
NICD Laboratory Handbook

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NICD Laboratory Handbook

1. Purpose:

The purpose of this document is to summarize all available testing services at the NICD and to provide guidance on conditions for submission, turnaround times, results queries in order to assist with providing quality diagnostic service to our clients.

1.1 Services available

The National Institute for Communicable Diseases (NICD) is a communicable disease (medical microbiology/virology) surveillance and diagnostics facility and laboratory and falls within the control of the National Health Laboratory Service (NHLS). The NICD has been established to function as a public health-oriented, laboratory-based, national facility distinct from and independent of the existing microbiology/virology laboratories attached to academic centres throughout the country. The direction the NICD takes, is that of public health orientation, rather than a patient oriented clinical diagnostic entity and this is reflected in the service commitments and research directions carried out by the organization. The NICD is, to a large extent, modelled on internationally recognized public health laboratories such as the Centre for Disease Control & Prevention of the USA and Public Health England (former Health Protection Agency).

1.2 Scope:

To provide a guide to services offered at the NICD.

1.3 Location of the NICD

The NICD is a permanent laboratory and is located at 1 Modderfontein Road, Sandringham, 2192.

1.4 Guidance on tests or clinical advice:

For medical advice, queries regarding outbreaks and public health issues, contact the NICD Hotline number (for clinicians only):
NICD Clinical Advice Hotline 0800 212 552

1.5 Operating hours

The laboratories at the NICD operate Monday to Friday (excluding public holidays) from 07h30 to 16h30 (excluding holidays).

For testing of urgent samples (for example viral haemorrhagic fever investigations), please contact the NICD Clinical Advice Hotline (see above). Key contacts per NICD Centre is provided in the Table below (see section 4).

1.6 Results queries and turnaround times

- Results queries please contact the Results Call Centre during office hours:

011 386 6404

011 386 6314

011 386 6466

Fax 011 386 6342

- Please note that the turnaround time (TAT) is calculated from the specimen reception at the NICD until a report is issued. This excludes weekends and public holidays.

1.7 Complaints and compliments

- Complaints can be submitted through the NICD website under the "General Enquiries" tab: NICD General Enquiries
- For more details, please refer to the Complaint Handling Process: NICD Complaint Handling Process
- Complaints of a minor nature should be addressed to the Laboratory concerned. (See Key Contact Staff Table)
- Complaints of a serious nature should be addressed to the Head of the relevant Laboratory (See Key Contact Staff Table)
- Compliments can be directed to the Laboratory concerned.

Please note that the TAT (Turnaround Time) quoted in this Handbook is calculated from the sample reception at the NICD until a report is issued.

1.7 Considerations to access best possible service: Help Us to Help You!

Consider the following pointers in ensuring that you receive the best possible service from the NICD.

- All specimens must be accompanied by the following clearly legible data:

Patient name and hospital number (or referring laboratory reference number).

Name and address of requesting clinician.

Nature of specimen (specimen type).

Collection date and time (where relevant).

Tests requested.

Brief clinical history.

Case investigation forms (CIFs) to be completed for Polio and Measles surveillance, and VHF and rabies request (available on NICD webpage, A-Z disease list).

Contact number/email for providing the laboratory report

- Hard copies of all reports are sent to the requesting clinician by post or electronically for referred samples.
- Take note of conditions required for specimens for example type of specimen, recommended sampling, shipping conditions etc. to ensure that specimen quality is adequate.

2. Abbreviations

The following abbreviations are used in this document:

Abbreviation	Descriptions
BAL	Bronchoalveolar lavage
CDC	Centre for Disease Control and Prevention
CIF's	Case investigation forms
CMV	Cytomegalovirus
CSF	Cerebrospinal Fluid
ESKAPE	<i>Enterococcus faecium, Staphylococcus aureus, Klebsiella pneumonia, Acinetobacter baumannii, Pseudomonas aeruginosa, E. coli and Enterobacter cloacae.</i>
GERMS-SA	Group for Enteric, Respiratory and Meningeal Surveillance in South Africa
HPV	Human papillomavirus
HSV	Herpes Simplex Virus
LGV	Lymphogranuloma venereum
LIMS	Laboratory Information Management System
ILI	Influenza like illness
NAAT	Nucleic acid amplification test
NICD	National Institute for Communicable Diseases
NHLS	National Health Laboratory Service
NS	Nasal swab
NPA	Nasopharyngeal aspirate
NPS	Nasopharyngeal swab
OPA	Oropharyngeal aspirate
OPS	Oropharyngeal swab
PCR	Polymerase Chain Reaction
RSVP	Respiratory PCR test

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SADC	Southern African Development Community
TA	Throat Aspirate
TAT	Turnaround Time
TMA	Transcription Mediated Assay
TP	<i>Treponema pallidum</i>
TS	Throat swab
TV	<i>Trichomonas vaginalis</i>
UTM	Universal Transport medium
URTI	Upper respiratory Tract Infection
VHF	Viral Haemorrhagic Fever
VTM	Viral transport medium
WHO	World Health Organization

3. A note on notifiable medical conditions

Notifiable Medical Conditions (NMC) are of public health importance. Surveillance of NMCs involves the systematic collection, analysis and use of epidemiologic data to provide scientifically proven and accurate information to detect and act against public health threats rapidly.

According to the International Health Regulations, rapid detection of public health risks, prompt risk assessment, notification, verification and response are crucial.

NMC national surveillance system acquires information from national, regional and local levels to:

Timeously detect and respond to public health threats in order to prevent disease outbreaks;
Estimates burden of priority diseases and identify populations at risk;
Monitor place, person and time trends in priority diseases of public health importance; and
Direct public health interventions and inform policy decisions.

For more information on NMCs, visit <https://www.nicd.ac.za/nmc-overview/>

For queries related to NMC:

NMC helpline: 072 621 3805

Email: NMCsurveillanceReport@nicd.ac.za

Fax: 086 639 1638

The NMC disease list:**CATEGORY 1 NOTIFIABLE MEDICAL CONDITIONS –**

Category 1 notifiable medical conditions that require immediate reporting by the most rapid means available upon diagnosis followed by a written or electronic notification to the Department of Health within 24 hours of diagnosis by health care providers, private health laboratories or public health laboratories.

* Food -borne disease outbreak is the occurrence of two or more cases of a similar foodborne disease resulting from the ingestion of a common food.

* *Examples of novel respiratory pathogens include novel influenza A virus and MERS coronavirus.

* ** Viral haemorrhagic fever diseases include Ebola or Marburg viruses, Lassa virus, Lujo virus, new world arena viruses, Crimean -Congo haemorrhagic fever or other newly identified viruses causing haemorrhagic fever.

Acute flaccid paralysis
Acute rheumatic fever
Anthrax
Botulism
Cholera
Diphtheria
Enteric fever (typhoid or paratyphoid fever)
Food borne disease outbreak*
Haemolytic uraemic syndrome (HUS)
Listeriosis
Malaria
Measles
Meningococcal disease
Mpox
Pertussis
Plague
Poliomyelitis
Rabies (human)
Respiratory disease caused by a novel respiratory pathogen**
Rift Valley fever (human)
Rubella
SARS-CoV-2 (COVID-19)
Smallpox
Viral haemorrhagic fever diseases***
Yellow fever

CATEGORY 2 NOTIFIABLE MEDICAL CONDITIONS –

Category 2 notifiable medical conditions to be notified through a written or electronic notification to the Department of Health within seven (7) days of clinical or laboratory diagnosis by health care providers, private health laboratories or public health laboratories

Agricultural or stock remedy poisoning

Bilharzia (schistosomiasis)

Brucellosis

Congenital rubella syndrome

Congenital syphilis

Haemophilus influenzae type B

Hepatitis A

Hepatitis B

Hepatitis C

Hepatitis E

Lead poisoning

Legionellosis

Leprosy

Maternal death (pregnancy, childbirth and puerperium)

Mercury poisoning

Mercury poisoning

Soil transmitted helminths (*Ascaris lumbricoides*, *Trichuris trichiuria*, *Ancylostoma duodenale* and *Necator americanus*)

Tuberculosis: pulmonary

Tuberculosis: extra-pulmonary

Tuberculosis: multidrug-resistant (MDR-TB)

Tuberculosis: extensively drug-resistant (XDR-TB)

CATEGORY 3 NOTIFIABLE MEDICAL CONDITIONS –

Category 3 notifiable medical conditions to be notified through a written or electronic notification to the Department of Health within 7 days of diagnosis by private and public health laboratories

Ceftriaxone-resistant *Neisseria gonorrhoea*

West Nile virus, Sindbis virus, Chikungunya virus (i.e. endemic arboviruses)

Dengue fever virus, other imported arboviruses of medical importance (i.e. non-endemic)

Salmonella spp. other than *S. Typhi* and *S. Paratyphi*

Shiga toxin-producing Escherichia coli	
Shigella spp.	
CATEGORY 4 NOTIFIABLE MEDICAL CONDITIONS –	
Category 4 notifiable medical conditions to be notified through a written or electronic notification to the Department of Health within 1 month of diagnosis by private and public health laboratories	
Healthcare-associated infections or multidrug-resistant organisms of public health importance	· Carbapenemase-producing Enterobacteriaceae
	· Vancomycin-resistant enterococci
	· Staphylococcus aureus: hGISA and GISA
	· Colistin-resistant Pseudomonas aeruginosa
	· Colistin-resistant Acinetobacter baumannii
	· Clostridium difficile

4. The NICD Centres, Divisions and Core Facilities and contact details

Also refer to <https://www.nicd.ac.za/contact-us/> for contact details.

Centre /Laboratories/ Departments	Laboratory	Contact Number
Centre Enteric Diseases (CED)	CED Bacteriology	011 555-0333 /0334
	CED Virology	011 555-0370
Centre for Emerging Zoonotic and Parasitic Diseases (CEZPD)	Electron Microscopy Laboratory	011 386 6318
	Antimalarial Resistance Monitoring and Malaria Operational	011 386 6364/6003
	Special Bacterial Pathogens Reference Laboratory (SBPRL)	011 555 0331
	Arbovirus Reference Laboratory (ARL)	01 386 6424/6353
	Special Viral Pathogens Laboratory (SVPL)	011 386 6376
	Parasitology Reference Laboratory (PRL)	011 555 0311/04
	Vector control Reference Laboratory (VCRL)	011 386 6480
Centre for HIV & STI's (CHIVSTI)	Cell Biology Unit	011 386-6366
	HIV Virology	011 386 6341
	HIV Surveillance	011 386 6447
	STI Surveillance	011 555 0461
Centre for Vaccines and Immunology (CVI)	Hepatitis	011 386-6347
	COVID-19 Wastewater Surveillance	011 386 6461/011 555 0431
	Measles	011 386 6343/6398
	Polio	011 555-0504 / 011 386 6361 / 011 386 6438/ 011 386 6388
Centre for Healthcare-Associated Infections,	Antimicrobial Resistance Laboratory-Culture Collection (AMRL- CC)	011 555 0342

Centre /Laboratories/ Departments	Laboratory	Contact Number
Antimicrobial Resistance and Mycoses (CHARM)	Mycology Reference Laboratory (MRL)	011 555 0325
	CHARM Molecular Laboratory (CML)	011 386 6395
Centre for Respiratory Diseases & Meningitis (CRDM)	GERMS-SA/microbiolc	011 555
	Molecular	011 555 0356/0387/0352
	Virus isolation and Serology	011 386 6390/6373
Centre for Tuberculosis (CTB)	TB Focus Programme & National TB Reference Laboratory	011 885 5316 /5317
Sequencing Core Facility	Sequencing Core Facility	011 555 0450
NICD Sample Receiving Office		011 386 6466
Division of Public Health, Surveillance and Response	Notifiable Medical Conditions (NMC)	072 621 3805
	Outbreak response Unit	079 8717278 011 555 0542
	NICD Clinical Advice Hotline	0800 212 552

Alphabetical order of tests offered at the NICD

5. Tests offered at the NICD

A summary of tests provided at the NICD and contact information. Also refer to section 6 for more information on tests requirements. The list below is alphabetic by disease.

Pathogen / Test Species Name (disease/ Syndrome)	Pathogen Species Name (disease/ syndrome, ICD-code)	Tests To Request	Department and Contact telephone no's
Arbovirus	Chikungunya virus, dengue virus, Japanese encephalitis virus, Rift Valley fever virus, Ross river virus, Sindbis virus, Oropouche virus, West Nile virus and Zika virus For other arboviruses contact the laboratory	Routine arbovirus screen , include serology for chikungunya virus, Sindbis virus, Rift Valley fever virus and West Nile virus. Serology for other arboviruses are performed on request. Arbovirus PCR for acute cases only (specify which arbovirus) Arbovirus specific IgM or IgG ELISA (specify which arbovirus)	CEZPD ARL Dr J Weyer:011 386 6376/082 903 9131
Adenovirus	Adenovirus Gastroenteritis: Diarrhoea, vomiting, fever	Enteric Adenovirus detection	CED Virology 011 555 0370
Anthrax (ANTHR)	<i>Bacillus anthracis</i> (anthrax)	Anthrax investigation (ANTHR)	CEZPD SBPRL 011 555 0331 011 555 0306/011 555 0584
Arthropods/ Insects	Arthropods/ Insects	Morphological identification, PCR identification and/or ELISA	CEZPD VCRL011 386 64806
Astrovirus	Astrovirus Gastroenteritis: Diarrhoea, vomiting, fever	Astrovirus detection	CED Virology 011 555 0370
Atypical pneumonia-causing pathogens	<i>M. pneumoniae</i> , <i>C. pneumoniae</i> , <i>Legionella</i> spp.	Atypical pneumonia pathogens (<i>M. pneumoniae</i> , <i>C. pneumoniae</i> , <i>Legionella</i> spp.)	CRDM 011 555 0315/011 555 0317
Avian Influenza (H5, H7, H9)	Avian Influenza (H5, H7, H9)	Suspected Avian influenza	Hotline-dr on call:082 883 9920 CRDM 011 555 0316 (Clinical) 011 386 6321 (Clinical)
Botulism	<i>Clostridium botulinum</i> (botulism)	Botulinum Investigation (CLOS)	CEZPD Special Bacterial Pathogens Reference Laboratory 011 555 0331/011 555 0306 /011 555 0584
<i>Campylobacter</i> spp	<i>Campylobacter</i> spp	Enteric surveillance and reference function	CED Bacteriology 011 386 6235/011 555 0348 011 555 0334/011 555 0426
Candida (surveillance)	Candida (surveillance)	Candida surveillance	CHARM Mycology Reference Laboratory

Pathogen / Test Species Name (disease/ Syndrome)	Pathogen Species Name (disease/ syndrome, ICD-code)	Tests To Request	Department and Contact telephone no's
			011 555 0325 /011 555 0381/011 555 0323
<i>Chlamydia trachomatis</i>	<i>Chlamydia trachomatis</i>	NAAT (PCR, TMA)	CHIVSTI/ STI: 011 555 0461 \ 011 555 0468
<i>Cryptococcus (surveillance)</i>	<i>Cryptococcus (surveillance)</i>	Cryptococcal surveillance	CHARM Mycology Reference Laboratory 011 555 0325/011 555 0384/011 555 0323
Cryptococcus meningitis	Identification of cryptococcal antigen (CrAg)	Identification of Cryptococcal antigen (CrAg)	CHARM: Mycology Reference Laboratory 011 386-6430 /011 386-6431/011 555 0323
Diphtheria	<i>Corynebacterium diphtheriae</i>	Identification (phenotypic and PCR), and toxin production (Elek and PCR)	CRDM 011 555 0315 (lab) 011 555 0317 (lab)
<i>E. coli</i> characterization	Diarrhoeagenic <i>Escherichia coli</i> or suspected STEC	Enteric surveillance and reference function / <i>E. coli</i> characterization	CED Bacteriology 011 386 6235 /011 555 0348 011 555 0334/011 555 0426
<i>Enterococcus faecium</i> and <i>faecalis</i>	<i>Enterococcus faecium</i> and <i>faecalis</i>	AMR detection/confirmation	CHARM AMRL-CC 011 555 0344 / 011 555 0342
Enterovirus	Enterovirus	Enterovirus / PCR / Enterovirus genotyping	CVI Polio 011 386 6438 011 555 0504
Fungal pathogen from clinical sources which cannot be identified by academic/ referral laboratories	Fungal pathogen from clinical sources which cannot be identified by academic/ referral laboratories	Identification of fungal pathogen; Antifungal susceptibility testing	CHARM Mycology Reference Laboratory 011 555 0323 /011 555 0325 011 555 0353
Genital Discharge syndrome	<i>Neisseria gonorrhoeae</i> <i>Chlamydia trachomatis</i> <i>Trichomonas vaginalis</i> and <i>Mycoplasma</i> <i>genitalium</i>	Multiplex PCR for genital discharge pathogens Organism specific PCR available for confirmation of <i>Neisseria gonorrhoeae</i> , <i>Chlamydia trachomatis</i> , <i>Trichomonas vaginalis</i> and <i>Mycoplasma genitalium</i>	CHIVSTI/ STI 11 555 0461 011 555 0468
Genital Ulcer syndrome	<i>Treponema pallidum</i> , Herpes simplex virus 1 and 2, <i>Haemophilus ducreyi</i> , Lymphogranuloma venereum	Multiplex PCR for genital ulcer pathogens Organism specific PCR available for confirmation of <i>Treponema pallidum</i> and Herpes simplex virus 1 and 2	CHIVST/STI 011 555 0461 011 555 0468
Gram-negative organisms (*As per current GERMS-SA case definition)	Gram-negative organisms (*As per current GERMS-SA case definition)	Surveillance	CHARM AMRL-CC 0115550344 0115550342
<i>Haemophilus ducreyi</i>	<i>Haemophilus ducreyi</i>	PCR	STI: 011 555 0461 \ 011 555 0468
Hepatitis	Hepatitis: For research and surveillance only (For staff immunity screening, a request form for anti-HavabG, anti-HBs, is completed and must accompany the sample)	Hepatitis A: Havab-G and Havab-M Hepatitis B: HBsAg, Anti-HBs, Anti-HBc, HBeAg, Anti- HBe, Anti-HBc IgM, HBV Viral load Sequencing, genotyping Hepatitis C:	CVI hepatitis 011 386 6347 011 555 0534

Pathogen / Test Species Name (disease/ Syndrome)	Pathogen Species Name (disease/ syndrome, ICD-code)	Tests To Request	Department and Contact telephone no's
		Hepatitis C:Anti-HCV, HCV Viral load, genotyping	
Herpes virus B (<i>Herpesvirus simiae</i>)	<i>Macacine herpesvirus</i> 1 commonly referred to as herpes B, monkey B virus, herpesvirus B, and <i>herpesvirus simiae</i> .	PCR	CEZPD SVPL Dr J Weyer:011 386 6376/082 903 9131
Herpes simplex virus type 1 and 2 (HSV1 and 2)	HSV 1 and 2	PCR; Acyclovir resistance testing by PCR/ sequencing and serum ELISA for HSV2 IgG	CHIVSTI/ STI :011 555 0461 \ 011 555 0468
Human common cold coronaviruses (229E, OC43, NL63, HKU1)	Human common cold coronaviruses (229E, OC43, NL63, HKU1)	Human common cold coronaviruses PCR	CRDM Results:011-386 6404 Queries:011 555 0488 011 386 6373 / 011 386 3690
Histoplasmosis	Histoplasma galactomannan antigen (HAT) and <i>Histoplasma/ Emergomyces</i> RT-qPCR	Histoplasma antigen and <i>Histoplasma/ Emergomyces</i> RT-qPCR	CHARM: Mycology Reference Laboratory 011 555 0325 /011 555 0323 011 555 0353 011 555 0491
HIV	HIV	HIV DNA PCR	HIV Sero-Molecular: 011 386 6435 /011 386 6437 / 011 386 6460
HIV	HIV	HIV Viral Load	HIV Sero-Molecular: 011 386 6435 /011 386 6437 / 011 386 6460
HIV	HIV	HIV ELISA	HIV Sero-Molecular: 011 386 6435 /011 386 6437 / 011 386 6457
HIV	HIV	HIV-1/2 Antigen-Antibody EIA	HIV Sero-Molecular: 011 386 6435 /011 386 6437 / 011 386 6457
HIV	HIV	HIV-1 or HIV-2 Western Blot	HIV Sero-Molecular: 011 386 6435 /011 386 6437 / 011 386 6457
HIV	HIV	Alere Determine Combo Rapid (On Request Only)	HIV Sero-Molecular: 011 386 6435 /011 386 6437 / 011 386 6457
HIV	HIV	HIV Incidence Testing	HIV Sero-Molecular: 011 386 6435 /011 386 6437 / 011 386 6457
HIV-1	HIV-1 (p24)	P24 – Culture Supernatant	Virology Research Laboratory Lab Manager: 011 386 6341
HIV-1	HIV-1	Neutralization assays a) Pseudovirion assay	Virology Research Laboratory Lab Manager: 011 386 6341
HIV-1	HIV-1	Drug resistance testing: HIV-1 Genotyping kit assay	HIV Sero-Molecular: 011 386 0410 /011 386 6437 / 011 386 6439
HIV-1	HIV-1	Gag ELISA	Virology Research Laboratory Lab Manager: 011 386 6341
HIV-1	HIV-1	HIV Rapid	HIV Sero-Molecular: 011 386 6435 /011 386 6437 / 011 386 6457

Pathogen / Test Species Name (disease/ Syndrome)	Pathogen Species Name (disease/ syndrome, ICD-code)	Tests To Request	Department and Contact telephone no's
HIV-1	HIV-1	HIV Virus isolation	Virology Research Laboratory Lab Manager: 011 386 6341
HPV	HPV	PCR / (Genotyping)	CHIVSTI/STI :011 555 0461 \ 011 555 0468
Influenza A and Influenza B virus.	Influenza A and Influenza B virus	Respiratory panel / Influenza PCR	CRDM 011 555 0387/0352 (lab) 011 555 0316 / 011 386 6321 (clinical)
<i>Leptospirosis</i> (LEPTO)	<i>Leptospira spp.</i> (Leptospirosis)	Leptospira serology (LEPTO)	CEZPD Special Bacterial Pathogens Reference Laboratory 011 555 0331/ 011 555 0306 / 011 555 0584
<i>Listeria spp</i>	<i>Listeria spp</i>	Enteric surveillance and reference function / <i>Listeria</i> characterization	CED Bacteriology 011 386 6235 /011 555 0348 011 555 0334 /011 555 0426
<i>Lympho granuloma venereum</i> (LGV)	<i>Chlamydia trachomatis</i> Serovars L1-L3	PCR	CHIVSTI/STI :011 555 0461 \ 011 555 0468
MALDI-TOF identification	MALDI-TOF identification	Identification	CHARM AMRL-CC 0115550344/0115550342
Measles and rubella ^{CVI1}	Measles Rubella	Measles and rubella IgM Measles or rubella PCR	CVI measles working group 011 386 6343 011 386 6398 011 555 0534
Meningitis/encephalitis screen (bacterial and viral)	<i>S. pneumoniae</i> , <i>H. influenzae</i> , <i>N. meningitidis</i> , <i>S. agalactiae</i> , <i>E. coli</i> K1, <i>L. monocytogenes</i> , Cytomegalovirus, Enterovirus, Herpes simplex-1 and -2, Human herpesvirus 6, Human Parechovirus, Varicella zoster virus	Meningitis/encephalitis screen – PCR Culture (bacterial pathogens) Serotyping/grouping of Spn, Hi and Nm – phenotypic (for culture) and PCR (directly from clinical specimen) MIC – bacterial culture	CRDM 011 555 0315/0317/0327/0387 (lab queries) 011 555 0316 (clinical queries)
MERS-Coronavirus (MERS-CoV)	MERS-Coronavirus (MERS-CoV)	Suspected MERS-Coronavirus (MERS-CoV) PCR	Hotline-Dr on call:082 883 9920 CRDM 011 555 0387/0352 (lab) 011 555 0316/011 386 6321 (clinical)
Monkeypox virus)	Monkeypox virus (causative agent of mpox)	PCR	CEZPD SVPL Dr J Weyer:011 386 6376/082 903 9131
Multi-drug resistant <i>Enterobacteriaceae</i> and other <i>ESKAPE</i> pathogens for surveillance and detection (*As per current GERMS-SA case definition)	Multi-drug resistant <i>Enterobacteriaceae</i> (*As per current GERMS-SA case definition and case report forms)	Cultures on Dorset slopes viable for up to one month at room temperature for surveillance or reference diagnostic	CHARM AMRL-CC 0115550344 /0115550342
<i>Mycobacterium tuberculosis</i>	<i>Mycobacterium tuberculosis</i>	Microscopy for acid-fast bacilli	Centre for TB 011 885 5317/011 885 5316

<i>Mycobacterium tuberculosis</i>	<i>Mycobacterium tuberculosis</i> or Non-tuberculosis mycobacteria	Culture	Centre for TB 011 8855317/011 885 5316
<i>Mycobacterium tuberculosis</i>	<i>Mycobacterium tuberculosis</i>	Phenotypic drug susceptibility testing (Specify drugs to be tested)	Centre for TB 011 885 5317/011 885 5316
<i>Mycobacterium tuberculosis</i>	<i>Mycobacterium tuberculosis</i> or Non-tuberculosis mycobacteria	Line Probe Assay - First line drug susceptibility - Second line drug susceptibility - NTM speciation - MTBcomplex speciation - NTM- drug susceptibility	Centre for TB 011 885 5317/011 885 5316
Pathogen / Test Species Name (disease/ Syndrome)	Pathogen Species Name (disease/ syndrome, ICD-code)	Tests To Request	Department and Contact telephone no's
<i>Mycobacterium tuberculosis</i>	<i>Mycobacterium tuberculosis</i>	Xpert MTB/RIF Assay	Centre for TB 011 885 5217/011 885 5316
<i>Mycobacterium tuberculosis</i>	<i>Mycobacterium tuberculosis</i> or Non-tuberculosis mycobacteria	Specialised testing Only on request via email to NTBRL. -Broth Microdilution or MGIT MIC testing. -Extended Panel for TB MIC testing for NTM. -MIC testing for Bedaquiline and / or Delamanid. - Next generation sequencing	Centre for TB 011 885 5317/011 885 5316
<i>Mycoplasma genitalium</i>	<i>Mycoplasma genitalium</i>	NAAT (PCR); Antimicrobial resistant determinants testing by PCR and sequencing	CHIVSTI/STI: 011 555 0461 /011 555 0468
<i>Mycoplasma pneumoniae</i> , <i>Chlamydia pneumoniae</i> , <i>Legionella</i> spp., <i>Bordetella</i> spp.	<i>Mycoplasma pneumoniae</i> , <i>Chlamydia pneumoniae</i> , <i>Legionella</i> spp., <i>Bordetella</i> spp.	Polymerase chain reaction (PCR) for identification	CRDM 011 555 0315 011 555 0317
<i>Neisseria gonorrhoeae</i>	<i>Neisseria gonorrhoeae</i>	Culture and Antimicrobial susceptibility testing / NAAT (PCR, TMA)/ Typing by PCR / Antimicrobial resistant determinants testing by PCR and sequencing	CHIVSTI/ STI: 011 555 0461 /011 555 0468
Nipah virus	<i>Henipavirus nipahense</i> (Nipah virus disease)	PCR	CEZPD SVPL Dr J Weyer:011 386 6376/082 903 9131
Norovirus	Norovirus Gastroenteritis: Diarrhoea, vomiting, fever	Norovirus detection	CED Virology 011 555 0370
Oropouche virus	Oropouche virus disease/Oropouche fever	PCR	CEZPD SVPL Dr J Weyer:011 386 6376/082 903 9131
Parasite - <i>Acanthamoeba</i> spp.	Parasite <i>Acanthamoeba</i> spp.	<i>Acanthamoeba</i> culture and/or PCR	Parasitology Reference Laboratory 011 555-0304 011 555-0311
Parasite - <i>Babesia</i> species (Babesiosis)	Parasite - <i>Babesia</i> species (Babesiosis)	<i>Babesia</i> microscopy	Parasitology Reference Laboratory

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			011 555-0304 011 555-0311
Parasite - <i>Borrelia duttoni</i> or <i>B. recurrentis</i> (Relapsing fever)	Parasite - <i>Borrelia duttoni</i> or <i>B. recurrentis</i> (Relapsing fever)	Relapsing fever borrelia microscopy	Parasitology Reference Laboratory 011 555-0304 011 555-0311
Parasite - <i>Entamoeba histolytica</i>	Parasite - <i>Entamoeba histolytica</i> (Amoebiasis)	Amoebiasis microscopy	Parasitology Reference Laboratory 011 555-0304 011 555-0311
Parasite - <i>Echinococcus species</i>	Parasite - <i>Echinococcus species</i> (Echinococcosis, hydatid disease)	Echinococcus microscopy	Parasitology Reference Laboratory 011 555-0304 011 555-0311
Parasite - <i>Enterobius vermicularis</i> (pinworm)	Parasite - <i>Enterobius vermicularis</i> (pinworm)	<i>Enterobius vermicularis</i> / (pinworm) microscopy	Parasitology Reference Laboratory 011 555-0304 011 555-0311
Parasite -Human cestodes (tapeworms) including: <i>Taenia saginata</i> , <i>T. solium</i> , <i>H. nana</i> , <i>H. diminuta</i> and <i>D. latum</i>	Parasite -Human cestodes (tapeworms) including: <i>Taenia saginata</i> , <i>T. solium</i> , <i>H. nana</i> , <i>H. diminuta</i> and <i>D. latum</i>	Stool parasites microscopy (specify suspected parasite, if applicable)	Parasitology Reference Laboratory 011 555-0304 011 555-0311

Pathogen / Test Species Name (disease/ Syndrome)	Pathogen Species Name (disease/ syndrome, ICD-code)	Tests To Request	Department and Contact telephone no's
Parasite -Human nematodes including: <i>Ascaris lumbricoides</i> (common roundworm), hookworms (<i>Ancylostoma duodenale/ Necator americanus</i>), <i>Trichuris trichiura</i> (whipworm), <i>Strongyloides stercoralis</i>	Parasite -Human nematodes including: <i>Ascaris lumbricoides</i> (common roundworm), hookworms (<i>Ancylostoma duodenale/ Necator americanus</i>), <i>Trichuris trichiura</i> (whipworm), <i>Strongyloides stercoralis</i>	Stool parasites microscopy (specify suspected parasite, if applicable)	Parasitology Reference Laboratory 011 555-0304 011 555-0311
Parasite -Human protozoa including: <i>Cryptosporidium</i> species, <i>Cystoisospora belli</i> , <i>Cyclospora cayetanensis</i> , <i>Giardia lamblia</i> , <i>Entamoeba coli</i> , <i>Blastocystis hominis</i>	Parasite -Human protozoa including: <i>Cryptosporidium</i> species, <i>Cystoisospora belli</i> , <i>Cyclospora cayetanensis</i> , <i>Giardia lamblia</i> , <i>Entamoeba coli</i> , <i>Blastocystis hominis</i>	Stool parasites microscopy (specify suspected parasite, if applicable)	Parasitology Reference Laboratory 011 555-0304 011 555-0311
Parasite -Human trematodes including: <i>Schistosoma mansoni/ haematobium</i>	Parasite -Human trematodes including: <i>Schistosoma mansoni/ haematobium</i> (Bilharzia, schistosomiasis)	Stool / urine parasites microscopy (specify suspected parasite, if applicable)	Parasitology Reference Laboratory 011 555-0304 011 555-0311
Parasite - <i>Leishmania</i> species	Parasite - <i>Leishmania</i> species (Leishmaniasis)	Leishmania microscopy	Parasitology Reference Laboratory 011 555-0304 011 555-0311
Parasite - <i>Microfilaria</i> species (<i>W. bancrofti</i> , <i>L. loa</i> , <i>M. perstans</i> etc)	Parasite - <i>Microfilaria</i> species (<i>W. bancrofti</i> , <i>L. loa</i> , <i>M. perstans</i> etc)	Microfilaria microscopy	Parasitology Reference Laboratory 011 555-0304 011 555-0311
Parasite – <i>Microsporidia</i> (unicellular intracellular parasites closely related to fungi)	Microsporidia including <i>Enterocytozoon bieneusi</i> , <i>Encephalitozoon</i> species	Microsporidia PCR	Parasitology Reference Laboratory 011 555-0304 011 555-0311
Parasite - <i>Plasmodium falciparum</i>	Parasite - <i>Plasmodium falciparum</i> (Malaria)	Antigen test for <i>Plasmodium falciparum</i> and/or pan malaria	Parasitology Reference Laboratory 011 555-0304 011 555-0311
Parasite - <i>Plasmodium</i> species	Parasite - <i>Plasmodium</i> species (Malaria)	Malaria microscopy	Parasitology Reference Laboratory 011 555-0304 011 555-0311
Parasite - <i>Plasmodium</i> species	Parasite - <i>Plasmodium</i> species (Malaria)	Malaria PCR	Parasitology Reference Laboratory 011 555-0304 011 555-0311
Parasite - <i>Plasmodium falciparum</i>	Parasite - <i>Plasmodium falciparum</i> (Malaria)	Antimalarial Drug and Diagnostic Resistance Assessment by PCR	ARMMOR 011 386 6374 / 011 386 6003
Parasite - <i>Pneumocystis jirovecii</i>	Parasite - <i>Pneumocystis jirovecii</i> (<i>Pneumocystis pneumonia</i> , PCP)	<i>Pneumocystis jirovecii</i> PCR	Parasitology Reference Laboratory 011 555-0304 011 555-0311
Parasite - <i>Strongyloides stercoralis</i>	Parasite - <i>Strongyloides stercoralis</i>	<i>Strongyloides stercoralis</i> microscopy and/or culture	Parasitology Reference Laboratory 011 555-0304 011 555-0311
Parasite – <i>Helminth/worm (adult) identification</i>	Parasite – <i>Helminth</i> (adult) identification	<i>Helminth/worm</i> microscopy	Parasitology Reference Laboratory 011 555-0304 011 555-0311

Pathogen / Test Species Name (disease/ Syndrome)	Pathogen Species Name (disease/ syndrome, ICD-code)	Tests To Request	Department and Contact telephone no's
Parasite - <i>Toxoplasma gondii</i> (protozoan)	<i>Toxoplasma gondii</i>	Toxoplasma PCR	Parasitology Reference Laboratory 011 555-0304 011 555-0311
Parasite - <i>Trypanosoma species</i>	Parasite - <i>Trypanosoma species</i> (Sleeping sickness or trypanosomiasis)	Trypanosome microscopy	Parasitology Reference Laboratory
Pertussis	<i>Bordetella pertussis</i>	<i>B. pertussis</i> culture and/or PCR	CRDM 011 555 0315/011 555 0317 (lab) 011 555 0316/011 386 6321 (clinical queries)
Poliovirus isolation Environmental surveillance.	Poliovirus Environmental surveillance.	Poliovirus Environmental Surveillance	CVI: Poliovirus ES: 011 555 0504/ 011 386 6358/011 386 6451
Pneumonia screen (molecular)	Adenovirus, coronavirus, human metapneumovirus, rhinovirus/EV, influenza A and B, parainfluenza virus, RSV, <i>A. baumannii complex</i> , <i>E. cloacae complex</i> , <i>E. coli</i> , <i>H. influenzae</i> , <i>K. aerogenes</i> , <i>K. oxytoca</i> , <i>K. pneumoniae group</i> , <i>M. catarrhalis</i> , <i>Proteus spp.</i> , <i>P. aeruginosa</i> , <i>S. marcescens</i> , <i>S. aureus</i> , <i>S. agalactiae</i> , <i>S. pneumoniae</i> , <i>S. pyogenes</i> , <i>C. pneumoniae</i> , <i>L. pneumophila</i> , <i>M. pneumoniae</i>	Pneumonia panel - PCR	CRDM 011 555 0315/011 555 0317/011 555 0387
Poliovirus Molecular	Poliovirus	Real Time RT-PCR and/or Sequencing	CVI: Polio Laboratory 011 386 6438 011 555 0504 / 011-386-6388
Poliovirus isolation. AFP surveillance.	Poliovirus	Poliovirus isolation. AFP surveillance. Poliovirus Poliovirus isolation. AFP surveillance.	CVI: Poliovirus Isolation 011 555 0504/ 011 386 6361 011 386 6358
Poliovirus isolation. AFP surveillance	Poliovirus (Acute Flaccid Paralysis (AFP) surveillance)	Poliovirus isolation. AFP surveillance	CVI: Poliovirus Isolation 011 555 0504/011 386 6361 011 386 6358
Poliovirus Serology	Poliovirus Serology	Poliovirus Antibody Neutralization	CVI: Poliovirus Serology 011 555 0504/ 011 386 6361
Poliovirus Serology	Poliovirus Serology	Poliovirus Antibody Neutralization	CVI: Poliovirus Isolation 011 555 0504/011 386 6361

Pathogen / Test Species Name (disease/ Syndrome)	Pathogen Species Name (disease/ syndrome, ICD-code)	Tests To Request	Department and Contact telephone no's
Poxvirus (not monkeypox virus)	Poxviruses causing human illness such as Orf, Tanapox etc.	Poxvirus PCR	CEZPD SVPL Dr J Weyer:011 386 6376/082 903 9131
Rabies	Rabies Rabies and rabies-related lyssaviruses ICD-10 code is A82	Rabies RT PCR or rabies DFA (for post mortem brain specimens)	CEZPD SVPL Dr J Weyer:011 386 6376/082 903 9131
Rabies immunity (for individuals with pre- exposure rabies vaccination)	Rabies antibodies	Rabies immunity / Rabies IgG	CEZPD SVPL Dr J Weyer:011 386 6376/082 903 9131
Respiratory screen (molecular)	Adenovirus, coronavirus 229E, coronavirus HKU1, coronavirus NL63, coronavirus OC43, middle east respiratory syndrome coronavirus (MERS-CoV), severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), human metapneumovirus, human rhinovirus/enterovirus, influenza A, influenza B, parainfluenza virus 1, parainfluenza virus 2, parainfluenza virus 3, parainfluenza virus 4, respiratory syncytial virus (RSV) , <i>Mycoplasma pneumoniae</i> , <i>Chlamydia pneumoniae</i> , <i>Bordetella pertussis</i> , <i>Bordetella parapertussis</i>	Respiratory panel - PCR	CRDM 011 555 0315/17/ 0327/0387 (lab)
Respiratory Syncytial Virus (RSV)	Respiratory Syncytial Virus (RSV)	Respiratory panel / RSV PCR	CRDM 011 555 0387/0352 (lab) 011 555 0316 / 011 386 6321 (clinical)
Rotavirus	Rotavirus Gastroenteritis: Diarrhoea, vomiting, fever	Rotavirus detection /Rotavirus genotyping	CED Virology 011 555 0370

Pathogen / Test Species Name (disease/ Syndrome)	Pathogen Species Name (disease/ syndrome, ICD-code)	Tests To Request	Department and Contact telephone no's
Rubella (done as a reflex test for Measles) ^{CV12, CV13}	See measles	See measles	CVI measles working group 011 386 6398 011 555 0534 011 386 6343
<i>Salmonella</i>	<i>Salmonella</i> Typhi <i>Salmonella</i> Paratyphi A, B and C Nontyphoidal <i>Salmonella</i>	Enteric surveillance and reference function / <i>Salmonella</i> characterization	CED Bacteriology 011 386 6235 /011 555 0348 011 555 0334 /011 555 0426
Sapovirus	Sapovirus Gastroenteritis: Diarrhoea, vomiting, fever	Sapovirus detection	CED Virology 011 555 0370
SARS-CoV-2 (COVID-19) (Coronavirus disease 2019)	SARS-CoV-2 (COVID-19)	SARS-CoV-2 PCR (COVID-19)	CRDM 011 555 0315/17/ 0327/0387 (lab) 011 555 0316/ 011 386 6321
SARS-CoV-2 (COVID-19) (Coronavirus disease 2019)	SARS-CoV-2 (COVID-19)	SARS-CoV-2 Sequencing (COVID-19)	CRDM 011 555 0352 011 386 6373
SARS-CoV-2 (COVID-19) (Coronavirus disease 2019)	SARS-CoV-2 (COVID-19)	SARS-CoV-2 Serology ELISA (IgG) (COVID-19)	CRDM 011 555 0352 011 386 6373
SARS-CoV-2 (COVID-19) (Coronavirus disease 2019)	SARS-CoV-2 (COVID-19)	Neutralization assays a) Pseudovirion assay	Virology Research Laboratory Lab Manager: 011 386 6341
Severe fever with thrombocytopenia syndrome (SFTS)	SFTS	SFTS PCR	CEZPD SVPL Dr J Weyer:011 386 6376/082 903 9131
<i>Shigella spp</i>	<i>Shigella spp</i>	Enteric surveillance and reference function / <i>Shigella</i> characterization	011 386 6235 /011 555 0348 011 555 0334 /011 555 0426
<i>Streptococcus</i> Group A and B	<i>Streptococcus agalactiae</i> (GBS) <i>Streptococcus pyogenes</i> (GAS)	Culture / PCR / serotyping of GBS	CRDM 011 555 0315 011 555 0317 011 555 0316/011 386 6321 (clinical queries)

Pathogen / Test Species Name (disease/ Syndrome)	Pathogen Species Name (disease/ syndrome, ICD-code)	Tests To Request	Department and Contact telephone no's
Tick bite fever	Rickettsia species	Tick bite fever / Rickettsia PCR	CEZPD SVPL 011 386 6376 / 082 903 9131
<i>Treponema pallidum</i>	<i>Treponema pallidum</i>	RPR//TPAb/PCR / Typing/ Antimicrobial resistant determinants testing by PCR / Macrolide resistance testing by PCR/ Sequencing	CHIVSTI/STI: 011 555 0461\ 011 555
<i>Trichomonas vaginalis</i>	<i>Trichomonas vaginalis</i>	PCR	CHIVSTI/ STI :011 555 0461 \ 011 555 0468
Urinary antigen test for identification	<i>Legionella pneumophila serogroup 1</i>	Urinary antigen test for detection of pathogen	CRDM 011 555 0315/011 555 0317
Viral haemorrhagic fever (VHF)	Viral haemorrhagic fevers (Crimean-Congo haemorrhagic fever, Ebola, Marburg, Lassa, Hanta and Yellow fever)ICD-10 code for unspecified viral haemorrhagic fever, A99	VHF	CEZPD SVPL 011 386 6376 / 082 903 9131 Dr J Weyer:011 386 6376/082 903 9131
<i>Yersinia pestis</i> (Plague)	<i>Yersinia pestis</i> (Plague)	Plague investigation (PLAGE) Plague serology (PLAGE) / Plague surveillance (RATS)	CEZPD Special Bacterial Pathogens Reference Laboratory 011 555 0331/ 011 555 0306 / 011 555 0584

Detailed information for tests offered at the NICD

A detailed summary for tests offered is provided below including specimens, transportation, TAT and special considerations. The tests are listed per Centre providing the testing.

6.1 Centre for Vaccines and Immunology (CVI)

Pathogen Species Name (disease/syndrome)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
<p>Poliovirus (Acute Flaccid Paralysis (AFP) surveillance)</p> <p>Note: For purposes of AFP surveillance, the Poliovirus Isolation Laboratory at NICD is the only laboratory in South Africa accredited by World Health Organization to perform this testing.</p>	<p>Two stool samples (adult thumb size) collected in universal sample containers, 24-48 hours apart and within 14 days of onset of paralysis. In the event a stool sample cannot be obtained, please forward a rectal swab as an alternative.</p> <p>Note: These are requirements for sample adequacy; however, all samples received will be subjected to processing and testing and sample adequacy will be identified on data analysis.</p>	<p>Maintenance of cold chain (2-8°C) from collection to receipt at NICD. Samples to reach laboratory within 3 days of collection.</p> <p>Note: These are guidelines met to comply with WHO requirements; however, samples will be subjected to processing and testing even if these criteria are not met and these will be identified on data analysis.</p>	Poliovirus isolation. AFP surveillance.	Virus Isolation	<p>EPI Notification 14 days (80% of all results to be reported within 14 days of receipt in lab). Issue of LIMS report: 21 days of receipt in Lab for samples received from South Africa, Namibia and Botswana.</p>	<p>The following information is required for capture on the AFP database and should be completed on specific AFP case investigation forms:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Epid number – unique number for epidemiology purposes <input type="checkbox"/> Name <input type="checkbox"/> Date of Birth <input type="checkbox"/> Date of onset of paralysis <input type="checkbox"/> Date of stool collection <input type="checkbox"/> Immunization history <input type="checkbox"/> Province <input type="checkbox"/> District <input type="checkbox"/> Case or contact <input type="checkbox"/> Specimen number <input type="checkbox"/> Date sent from field to National Level – where applicable <input type="checkbox"/> Date received at National Level – where applicable <input type="checkbox"/> Date sent to NICD <input type="checkbox"/> Testing requested and clinical diagnosis to be clearly stated to prevent incorrect / unnecessary tests being performed 	<p>Poliovirus Laboratory 011 555 0508 011 386 6361 011 386 6438</p>

Pathogen Species Name (disease/syndrome)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
Poliovirus	Virus isolate from stool or environmental sample, minimum 1ml. FTA Card inoculated with virus isolate	Transport frozen or at 4°C. Specimen must reach the laboratory within 3 days of dispatch. Transport at ambient temperature. Specimen must reach the laboratory within 3 days of dispatch.	Real Time RT-PCR Sequencing (AFP) Sequencing (Environmental)	Real Time ITD RT-PCR Real Time VDPV Screening RT-PCR Sequencing VP1 Region	7 days 7 days 14 days	AFP Investigation Form with at least the following information: <input type="checkbox"/> Epid Number <input type="checkbox"/> Patient Name <input type="checkbox"/> Date of onset of paralysis <input type="checkbox"/> District <input type="checkbox"/> Case or contact <input type="checkbox"/> Specimen Number <input type="checkbox"/> Referring Laboratory specimen number <input type="checkbox"/> Date sent to NICD <input type="checkbox"/> Cell Line (L-Arm or R-Arm) Real Time PCR Results (if requesting Sequencing)	Centre for Vaccines & Immunology: Polio Laboratory 011 386 6438 /6388 011 555 0508
Poliovirus Serology	Clotted Blood - 5ml, Sera - 0.5ml	Maintenance of cold chain (2-8°C)	Poliovirus Antibody Neutralization	Neutralization Test	21 days NB: Samples are batched for testing. This may result in TATs being exceeded if samples volumes are low.	Testing requested and clinical diagnosis to be clearly stated on request forms to prevent incorrect / unnecessary tests being performed	Poliovirus Serology 011 555 0508 011 386 6361

Pathogen Species Name (disease/syndrome)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
Enterovirus	Hand foot and mouth disease: Dextran swab of vesicle/rash fluid with a stool sample Meningitis/encephalitis: CSF with a stool sample Respiratory disease: throat swab/lavage with a stool sample	Transport frozen or at 4°C. Specimen must reach the laboratory within 3 days of dispatch.	Enterovirus PCR Enterovirus genotyping	Real-time PCR Sequencing of VP1 region	7 Days 14 days	Cold chain essential for the storage and transport of samples	Centre for Vaccines & Immunology: Polio Laboratory 011 386 6438 011 555 0504
Poliovirus (Environmental surveillance)	Sewage wastewater sample. Collected in an external screw cap 1 litre bottle as a grab sample.	Maintain cold chain transportation at 4°C	Poliovirus environmental isolation. Poliovirus Environmental Surveillance Note: Poliovirus isolation in environmental wastewater samples is performed on pre-selected wastewater treatment works following site selection as per WHO selection criteria (recommended) and evaluation of site by selected stakeholders. Please contact the laboratory for detailed information regarding site selection and poliovirus environmental surveillance.	Virus Isolation	Environmental Surveillance, 80% of results must be available within 21 days of receipt	The following information is required for capture on the ES database and should be completed on Poliovirus Environmental Surveillance Forms: <input type="checkbox"/> ID code – unique number for epidemiology purposes <input type="checkbox"/> Site Name <input type="checkbox"/> Sampling Method <input type="checkbox"/> Time sample collected <input type="checkbox"/> Date sample collected <input type="checkbox"/> Atmospheric temperature at time of sample collection <input type="checkbox"/> Province <input type="checkbox"/> District <input type="checkbox"/> Date sent to the laboratory	Polio Environmental Laboratory 011 555 0508 011 386 6388 011 386 6451

Pathogen Species Name (disease/syndrome)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
Measles/Rubella serology (Rash-based Surveillance)	<p>Serology: 5 ml Clotted Blood or EDTA Blood (red top or yellow SST tube or EDTA/heparin Blood or Serum</p> <p>Molecular: Throat swabs/nasopharyngeal swabs Urine Sera (for measles only)</p>	<p>For serology, the blood/serum samples can be transported at room temperature to NICD. If transportation is delayed the samples should be refrigerated.</p> <p>For molecular testing, samples should be transported at 2°C-8°C</p> <p>All samples to reach the lab within three days of sample collection.</p>	<p>Serology: Measles IgM (refer to notes on page 29)</p> <p>Molecular: For surveillance only</p>	<p>Serology: Anti-Measles IgM antibody (EIA) / Anti-Rubella IgM antibody (EIA)</p> <p>Molecular: Real-time PCR and Sequencing</p>	<p>7 working days for serology</p> <p>14 days for real-time PCR</p> <p>2 months for sequencing</p>	<p>A Measles Case Investigation Form (CIF) must be completed in full and must accompany specimens. Please ensure that the following information is captured on the CIF:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Name, age, Date of Birth, address of patient <input type="checkbox"/> Name and contact number of clinician <input type="checkbox"/> Symptoms marked in tick boxes <input type="checkbox"/> Complications marked in tick boxes <input type="checkbox"/> Date of onset of rash <input type="checkbox"/> Date seen at health facility <input type="checkbox"/> Date specimen collected <input type="checkbox"/> Medical history including measles vaccination history, number of doses and date of last measles vaccination Date of notification and response to case 	<p>CVI measles working group 011 386 6398 011 555 0534 011 386 6343</p>

Pathogen Species Name (disease/syndrome)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
Hepatitis	<p>Serology: 5 ml Clotted Blood or EDTA Blood (red top or yellow SST tube or EDTA Blood or Serum)</p> <p>Molecular: 5ml EDTA blood for HAV sequencing (red top or yellow SST tube or Serum)</p>	Transport at 2°C-8°C Sample should reach laboratory within 3 days	<p>For research and surveillance only</p> <p>(anti-HAV, anti-HBs for staff immunity screening)</p>	<p>Hepatitis A: Architect System Havab IgG, Havab IgM Genotyping - Sequencing VP1/P2B junction</p> <p>Hepatitis B: Architect System HBsAg, Anti-HBs, Anti-HBc, HBeAg, Anti-HBe, Anti-HBc IgM, HBV Viral load, genotyping</p> <p>Hepatitis C: Architect System Anti-HCV, HCV Viral load, genotyping</p> <p>Hepatitis E: ELISA IgM</p>	<p>Serology: 14 working days Molecular: 2-1 working days</p>	For research and surveillance only (Anti-HBs the staff immunity screening request form is completed and must accompany the specimen)	CVI hepatitis working group 011 386 6347 011 555 0534

CVI1: Please note that Measles IgG and Rubella IgG should not be requested by users of the service as it is only done for NICD staff immunity screening

CVI2: Please note that the Measles IgM or Rubella IgM tests are not offered as a single test, they are done as part of the testing for national measles surveillance for the Expanded Programme on Immunization (EPI), every sample that is sent for a suspected measles case will be tested for both measles and rubella IgM

6.2 Centre for Tuberculosis (CTB)

Pathogen Species Name (disease/syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
<i>Mycobacterium tuberculosis</i>	Sputum	Cool ambient temperature Specimens should be collected in clean leak proof containers free from paraffin and other waxes or oils. Specimens should be kept cool during transportation but should not be frozen. If there is a delay in transport, the specimen should be refrigerated (2-8°C) although this is not required for microscopy An adequate sample should be about 2-5ml sputum.	Microscopy for acid-fast bacilli	Microscopy for acid-fast bacilli	90% within 48-72hours	Test limited for surveillance and research projects	Centre for TB 011 885 5323 011 885 5316

Pathogen Species Name (disease/ syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
<i>Mycobacterium tuberculosis</i> or Non-tuberculous mycobacteria	Sputum raw) kept at room temperature for 72 hours OR 2-8°C for 3 days or longer until processed Sputum in cetylpyridinium chloride (CPC) collection medium (Sputum containing CPC can be kept for up to 7 days but must be kept at room temperature)	Specimens should be collected in clean leak proof containers free of oils. Study specific containers may be used. Sputum should be from deep cough avoiding saliva and secretions from nasopharynx. Specimens should be kept cool during transportation but should not be frozen. If there is a delay in transport, the specimen should be refrigerated (2-8°C) An adequate sample should be about 2-5ml sputum.	Culture	Culture	Project dependant	Test limited for surveillance and research projects	Centre for TB 011 8855323 011 885 5316

Pathogen Species Name (disease/syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
<i>Mycobacterium tuberculosis</i> Non-tuberculous mycobacteria	Isolate in MGIT tubes (or other liquid media) and on solid media	Isolates should be packaged as a biohazard category A (triple packaging)	Drug susceptibility testing (Specify drugs to be tested)	Drug susceptibility testing (MGIT 960)	3-8 weeks from pure positive sub-culture or Project dependant	Extended TB DST should be requested via email to the pathologist.	Centre for TB 011 885 5323 011 885 5316
<i>Mycobacterium Tuberculosis</i> Non-tuberculous mycobacteria	Culture isolates (liquid/solid)	For isolates these should be packaged as biohazard category A (triple packaging)	Line Probe Assay NTM speciation MTB complex speciation (BCG) NTM- drug susceptibility	Molecular testing methods GenoType CM GenoType MTBC GenoType NTM DR	Batched monthly from AFB positive culture or Project dependant	Culture isolates these should be packaged as a biohazard category A (triple packaging)	Centre for TB 011 885 5323 011 885 5316

Pathogen Species Name (disease/ syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
<i>Mycobacterium tuberculosis</i>	<p>Sputum (raw) kept at room temperature for 72 hours OR 2-8°C for 4 - 10 days</p> <p>or Decontaminated sediment stored 2-8°C indefinitely</p> <p>Stool Store stool sample containers in the refrigerator (2-8°C) until testing can be performed. Stool samples should not be stored for longer than 5 days in the refrigerator or 48 hours at room temperature.</p>	<p>Cool ambient temperature Specimens should be collected in clean leak proof containers free from paraffin and other waxes or oils. Specimens should be kept cool during transportation but should not be frozen. If there is a delay in transport, the specimen should be refrigerated (2-8°C)</p> <p>An adequate sample should be about 2-5ml sputum.</p>	<p>Xpert MTB/RIF Ultra Assay Xpert XDR</p>	<p>Molecular testing methods</p>	<p>48-72 hours or Project dependant</p>		<p>Centre for TB 011 885 5217 011 885 5316</p>
<i>Mycobacterium tuberculosis</i> or Non-tuberculosis mycobacteria	<p>Isolate in MGIT tubes (or other liquid media) and on solid media</p>	<p>Isolates should be packaged as a biohazard category A (triple packaging)</p>	<p>Specialised testing</p> <p>-Broth Microdilution OR agar proportion OR MGIT MIC testing. -Extended Panel for MTB -MIC testing for Bedaquiline, Clofazimine, Linezolid, Levofloxacin, Pretomanid and / or Delamanid.</p>	<p>Advanced DST Methods</p> <p>MIC testing:</p> <p>Bedaquiline Clofazimine Delamanid Linezolid Levofloxacin Pretomanid</p> <p>Extended TB DST</p> <p>Sensitre: -MYCOTB (MTB) -Rapid grower NTM -Slow grower NTM</p>	<p>3-8 weeks from pure positive sub-culture or Project dependant</p>	<p>Extended DST / MIC requests should be done via email to the pathologist.</p>	<p>Centre for TB 011 885 5323 011 885 5316</p>

Pathogen Species Name (disease/ syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
<i>Mycobacteria</i>	Clinical specimen (pulmonary) or pure cultured isolate obtained from growth media(liquid or solid) or contaminated cultured isolate (provided the presence of mycobacteria)	Isolates should be packaged as a biohazard category A (triple packaging)	Specialised testing -Whole Genome Sequencing -targeted NGS	Next Generation Sequencing	Project dependant	Only on request via email to the pathologist	Centre for TB 011 885 5323 011 885 5316

6.3 Centre for HIV and STI (CHIVSTI)

Pathogen Species Name (disease/syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
Bacterial vaginosis	Vaginal smear on glass slide	Transport at ambient temperature in a slide holder. Temperature does not affect the quality of the sample. Time to reach the laboratory: not applicable		Gram stain	Project Dependant	Only available for surveillance and research purposes	STI 011 555 0461 011 555 0468
<i>Candida</i> species	Vaginal smear on glass slide	Transport at ambient temperature in a slide holder. Temperature does not affect the quality of the sample. Time to reach the laboratory: not applicable		Gram stain	Project Dependant	Only available for surveillance and research purposes	STI 011 555 0461 011 555 0468
Herpes Simplex Type 2	Clotted Blood EDTA Blood Serum Plasma	Transport on ice 2-8°C. Specimen must reach the laboratory within 3 days of collection.		HSV2 IgG EIA	Project Dependant	Only available for Surveillance purposes and research projects	STI 011 555 0461 011 555 0468
Herpes Simplex Virus Type 1 and 2	Ulcer swab (Dacron)	Transport on ice 2-8°C to reach the laboratory within 7 days or frozen if delays are anticipated.	HSV PCR	PCR	10 days	Only available for Surveillance purposes and research project Special cases: persistent/recurrent genital ulcer disease (require prior consultation with STI Section staff & completion of specific request form)	STI 011 555 0461 011 555 0468

Pathogen Species Name (disease/ syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
Herpes Simplex Virus Type 1 and 2 acyclovir resistance testing	Ulcer swab (Dacron): 1 swab in viral transport medium 1 swab in dry sterile container	Transport on ice 2-8°C to reach the laboratory within 7 days or frozen if delays are anticipated.	HSV PCR and sequencing for thymidine kinase +/- DNA polymerase mutations HSV viral culture and acyclovir plaque reduction assay	PCR + sequencing and viral culture	Project Dependant	Only available for Surveillance purposes and research project Special cases: persistent/ genital ulcer disease non-responsive to acyclovir therapy (require prior consultation with STI Section staff & completion of specific request form)	STI 011 555 0461 011 555 0468
Genital Ulcer Disease HSV 1 &2, <i>Haemophilus ducreyi</i> , <i>Treponema pallidum</i> , Lymphogranuloma venereum)	Ulcer swab (Dacron)	Transport on ice 2-8°C to reach the laboratory within 7 days or frozen if delays are anticipated.	Multiplex PCR for genital ulcer pathogens Organism-specific PCR available for confirmation of HSV and LGV	PCR	10 days	Available for Surveillance purposes and research projects Special cases: persistent/ recurrent genital ulcer disease (require prior consultation with STI Section staff & completion of specific request form)	STI 011 555 0461 011 555 0468
Genital Discharge (<i>Neisseria gonorrhoeae</i> , <i>Chlamydia trachomatis</i> and <i>Mycoplasma genitalium</i>)	Urethral swab Vaginal swab Other samples as indicated by clinical presentation Endocervical swab Rectal swab Pharyngeal swab (Dacron swabs)	Transport on ice 2-8°C to reach the laboratory within 7 days or frozen if delays are anticipated.	Multiplex PCR for genital discharge pathogens Organism specific PCR available for confirmation of <i>Neisseria gonorrhoeae</i> <i>Chlamydia trachomatis</i> <i>Trichomonas vaginalis</i> and <i>Mycoplasma genitalium</i>	PCR	10 days	Available for Surveillance purposes and research projects Special cases: persistent/ recurrent genital discharge or suspected treatment failure for gonorrhoea: *sexual abuse/ assault (require prior consultation with STI Section staff & completion of specific request form)	STI 011 555 0461 011 555 0468

Pathogen Species Name (disease/ syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
<i>Neisseria gonorrhoeae</i> culture isolate	<p>Viable culture isolate on sealed agar plate</p> <p>For AST and confirmation of ceftriaxone-resistance, additionally inoculate: chocolate agar slope (overnight incubation in CO₂)</p> <p>AND Trypticase soy broth with 10% glycerol (frozen at -20°C or -70°C) and transported on ice</p>	Plates/ slopes must ideally reach the lab within 48 hours of subculture and transported at room temperature or fridge 2-8°C.	<p>Identification</p> <p>Antimicrobial Susceptibility Testing (AST)</p> <p>Confirmation of extended-spectrum cephalosporin resistance</p>	<p>Culture, phenotypic ID, PCR</p> <p>Culture, ID, AST by (E-test and agar dilution)</p> <p>Culture, ID, AST by (E-test and agar dilution) + antimicrobial resistance determinants testing by PCR</p>	7 days	<p>Sexual abuse/ assault case</p> <ul style="list-style-type: none"> Two different phenotypic confirmatory methods should be performed on culture isolate at the local NHLS laboratory *Refer swab specimen for multiplex PCR for genital discharge pathogens, if required (see above) <p>Suspected treatment failure for gonorrhoea or extended-spectrum cephalosporin resistance (require prior consultation with STI Section staff & completion of specific request form)</p> <p>Ceftriaxone-resistant gonorrhoea is a notifiable medical condition (Category 3). All clinical isolates identified as resistant to ceftriaxone (+/- cefixime) on phenotypic AST should be referred to STI Reference laboratory, NICD, for confirmation of resistance (requires completion of specific request form)</p>	STI 011 555 0461 011 555 0468

Pathogen Species Name (disease/syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
HIV	Whole blood (EDTA or ACD Tube)	4°C to room temperature Minimum 2ml whole blood DO NOT FREEZE	HIV DNA PCR	HIV-1 DNA PCR (Whole blood)	5 working days		HIV Sero-Molecular Laboratory 011 386 6330 011 386 6437
HIV	Dried Blood Spots collected on 903 Specimen Whatman collection paper	Sealed in plastic bags with desiccant and indicator to prevent moisture Minimum of three (3) full spots per card must be sent	HIV DNA PCR	HIV-1 DNA PCR (Dried Blood Spot)	5 working days or Project dependent		HIV Sero-Molecular Laboratory 011 386 6330 011 386 6437
HIV	Plasma in EDTA or ACD tube	Frozen 1ml Plasma (-20°C) or Whole blood to be separated within 24 hours of collection	HIV Viral Load	Cobas 8800	5 working days or Project dependent		HIV Sero-Molecular Laboratory 011 386 6330 011 386 6437
HIV	Dried Blood Spots collected on 903 Specimen Whatman collection paper	Sealed in plastic bags with desiccant and indicator to prevent moisture Minimum of three (3) full spots per card must be sent	HIV DBS viral load	ABBOTT RealTime HIV-1 quantitative PCR on DBS	5 working days or Project dependent		HIV Sero-Molecular Laboratory 011 386 6330 011 386 6437
HIV	Plasma collected on Plasma Separation Card (PSC)	Sealed in plastic bags with desiccant and indicator to prevent moisture Minimum of three (3) full spots per card must be sent	HIV-1 RNA PCR	Roche HIV-1 Viral load	5 working days		HIV Sero-Molecular Laboratory 011 386 6330 011 386 6437

Pathogen Species Name (disease/syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
HIV	5 ml/10ml Clotted Blood or EDTA Blood and Dried Blood Samples (DBS) collected on Whatman 903 Cards – minimum of 3 full circles of whole blood, preferably fill all 5 circles	Transport blood samples at 2°C-8°C Maintenance of cold chain is required from collection to receipt at NICD DBS samples can be transported at RT°C (stable at RT°C for 14 days)	HIV ELISA	HIV-1/2 Antigen-Antibody EIA	7 working days or project dependent	Project/Survey requirements must be provided in writing by Requestor and discussed with NICD prior to testing.	HIV Serol-Molecular 011 386 6435 011 386 6437 011 386 6457
HIV	5 ml/10ml Clotted Blood or EDTA Blood and Dried Blood Samples (DBS) collected on Whatman 903 Cards – minimum of 3 full circles of whole blood, preferably fill all 5 circles	Transport blood samples at 2°C-8°C Maintenance of cold chain is required from collection to receipt at NICD DBS samples can be transported at RT°C (stable at RT°C for 14 days)	HIV-1 or HIV-2 Western Blot	HIV-1 Western Blot HIV-2 Western Blot	7 working days or project dependent	Project/Survey requirements must be provided in writing by Requestor and discussed with NICD prior to testing	HIV Serol-Molecular 011 386 6435 011 386 6437 011 386 6457
HIV	5 ml/10ml Clotted Blood or EDTA Blood and Dried Blood Samples (DBS) collected on Whatman 903 Cards – minimum of 3 full circles of whole blood, preferably fill all 5 circles	Transport blood samples at 2-8°C Maintenance of cold chain is required from collection to receipt at NICD DBS samples can be transported at Room Temperature for (stable for 14 days at RT°C after collection)	HIV Incidence testing	Maximum HIV-1 LAg Avidity Incidence EIA (Serum/Plasma/DBS)(Research Purposes Only)	14 - 21 working days for up to 1000 samples or project dependent	Project/Survey requirements must be provided in writing by Requestor and discussed with NICD prior to testing.	HIV Serol-Molecular 011 3866475 011 386 6437
HIV	5 ml/10ml Clotted Blood or EDTA Blood and Whole Blood	Transport blood samples at 2-8°C Maintenance of cold chain is required from collection to receipt at NICD	HIV Rapid	Geenius HIV 1/2 Confirmatory Rapid Assay	7 working days or project dependent	Project/Survey requirements must be provided in writing by Requestor and discussed with NICD prior to testing	HIV Serol-Molecular 011 386 6435 011 386 6437 011 386 6457

Pathogen Species Name (disease/ syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
HIV-1	p24	Store at -70°C	HIV-2 Western Blot	Culture supernatants	2 months	All these tests are done for Research/Project purposes only.	Virology Research Laboratory Lab Manager L Nxumalo 011 386 6341
HIV-1	Neutralization assays a) Pseudovirion assay	Transported on dry ice		Serum /plasma, monoclonal antibodies	2 months or project dependent	All tests are done for Research / Project purposes	Virology Research Laboratory Lab Manager L Nxumalo 011 386 6341
HIV-1	Gag ELISA	Store at -20°C		Serum	2 months	All these tests are done for Research/Project purposes only.	Virology Research Laboratory Lab Manager L Nxumalo 011 386 6341
HIV-1	HIV Virus isolation	LN storage		PBMC's	2 months	Whole blood received for testing to be stored at ambient temperature only	Virology Research Laboratory Lab Manager L Nxumalo 011 386 6341
HIV-1	Clotted blood or EDTA / PPT / ACD blood Dried blood samples (DBS) collected on Whatman 903 Cards – minimum of 4 full circles of whole blood, preferably fill all 5 circles Frozen Plasma	Transport blood samples on ice. DBS samples can be transported at room temperature (or Project Dependant) Frozen plasma should be transported on dry Ice. All transport can be on Dry Ice and stored at -70°C.	Drug resistance testing: Applied Biosystems TaqPath Seq HIV-1 Genotyping Kit	Plasma from EDTA / PPT / ACD blood DBS	3 Months or project dependant	Project/Survey requirements must be provided in writing by Requestor and discussed with HIVDR Laboratory prior to testing Can be used for diagnostic purposes in special circumstances.	HIV Sero-Molecular/ HIV Drug Resistance (HIVDR) Laboratory Senior Medical Scientist E Cutler 011 386 6439
HIV-1	Mycoalert Mycoplasma	Store at -20°C		Cell supernatants	1 month		Virology Research Laboratory Lab Manager L Nxumalo 011 386 6341

Pathogen Species Name (disease/syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
<i>Treponema pallidum</i>	Clotted blood or EDTA Serum Plasma	Transport on ice 2-8°C. Specimen must reach the laboratory within 3 days.		RPR	Project dependant	Only available for Surveillance purposes and research projects	STI 011 555 0461 011 555 0468
<i>Treponema pallidum</i>	Clotted blood or EDTA Serum Plasma	Transport on ice 2-8°C to reach the laboratory within 7 days or frozen if delays are anticipated.		TPAb	Project dependant	Only available for Surveillance purposes and research projects	STI 011 555 0461 011 555 0468
<i>Treponema pallidum</i>	Ulcer swab (Dacron)	Transport on ice 2-8°C to reach the laboratory within 7 days or frozen if delays are anticipated.	Syphilis/ <i>Treponema pallidum</i> PCR	NAAT (PCR)	10 days	Only available for Surveillance purposes and research projects. Special cases require prior consultation with STI Section staff & completion of specific request form	STI 011 555 0461 011 555 0468
<i>Treponema pallidum</i>	Ulcer swab (Dacron)	Transport on ice 2-8°C to reach the laboratory within 7 days or frozen if delays are anticipated.		Molecular Typing	Project dependant	Only available for Surveillance purposes and research projects	STI 011 555 0461 011 555 0468
<i>Treponema pallidum</i>	Ulcer swab (Dacron)	Transport on ice 2-8°C to reach the laboratory within 7 days or frozen if delays are anticipated.		Macrolide resistance testing by PCR/ Sequencing	Project dependant	Only available for Surveillance purposes and research projects	STI 011 555 0461 011 555 0468
<i>Lympho granuloma Venereum (LGV)</i>	Ulcer swab Genital swab (Dacron)	Transport on ice 2-8°C to reach the laboratory within 7 days or frozen if delays are anticipated.		NAAT (PCR)	10 days	Only available for Surveillance purposes and research projects. Special cases require prior consultation with STI Section staff & completion of specific request form	STI 011 555 0461 011 555 0468

Pathogen Species Name (disease/syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
<i>Chlamydia trachomatis</i>	Urine Urethral Swab Vaginal swab Endocervical swab Oropharyngeal swab Rectal swab Other samples as indicated by clinical presentation (Dacron or nylon flocced swabs)	Transport on ice 2-8°C to reach the laboratory within 7 days or frozen if delays are anticipated.		NAAT (PCR, TMA)	10 days	Only available for Surveillance purposes and research projects. Special cases require prior consultation with STI Section staff & completion of specific request form	STI 011 555 0461 011 555 0468
<i>Haemophilus ducreyi</i>	Ulcer swab (Dacron swabs)	Transport on ice 2-8°C to reach the laboratory within 7 days or frozen if delays are anticipated.		PCR	10 days	Only available for Surveillance purposes and research projects. Special cases require prior consultation with STI Section staff & completion of specific request form	STI 011 555 0461 011 555 0468
<i>Mycoplasma genitalium</i>	Urine Urethral swab Vaginal swab Endocervical swab (Dacron or nylon flocced swabs)	Transport on ice 2-8°C to reach the laboratory within 7 days or frozen if delays are anticipated.		NNAT (PCR)	10 days	Only available for Surveillance purposes and research projects. Special cases require prior consultation with STI Section staff & completion of specific request form	STI 011 555 0461 011 555 0468
<i>Neisseria gonorrhoeae</i>	Urethral swab Vaginal swab Endocervical swab Rectal swab Pharyngeal swab Cultured strains Other samples as indicated by clinical presentation (Dacron or nylon flocced swabs)	Use special transport media (Amies Stuarts). Transport at 4°C to reach lab within 48 hours.		Culture and Antimicrobial susceptibility testing	7 days	Only available for Surveillance purposes and research projects. Special cases require prior consultation with STI Section staff & completion of specific request form	STI 011 555 0461 011 555 0468

Pathogen Species Name (disease/ syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
<i>Neisseria gonorrhoeae</i>	Urine Urethral swab Vaginal swab Other samples as indicated by clinical presentation Endocervical swab Penile swab Rectal swab Pharyngeal swab (Dacron or nylon flocked swabs)	Transport on ice 2-8°C to reach the laboratory within 7 days or frozen if delays are anticipated.		NAAT (PCR, TMA)	10 days	Only available for Surveillance purposes and research project And special cases require prior consultation with STI Section staff & completion of specific request form	STI 011 555 0461 011 555 0468
<i>Neisseria gonorrhoeae</i>	Urine Urethral swab Vaginal swab Other samples as indicated by clinical presentation Endocervical swab Rectal swab Pharyngeal swab Cultured strains (Dacron or nylon flocked swabs)	Transport on ice 2-8°C to reach the laboratory within 7 days or frozen if delays are anticipated. Except for cultured strains which should be at ambient temperature.		Typing by PCR / Sequencing	Project dependent	Only available for Surveillance purposes and research projects S pecial cases require prior consultation with STI Section staff & completion of specific request form	STI 011 555 0461 011 555 0468
<i>Neisseria gonorrhoeae</i>	Urethral swab Vaginal swab Endocervical swab Rectal swab Pharyngeal swab Cultured strains (Dacron or nylon flocked swabs) Other samples as indicated by clinical presentation	Transport on ice 2-8°C to reach the laboratory within 7 days or frozen if delays are anticipated. Except for cultured strains which should be at ambient temperature.		Antimicrobial resistance testing by PCR	Project dependent	Only available for Surveillance purposes and research projects. S pecial cases require prior consultation with STI Section staff & completion of specific request form	STI 011 555 0461 011 555 0468

Pathogen Species Name (disease/ syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
SARS-CoV-2	(i) Pseudovirion assay (ii) Spike and RBD ELISA	Transport on dry ice Store at -70°C or cooler. Transport on dry ice or at 2-8°C. Depends on the cohort. Plasma/serum received for testing to be stored at 2-8°C if for immediate testing or -70°C or cooler for long term storage		Serum Serum/Plasma	2 months 2 months	All these tests are done for Research/Project purposes only.	Virology Research Laboratory Lab Manager L Nxumalo 011 386 6341
SARS-CoV-2	Neutralization assays a) Pseudovirion assay	Transported on dry ice		Serum /plasma / monoclonal antibodies / mucosal	2 months or project dependent	All tests are done for Research / Project purposes	Virology Research Laboratory Lab Manager L Nxumalo 011 386 6341
<i>Trichomonas vaginalis</i>	Urine Urethral swab Vaginal swab Endocervical swab (Dacron or nylon flocced swabs)	Transport on ice 2-8°C to reach the laboratory within 7 days or frozen if delays are anticipated.		NAAT (PCR)	10 days	Only available for Surveillance purposes and research projects Special cases require prior consultation with STI Section staff & completion of specific request form	STI 011 555 0461 011 555 0468

6.4 Centre for Emerging Zoonotic and Parasitic Diseases (CEZPD)

Pathogen Species Name (disease/syndrome, ICD-code)	Specimen collection (E.g. source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	TAT	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Centre/Laboratory and contact details
Arbovirus Reference Laboratory (ARL)							
<p>Arbovirus disease</p> <p>Chikungunya virus Dengue virus Japanese encephalitis virus Rift Valley fever virus Sindbis virus West Nile virus Ross river Oropouche virus Zika virus (for other arboviruses contact the Laboratory)</p> <p>ICD-10 code for unspecified arthropod-borne viral fever, A94</p>	<p>Clotted blood or serum, minimum of 1.0 ml</p> <p>Highly recommended to submit repeat specimens, preferably acute and convalescent specimens.</p> <p>Alternative/additional specimens for PCR: - CSF (For encephalitic cases only, requires at least 500µl)</p> <p>- Liver biopsies (for post mortem confirmation only, contact Laboratory)</p>	<p>Clearly labelled tubes in sealed leak-proof p containers.</p> <p>Cold transport on ice packs.</p> <p>Adhere to national and international regulations for transportation of hazardous biological goods as required.</p> <p>Address to Centre for Emerging Zoonotic and Parasitic Diseases, Arbovirus Reference Laboratory</p>	<p>Routine arbovirus screen, include serology for chikungunya virus, Sindbis virus, Rift Valley fever virus, West Nile virus,</p> <p>Dengue virus, Ross river virus (currently unavailable) and Zika virus serology on specific request</p> <p>Arbovirus specific IgM or IgG ELISA (Specify which arbovirus)</p> <p>Arbovirus PCR for acute cases only (Specify which arbovirus)</p>	<p>Haemagglutination inhibition assay (HAI) performed as initial screen; any positive results followed up with pathogen specific IgM ELISA to confirm recent infection</p> <p>IgM and IgG ELISA</p> <p>Real-time PCR</p>	<p>HAI: 5 working days</p> <p>HAI + IgM ELISA: 7 working days</p> <p>IgM/IgG ELISA: 4 working days</p> <p>PCR: 2 working days</p>	<p>Rash or arthralgia syndromes with fever which may be linked to travel history or insect bites.</p> <p>Some cases develop encephalitis.</p> <p>PCR only for specimens collected within 7 days of symptom onset or acutely ill patients.</p> <p>Highly recommended to submit repeat / paired specimens (preferably acute and convalescent specimens) to demonstrate seroconversion or four-fold rise in antibody titre.</p> <p>Case investigation form (available from NICD website) to accompany all submitted samples.</p> <p>Category III notifiable medical condition</p>	<p>CEZPD SVPL Dr J Weyer:011 386 6376/082 903 9131</p> <p>NICD Hotline</p>

Pathogen Species Name (disease/syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
Special Viral Pathogens Laboratory							
Herpes B virus infection (<i>Herpesvirus simiae</i> , also known as B virus)	Saliva or material from blisters (if present) Serum (SST tube or clotted tube), minimum of 1.0 ml Human or animal cases can be tested	Clearly labelled tubes in sealed leak-proof proof containers. Cold transport on ice packs. Adhere to national and international regulations for transportation of hazardous biological goods as required. Address to Centre for Emerging Zoonotic and Parasitic Diseases, Special Viral Pathogens Laboratory	Herpes B virus/B virus or <i>Herpes simiae</i>	Herpes B virus PCR	2 working days	Very rare condition with 80% case fatality rate. May include: Flu-like symptoms: Fever, chills, muscle aches, fatigue, and headache Skin lesions: Small blisters or pus-filled pimples at or near the site of exposure Neurological symptoms: Itching, tingling, numbness, dizziness, double vision, difficulty swallowing, and confusion Breathing problems: Shortness of breath, chest pain, and difficulty breathing Other symptoms: Nausea, vomiting, abdominal pain, hiccups, and inflamed lymph nodes	CEZPD SVPL Dr J Weyer: 011 386 6376/082 903 9131 NICD Hotline

<p>Mpox (caused by monkeypox virus)</p> <p>ICD-10 code is B04</p>	<p>Skin lesion material: Swabs of lesion exudate / aspirate of lesion fluid, lesion fluid, lesion of roof/s, lesion crust/s collected in Dacron or polyester flocked swabs with VTM or dry swab.</p> <p>Also see https://www.nicd.ac.za/key-reference-documents/</p>	<p>Clearly labelled tubes in sealed leak-proof containers.</p> <p>Cold transport on ice packs.</p> <p>Adhere to national and international regulations for transportation of hazardous biological goods as required.</p> <p>Address to Centre for Emerging Zoonotic and Parasitic Diseases, Arbovirus Reference Laboratory</p>	<p>Mpox PCR</p>	<p>mpPCR</p>	<p>2 working days</p>	<p>Signs and symptoms may include:</p> <p>Rash: A distinctive rash that can appear as flat sores, blisters, or pimples. The rash can start on the face and spread to other parts of the body, including the hands, feet, genitals, and chest.</p> <p>Fever: A fever that can occur along with other symptoms</p> <p>Swollen lymph nodes: Swollen lymph nodes in the neck or armpit that may feel large or tender</p> <p>Headache: A headache that can occur along with other symptoms</p> <p>Muscle aches: Muscle aches and back pain that can occur along with other symptoms</p> <p>Chills: Chills that can occur along with other symptoms</p> <p>Exhaustion: Low energy or exhaustion that can occur along with other symptoms</p> <p>Sore throat: A sore throat that can occur along with other symptoms</p> <p>Joint pain: Joint pain that can occur along with other symptoms</p> <p>Also see https://www.nicd.ac.za/diseases-a-z-index/mpox-2/</p>	<p>CEZPD SVPL Dr J Weyer:011 386 6376/082 903 9131</p> <p>NICD Hotline</p>
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Nipah virus disease (caused by Nipah virus)	<p><u>Blood / serum:</u> SST or clotted blood tubes, 1 tube (approx. 10 ml)</p> <p><u>Nasopharyngeal swab:</u> In viral transport medium</p> <p><u>Cerebrospinal fluid:</u> Submit at least 1 ml. Submit for patient presenting with encephalitis</p> <p>Also see https://www.nicd.ac.za/diseases-a-z-index/nicd-disease-index-nipah-virus/</p>	<p>Clearly labelled tubes in sealed leak-proof containers.</p> <p>Cold transport on ice packs.</p> <p>Adhere to national and international regulations for transportation of hazardous biological goods as required (i.e. Category A shipping requirements)</p> <p>Address to Centre for Emerging Zoonotic and Parasitic Diseases, Arbovirus Reference Laboratory</p>	Nipah virus	Nipah virus PCR	2 Working days	<p>An acute onset of fever ($\geq 38^{\circ}\text{C}$) with new onset of altered mental status or seizure and/or fever with headache and/or cough or shortness of breath; AND has an epidemiological link - who visited or resided in Kerala, India, or a community affected by a NiV disease outbreak in the six weeks prior to onset of illness and had direct contact or cared for suspected/confirmed NiV cases (humans/pigs) in the six weeks prior to onset of illness.</p> <p>Also see https://www.nicd.ac.za/diseases-a-z-index/nicd-disease-index-nipah-virus/</p> <p>Submit case investigation form (available from web link shared here)</p>	<p>CEZPD SVPL Dr J Weyer:011 386 6376/082 903 9131</p> <p>NICD Hotline</p>
Poxvirus	<p><u>Skin lesion material:</u> Swabs of lesion exudate / aspirate of lesion fluid, lesion fluid, lesion of roof/s, lesion crust/s collected in Dacron or polyester flocked swabs with VTM or dry swab.</p>	<p>Clearly labelled tubes in sealed leak-proof containers.</p> <p>Cold transport on ice packs.</p> <p>Adhere to national and international regulations for transportation of hazardous biological goods as required (i.e. Category A shipping requirements)</p>	Poxvirus (for example Orf virus, Tanapox virus)	Poxvirus PCR	2 working days	<p>Pox-like lesions, fever, lymphadenopathy, malaise, body aches</p> <p>Refer to: https://www.nicd.ac.za/diseases-a-z-index/tanapox/</p>	<p>CEZPD SVPL Dr J Weyer:011 386 6376/082 903 9131</p> <p>NICD Hotline</p>

Pathogen Species Name (disease/syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
Severe fever with thrombocytopenia syndrome (SFTS)	Clotted blood or serum, minimum of 0.5 ml	Specimen containers must be sealed leak-proof containers. Adhere to national and international transportation of biological goods. Address to Centre for Emerging Zoonotic and Parasitic Diseases, Special Viral Pathogens, cold transport on ice packs Contact Laboratory or NICD Hotline	SFTS	SFTS PCR	2 Working days	High fever, thrombocytopenia, leukocytopenia and gastrointestinal disorders. Travel history to endemic areas or other exposure events	CEZPD SVPL Dr J Weyer:011 386 6376/082 903 9131 NICD Hotline
Tick bite fever	Dry swab of the eschar EDTA blood can be submitted if the patient has not yet been initiated on antibiotics	Specimen containers must be in sealed container on ice packs. Adhere to national and international transportation of biological goods. Address to Centre for Emerging Zoonotic and Parasitic Diseases, Special Viral Pathogens Contact Laboratory or NICD Hotline	Tick bite fever / Rickettsia	Rickettsia PCR	2 working days	Illness 5-7 days after been bitten by an infected tick. Headache, fever, body pains. Skin rash may appear. Eschar present.	CEZPD SVPL Dr J Weyer:011 386 6376/082 903 9131 NICD Hotline

Pathogen Species Name (disease/syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
<p>Viral haemorrhagic fevers</p> <p>(Crimean-Congo haemorrhagic fever, Ebola, Marburg, Lassa, Hanta and yellow fever)</p> <p>ICD-10 code for unspecified viral haemorrhagic fever, A99</p>	Clotted blood or serum, minimum of 1.0 ml	<p>Tubes in sealed in leak-proof containers. Label clearly as biohazardous and suspected VHF. Adhere to national and international regulations for transportation of hazardous biological goods (Category A) as required</p> <p>Address to Centre for Emerging Zoonotic and Parasitic Diseases, Special pathogens, cold transport on ice packs</p> <p>Contact Laboratory and/or NICD Hotline</p>	VHF	<p>Serology (Fluorescent antibody test: IgG and IgM ELISA: IgG and IgM)</p> <p>PCR</p> <p>Virus Isolation</p>	<p>2 Working days</p> <p>2 Working days</p> <p>21 working days</p>	<p>Fever, Rash</p> <p>Headache, Arthralgia, Myalgia, Haemorrhagic manifestations, Gastrointestinal symptoms, Pathology indicators, Travel history or other exposure events</p> <p>Contact Laboratory and/or NICD Hotline</p> <p>Submission of repeat specimen critical to confirm or exclude VHF</p> <p>Full battery of tests (serology, PCR and isolation) recommended for most conclusive testing)</p>	<p>CEZPD SVPL Dr J Weyer:011 386 6376/082 903 9131</p> <p>Contact NICD Hotline</p>
Electron Microscopy Laboratory							
Virus screening (infections of unknown aetiology)	Cultured isolates, any fluid specimen (minimum 0.1 ml) in sterile container or dried between 2 microscope slides and sealed (lesion fluid, aspirate, serum, CSF, tears), scabs, crusts, biopsy/autopsy tissues (in saline and not larger than 10 ³ mm), clarified stool samples	<p>Specimen containers must be sealed in plastic bags. Transport at 2-8°C whenever possible.</p> <p>Adhere to national and international transportation of biological goods. Address to Centre for Emerging Zoonotic and Parasitic Diseases, Electron Microscopy Laboratory</p>	Viral screening	Transmission electron microscopy and negative staining	3 working days (NICD TEM)	Please contact laboratory for specimen-specific requirements. Notify the laboratory when specimens are dispatched	<p>Electron Microscope Laboratory</p> <p>011 386 6318</p>

Pathogen Species Name (disease/ syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
Pathogen ultrastructure	Cultured isolates / pathogen — containing tissues	Specimens should be immersed in EM fixative provided by the EM lab. Formalin-fixed and FFPE specimens also accepted reluctantly. Address as above.	TEM of sectioned material	Resin-embedding, ultramicrotomy and TEM	21 days / project dependent	Please contact laboratory prior to sampling, for buffered fixative and for specimen-specific requirements.	

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Special Bacterial Pathogens Reference Laboratory (SBPRL)							
<i>Bacillus anthracis</i> (Anthrax)	<p><u>Cutaneous</u> <u>Vesicular stage:</u> Soak 2x sterile dry swabs in vesicular fluid from a previously unopened vesicle.</p> <p><u>Eschar stage:</u> Rotate 2x sterile dry swabs for 2-3s beneath the edge of eschar without removing it.</p> <p><u>Biopsy of lesion:</u> Fresh Tissue in PBS/saline <i>Please note:</i> Do not send preserved tissue</p> <p><u>Inhalation</u> Pleural fluid or sputum (>1 ml) collected in sterile container</p> <p>Blood culture <u>plus</u> 1 tube clotted blood and 1 tube whole blood (EDTA tube)</p> <p><u>Gastrointestinal</u> Stool or rectal swab</p> <p>Blood culture <u>plus</u> 1 tube clotted blood and 1 tube whole blood (EDTA tube)</p>	<p>Transport at room temperature</p> <p>Transport at 2-8°C</p> <p>Transport blood culture at room temperature and blood tubes at 2- 8°C</p> <p>Transport at 2-8°C</p> <p>Transport blood culture at room temperature and blood tubes at 2-8°C</p>	Anthrax (ANTHR)	Microscopy, culture and special identification	5 days	<p>Safety precautions should be taken when handling/collecting samples</p> <p>Samples should be taken prior to antibiotic treatment and should reach laboratory as quickly as possible</p> <p><u>Important</u> Please notify laboratory prior to sending specimens</p>	<p>Special Bacterial Pathogens Reference Laboratory</p> <p>011 555 0331</p> <p>011 555 0306</p> <p>011 555 0584</p>

Pathogen Species Name (disease/ syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
	<p><i>Meningitis</i> CSF in sterile container</p> <p>Blood culture <u>plus</u> 1 tube clotted blood and 1 tube whole blood (EDTA tube)</p>	<p>Transport at 2-8°C</p> <p>Transport blood culture at room temperature and blood tubes at 2-8°C</p>					
<i>Clostridium botulinum</i> (Botulism)	<p>20 to 30 ml clotted blood or 10 to 15 ml serum 25 to 50 g of stool Gastric washing Vomit Suspected food</p>	<p>Transport at 2-8°C</p>	<p>Botulinum (CLOS)</p>	<p>Mouse toxicity and neutralization assays, Anaerobic culture and confirmation</p>	<p>4 weeks</p>	<p><u>Important</u> Please notify laboratory prior to sending specimens. Samples should be taken as soon as possible after onset of illness.</p>	<p>Special Bacterial Pathogens Reference Laboratory 011 555 0331 011 555 0306 011 555 0584</p>
<i>Leptospira spp.</i> (Leptospirosis)	<p>1 Tube of clotted blood or serum</p> <p><i>Please note:</i> Tests not done on urine, plasma, haemolysed, icteric or lypeamic blood.</p>	<p>Transport at 2-8°C Sample should reach laboratory within 3 days.</p>	<p>Leptospirosis (LEPTO)</p>	<p>Serology: IgM ELISA</p>	<p>4 days</p>		<p>Special Bacterial Pathogens Reference Laboratory 011 555 0331 011 555 0306 011 555 0584</p>

Pathogen Species Name (disease/syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
<i>Yersinia pestis</i> (Plague)	<u>Bubonic</u> Bubo aspirate in PBS in sterile container plus 2x swabs (absorb a few drops of sample on a sterile swab and place into Cary Blair transport medium)	Transport at 2-8°C or room temperature	Plague (PLAGE)	Microscopy (Gram, Wayson & DFA), culture and confirmation, PCR	5 Days	Safety precautions should be taken when handling/collecting samples Samples should be taken prior to antibiotic treatment and should reach laboratory as quickly as possible <u>Important</u> Please notify laboratory prior to sending specimens	Special Bacterial Pathogens Reference Laboratory 011 555 0331 011 555 0306 011 555 0584
	<u>Pneumonic</u> Sputum in sterile container plus 2 X swabs (rotate swab in sputum sample and place into Cary Blair transport medium)	Transport at 2-8°C or room temperature					
	<u>Septicemic</u> Blood culture bottle	Transport at 2-8°C or room temperature					
	<u>All types of plague</u> 1 tube clotted blood or serum <i>Please note:</i> Paired serum taken 2-3 weeks apart is required for confirmation	Transport at 2-8°C or room temperature	Plague serology (PLAGE)	Serology: ELISA	2 days		
<u>Surveillance</u> Clotted animal blood e.g. rodent, dog	Transport at 2-8°C or room temperature	Plague surveillance (RATS)	Serology: ELISA	4 Weeks			

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Pathogen Species Name (disease/syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
Parasitology							
<u>Parasite -Borrelia duttoni</u> or <u>B. recurrentis</u> (Relapsing fever)	Unclotted, EDTA blood or blood films. <i>Clotted blood is unsuitable.</i>	Transport at ambient temperature or on ice.	Relapsing fever borrelia microscopy	Staining and microscopy	1 working day	Note: this does not include testing for Lyme disease.	Parasitology Reference Laboratory (PRL) 011 555-0304 011 555-0311
<u>Parasite -Babesia species</u> (Babesiosis)	Unclotted, EDTA blood or blood films. <i>Clotted blood is unsuitable.</i>	Transport at ambient temperature or on ice.	Babesia microscopy	Staining and microscopy	1 working day	Note: A research PCR may be performed following discussion with the PRL pathologist. pathologist and submission of the PRL test request form	Parasitology Reference Laboratory (PRL) 011 555-0304 011 555-0311
<u>Parasite -Plasmodium species</u> (Malaria)	Unclotted, EDTA blood or blood films. <i>Clotted blood is unsuitable.</i>	Transport at ambient temperature or on ice. Blood should be transported to the laboratory as quickly as possible.	Malaria microscopy	Staining and microscopy	1 working day		Parasitology Reference Laboratory (PRL) 011 555-0304 011 555-0311
<u>Parasite -Plasmodium species</u> (Malaria) - <i>P. falciparum</i> - <i>P. malariae</i> - <i>P. ovale</i> - <i>P. vivax</i> - <i>P. knowlesi</i>	Unclotted, EDTA blood - minimum 200µl. Blood spots blood films & RDTs may be used in exceptional circumstances. <i>Clotted blood is unsuitable.</i>	Transport at ambient temperature or on ice.	Malaria PCR	Malaria PCR	2 working days	Only request PCR test when: ■ the malaria microscopy and RDT (rapid diagnostic test) results do not correlate ■ the malaria microscopy and/or RDT results are negative and malaria is still suspected ■ malaria species confirmation is needed ■ the patient has already been treated for malaria but routine tests are either Not available or negative	Parasitology Reference Laboratory (PRL) 011 555-0304 011 555-0311

Pathogen Species Name (disease/syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
Parasite - <i>Plasmodium falciparum</i> (Malaria)	Unclotted, EDTA blood. <i>Clotted blood is unsuitable.</i>	Transport at ambient temperature or on ice.	Antigen test for malaria	Antigen test for <i>Plasmodium falciparum</i> ; Combo antigen test for <i>Plasmodium</i> species (<i>P. falciparum</i> , <i>P. malariae</i> , <i>P. ovale</i> , <i>P. vivax</i>)	1 working day		Parasitology Reference(PRL) Laboratory 011 555-0304 011 555-0311
Parasite -Microfilaria species (<i>W. bancrofti</i> , <i>L. loa</i> , <i>M. perstans</i> etc)	Unclotted, EDTA blood (minimum 1ml) or blood films. Blood sampling should be performed at the correct times depending on the suspected filarial species*	Transport at ambient temperature or on ice.	Microfilaria microscopy	Staining and microscopy	1 working day	*For <i>W. bancrofti</i> collect sample after 8pm, for <i>L. loa</i> at ~12pm and others at any time. Note: A research PCR may be performed following discussion with the PRL pathologist and submission of the PRL test request form.	Parasitology Reference Laboratory (PRL) 011 555-0304 011 555-0311

Pathogen Species Name (disease/syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
Parasite - <i>Trypanosoma</i> species (Sleeping sickness or trypanosomiasis)	Unclotted, EDTA blood, CSF, lymph node aspirate (minimum 1ml) or blood films. <i>Clotted blood is unsuitable.</i>	Transport at ambient temperature or on ice. Ideally CSF specimens must reach laboratory within 24 hours of sampling.	Trypanosome microscopy	Staining and microscopy	1 working day	Note: A research PCR may be performed following discussion with the PRL pathologist and submission of the PRL test request form.	Parasitology Reference Laboratory (PRL) 011 555-0304 011 555-0311
Parasite - Human protozoa including: <i>Cryptosporidium</i> species, <i>Cystoisospora belli</i> , <i>Cyclospora cayetanensis</i> , <i>Giardia duodenalis</i> <i>Entamoeba coli</i> , <i>Blastocystis hominis</i>	Stool (no preservatives) (minimum 1ml) or duodenal aspirate/string test.	Transport at ambient temperature or on ice.	Stool parasites (specify suspected parasite, if applicable)	Microscopic identification of all human protozoa	1 working day	Note: A research PCR for <i>E. histolytica</i> , <i>G. duodenalis</i> and <i>Cryptosporidium</i> species may be performed following discussion with the PRL pathologist and submission of the PRL test request form	Parasitology Reference Laboratory (PRL) 011 555-0304 011 555-0311
Parasite – Microsporidia (unicellular intracellular parasites closely related to fungi) including <i>Enterocytozoon bieneusi</i> , <i>Encephalitozoon</i> species	Stool, (no preservatives), urine, duodenal aspirates, CSF (minimum 1ml) eye or other appropriate tissue samples.	Transport at ambient temperature or on ice. Tissue biopsies in saline.	Microsporidia PCR	Research PCR - May be performed following discussion with the PRL pathologist and submission of the PRL test request form, Appendix D NIC1307.	2 working days		Parasitology Reference Laboratory (PRL) 011 555-0304 011 555-0311
Parasite – <i>Toxoplasma gondii</i> (protozoan)	Whole blood, amniotic fluid, CSF (minimum 1ml) tissue (eg. Brain biopsy), vitreous fluid..	Transport at ambient temperature or on ice. Tissue biopsies in saline	Toxoplasma PCR	Research PCR - May be performed following discussion with the PRL pathologist and submission of the PRL test request form, Appendix D NIC1307.	2 working days		Parasitology Reference Laboratory (PRL) 011 555-0304 011 555-0311

Pathogen Species Name (disease/ syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
Parasite - <i>Entamoeba histolytica</i> (Amoebiasis)	Stool, (no preservatives), liver abscess fluid or cyst fluid. Minimum volume is 1ml.	Transport at ambient temperature or on ice. Don't add preservative. Ideally specimen must reach laboratory within 30 minutes of sampling.	Amoebiasis microscopy	Microscopy	1 working day	Note: a research PCR may be performed following discussion with the PRL pathologist and submission of the PRL test request form	Parasitology Reference Laboratory (PRL) 011 555-0304 011 555-0311
Parasite -Human nematodes including: <i>Ascaris lumbricoides</i> (common roundworm), hookworms (<i>Ancylostoma duodenale/ Necator americanus</i>), <i>Trichuris trichiura</i> (whipworm), <i>Strongyloides stercoralis</i>	Stool (no preservatives, minimum 1ml) or worm/s. or worm/s.	Transport at ambient temperature or on ice.	Stool parasites (specify suspected parasite, if applicable)	Macroscopic and/or microscopic identification.	1 working day	Note: a research PCR may be performed following discussion with the PRL pathologist.	Parasitology Reference Laboratory (PRL) 011 555-0304 011 555-0311
Parasite - <i>Enterobius vermicularis</i> (pinworm)	Early morning sticky tape swab is the optimal specimen. Alternatively early morning scrapings from under the finger nails.	Transport at ambient temperature or on ice.	<i>Enterobius vermicularis</i> / (pinworm)	Microscopy	1 working day	Eggs may be infective – handle with care.	Parasitology Reference Laboratory (PRL) 011 555-0304 011 555-0311

Pathogen Species Name (disease/ syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
Parasite - <i>Strongyloides stercoralis</i>	Sputum, urine or CSF. Minimum volume is 1ml. Larvae may be infective – handle with care.	Transport at ambient temperature or on ice.	<i>Strongyloides Stercoralis culture</i>	Microscopy and/or culture for larvae of <i>Strongyloides stercoralis</i> .	1 working day	For disseminated infections.	Parasitology Reference Laboratory (PRL) 011 555-0304 011 555-0311
Parasite -Human trematodes including: <i>Schistosoma mansoni/ haematobium</i> (Bilharzia, schistosomiasis)	Stool.	Transport at ambient temperature or on ice.	Stool parasites microscopy (specify suspected parasite, if applicable)	Microscopic identification of all human trematodes.	1 working day	Note: A research PCR for <i>S. haematobium/ mansoni</i> may be performed following discussion with the PRL pathologist.	Parasitology Reference Laboratory (PRL) 011 555-0304 011 555-0311
Parasite - <i>Schistosoma haematobium</i> (Schistosomiasis, bilharzia)	Urine, minimum volume is 5ml.	Transport at ambient temperature or on ice.	<i>Schistosoma Haematobium microscopy</i>	Microscopy	1 working day	Note: A research PCR for <i>S. haematobium/ mansoni</i> may be performed following discussion with the PRL pathologist.	Parasitology Reference Laboratory (PRL) 011 555-0304 011 555-0311
Parasite -Human cestodes (tapeworms) including: <i>Taenia saginata, T. solium, H. nana, H. diminuta</i> and <i>D. latum</i>	Stool.	Transport at ambient temperature or on ice.	Stool parasites microscopy (specify suspected parasite, if applicable)	Microscopic identification of all human cestodes/ tapeworms.	1 working day	Note: A research PCR for cestodes may be performed following discussion with the PRL pathologist.	Parasitology Reference Laboratory (PRL) 011 555-0304 011 555-0311
Parasite – Helminth/worm (adult) identification	Worm or proglottid (tapeworm segment). Submit proglottids in saline.	Transport at ambient temperature or on ice.	Helminth/worm identification	Macroscopic and/or microscopic identification.	1-2 working days	Proglottids may be infective – handle with care.	Parasitology Reference Laboratory (PRL) 011 555-0304 011 555-0311
Parasite - <i>Echinococcus</i> species (Echinococcosis, hydatid disease)	Cyst tissue, cyst fluid or sputum, minimum volume is 1ml.	Transport at ambient temperature or on ice.	Echinococcus	Microscopic examination for hydatid hooklets and scolices of <i>Echinococcus</i> species.	1 working day	May be infective – handle with care. Note: A research PCR may be performed following discussion with the PRL pathologist.	Parasitology Reference Laboratory (PRL) 011 555-0304 011 555-0311

Pathogen Species Name (disease/ syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
<u>Parasite -</u> <i>Acanthamoeba</i> spp. (<i>Acanthamoeba</i> Keratitis granulomatous amoebic encephalitis, nasopharyngeal, cutaneous or disseminated infection)	Corneal scrapings or biopsy, or contact lenses, cases and solutions. Send tissue in saline. Brain, skin, nasal or sinus biopsies. Send tissue in saline.	Transport at ambient temperature or on ice.	Acanthamoeba culture	Culture, Staining	2 weeks (Prov. result sent day 2) 2 working days	Note: A research PCR may be performed following discussion with the PRL pathologist.	Parasitology Reference Laboratory (PRL) 011 555-0304 011 555-0311
<u>Parasite -</u> <i>Leishmania</i> species (Leishmaniasis)	Bone marrow, liver biopsy, skin biopsy/impression smears. Submit skin biopsy in saline.	Transport at ambient temperature or on ice.	Leishmania microscopy	Staining and Microscopy	1 working day	Note: A research PCR may be performed following discussion with the PRL pathologist.	Parasitology Reference Laboratory (PRL) 011 555-0304 011 555-0311
<u>Parasite -</u> <i>Pneumocystis jirovecii</i> (<i>Pneumocystis</i> pneumonia, PCP)	Respiratory specimens including: induced sputum, tracheal aspirates, bronchial washings, bronchoalveolar lavage (BAL) or gastric wash. Random sputum is not an optimal specimen. Minimum volume is 1ml.	Transport at ambient temperature or on ice.	<i>Pneumocystis jirovecii</i> PCR	PCR	2 working days		Parasitology Reference Laboratory (PRL) 011 555-0304 011 555-0311

Pathogen Species Name (disease/ syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
Vector Control Reference Laboratory							
Arthropods/ Insects	<p>Adult mosquitos must be undamaged and preserved on silica. A piece of paper must separate the specimen from the silica crystals. There must be only 1 mosquito per silica tube.</p> <p>Mosquito larvae should preferentially be reared to adults and preserved on silica tubes as described above.</p> <p>Identifying larvae by PCR is not recommended; However, if rearing of the larvae is not possible, larvae must be preserved in 70% ethanol with 1 larva per tube.</p>	Transport at ambient temperature. Estimated time of arrival: 1 week	Morphological identification, PCR identification and/or ELISA where indicated	Morphological identification; PCR identification: <i>An. gambiae</i> and <i>An. funestus</i> identification, MS PCR and <i>kdr</i> PCR and/or ELISA	<p>30 working days For PCR identification from the time the samples (with shipping list) were received at VCRL.</p> <p>10 extra working days (40 in total) for morphological identification as well as PCR identification</p> <p>Please note: TAT does not apply for project specimens</p> <p>Samples for ELISA testing are done (depending on availability of reagents) in a batch every 6 months unless ELISA testing of samples is urgent.</p>	<p>Please send undamaged samples and all information relating to each sample must be in document form.</p> <p>Samples must be clearly labelled on the individual tube caps. The labels must match the information sheet.</p> <p>Sample numbers should be listed in consecutive order on the information sheet. Two samples must not have the same number.</p> <p>GPS coordinates for all locations should be provided.</p>	Vector Control Reference Laboratory 011 386 6480

Pathogen Species Name (disease/syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
ANTIMALARIAL RESISTANCE MONITORING AND MALARIA OPERATIONAL RESEARCH (ARMMOR)							
Parasite - <i>Plasmodium falciparum</i> (Malaria)	Unclotted, EDTA blood, Dried blood spots, blood films & used malaria RDTs	EDTA Blood should be transported on ice to the laboratory as quickly as possible. Dried blood spots, blood films and used malaria RDTs can be transported at ambient temperature. They should be individually packaged with desiccant and ideally should reach the laboratory within 5 working days.	Antimalarial drug or diagnostic resistance marking	Antimalarial drug or diagnostic resistance PCR	4 weeks for antimalarial drug resistance analysis 5 working days for the antimalarial diagnostic resistance analysis	Only request PCR for antimalarial resistance marking if the patient has failed treatment. Ideally samples from initially infection and relapsed infection should be sent to the laboratory for testing Only request PCR for antimalarial diagnostic resistance testing if a patient with high parasitemia is malaria positive by microscopy but negative by malaria RDT	ARMMOR 011 386 6374

6.5 Centre for Enteric Diseases

Pathogen Species Name (disease/ syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
<i>Campylobacter</i> spp	Laboratory-confirmed isolates from all body site	Inoculated Dorset slopes / Transwab incubated at 42° C overnight at source laboratory, prior to submission to CED- Bacteriology Dorset slope / Transwab to be transported at ambient temperatures to the NICD	Enteric surveillance and reference function	Genotypic: Real time PCR for detection of <i>Campylobacter jejuni</i> and <i>Campylobacter coli</i>	Project dependent and GERMS-SA Quarterly stats timelines	Submit a copy of the patient's laboratory report OR a case report form obtainable from CED-Bacteriology Provide email address or telephone number for urgent requests Surveillance isolates are tested in batches	CED Bacteriology 011 386 6235 011 555 0348 011 555 0334 011 555 0426

Pathogen Species Name (disease/ syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
Diarrhoeagenic <i>Escherichia coli</i>	Laboratory-confirmed isolates from stool or rectal swab only. Laboratory confirmed isolate from all body sites for suspect EHEC/ <i>E. coli</i> O157. Laboratory-confirmed isolates from environmental or food samples	Inoculated Dorset slopes incubated at 37°C overnight at source laboratory, prior to submission to CED- Bacteriology. Dorset slope to be transported at room temperatures to the NICD.	Diarrhoeagenic <i>Escherichia coli</i> Characterization of suspected EHEC/ <i>E. coli</i> O157.	Phenotypic: Serotyping O-antigen	7 working days	Submit a copy of the patient's laboratory report OR a case report form obtainable from CED-Bacteriology Provide email address or telephone number for urgent requests	CED Bacteriology 011 386 6235 011 555 0348 011 555 0334 011 555 0360/0426
				Genotypic: Virulence gene detection by multiplex-PCR.	5 working days		
			Enteric surveillance and reference function	Phenotypic and genotypic characterization	Project dependent and GERMS-SA Quarterly stats timelines	Surveillance isolates are tested in batches Surveillance isolates are tested in batches	

Pathogen Species Name (disease/ syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
Vibrio species (including cholerae and non-cholerae species)	Laboratory-confirmed cultured isolate from all body sites. Laboratory-confirmed isolates from environmental or food samples	Inoculated Dorset slopes incubated at 37°C overnight at source laboratory, prior to submission to CED- Bacteriology. Dorset slope to be transported at ambient temperatures to the NICD	Vibrio species characterization and antimicrobial susceptibility testing	Phenotypic: <i>Vibrio cholerae</i> Serotyping	3 working days	Submit a copy of the patient's laboratory report OR a case report form obtainable from CED-Bacteriology Provide email address or telephone number	CED Bacteriology 011 386 6235 011 555 0348 011 555 0334 011 555 0360/0426
				Antimicrobial susceptibility testing	4 working days		
				Genotypic: Cholera enterotoxin detection by real-time PCR	3 working days		
			Enteric surveillance and reference function	Phenotypic characterization and whole- genome sequence (WGS) analysis	Project dependent and GERMS-SA Quarterly stats timelines		

Pathogen Species Name (disease/ syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
Salmonella Typhi and non-typhoidal Salmonella species	Laboratory-confirmed isolates from all body site	Inoculated Dorset slopes incubated at 37°C overnight at source laboratory, prior to submission to CED- Bacteriology	Salmonella species characterization	Phenotypic Salmonella serotyping	12 Working days	Submit a copy of the patient's laboratory report OR a case report form obtainable from CED-Bacteriology	CED Bacteriology 011 386 6235 011 555 0348 011 555 0334 011 555 0426
	Laboratory-confirmed isolates from environmental or food samples	Dorset slope to be transported at ambient temperatures to the NICD		Antimicrobial susceptibility testing	4 Working days	Provide email address or telephone number for urgent requests	
				Enteric surveillance and reference function	Phenotypic characterization and whole- genome sequence (WGS) analysis	Project dependent and GERMS-SA Quarterly stats timelines	
Shigella species	Laboratory-confirmed isolates from all body site	Inoculated Dorset slopes incubated at 37°C overnight at source laboratory, prior to submission to CED- Bacteriology	Shigella species characterization	Phenotypic: Shigella serotyping	5 working days	Submit a copy of the patient's laboratory report OR a case report form obtainable from CED-Bacteriology	CED Bacteriology 011 386 6235 011 555 0348 011 555 0334 011 555 0426
	Laboratory-confirmed isolates from environmental or food samples	Dorset slope to be transported at ambient temperatures to the NICD		Antimicrobial susceptibility testing	4 working days	Provide email address or telephone number for urgent requests	
				Enteric surveillance and reference function	Phenotypic characterization and whole- genome sequence (WGS) analysis	Project dependent and GERMS-SA Quarterly stats timelines	

Pathogen Species Name (disease/ syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
Listeria monocytogenes	Laboratory-confirmed isolates from all body site Laboratory-confirmed isolates from environmental or food samples	Inoculated Dorset slopes incubated at 37°C overnight at source laboratory, prior to submission to CED- Bacteriology Dorset slope to be transported at ambient temperatures to the NICD	Enteric surveillance and reference function	Genotypic: Whole-genome sequence (WGS) analysis	Project dependent and GERMS-SA Quarterly stats timelines	Submit a copy of the patient's laboratory report OR a case report form obtainable from CED-Bacteriology Provide email address or telephone number for urgent requests Surveillance isolates are tested in batches	CED Bacteriology 011 386 6235 011 555 0348 011 555 0334 011 555 0426
	CSF or DNA from tissue samples (e.g placenta)	Maintenance of cold chain from collection to receipt at NICD. Store and transport at 4°C	<i>Listeria monocytogenes</i> detection	Genotypic: Real-time PCR	3 working days	Submit a copy of the patient's laboratory report OR a case report form obtainable from CED-Bacteriology Provide email address or telephone number	CED Bacteriology 011 386 6235 011 555 0348 011 555 0334 011 555 0426
Adenovirus Gastroenteritis: Diarrhoea, vomiting, fever	Specimen: Stool Unsuitable Specimen: Rectal swab in VTM	Maintenance of cold chain from collection to receipt at NICD. Store and transport at 4°C.	Enteric Adenovirus detection	Real-time PCR (Multiplex/ Singleplex) (Enteric adenovirus)	5 days	Specimen containers closed tightly and sealed in plastic bag accompanied with date of specimen collection and date of birth	CED Virology 011 555 0370

Pathogen Species Name (disease/ syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
Astrovirus Gastroenteritis: Diarrhoea, vomiting, fever	Specimen: Stool Unsuitable Specimen: Rectal swab in VTM	Maintenance of cold chain from collection to receipt at NICD. Store and transport at 4°C.	Astrovirus detection	Real-time PCR (Multiplex/ Singleplex)	5 days	Specimen containers closed tightly and sealed in plastic bag accompanied with date of specimen collection and date of birth	CED Virology 011 555 0370
Sapovirus Gastroenteritis: Diarrhoea, vomiting, fever	Specimen: Stool Unsuitable Specimen: Rectal swab in VTM	Maintenance of cold chain from collection to receipt at NICD. Store and transport at 4°C.	Sapovirus detection	Real-time PCR (Multiplex/ Singleplex)	5 days	Specimen containers closed tightly and sealed in plastic bag accompanied with date of specimen collection and date of birth	CED Virology 011 555 0370
Norovirus Gastroenteritis: Diarrhoea, vomiting, fever	Specimen: Stool Unsuitable Specimen: Rectal swab in VTM	Maintenance of cold chain from collection to receipt at NICD. Store and transport at 4°C.	Norovirus detection	Real-time PCR (Multiplex/ Singleplex)	5 days	Specimen containers closed tightly and sealed in plastic bag accompanied with date of specimen collection and date of birth	CED Virology 011 555 0370
Rotavirus Gastroenteritis: Diarrhoea, vomiting, fever	Specimen: Stool Unsuitable Specimen: Rectal swab in VTM	Maintenance of cold chain from collection to receipt at NICD. Store and transport at 4°C.	Rotavirus detection	ELISA Real-time PCR (Multiplex/ Singleplex)	5 days	Specimen containers closed tightly and sealed in plastic bag accompanied with date of specimen collection and date of birth as well as vaccination history (where possible)	CED Virology 011 555 0370
			Rotavirus genotyping	RT-PCR genotyping			

6.6 Centre for Healthcare-Associated Infections, Antimicrobial Resistance and Mycoses

The Centre for Healthcare-Associated Infections, Antimicrobial Resistance and Mycoses (CHARM) aims to prevent and control opportunistic, healthcare-associated infections, to combat AMR (including antifungal and antibacterial resistance) and to provide expertise in mycology in South Africa

Pathogen Species Name (disease/syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)			Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
Mycology Refence Laboratory							
Fungal pathogen from clinical sources which cannot be identified by academic/ referral laboratories	Unidentified fungal pathogen from clinical source should be inoculated onto an agar slope/plate (screw-top) bottle such as Dorset transport medium for yeasts isolates or mould isolates onto potato dextrose medium or	Room temperature; inform Mycology Reference Laboratory if suspected dimorphic fungus which needs to be processed in the CHARM Thermally dimorphic Lab	Identification of fungal pathogen; antifungal susceptibility testing	Phenotypic and genotypic identification (where required) of unidentified fungal pathogens from clinical sources; antifungal susceptibility testing	15 working days (unless very slow-growing organism or unusual [difficult to identify])	Complete case report form (can be obtained from the Mycology Reference Laboratory)	CHARM Mycology Reference Laboratory 011 555 0323 011 555 0325 011 555 0353 011 386 6430 011 386 6431
Moulds and dimorphic fungi from normally-sterile sites (surveillance)	Inoculated onto an agar slope/plate (screw-top) bottle such as sabouraud or potato dextrose medium or parafilm sealed cultrue /agar plates	Room temperature; Subcultured mould isolates can be kept for 7-14 days in the incubator, when pure culture is observed the agar slants/plates can be stored in the fridge to avoid contamination until ready for referral to CHARM inform Mycology Reference Laboratory if suspected	Identification of fungal pathogen; antifungal susceptibility testing; genotyping	Phenotypic and genotypic identification (where required) of unidentified fungal pathogens from clinical sources; antifungal susceptibility testing	15 working days (unless very slow-growing organism or unusual [difficult to identify])	Laboratory report	CHARM Mycology Reference Laboratory 011 555 0323 011 555 0325 011 555 0353 011 386 6430 011 386 6431

Cryptococcosis (surveillance)	Cryptococcal isolate should be inoculated into an agar slope/plate (screw-top) bottle such as Dorset transport medium	Room temperature	Cryptococcal surveillance	Identification by phenotypic and genotypic methods; antifungal susceptibility testing	N/A	Complete GERMS case report or attach final lab report; Submission requested from GERMS-SA enhanced surveillance sites; private labs and NHLS labs in KZN	CHARM Mycology Reference Laboratory 011 555 0325 011 555 0381 011 555 0323
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Pathogen Species Name (disease/syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
Cryptococcal meningitis or antigenaemia or other disseminated syndrome	Whole blood ,plasma, serum and CSF	Transport at ambient temperature or on ice	Detection of cryptococcal antigen (CrAg)	CrAg iateral flow assay (LFA) CrAg enzyme immunoassay (EIA)	72hrs- 5 working days	Laboratory report and worksheet	CHARM Mycology Reference Laboratory 011 555 0381 011 555 0323 011 555 0325
Candidaemia (surveillance)	Candida isolate should be inoculated onto an agar slope/plate (screw-top) bottle such as Dorset transport medium	Room temperature Viable culture on Dorset slope can be kept at room temperature for a month until ready to send to CHARM-MRL must be viable	Candida surveillance	Identification by phenotypic and genotypic methods; antifungal susceptibility testing	N/A	Complete GERMS case report or attach final lab report; submission requested from participating GERMS-SA labs	CHARM Mycology Reference Laboratory 011 555 0325 011 555 0381 011 555 0323
Histoplasmosis	Urine	Transport in cooler box with ice packs	Detection of Histoplasma galactomannan antigen	Histoplasma enzyme immunoassay (EIA)	7 working days	Clinical history and case investigation form	CHARM Mycology Reference Laboratory 011 555 0325 011 555 0381 011 555 0323 011 555 0491

Pathogen Species Name (disease/syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
Histoplasmosis and emeryngomycosis	Whole blood(EDTA tube), bone marrow, urine (container), clinical swabs, CSF, fresh tissue samples in saline or formalin fixed paraffin embedded tissue and bronchoalveolar lavage (BAL)	Transport at ambient temperature	Detection of <i>Histoplasma/Emeryngomycetes</i>	<i>Histoplasma/Emeryngomycetes</i> RT-qPCR	5 working days from receipt of urine/whole blood/bone marrow/CSF/BAL and clinical swab 10 working days from receipt of sectioned FFPE and fresh tissue samples	Clinical history and case investigation form	CHARM Mycology Reference Laboratory 011 555 0325 011 555 0323 011 555 0491 011 555 0353 011 386 6430 011 386 6431
Any fungal pathogen (clinical cases where a mycosis is suspected and/or fungal elements observed but culture is negative)	Tissue (FFPE or fresh)	Transport in cooler box with ice packs	Detection of fungal DNA for sequence-based identification	Pan-fungal PCR with or without prolonged fungal culture (fungal culture only on fresh tissue)	10 working days for PCR/sequencing; 4 weeks for culture	Clinical history and case investigation form	CHARM Mycology Reference Laboratory 011 555 0325 011 555 0323 011 555 0491 011 555 0353
Identification of fungal pathogen/s from an outbreak	Any relevant clinical specimen including colonisation swabs	Transport in cooler box with ice packs	Detection of fungal DNA for sequence-based identification or real-time PCR assay or fungal culture	Pan-fungal PCR, whole genome sequencing, real-time PCR for <i>Candida auris</i> , fungal culture and MALDI-TOF	48 hours to 1 week for molecular tests depending on urgency; fungal culture TAT depends on pathogen and rate of growth	Clinical history and case investigation form	CHARM Mycology Reference Laboratory 011 555 0325 011 555 0323 011 555 0491 011 555 0353

Pathogen Species Name (disease/syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
CHARM Antimicrobial Resistance Laboratory and Culture Collection (AMRL-CC)							
<i>Staphylococcus aureus</i>	Blood culture isolates, pus aspirate, sputum and other significant isolates sub-cultured on Dorset slopes	Transport at ambient temperature	AMR and virulence factor detection/confirmation	ID, MIC and molecular characterization of resistance mechanisms <i>mecA</i> and <i>mecC</i> ; cfr-linezolid resistant gene, Virulence factor <i>-pvf</i> ; vancomycin AST	14 working days from receipt of culture	Referral isolate case Report forms FML1234 and lab report Refer to NICD using NIC1121	CHARM AMRL-CC 011 555 0342/4
Multi-drug resistant organisms (MDROs) Enterobacteriales and other organisms	Cultures on Dorset slopes or other suitable media to sustain viability during transport	Transport at ambient temperature	AMR –CPE; colistin, etc	ID, MIC and molecular characterization of resistance mechanisms	14 working days from receipt of culture	Referral isolate case Report forms FML1234 and lab report Refer to NICD using NIC1121	CHARM AMRL-CC 011 555 0342/4
<i>Enterococcus faecium</i> and <i>faecalis</i>	Cultures on Dorset slopes or other suitable media to sustain viability during transport	Transport at ambient temperature	AMR detection/confirmation	<i>Van A, B and C</i> genes	14 working days from receipt of culture	Referral isolate case Report forms FML1234 Refer to NICD using NIC1121	CHARM AMRL-CC 011555 0342/4
MALDI-TOF identification	Cultures on Dorset slopes or other suitable media to sustain viability during transport	Transport at ambient temperature	Identification	Identification on MALDI-TOF	7 working days (organism dependent)	Referral isolate case Report forms FML1234 and/or lab report Refer to NICD using NIC1121 Test requests written on agar plates will not be accepted	CHARM AMRL-CC 011555 0342/4

Pathogen Species Name (disease/syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
Pan-bacterial PCR (16S rRNA sequencing or Sanger sequencing)	Cultures on Dorset slopes or other suitable media to sustain viability during transport or tissue samples in saline/formalin fixed paraffin embedded tissue	Transport at ambient temperature	Bacterial identification	PCR and Sequencing for bacterial identification	14 working days from receipt of sample	Referral isolate case Report forms FML1234 and lab report Refer to NICD using NIC1121	CHARM AMRL-CC 011 555 0427

6.7 Centre for Respiratory Diseases and Meningitis

Pathogen Species Name (disease/syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigation forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
Respiratory illness: <ul style="list-style-type: none"> Adenovirus Influenza A virus (H1N1pdm09 and H3N2) Influenza B virus Parainfluenza virus types 1,2,3,4 [PIV] Respiratory Syncytial Virus [RSV] Rhinovirus / enterovirus Human metapneumovirus [hMPV] Human coronaviruses (229E, OC43, NL63, HKU1) SARS-CoV-2 <i>Mycoplasma pneumoniae</i> <i>Chlamydia pneumoniae</i> <i>Bordetella pertussis</i> <i>Bordetella parapertussis</i> 	Any respiratory sample (e.g. nasopharyngeal or tracheal aspirates, nasal, nasopharyngeal and/or oropharyngeal swabs, sputum, biopsies, autopsies etc.) Swabs should be placed in universal / viral transport medium (UTM/VTM) Nasopharyngeal- and oropharyngeal swabs should be combined in same UTM/VTM *Flocked swabs recommended, alternatively dacron or rayon swabs.	Transport in cooler box with ice packs. Sample should reach laboratory within 72hrs	Respiratory panel Please note that this will only be done as part of comprehensive diagnosis to investigate cause of severe respiratory illness or outbreaks of unknown cause	Real-time PCR Note: routine diagnostic testing available at NHLS or private pathology laboratories	24 hours from receipt of specimen	Specimens should be submitted with CRDM specimen submission form available on NICD website	CRDM Results; 011-386 6404 Queries; 011 555 6390 011 386 6373 Prof Anne von Gottberg 011 555 0316
Pneumonia: <ul style="list-style-type: none"> Adenovirus Coronavirus Human metapneumovirus [hMPV] Rhinovirus/enterovirus Influenza A virus Influenza B virus Parainfluenza virus [PIV] Respiratory syncytial virus [RSV] Acinetobacter calcoaceticus-baumannii complex 	Any lower respiratory tract sample eg. sputum, bronchoalveolar lavage)	Transport in cooler box On ice packs. Sample should reach laboratory within 72hrs	Pneumonia panel Please note that this will only be done as part of comprehensive diagnosis to investigate cause of severe respiratory illness or outbreaks of	Real-time PCR Note: routine diagnostic testing available at NHLS or private pathology laboratories	24 hours from receipt of specimen	Specimens should be submitted with CRDM specimen submission form available on NICD website	CRDM Results; 011-386 6404 Queries; 011 555 6390 011 386 6373 Prof Anne von Gottberg 011 555 0316

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Pathogen Species Name (disease/syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
<ul style="list-style-type: none"> • Enterobacter cloacae complex • <i>Escherichia coli</i> • <i>Haemophilus influenzae</i> • <i>Klebsiella aerogenes</i> • <i>Klebsiella oxytoca</i> • <i>Klebsiella pneumoniae</i> • <i>Moraxella catarrhalis</i> • <i>Proteus</i> spp. • <i>Pseudomonas aeruginosa</i> • <i>Serratia marcescens</i> • <i>Staphylococcus aureus</i> • <i>Streptococcus agalactiae</i> [GBS] • <i>Streptococcus pneumoniae</i> • <i>Streptococcus pyogenes</i> [GAS] • <i>Chlamydia pneumoniae</i> • <i>Legionella pneumophila</i> • <i>Mycoplasma pneumoniae</i> 			unknown cause				
Meningitis/Encephalitis (viral/bacterial) <ul style="list-style-type: none"> • <i>Escherichia coli</i> K1 • <i>Haemophilus influenzae</i> • <i>Listeria monocytogenes</i> • <i>Neisseria meningitidis</i> • <i>Streptococcus agalactiae</i> • <i>Streptococcus pneumoniae</i> • Cytomegalovirus (CMV) • Enterovirus (EV) • Herpes simplex virus 1 (HSV-1) • Herpes simplex virus 2 (HSV-2) • Human herpesvirus 6 (HHV-6) • Human parechovirus (HPeV) • Varicella zoster virus (VZV) • <i>Cryptococcus neoformans/gattii</i> 	CSF (Cerebrospinal fluid)	Transport in cooler box with ice packs. Sample should reach laboratory as soon as possible.	Meningitis panel	Real-time PCR	24 hours from receipt of specimen	Specimens should be submitted with CRDM specimen submission form available on NICD website	011 555 0315/7 (lab) 011 555 0387 (Dr Mignon du Plessis) Laboratory Manager (Linda de Gouveia) 011 555 0327 Clinical queries – Prof Anne von Gottberg (011 555 0316)

Pathogen Species Name (disease/ syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn- around time	Special Instructions (Case investigation s forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
SARS-CoV-2 COVID-19 (Coronavirus disease 2019)	Any respiratory sample (e.g. Nasopharyngeal or tracheal aspirates, nasal, nasal mid-turbinate, nasopharyngeal and/or oropharyngeal swabs placed in UTM/VTM, sputum BAL, biopsies) Other samples – discuss with Dr on call Swabs should be placed in universal / viral transport medium (UTM/VTM) Nasopharyngeal- and oropharyngeal swabs should be combined in same UTM/VTM Flocked swabs recommended. Alternatively, dacron or rayon swab	Transport in cooler box with ice packs. Sample should reach laboratory within 72hrs	SARS-CoV-2 COVID-19	Real-time PCR	2 working days	Specimens should be submitted with CRDM specimen submission form available on NICD website COVID-19 is classified as a category 1 notifiable medical condition (NMC).	CRDM: 011 386 6373/0356/6390 Queries: 011 555 6390/0356/0387/0352 Dr Nicole Wolter 011 555 0352 Prof Anne von Gottberg 011 555 0316
			SARS-CoV-2 COVID-19 Sequencing	Sequencing	3 weeks		
			COVID-19 ELISA Antibodies (IgG)	ELISA Antibodies (IgG)	3-5 Working days		
Avian Influenza (H5, H7, H9)	Any respiratory sample (e.g. Nasopharyngeal or tracheal aspirates, nasal, nasopharyngeal and/or oropharyngeal swabs, sputum, biopsies, autopsies etc.)	Transport in cooler box with ice packs. Sample should reach laboratory as soon as possible and within 72hrs Transport as infectious	Avian influenza Contact NICD hotline on 082 883 9920 for all suspected avian influenza requests before	Real-time PCR	24 hours	Clinical features consistent with avian influenza infection PLUS meets epidemiological criteria as outlined in AI Case	NICD Hotline 082 883 9920 CRDM 011 555 6390 011 555 0352 Dr Nicole Wolter

Pathogen Species Name (disease/ syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn- around time	Special Instructions (Case investigation s forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
	Swabs should be placed in universal / viral transport medium (UTM/VTM). Nasopharyngeal- and oropharyngeal swabs can be combined in same UTM/VTM Flocked swabs recommended. Alternatively, dacron or rayon swabs	substance (packaging instruction 602 of IATA Category A).	submitting samples			Investigation Document (Contact Epidemiologist) Specimens should be submitted with CRDM specimen submission form available on NICD website	011 555 0316 Prof Anne von Gottberg
MERS-Coronavirus (MERS-CoV)	Induced sputum, lung aspirates, combined nasopharyngeal and oropharyngeal swabs or nasopharyngeal aspirates in UTM/VTM, BAL and biopsies of respiratory tract tissues. Other samples - discuss with Dr on call. Swabs should be placed in universal / viral transport medium (UTM/VTM). Nasopharyngeal and oropharyngeal swabs should be combined in same UTM/VTM Flocked swabs recommended. Alternatively, dacron or rayon swabs	Transport in cooler box with ice packs. Sample should reach laboratory as soon as possible and within 72hrs Transport as infectious substance (packaging instruction 602 of IATA Category A).	MERS-CoV Contact NICD hotline on 082 883 9920 for all suspected MERS coronavirus test requests Please note that this test will only be done if case definition was met and discussed with NICD Dr on call (see NICD hotline number)	Real-time PCR	24 hours	Clinical features consistent with MERS-CoV infection PLUS meets epidemiological criteria as outlined in MERS-CoV Case Investigation Document (Contact Epidemiologist) Specimens should be submitted with CRDM specimen submission form available on NICD website	NICD Hotline 082 883 9920 CRDM 011 555 0316 (Prof Anne von Gottberg)
Severe respiratory illness of unknown cause	Any respiratory sample (e.g. Nasopharyngeal or	Transport in cooler box with ice packs.	Respiratory panel	Real-Time PCR	24 hours	Specimens should be	NICD Hotline 082 883 9920

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Pathogen Species Name (disease/syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn-around time	Special Instructions (Case investigations forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
	<p>tracheal aspirates, nasal, nasopharyngeal and/or oropharyngeal swabs, sputum, biopsies, autopsies etc.)</p> <p>Swabs should be placed in universal / viral transport medium (UTM/VTM).</p> <p>Nasopharyngeal- and oropharyngeal swabs should be combined in same UTM/VTM</p> <p>Flocked swabs recommended. Alternatively, dacron or rayon swabs</p>	<p>Sample should reach laboratory as soon as possible and within 72hrs</p>	(bacterial and viral)			<p>submitted with CRDM specimen submission form available on NICD website</p> <p>Severe respiratory illness of unknown cause is classified as a category 1 notifiable medical condition (NMC).</p>	<p>CRDM 011 555 0316 (Prof Anne von Gottberg)</p>
<p><i>Neisseria</i> species, <i>Haemophilus</i> species and <i>Streptococcus</i> species (GERMS surveillance)</p> <p>Bacterial meningitis screen - diagnostic (<i>N. meningitidis</i>, <i>H. influenzae</i>, <i>S. pneumoniae</i> - routinely done), (Group B <i>Streptococcus</i>*, <i>E. coli</i>*, <i>S. aureus</i>*, <i>L. monocytogenes</i>*)</p> <p>*on request</p>	<p>Isolates inoculated onto Dorset transport medium and incubated overnight at 37°C in 5% CO₂</p> <p>Normally sterile site specimen (blood or cerebrospinal fluid [CSF] or other fluids e.g. pleural, peritoneal, synovial)</p> <p>Isolates inoculated onto Dorset transport medium and incubated overnight at 37°C in 5% CO₂</p> <p>Clinical samples: minimum volume of 200µl, EDTA blood</p>	<p>Submit isolates on Dorset transport media after overnight incubation.</p> <p>Inoculate as per NIC0184.</p> <p>Do not refrigerate. Do not batch for longer than 1 week as isolates will lose viability.</p> <p>Clinical specimens at cool ambient temperature (e.g. in a cooler box)</p>	<p>Identification of <i>Neisseria</i> species, <i>Haemophilus</i> species or <i>Streptococcus</i> species for GERMS surveillance (GERMS- SA)</p> <p>Bacterial meningitis screen (PCR and culture)</p>	<p>PCR identification of <i>S. pneumoniae</i>, <i>N. meningitidis</i>, <i>H. influenzae</i> Group B <i>Streptococcus</i>, <i>E. coli</i>, <i>S. aureus</i>, <i>L. monocytogenes</i></p> <p>Serotyping/ Serogrouping of <i>S. pn</i>, <i>Nm</i>, <i>Hi</i> (phenotypic and molecular)</p> <p>Antimicrobial susceptibility testing (disc and minimum inhibitory concentration - MIC)</p>	<p>PCR urgent 1-2 days</p> <p>Surveillance 1-2 months</p>	<p>Isolates submitted to NICD for national surveillance (GERMS- SA). Submit with sterile isolate form or LIS report.</p> <p>Specimens should be submitted with CRDM specimen submission form available on NICD website</p>	<p>NICD Hotline 082 883 9920</p> <p>CRDM 011 555 0315 (micro) 011 555 0317 (micro) 011 555 0356 (molecular) 011 555 0387 (Dr Mignon du Plessis) 011 555 0352 (Dr Nicole Wolter)</p>
<p>Atypical pneumonia- causing pathogens</p> <ul style="list-style-type: none"> <i>Mycoplasma pneumoniae</i> <i>Chlamydia pneumoniae</i>, 	<p>Sputum (expectorated or induced) in a sterile container, and/or nasopharyngeal-</p>	<p>Sputum to be frozen immediately and transported on dry ice</p>	<p>Atypical pneumonia PCR</p>	<p>Real-time PCR for identification of atypical pneumonia- causing bacteria</p>	<p>PCR urgent 1 day/24 hours</p>	<p>Specimens should be submitted with</p>	<p>CRDM 011 555 0315 011 555 0317 011 555 0316 (Prof</p>

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Pathogen Species Name (disease/ syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn- around time	Special Instructions (Case investigation s forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
<ul style="list-style-type: none"> <i>Legionella</i> spp. 	<p>oropharyngeal aspirate or combined flocced swabs preferably in universal transport medium (UTM) or Primestore.</p> <p>Urine (for <i>L. pneumophila</i> serogroup 1). Minimum volume 5ml in a sterile leak-proof container</p>	<p>UTM and urine to be stored and transported refrigerated. Primestore – ambient temperature</p>	<p>Legionella spp.</p>	<p>(<i>M. pneumoniae</i>, <i>C. pneumoniae</i>, and <i>Legionella</i> spp)</p> <p>Culture for <i>Legionella</i> spp.</p> <p>Binax NOW for <i>Legionella pneumophila</i> (serogroup 1)</p>	<p>Non-urgent 2-4 days</p> <p>Culture 7-10 days</p>	<p>CRDM specimen submission form available on NICD website</p>	<p>Anne von Gottberg)</p>
<p><i>Bordetella pertussis</i> and <i>Bordetella</i> spp. (Pertussis)</p>	<p>Sputum (expectorated or induced) in a sterile container, and/or nasopharyngeal- oropharyngeal aspirate or combined flocced swabs preferably in universal transport medium (UTM)</p> <p>For <i>Bordetella pertussis</i> culture, swabs should be placed in Regan Lowe (RL)</p>	<p>Sputum to be frozen immediately and transported on dry ice</p> <p>UTM to be stored and transported in cooler boxes with ice packs.</p> <p>RL to be stored and transported at room temperature</p>	<p><i>Bordetella pertussis</i></p>	<p>Real-time PCR for <i>B. pertussis</i> and other <i>Bordetella</i> spp.</p> <p>Culture for <i>B. pertussis</i> and other <i>Bordetella</i> spp.</p>	<p>PCR urgent 1 day/24 hours</p> <p>Non-urgent 2-4 days</p> <p>Culture 7-10 days</p>	<p>Specimens should be submitted with CRDM specimen submission form available on NICD website</p> <p><i>Bordetella pertussis</i> is classified as a category 1 notifiable medical condition (NMC).</p>	<p>CRDM 011 555 0315 011 555 0317 011 555 0352 (Dr Nicole Wolter) 011 555 0316 (Prof Anne von Gottberg)</p>
<p><i>Corynebacterium diphtheriae</i> (Diphtheria)</p>	<p>Respiratory: Oropharyngeal swab Nasopharyngeal swab or aspirate Throat swab Pseudo-membrane tissue from affected area</p> <p>Cutaneous: Pus/wound swabs</p> <p>Other: Blood/blood culture</p>	<p>Isolates on Hoyles or Dorset transport medium for identification</p> <p>Clinical samples (swabs – dry or in a transport medium) (for culture + PCR)</p> <p>Stored and transported at cool ambient temperature.</p>	<p><i>Corynebacterium diphtheriae</i> identification</p> <p>Elek and PCR for toxin production</p>	<p>Phenotypic identification (MALDI-ToF)</p> <p>Elek for toxin production and PCR for presence of toxin gene</p>	<p>PCR urgent 1 day/24 hours</p> <p>Non-urgent 2-4 days</p> <p>Culture 3-5 days</p>	<p>Specimens should be submitted with CRDM specimen submission form available on NICD website</p> <p>Diphtheria is classified as a category 1 notifiable medical condition (NMC).</p>	<p>CRDM 011 555 0315 011 555 0317 011 555 0327 (Linda de Gouveia) 011 555 0316 (Prof Anne von Gottberg)</p>

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Pathogen Species Name (disease/ syndrome, ICD-code)	Samples Collection (E.g. Sample source, type amount, specimen container, transport medium, type of swab)	Specimen Transportation Requirements (Temperature requirements, Stability, Minimum time to reach laboratory)	Tests To Request	Available Tests (Methodology)	Turn- around time	Special Instructions (Case investigation s forms to be completed, guidelines, other relevant info)	Department and Contact telephone no's
	Mitral valve						
<i>Streptococcus pyogenes</i> (Group A Streptococcus)	Respiratory: Throat or nasopharyngeal swab Cutaneous: skin scrapings/lesions Normally sterile site specimen (blood or cerebrospinal fluid [CSF] or other fluids e.g. pleural, peritoneal, synovial)	Isolates on blood agar or Dorset transport medium for identification (stored and transported at ambient temperature) Clinical samples (swabs) in Amies transport medium (for culture + PCR) - stored and transported at ambient temperature.	<i>Streptococcus pyogenes</i> (Group A Streptococcus)	Phenotypic identification (MALDI-ToF) PCR identification of <i>S.pyogenes</i> Antimicrobial susceptibility testing (disc and minimum inhibitory concentration - MIC)	PCR urgent 1 day/24 hours Non-urgent 2-4 days Culture 3-5 days	Specimens should be submitted with CRDM specimen submission form available on NICD website	CRDM 011 555 0315 011 555 0317 011 555 0327 (Linda de Gouveia) 011 555 0316 (Prof Anne von Gottberg)
<i>Streptococcus agalactiae</i> (Group B Streptococcus)	Respiratory: Throat or nasopharyngeal swab Normally sterile site specimen (blood or cerebrospinal fluid [CSF] or other fluids e.g. pleural, peritoneal, synovial)	Isolates on blood agar or Dorset transport medium for identification (stored and transported at ambient temperature) Clinical samples (swabs) in Amies transport medium (for culture + PCR) - stored and transported at ambient temperature.	<i>Streptococcus agalactiae</i> (Group B Streptococcus)	Phenotypic identification (MALDI-ToF) PCR identification of <i>S.agalactiae</i> Serotyping/ Serogrouping of isolates Antimicrobial susceptibility testing (disc and minimum inhibitory concentration - MIC)	PCR urgent 1 day/24 hours Non-urgent 2-4 days Culture 3-5 days	Specimens should be submitted with CRDM specimen submission form available on NICD website	CRDM 011 555 0315 011 555 0317 011 555 0327 (Linda de Gouveia) 011 555 0316 (Prof Anne von Gottberg)

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7. Public Health, Surveillance and Response

The Public Health Surveillance and Response Division includes the Outbreak Unit, the GERMS-SA surveillance programme, Travel Health. The division facilitates communication and data sharing between the national and provincial health departments and the NICD and the public and provides epidemiological input to other NICD units through collaborative projects and support of surveillance and epidemiological activities and outbreak responses.

Outbreak Response Unit

The Outbreak Response Unit (ORU) provides technical support for all aspects of communicable disease outbreaks and control in South Africa. Through close collaboration with provincial and national health departments and other stakeholders, together with systems for early detection and improved reporting of epidemic-prone communicable diseases, the ORU functions as a source of intelligence for outbreak detection and facilitates comprehensive outbreak response activities. In addition, close partnerships with NHLS diagnostic laboratories and NICD centres provide appropriate laboratory diagnostic services during outbreaks and specialised diagnostic testing as required.

Public Health Services

The ORU's role in outbreaks may include, but is not limited to, the following: outbreak detection and reporting, field investigation, development of clinical and laboratory guidelines, management of laboratory data and interpretation of results, and recommendations for prevention and control.

Contact Details

Susan Nzene	+27 11 386 6400	0835550544
24/7 Doctor on call/Outbreak Hotline	082 883 9920	

Please refer to the NICD website for further contact information:

<http://www.nicd.ac.za/index.php/centres/division-of-public-health-surveillance-and-response/>

GERMS-SA

Surveillance/Diagnostic Services

The GERMS-SA laboratory-based surveillance programme for diseases of public health importance is co-ordinated by a core team within the Division of Public Health Surveillance and Response and spans most of the centres at the NICD. Laboratory work is done through the respective Centre. The laboratory surveillance pathogens routinely include: *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Neisseria meningitidis*, *Streptococcus pyogenes*, *Streptococcus agalactiae*, *Salmonella* Typhi, *Salmonella enterica* serotype Paratyphi (A, B and C) and *Vibrio cholerae*, *Cryptococcus* spp., carbapenem-resistant Enterobacteriaceae (CRE) and for outbreak-related *Salmonella* non-Typhi, *Shigella* spp, non-cholera *Vibrio*, *Campylobacter* spp, Diarrheoagenic *E.coli* and *Listeria* spp. GERMS-SA is an active surveillance programme and relies not only on participating laboratories to submit isolates,

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but also makes use of the NHLS Corporate Data Warehouse to ensure that all cases that meet the case definition are included in the various surveillance databases.

The aim of GERMS-SA is to use the data to inform and guide public health policymakers in their decisions. The objectives include estimating the burden of both community- and hospital-acquired infectious diseases under surveillance; monitoring antimicrobial susceptibility trends; monitoring HIV-associated opportunistic infections; and evaluating the impact of vaccines included in the Expanded Programme on Immunisation (EPI). GERMS-SA's work is funded through the NICD/DoH.

GERMS-SA clinic-based surveillance (STI, HIV and TB)

GERMS-SA has expanded to include clinic-based surveillance. Sites have been initiated in all provinces. Clinic-based surveillance includes TB and HIV surveillance to describe the epidemiology of drug resistance among HIV-infected persons initiating ART and/or TB treatment at the selected sites, as well as undertake STI surveillance. The STI component includes surveillance of STI syndrome aetiologies and gonococcal antimicrobial resistance and HPV genotypes among patients attending the clinic's STI.

The Acute Febrile Illness Surveillance Project continues to be incorporated into clinic-based syndromic surveillance at one clinic site in rural Mpumalanga. This surveillance is a One-Health project and takes place in collaboration with veterinary practitioners and researchers from the University of Pretoria Veterinary Faculty. The aim is to describe the prevalence of zoonotic infections in adult patients presenting with acute febrile illness and for whom the clinic sisters would do a malaria test. Laboratory testing includes PCR and serology for brucellosis, bartonella infections, leptospirosis, Q-fever, tick bite fever, West Nile virus, Sindbis, Rift Valley fever and chikungunya virus infections.

Travel Health:

Travel Health was established in 2008 with the aim of being a centre for travel health-related activities and consulting on international health matters. This working group provides pre- and post-travel health advice and consultations for travel health practitioners, as well as for staff of the NHLS and NICD for work related field activities. Regular expert consultations are provided both locally and internationally to international focal points, institutes and health practitioners for South African travellers presenting with infectious diseases after travel within southern Africa and further abroad. These include diseases in travellers such as trypanosomiasis, severe malaria and rickettsial disease (tick bite fever). Consultation is also provided for the elimination of malaria in South Africa and other countries within southern Africa.

8. NICD Sequencing Core Facility

The NICD Sequencing Core Facility was established in January 2016 to promote and expedite research and surveillance activities at the NICD aimed at providing accurate, high quality and cost-effective next generation sequencing (NGS) solutions. The Sequencing Core Facility currently supports all centres at the NICD in terms of NGS and bioinformatics needs, thus acts as an extension of every centre with regards to NGS capacity. Since its inception, the core facility has continually engaged in several projects from design to completion.

Some key focus areas involve whole genome sequencing (de novo and re-sequencing), custom amplicon sequencing and metagenomics (viral and bacterial). For short read sequencing the NICD Sequencing Core Facility currently supports four Illumina NextSeq sequencers, one Illumina NovaSeq X Plus sequencer, one Elements Bioscience AVITI sequencer and for long read sequencing one Pacific Bioscience sequencer. In addition to NGS, the core facility has a dedicated server (genomics server) for data analysis. The genomics server offers secure, powerful, and flexible bioinformatic computing accessible to all NICD scientists. CLC Genomics Server Core aims to provide a unique and stable software architecture core that makes it possible to apply a range of bioinformatics analysis-solutions on high-throughput sequencing data.

Important Considerations:

Sample Requirements:

For NGS, accepted sample types include genomic DNA (gDNA), complementary DNA (cDNA), PCR products and amplicons. No original clinical specimens (e.g. swabs, blood, urine, stools, etc.) are accepted.

Nucleic acid material can be prepared from any sample source. DNA must be eluted in Tris-Cl buffer, pH 8.5 (not Tris-EDTA buffer). RNA must be eluted in nuclease-free ultra-pure water (not Tris- EDTA buffer) followed by conversion into cDNA. PCR products and cDNA preparations must be purified (recommended using AMPure beads or Zymo DNA Clean & Concentrator-5 kit).

DNA Input Recommendations: > 100 ng of DNA, non-degraded and free of particulate matter, double-stranded DNA > 70 bp; OD_{260/280} > 1.8, minimum concentration 10 ng/μL in 10mM Tris-Cl, pH 8.5.

When submitting samples, a Sample Request Form must be completed in full and emailed to the laboratory.

Samples must be submitted in sterile tubes or reaction plates, with precautions taken to prevent leakage during transport. To preserve nucleic acid integrity, it is recommended that the cold chain be maintained throughout shipment. Samples should be placed in sealed, clearly labelled containers and transported via a reliable courier service. Avoid dispatching samples on Fridays or weekends to minimize transit time.

Expected Turnaround Time

Samples have an expected turnaround time calculated from sample reception in the laboratory to the delivery of sequencing data to the client. Turnaround times are project-dependent and structured as follows:

- Urgent Samples: Urgent samples will be prioritised above all other samples and sequenced within 5 days. Urgent samples must be highlighted to both the laboratory manager and the Head of Department (HOD) of the Sequencing Core Facility (SCF). Urgent samples are defined as those related to ongoing outbreaks within South Africa. Other samples may be deemed urgent based on specific needs and in consultation with the SCF HOD.
 - o Urgent samples in excess of 96 will fall under general "NICD samples."
 - o A minimum of 10 samples must be processed per run. Urgent samples fewer than 10 will be combined with NICD samples if available; otherwise, they will be classified as "NICD samples."
- NICD Samples: 80% of all NICD samples will be sequenced within 10 working days.
- Non-NICD Samples: 80% of all external samples will be sequenced within 20 working days. Examples of these samples include University Student samples.

NGS Applications: The core facility engages in various NGS projects from design to completion, and the key focus areas include whole genome sequencing (de novo and re-sequencing), custom amplicon sequencing, whole transcriptome sequencing, RNA sequencing and metagenomics (viral and bacterial).

Sample Rejection Criteria:

All incoming samples are logged in the Sample Receiving Log Sheet and verified against acceptance criteria. Samples will be rejected if they meet any of the following conditions:

- Unlabelled or improperly labelled samples
- Leaking samples
- Incorrect sample type (e.g. blood, sputum, urine, swab, etc.)
- Mismatch between information on the sample tube and the Sample Request Form
- Insufficient sample volume

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- Nucleic acid concentration below the specified minimum
- Missing or incomplete Sample Request Form
- Illegible handwriting on the sample tube
- Tests requested are not offered by the laboratory

Contact Details (Sequencing Core Facility):

E-mail address : sequencing@nicd.ac.za

Telephone no. : 011 386 6459 / 011 386 6322 / 011 555 0450

Shipping address : ATT:Prof Arshad
Ismail

Sequencing Core Facility

National Institute for Communicable Diseases

1 Modderfontein Road, Sandringham, 2192

9. Key Contact Staff – National Institute for Communicable Diseases

Department	Contact Person	Contact Numbers	Email Address
24/7 NICD Emergency/Assistance Cell Phone		082 883 9920	
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		Fax 386-6332	
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Centre for Vaccines and Immunology: Head	Dr N Prabdiel Sing	011 386 6387 / 0845117539	niship@nicd.ac.za
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Centre for HIV and STI			
Centre for HIV and STI : Head	Prof A Puren	011 386-6328/082 908 8048	adrianp@nicd.ac.za

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Centre for Emerging, Zoonotic and Parasites Diseases			
Centre for Emerging, Zoonotic and Parasites Diseases: Head	Dr. Jacqueline Weyer	0113866376	jacquelinew@nicd.ac.za
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Special Bacterial Pathogens Laboratory: Principal Scientist	Dr J Rossouw	011 555 0584	jennyr@nicd.ac.za
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Centre for Healthcare-Associated Infections, Antimicrobial Resistance and Mycoses (CHARM)			
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Laboratory Manager Mycology	Ms. R Mpembe	011 555 0325	ruthm@nicd.ac.za
Antimicrobial Resistance Laboratory and Culture Collection	Dr C Maluleka	011 386 6431	carolinem@nicd.ac.za
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National Stock Culture Collection	Mrs. M Smith	011 555 0342	marshagnes@nicd.ac.za

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Public Health Surveillance and Response	Dr V Quan	011 386 6012	vanessaq@nicd.ac.za
Notifiable Medical Conditions (NMC)		072 621 3805	NMCsurveillanceReport@nicd.ac.za
Sequencing Core Facility			
Sequencing Core Facility: Head	Prof Arshad Ismail	011 386 6459 / 072 981 5275	arshadi@nicd.ac.za
Specimen Receiving Office			
NICD Specimen receiving office	Ms M Mpe	011 386 6314	MosimaM@nicd.ac.za

