab. 4. Place tip of the swab into sterile viral transport media tube and cut off the applicator stick.
Respiratory **Combined Nasal & Throat Swab in VTM** This is the preferred respiratory sampling in URTI	Copan FLOQSwab (flocked swabs) in UTM (red-topped) or Virocult swab in VTM (green-topped)   Virus PCR Sample Solution (VPSS)	**Nasals swab:** 1. Tilt patient's head back 70 degrees. 2. Take a dry swab, insert into mouth, and swab the posterior pharynx and tonsillar areas (avoid the tongue). 3. Use the same swab and insert it less than one inch into nostril (anterior nares) until resistance is met at turbinates 4. Rotate the swab several times against nasal wall and repeat in other nostril using the same swab. 5. Place tip of the swab into sterile viral transport media tube and cut off the applicator stick.

Sample	Material required	Methods
VirNA Combined Nasal & Throat Swab for SARS CoV-2 RNA testing		Full sampling and labelling instruction provided in the leaflet provided with the kit
Saliva in VTM (for measles, mumps and rubella virus RNA)	Copan FLOQSwab (flocked swabs) in UTM (red-topped) or Virocult swab in VTM (green-topped)   	1. The saliva specimen is obtained by rubbing the swab on the inside of the mouth like a tooth brush until the swab is saturated with saliva. 2. It takes 1 to 2 minutes for the swab to be saturated. 3. The swab is then inserted in to the red tube provided.
Saliva in Oracol (for measles, mumps and rubella virus RNA)	If available, Malvern Oracol saliva testing kit  	1. The saliva specimen is obtained by rubbing the sponge which is on a stick (Oracol Saliva Collection System; Malvern Medical Developments Limited) on the inside of the mouth like a tooth brush until the sponge is saturated with saliva. 2. It takes 1 to 2 minutes for the sponge to be saturated. 3. The sponge is then inserted in to the plastic tube provided.
Serum	Gold-topped container for adults  Adult  Paediatric	Collect 10 mL of blood in adults and at least 2 mL in children. Serum is used for serological markers for IgG, IgM, total antibody and some BBV antigen assays. Heparinised blood (green topped) may cause non-specific reactions in some antigen / IgM assay and so is not recommended.

Sample	Material required	Methods
Sputum	15 mL or 30 mL sterile universal container 	1. Ask a physiotherapist to assist if a patient has difficulty in producing satisfactory specimens. 2. Induced sputum or expectorated sputum can be used for virological assessment. 3. Do not collect shortly after the patient has been eating, drinking or cleaning their teeth. 4. It is usually difficult to perform respiratory PCRs on this sample.
Surface swabs and skin swabs	Copan FLOQSwab (flocked swabs) in UTM (red-topped) or Virocult swab in VTM (green-topped)  	Swab the area of concern vigorously. Send swab in VTM Rotate the swab on or in the required site. Place the swab in the VTM.
Tissues and biopsies	Sterile saline. 15 mL or 30 mL sterile universal container	Under aseptic conditions transfer material to a sterile universal container that does not contain formalin as this inactivates pathogens very rapidly. Send in 0.5mL of sterile saline. Please specify which virus is being investigated for virology.
Urethral swabs *Chlamydia trachomatis* and *Neisseria gonorrhoea*:	*Please see Microbiology User Manual for details* APTIMA Unisex Swab for Endocervical and Male Urethral Swab specimens swab APTIMA swab specimen transport medium. 	1. Male urethral swab 2. The patient should not have urinated for at least 1 hour prior to sample collection. 3. Insert the specimen collection swab (blue shaft swab in the package with the green printing) 2 to 4 cm into the urethra. 4. Gently rotate the swab clockwise for 2 to 3 seconds in the urethra to ensure adequate sampling. 4. Withdraw the swab carefully. 5. Remove the cap from the swab specimen transport tube and immediately place the specimen collection swab into the transport tube. 6. Carefully break the swab shaft against the side of the tube at the score line and discard the top portion of the swab shaft; use care to avoid splashing of contents. 7. Re-cap the swab specimen transport tube tightly.

Sample	Material required	Methods
Urine Clean-voided midstream urine is preferred for virology.	15 mL or 30 mL sterile universal container 	1. It is recommended that in females the hands and the perineal area should be washed with soap and water prior to specimen collection. Part the labia and clean the area around the urethral meatus from front to back. Spread the labia with the fingers of one hand. 2. In males retract the foreskin, if present, and clean the skin surrounding the urethral meatus. 3. Start passing urine into the toilet, bedpan or urinal. When the urine is flowing freely, collect urine in a clean sterile container. 4. Special urine collection pouches are needed for collection in paediatric patients.
First catch urine for *Chlamydia trachomatis* and *Neisseria gonorrhoea* (not for female *Neisseria gonorrhoea* testing)	APTIMA Urine Specimen Collection Kit 	1. The patient should not have urinated for at least 1 hour prior to specimen collection. 2. Direct patient to provide a first-catch urine (approximately 20 to 30 mL of the initial urine stream) into a urine collection cup free of any preservatives. Collection of larger volumes of urine may result in rRNA target dilution that may reduce test sensitivity. Female patients should not cleanse the labial area prior to providing the specimen. 3. Remove the cap and transfer 2 mL of urine into the urine specimen transport tube using the disposable pipette provided. The correct volume of urine has been added when the fluid level is between the black fill lines on the urine specimen transport tube label. 4. Re-cap the urine specimen transport tube tightly.
Vesicles, ulcers and genital lesions in VTM	Copan FLOQSwab (flocked swabs) in UTM (red-topped) or Virocult swab in VTM (green-topped)  	1. Method 2. Burst a vesicle using a sterile needle and collect with a swab or aspirate the fluid contents of the vesicle. 3. Alternatively, scrape the base of the vesicle or ulcer with a swab so that cellular material is collected. Inoculate this fluid / cellular material into VTM. 4. Always state the site, distribution and nature of the vesicle. This is essential, as the laboratory may need to prioritise between HSV / VZV and enterovirus testing.

8. External Quality Assurance (EQA) scheme participation

Process / Test	EQA Schemes
Adenovirus DNA quantitative	QCMD
Arbovirus serology and molecular	Referred sample
Antistreptolysin-O titre (ASO)	NEQAS & LABQUALITY
Avian influenza A virus H5N1	Referred sample
BK virus DNA	QCMD
CFT for Chlamydia genus, *M. pneumoniae*, *C. burnetii*	LABQUALITY
Chlamydia trachomatis NAAT/ Neisseria gonorrhoea DNA	NEQAS
Cytomegalovirus DNA	QCMD
Cytomegalovirus IgG	NEQAS
Cytomegalovirus IgG avidity	NEQAS
Cytomegalovirus IgM	NEQAS
Cytomegalovirus resistance testing	Referred sample
Dried Blood Spot (DBS) tests for HIV antibody, HBsAg, HB core total antibody, HCV antibody and HCV RNA	No external scheme available
Epstein Barr virus DNA	QCMD & NEQAS
Epstein Barr virus VCA IgG	NEQAS
Epstein Barr virus VCA IgM	NEQAS
Epstein Barr virus VCA IgG (Avidity)	Sample Exchange with GSTT
Electron microscopy	Referred sample
Enterovirus antibody (IgM and neutralisation)	Referred sample
Enterovirus RNA	QCMD
HB core IgM	NEQAS
HB core total antibody	NEQAS
HBeAg	NEQAS
HBeAg	NEQAS
HBV DNA	QCMD
HBV e antibody	NEQAS
Hepatitis B surface antibody level	NEQAS
HBV resistance testing	QCMD
HDV antibody (IgG and IgM)	Referred sample
Hepatitis A virus IgM	NEQAS
Hepatitis A virus RNA	Referred sample

Process / Test	EQA Schemes
Hepatitis A virus total	NEQAS
Hepatitis C virus antibody	NEQAS
Hepatitis C virus RNA	QCMD
HEV antibody (IgG and IgM)	NEQAS
HEV RNA	QCMD
HHV 6 DNA	QCMD
HHV 7 DNA	QCMD
HHV 8 DNA	QCMD
HIV antibody	NEQAS
HIV immunoblot (HIV Line Immunoblot Assay)	NEQAS
HIV-1 p24 antigen	NEQAS
HIV-1 genotypic resistance testing RT, Protease and Integrase	QCMD & UK HSA Colindale panel
HIV-2 genotypic resistance testing	Referred sample
HIV-1 RNA	VQA and NEQAS
HIV-2 RNA	Referred sample
HIV-1 proviral DNA	Referred sample
HIV-1 phenotypic resistance testing	Referred sample
HIV-1 CCR5 Tropism assay	QCMD & UK HSA Colindale panel
HIV-2 integrase inhibitor resistance assay	Referred sample
HSV 1 and 2 DNA	QCMD
HSV IgG	LABQUALITY
HSV IgG type specific serology	Referred sample
HTLV antibody	NEQAS
HTLV proviral DNA	Referred sample
HTLV immunoblot	Referred sample
Influenza A virus RNA (see Respiratory virus RNA / DNA below)	See below
JC virus DNA	QCMD
JC virus HI	Referred sample
Measles IgG	NEQAS
Measles IgM	Referred sample
Measles RNA	Referred sample
Microbiology Send Always (like Lyme serology, schistosomiasis etc.)	Referred sample
Mumps IgG	NEQAS
Mumps IgM	Referred sample
Mumps RNA	Referred sample
Viral Gastroenteritis	QCMD
Parvovirus B19 DNA	Referred sample
Parvovirus B19 IgG	NEQAS & LABQUALITY

Parvovirus B19 IgM	NEQAS &LABQAULITY
Respiratory viral RNA / DNA **RNA for influenza A virus, influenza B virus, parainfluenza 1, 2 & 3, rhinovirus, human metapneumovirus, RSV A and RSV B.** **DNA for adenovirus**	QCMD & NEQAS UK HSA Colindale panel

Process / Test	**EQA Schemes**
SARS-CoV-2 RNA	QCMD and NEQAS
Rheumatoid Factor (RF)	NEQAS
Rotavirus RNA	QCMD
Rubella virus IgG	NEQAS
Rubella virus IgG avidity	Referred sample
Rubella virus IgM	NEQAS
Rubella virus RNA	Referred sample
Toxoplasma dye test	Referred sample
Toxoplasma IgG	NEQAS
Treponemal antibody	NEQAS
Treponemal IgM	NEQAS
Treponemal RPR	NEQAS
Virus isolation	QCMD & NEQAS
Varicella zoster virus DNA	QCMD
Varicella zoster virus IgG	NEQAS