
LABORATORY TEST INFORMATION HANDBOOK

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This sop supersedes NIC0104

LABORATORY TEST INFORMATION HANDBOOK

Purpose:

Services Available

The National Institute for Communicable Diseases (NICD) is a communicable disease (medical microbiology/virology) surveillance 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).

Scope:

To provide a guide to services offered at the NICD.

Location of the NICD

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

Advice:

For medical advice contact the consultants from the relevant Centre.

For medical advice on investigation of haemorrhagic fevers contact the Medical Consultant to the Centre for Emerging Zoonotic and Parasitic diseases (contact details provided in Table)

Working Hours:

The laboratories at the NICD operate Monday to Friday from 07h30 to 16h30. For after-hour service, please contact the consultant. Please see Key Contact Staff Table

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Special Pathogens Laboratory – for after-hour service, please contact the Medical consultant on call (or NICD Call/Emergency Phone number) or the Laboratory directly (contact details provided in Table).

Hotline:

For outbreak, clinical advice or public health queries:

NICD Clinical Advice Hotline +27 82 883 9920

Results:

Results queries please contact the Results Call Centre

011 386 6404

011 386 6314

011 386 6466

Fax 011 386 6342

Abbreviations

| 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 |
| NICD | National Institute for Communicable Diseases |
| NS | Nasal swab |
| NPA | Nasopharyngeal aspirate |
| NPS | Nasopharyngeal swab |
| OPA | Oropharyngeal aspirate |
| OPS | Oropharyngeal swab |

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| | |
|-------------|--|
| RSVP | Respiratory PCR test |
| SADC | Southern African Development Community |
| TA | Throat Aspirate |
| TAT | Turnaround Time |
| 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 |
| | |

Help Us to Help You

1. All specimens must be accompanied by the following clearly legible data:
 - a) Patient name and hospital number (or referring laboratory reference number).
 - b) Name and address of requesting clinician.
 - c) Nature of specimen (specimen type).
 - d) Collection date and time (where relevant).
 - e) Tests requested.
 - f) Brief clinical history.
 - g) 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).
 - h) Contact number/email for providing the laboratory report
2. Hard copies of all reports are sent to the requesting clinician by post or electronically for referred samples.

Where possible, the sender of category “A” specimens must notify the NICD testing laboratory via the NICD Hotline or the provided telephone numbers of the shipment of such samples prior to its arrival at the NICD.

Complaints and Queries

1. Complaints and queries of a minor nature should be addressed to the Laboratory concerned. (See Key Contact Staff Table)
2. Complaints and queries of a serious nature should be addressed to the head of the relevant Laboratory (See Key Contact Staff Table)

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.

NOTIFIABLE MEDICAL CONDITION (NMC)

Notifiable Medical Conditions are diseases that are of public health importance because they pose significant public health risks that can result in disease outbreaks or epidemics with high case fatality rates both nationally and internationally.

FOR ANY NMC RELATED QUESTIONS/QUERIES/CONCERNS?

NMC helpline: 072 621 3805

Email: NMCsurveillanceReport@nicd.ac.za

Fax: 086 639 1638

Website: www.nicd.ac.za

The NICD Testing Centres / Laboratories

| 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 Lab | 011 386 6424/6353 |
| | Special Viral Pathogens Laboratory (SVPL) | 011 386 6376 |
| | Parasitology Reference Laboratory (PRL) | 011 555 0311 |
| | 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 6462 |
| | 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 |
| Centre for Healthcare-Associated Infections, Antimicrobial Resistance and Mycoses (CHARM) | Antimicrobial Resistance Laboratory-Culture Collection (AMRL-CC) | 011 555 0342 |
| | Mycology Reference Laboratory (MRL) | 011 555 0325 |
| | CHARM Molecular Laboratory (CML) | 011 386 6395 |

| Centre /Laboratories/ Departments | Laboratory | Contact Number |
|--|---|--------------------------------|
| Centre for Respiratory Diseases & Meningitis (CRDM) | GERMS-SA/microbiology | 011 555 0315/7 |
| | 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 +27 11 555 0542 |
| | 24/7Doctor on call/Outbreak Hotline | 082 883 9920 |

Alphabetical order of tests offered at the NICD

| Pathogen / Test Species Name (disease/ Syndrome) | Pathogen Species Name (disease/ syndrome, ICD-code) | Tests To Request | Department and Contact telephone no's |
|--|---|--|--|
| <i>Arbovirus</i> | Chikungunya virus, dengue virus, Japanese encephalitis virus, Rift Valley fever virus, Ross river virus, Sindbis virus, West Nile virus and Zika virus | Routine arbovirus screen , include serology for chikungunya virus, Sindbis virus, Rift Valley fever virus and West Nile virus Dengue virus, Ross river virus and Zika virus requests only for patients with travel history to endemic areas. Arbovirus PCR for acute cases only (specify which arbovirus) | CEZPD Arbovirus Reference Laboratory 011 386 6424/6353 |
| <i>Adenovirus</i> | Adenovirus Gastroenteritis: Diarrhoea, vomiting, fever | Enteric Adenovirus detection | CED Virology 011 555 0370 |
| <i>Anthrax</i> (ANTHR) | <i>Bacillus anthracis</i> (anthrax) | Anthrax investigation (ANTHR) | CEZPD Special Bacterial Pathogens Reference Laboratory 011 555 0331 011 555 0306/011 555 0584 |
| Arthropods/ Insects | Arthropods/ Insects | Morphological identification, PCR identification and/or ELISA | Vector Control Reference Laboratory 011 386 6480 |
| <i>Astrovirus</i> | 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 |
| <i>Candida</i> (surveillance) | <i>Candida</i> (surveillance) | <i>Candida</i> 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) | STI: 011 555 0461 \ 011 555 0468 |
| <i>Cryptococcus (surveillance)</i> | Cryptococcus (surveillance) | 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 genitalium</i> | Multiplex PCR for genital discharge pathogens rganism specific PCR available for confirmation of <i>Neisseria gonorrhoeae</i> 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 | 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 load, 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 | |
| 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) | Histoplasma antigen | CHARM: Mycology Reference Laboratory 011 555 0325 /011 555 0323 011 555 0353 011 555 0491 |
| HIV | HIV | HIV-1 Pooled Plasma | HIV Sero-Molecular: 011 386 6435 /011 386 6437 / 011 386 6460 |
| HIV | HIV | CD4 | 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 a) In-House assay | Virology Research Laboratory Lab Manager: 011 386 6341 |
| 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 / Hybridisation | CHIVSTI/STI :011 555 0461 \ 011 555 0468 |
| HSV 1 and 2 | HSV 1 and 2 | PCR; Acyclovir resistance testing by PCR/ sequencing & viral culture; and serum ELISA for HSV2 IgG | 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 (LGV)</i> MALDI-TOF identification | <i>Lympho granuloma Venereum (LGV)</i> MALDI-TOF identification | PCR Identification | CHIVSTI/STI :011 555 0461 \ 011 555 0468 CHARM AMRL-CC 0115550344/0115550342 |
| <i>Measles</i> ^{CVI} Rash-based Surveillance | Measles Rash-based Surveillance | Measles IgM | 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) |
| mpox (formerly known as Monkeypox virus) | mpox (formerly known as Monkeypox virus) | mpox (formerly known as Monkeypox virus) | Special Viral Pathogens Laboratory Dr J Weyer: 011 386 6376 / 082 903 9131 NICD Hotline |
| Multi-drug resistant <i>Enterobacteriaceae</i> and other ESKAPE 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, TMA) | 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 | STI: 011 555 0461 /011 555 0468 |
| <i>Norovirus</i> | Norovirus Gastroenteritis: Diarrhoea, vomiting, fever | Norovirus detection | CED Virology 011 555 0370 |
| Parasite - <i>Acanthamoeba</i> spp. | Parasite <i>Acanthamoeba</i> spp. | Acanthamoeba | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |
| Parasite - <i>Babesia</i> species (<i>Babesiosis</i>) | Parasite - <i>Babesia</i> species (<i>Babesiosis</i>) | Babesia | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |
| Parasite - <i>Borrelia duttoni</i> or <i>B. recurrentis</i> (<i>Relapsing fever</i>) | Parasite - <i>Borrelia duttoni</i> or <i>B. recurrentis</i> (<i>Relapsing fever</i>) | Relapsing fever <i>Borrelia</i> | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |
| Parasite - <i>Entamoeba histolytica</i> | Parasite - <i>Entamoeba histolytica</i> (<i>Amoebiasis</i>) | Amoebiasis | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |

| | | | |
|---|--|---|---|
| <i>Parasite -Echinococcus species</i> | Parasite - <i>Echinococcus</i> species (Echinococcosis, hydatid disease) | Echinococcus | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |
| <i>Parasite -Enterobius vermicularis</i> (pinworm) | Parasite - <i>Enterobius vermicularis</i> (pinworm) | <i>Enterobius vermicularis</i> / (pinworm) | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |
| <i>Parasite -Human cestodes (tapeworms)</i> 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 (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</i> / <i>Necator americanus</i>), <i>Trichuris trichiura</i> | Parasite -Human nematodes including: <i>Ascaris lumbricoides</i> (common roundworm), hookworms (<i>Ancylostoma duodenale</i> / <i>Necator americanus</i>), <i>Trichuris trichiura</i> (whipworm), <i>Strongyloides stercoralis</i> | Stool parasites (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> , | 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 (specify suspected parasite, if applicable) | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |
| Parasite -Human trematodes including: <i>Schistosoma mansoni</i> / <i>haematobium</i> | Parasite -Human trematodes including: <i>Schistosoma mansoni</i> / <i>haematobium</i> (Bilharzia, schistosomiasis) | Stool / urine parasites (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 investigation | 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 investigation | 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 investigation | 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> | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |
| Parasite - <i>Plasmodium</i> species | Parasite - <i>Plasmodium</i> species (Malaria) | Malaria investigation | 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</i> pneumonia, PCP) | <i>Pneumocystis jirovecii</i> PCR | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |
| Parasite - <i>Schistosoma haematobium</i> | Parasite - <i>Schistosoma haematobium</i> (Schistosomiasis, bilharzia) | <i>Schistosoma haematobium</i> | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |
| Parasite - <i>Strongyloides stercoralis</i> | Parasite - <i>Strongyloides stercoralis</i> | <i>Strongyloides stercoralis</i> | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |
| Parasite -Tapeworm (adult) identification | Parasite -Tapeworm (adult) identification | Tapeworm identification | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |

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| 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 investigation | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |
| 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 | 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</i> complex, <i>E. cloacae</i> complex, <i>E. coli</i> , <i>H. influenzae</i> , <i>K. aerogenes</i> , <i>K. oxytoca</i> , <i>K. pneumoniae</i> group, <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 | Poliovirus | Real Time RT-PCR and/or Sequencing | Centre for Vaccines & Immunology: Polio Laboratory 011 386 6438 011 555 0504 |
| Poliovirus isolation. AFP surveillance. | Poliovirus | Poliovirus isolation. AFP surveillance. Poliovirus Poliovirus isolation. AFP surveillance. | 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 | Poliovirus Isolation 011 555 0504/011 386 6361 011 386 6358 |
| Poliovirus Serology | Poliovirus Serology | Poliovirus Antibody Neutralization | Poliovirus Serology 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 |
|--|--|---|---|
| Poliovirus isolation. AFP surveillance. | Poliovirus Acute Flaccid Paralysis (AFP) surveillance) | Poliovirus isolation. AFP surveillance. | Poliovirus Isolation 011 555 0504/011 386 6361 011 386 6358 |
| Poliovirus Serology | Poliovirus Serology | Poliovirus Antibody Neutralization | Poliovirus Isolation 011 555 0504/011 386 6361 |
| Pox virus | Pox virus | Pox virus | Centre for Emerging Zoonotic and Parasitic Diseases, Special Viral Dr J Weyer:011 386 6376/082 903 9131 NICD Hotline |
| Rabies | Rabies Rabies and rabies-related lyssaviruses) ICD-10 code is A82 | Rabies | Center for Emerging Zoonotic and Parasitic Diseases, Special Viral Dr J Weyer:011 386 6376 082 903 9131 NICD Hotline |
| Rabies immunity (for individuals with pre-exposure rabies vaccination) | Rabies antibodies | Rabies immunity | Center for Emerging Zoonotic and Parasitic Diseases, Special Viral Dr J Weyer:011 386 6376 082 903 9131 NICD Hotline |
| 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) |

| Pathogen / Test Species Name (disease/ Syndrome) | Pathogen Species Name (disease/ syndrome, ICD-code) | Tests To Request | Department and Contact telephone no's |
|--|---|--|--|
| 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 |
| 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 | CRDM 011 555 0315/17/ 0327/0387 (lab) 011 555 0316/ 011 386 6321 |
| Severe fever with thrombocytopenia syndrome (SFTS) | SFTS | SFTS PCR | Centre for Emerging Zoonotic and Parasitic Diseases, Special Viral Dr J Weyer:011 386 6376 082 903 9131 NICD Hotline |
| <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) |
| <i>Treponema pallidum</i> | <i>Treponema pallidum</i> | RPR/TPPA/ TPAb/PCR / Typing/ Antimicrobial resistant determinants testing by PCR / Macrolide resistance testing by PCR/ Sequencing | CHIVSTI/STI: 011 555 0461\ 011 555 |

| Pathogen / Test Species Name (disease/ Syndrome) | Pathogen Species Name (disease/ syndrome, ICD-code) | Tests To Request | Department and Contact telephone no's |
|--|--|--|--|
| 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 | Centre for Emerging Zoonotic and Parasitic Diseases, Special Viral Dr J Weyer:011 386 6376 082 903 9131 NICD Hotline |
| <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 |

CVI1: Please note that Measles 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 Rubella IgM test should not be requested by users of the service as it is not offered as a single test, the Rubella IgM is 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

CVI3: Please note that Rubella IgG should not be requested by users of the service as it is only done for NICD staff immunity screening.

Notifiable Medical Conditions (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

Pertussis

Plague

Poliomyelitis

Rabies (human)

Respiratory disease caused by a novel respiratory pathogen**

Rift Valley fever (human)

SARS-CoV-2 (COVID-19)

Smallpox

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| |
|--|
| 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 |
| <i>Haemophilus influenzae</i> 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 (<i>Ascaris lumbricoides</i> , <i>Trichuris trichiuria</i> , <i>Ancylostoma duodenale</i> and <i>Necator americanus</i>) |
| 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 <i>Neisseria gonorrhoea</i> |
| 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 <i>S. Typhi</i> and <i>S. Paratyphi</i> |
| Rubella virus |

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| | |
|--|--|
| 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 |

Tests offered at the NICD by Centre

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, 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>Poliovirus</p> <p>(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>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 with relevant details captured accordingly.</p> | <p>Poliovirus isolation. AFP surveillance.</p> | <p>Virus Isolation</p> | <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.</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"> • Epid number – unique number for epidemiology purposes • Name • Date of Birth • Date of onset of paralysis • Date of stool collection • Immunization history • Province • District • Case or contact • Specimen number • Date sent from field to National Level – where applicable • Date received at National Level – where applicable • Date sent to NICD • Testing requested and clinical diagnosis to be clearly stated to prevent incorrect / unnecessary tests being performed | <p>Poliovirus Laboratory 011 555 0504 011 386 6361 011 386 6358 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, 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 |
|--|---|--|---|--|---|---|--|
| 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 | Real Time ITD RT-PCR Real Time VDPV Screening RT-PCR Sequencing VP1 Region | 7 days 7 days | AFP Investigation Form with at least the following information: <ul style="list-style-type: none"> • Epid Number • Patient Name • Date of onset of paralysis • District • Case or contact • Specimen Number • Referring Laboratory specimen number • Date sent to NICD • Cell Line (L-Arm or R-Arm) Real Time PCR Results (if requesting Sequencing) | Centre for Vaccines & Immunology: Polio Laboratory 011 386 6438 011 555 0504 |
| 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 not stated as urgent. | Testing requested and clinical diagnosis to be clearly stated on request forms to prevent incorrect / unnecessary tests being performed | Poliovirus Serology 011 555 0504 011 386 6361 011 386 6358 |
| 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 Gastroenteritis/diarrhoea: Stool sample/rectal swab | 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 |

| 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 |
|--|--|--|--|-------------------------------|--|---|--|
| Poliovirus (Environmental surveillance) | Sewage wastewater sample. Collected in an external screw cap 1 litre bottle. | 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 0504 011 386 6358 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 (Rash-based Surveillance) | 5 ml Clotted Blood or EDTA Blood (red top or yellow SST tube or EDTA/heparin Blood or Serum | The blood/serum samples can be transported at room temperature to NICD. If transportation is delayed the samples should be refrigerated Samples to reach the lab within three days of sample collection | Measles IgM | Anti-Measles IgM antibody (EIA) | 7 working days | 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: <ul style="list-style-type: none"> Name, age, Date of Birth , address of patient Name and contact number of clinician Symptoms marked in tick boxes Complications marked in tick boxes Date of onset of rash Date seen at health facility Date specimen collected Medical history including measles vaccination history, number of doses and date of last measles vaccination Date of notification and response to case | CVI measles working group 011 386 6398 011 555 0534 011 386 6343 |
| Rubella (Rash based surveillance) | 5 ml Clotted Blood or EDTA Blood (red top or yellow SST tube or EDTA/heparin Blood or Serum | Same as for measles | See note on page 18 under Measles & Rubella | Anti-Rubella IgM antibody (EIA) | 7 working days | Same as for Measles | CVI measles working group 011 386 6398 011 555 0534 |

| 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 | Throat swab Throat swabs should be collected from all suspected cases | Transport at 2°C-8°C Sample should reach laboratory within 3 days | For surveillance only | RT-PCR Sequencing | 14 days 14 days | Surveillance only. Case Investigation Forms (CIF) must be completed in full and must accompany specimens. | CVI measles working group 011 386 6343 011 386 6398 011 555 0534 |
| Hepatitis | Serology: 5 ml Clotted Blood or EDTA Blood (red top or yellow SST tube or EDTA Blood or Serum) Molecular: 5ml EDTA blood | Transport at 2°C-8°C Sample should reach laboratory within 3 days | For research and surveillance only (anti-HAV, anti-HBs for staff immunity screening) | Hepatitis A: Architect System Havab IgG, Havab IgM Hepatitis B: Architect System HBsAg, Anti-HBs, Anti-HBc, HBeAg, Anti-HBe, Anti-HBc IgM, HBV Viral load, genotyping Hepatitis C: Architect System Anti-HCV, HCV Viral load, genotyping | Serology: 14 working days Molecular: 21 working days | 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 |

Centre for Tuberculosis

| 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 or other human sample | 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) 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 |

Centre for Tuberculosis

| 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 or other human samples type | 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 | Sputum (or other samples type) and/or culture (liquid/solid) | 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) An adequate sample should be about 2-5 ml sputum. For isolates these should be packaged as biohazard category A (triple packaging) | Line Probe Assay First line drug susceptibility Second line drug susceptibility - NTM speciation - MTB complex speciation (BCG) - NTM- drug susceptibility | Molecular testing methods GenoType MTBDRplus, GenoType MTBDRsl, , GenoType CM GenoType MTBC GenoType NTM DR | 2-7 days specimen or 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> | Sputum or other specimen or decontaminated sediment | 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) An adequate sample should be about 2-5ml sputum. | Xpert MTB/RIF Ultra Assay | Molecular testing methods | 48-72 hours or Project dependant | | Centre for TB 011 885 5217 011 885 5316 |
| <i>Mycobacterium tuberculosis</i> or Non-tuberculosis mycobacteria | Isolate in MGIT tubes (or other liquid media) and on solid media | Isolates should be packaged as a biohazard category A (triple packaging) | Specialised testing -Broth Microdilution or agar proportion or MGIT MIC testing. -Extended Panel for MTB -MIC testing for Bedaquiline, Clofazimine and / or Delamanid. MIC testing for NTM. | Advanced DST Methods Bedaquiline MIC testing Clofazimine MIC testing Delamanid MIC testing Extended TB DST Sensitre: -MYCOTB (MTB) -Rapid grower NTM -Slow grower NTM | 3-8 weeks from pure positive sub-culture or Project dependant | Extended DST / MIC requests should be done via email to the pathologist. | 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>Mycobacteria</i> | Clinical specimen (pulmonary or extrapulmonary) 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 |

Centre for HIV and STI

| 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 | Transport at ambient temperature | | Gram stain | | Only available for surveillance and research purposes | STI 011 555 0461 011 555 0468 |
| <i>Candida</i> species | Vaginal smear | Transport at ambient temperature | | Gram stain | | 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 | | 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 or frozen | 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 |
| 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 | 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 |

| 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 |
|---|---|--|--|-------------------------------|------------------|---|---------------------------------------|
| Genital Ulcer Disease HSV 1 &2, <i>Haemophilus ducreyi</i> , <i>Treponema pallidum</i> , Lymphogranuloma venereum) | Ulcer swab (Dacron) | Transport on ice or frozen | 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> <i>Trichomonas vaginalis</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 or frozen | 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> | | <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 (E-test and agar dilution)</p> <p>Culture, ID, AST (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> | <p>STI</p> <p>011 555 0461</p> <p>011 555 0468</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 |
|--|--|--|---------------------|---|-------------------------------------|---|---|
| HIV | Plasma in EDTA or ACD tube | Frozen 1ml Plasma (-20°C) or Whole blood to be separated within 24 hours of collection | HIV-1 Pooled Plasma | Roche HIV-1 Viral Load | 4 weeks | | 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-1 RNA PCR | Roche HIV-1 Viral Load | 5 Working days | | HIV Sero-Molecular Laboratory 011 386 6330 011 386 6437 |
| 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 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 | Frozen EDTA whole blood | Minimum of 2 X 100ul of frozen whole blood | HIV TNA PCR | HIV TNA PCR | 5 working days | | 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 | Transport blood samples at 2°C-8°C Maintenance of cold chain is required from collection to receipt at NICD. | HIV ELISA | HIV-1/2 Antibody EIA | 5 -7 working days or project dependent | Project/Survey requirements must be provided in writing by Requestor and discussed with NICD prior to testing. | HIV Sero-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 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 | 5 -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 | 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 | Sedia HIV-1 BED Incidence EIA (Serum/Plasma only) Sedia HIV-1 LAg Avidity Incidence EIA (Serum/Plasma) 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 | 5 -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 | 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 | | HIV Sero-Molecular Laboratory 011 386 6330 011 386 6437 |
| 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 | Drug resistance testing a) In-House assay | Store at -70°C | | Plasma from EDTA blood | 2 months | Can be used for diagnostic purposes in special circumstances. | Virology Research Laboratory Lab Manager L Nxumalo 011 386 6341 |

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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 |
|--|--|---|---|-------------------------------|-------------------------------|---|--|
| 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 | 5ml/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 or frozen plasma | Transport blood samples at 2-8°C DBS samples can be transported at room temperature (stable for 14 days at RT°C after collection) Transport can be on Dry Ice and stored at -70°C | Drug resistance testing In-house assay | Plasma from EDTA blood DBS | 2 Months or project dependant | Project/Survey requirements must be provided in writing by Requestor and discussed with NICD prior to testing | Virology Research Laboratory Lab Manager L Nxumalo 011 386 6341 |
| HIV-1 | Mycoalert Mycoplasma | Store at -20°C | | Cell supernatants | 1 month | | Virology Research Laboratory Lab Manager L Nxumalo 011 386 6341 |
| <i>Treponema pallidum</i> | Clotted blood or EDTA Serum Plasma | Transport on ice | | 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 | | TPPA | 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 | | TPAb | Project dependant | Only available for Surveillance purposes and research projects | 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>Treponema pallidum</i> | Ulcer swab (Dacron) | Transport on ice or frozen | Syphilis/ <i>Treponema pallidum</i> PCR | PCR | 10 days | Only available for Surveillance purposes and research projects and 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 or frozen | | 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 or frozen | | 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 or frozen | | PCR | 10 days | Only available for Surveillance purposes and research projects And special cases require prior consultation with STI Section staff & completion of specific request form | STI 011 555 0461 011 555 0468 |
| <i>Chlamydia trachomatis</i> | Urine Urethral Swab Vaginal swab Endocervical swab Oropharyngeal swab Rectal swab (Dacron swabs) | Transport on ice or frozen | | 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>Haemophilus. ducreyi</i> | Ulcer swab (Dacron swabs) | Transport on ice or frozen | | PCR | 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>Mycoplasma genitalium</i> | Urine Urethral swab Vaginal swab Endocervical swab (Dacron swabs) | Transport on ice or frozen | | PCR | 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 |

| 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> | Urethral swab Vaginal swab Other samples as indicated by clinical presentation Endocervical swab Rectal swab Pharyngeal swab Cultured strains (Dacron or nylon flocked 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 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 Penile swab Rectal swab Pharyngeal swab (Dacron or nylon flocked swabs) | Transport on ice or frozen | | 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> | Urethral swab Vaginal swab Other samples as indicated by clinical presentation Endocervical swab Rectal swab Pharyngeal swab (Dacron or nylon flocked swabs) Cultured strains | Transport on ice or frozen Except for cultured strains at ambient temperature | | Typing by PCR / Sequencing | Project dependent | Only available for Surveillance purposes and research projects And 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> | Urethral swab Vaginal swab Other samples as indicated by clinical presentation Endocervical swab Rectal swab Pharyngeal swab (Dacron or nylon flocced swabs) Cultured strains | Transport on ice or frozen Except for cultured strains at ambient temperature | | Antimicrobial resistance testing by PCR | Project dependent | 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 |
| 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 |
| <i>Trichomonas vaginalis</i> | Urine Urethral swab Vaginal swab Endocervical swab | Transport on ice or frozen | | NAAT (PCR,TMA) | 10 days | Only available for Surveillance purposes and research project And special cases | STI 011 555 0461 011 555 0468 |

Centre for Emerging Zoonotic and Parasitic 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 |
|--|--|--|---|---|--|---|--|
| Arbovirus Reference Laboratory | | | | | | | |
| Arbovirus Chikungunya virus Dengue virus Japanese encephalitis virus Rift Valley fever virus Sindbis virus West Nile virus Ross river Zika virus ICD-10 code for unspecified arthropod-borne viral fever, A94 | Clotted blood or serum, minimum of 1.0 ml Highly recommended to submit repeat specimens, preferably acute and convalescent specimens. Alternative/additional specimens for PCR: - CSF <i>(for encephalitic cases only, requires at least 500µl)</i> - Liver biopsies <i>(for post mortem confirmation only, contact Laboratory)</i> | Tubes in sealed leak-proof containers. Cold transport on ice packs. Label clearly as biohazardous. Adhere to national and international regulations for transportation of hazardous biological goods as required. Address to Centre for Emerging Zoonotic and Parasitic Diseases, Arbovirus Reference Laboratory | Routine arbovirus screen , include serology for chikungunya virus, Sindbis virus, Rift Valley fever virus, West Nile virus, Dengue virus, Ross river virus and Zika virus requests only for patients with travel history to endemic areas. Arbovirus specific IgM or IgG ELISA <i>(specify which arbovirus)</i> Arbovirus PCR for acute cases only <i>(specify which arbovirus)</i> | Haemagglutination inhibition assay (HAI) performed as initial screen; any positive results followed up with pathogen specific IgM ELISA to confirm recent infection IgM and IgG ELISA Real-time PCR | HAI: 5 working days HAI + IgM ELISA: 7 working days IgM/IgG ELISA: 4 working days PCR: 2 working days | Rash or arthralgia syndromes with fever which may be linked to travel history or insect bites. Some cases develop encephalitis. PCR only for specimens collected within 7 days of symptom onset or acutely ill patients. Highly recommended to submit repeat / paired specimens (preferably acute and convalescent specimens) to demonstrate seroconversion or four-fold rise in antibody titre. Case investigation form (available from NICD website) to accompany all submitted samples. | Arbovirus Reference Laboratory: Dr O Hellferscee 011 386 6424/6353 Dr J Weyer 082 903 9131 011 386 6376 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 |
|--|--|--|--|--|------------------|--|--|
| Special Viral Pathogens Laboratory | | | | | | | |
| mpox (formerly known as monkeypox virus) ICD-10 code is B04 | 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. | Specimen containers must be sealed leak- proof containers Adhere to national and international transportation of biological goods. (Category A) Address to Centre for Emerging Zoonotic and Parasitic Diseases, Special Viral Pathogens Laboratory, cold transport on ice packs | mpox (formerly known as monkeypox virus) | mpox (formerly known as monkeypox virus) | 2 Working days | Fever, headache, muscle aches, backache, chills, exhaustion, lymphadenopathy, lesions. Travel history to central and western Africa or other exposure events (i.e. contact with exotic pets) | Special Viral Pathogens Laboratory Dr J Weyer 011 386 6376 082 903 9131 NICD Hotline |
| Pox virus | 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. | Specimen containers must be sealed leak- proof containers Adhere to national and international transportation of biological goods. (Category A) Address to Centre for Emerging Zoonotic and Parasitic Diseases, Special Viral Pathogens Laboratory, cold transport on ice packs | Pox virus | Pox virus PCR | 2 working days | Skin lesions, fever, lymphadenopathy, malaise, body aches Contact with animals | Special Viral Pathogens Laboratory 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 Requirements (Temperature Stability, Minimum time to) | 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 |
|--|---|---|------------------|--|--|---|--|
| Rabies | Clotted blood or serum, minimum of 0.5 ml | Specimen containers must be sealed in proof containers. Adhere to national and international transportation of biological goods. Address to Emerging Zoonotic and Parasitic Pathogens, cold transport on ice packs. | Rabies immunity | Serology: Rabies IgG | 2 Working days | Only for post vaccinal immunity screening. Usually for high risk occupational groups such as veterinarians or animal handlers or laboratory workers in laboratories that handle rabies virus | Special Viral Pathogens Laboratory Dr J Weyer 011 386 6376 082 903 9131 |
| Rabies (Rabies and rabies-related lyssaviruses) ICD-10 code is A82.9 | Antemortem: Saliva, minimum of 0.5 ml CSF, minimum of 0.5 ml Nuchal biopsies, single biopsy collected with dermatological punch from nape of neck <i>Post mortem:</i> Brain. Brainstem is most specimen. Whole, half or representative regions of brain submitted in 50 % glycerol in plastic screw top Brain biopsies collected via supraorbital fissure (contact laboratory for instructions). Do not submit in formalin. If saline available freeze fresh. | Specimen containers be sealed in leak-containers. Adhere to national international transportation of biological goods as Address to Centre for Emerging Zoonotic Parasitic Diseases, Arbovirus, cold ice packs Contact Laboratory Hotline for consult on cases | Rabies | <i>Antemortem:</i> RT-PCR (performed on saliva, CSF and biopsy) Serology (Rabies IgG/IgM) (performed on CSF and blood/serum) <i>Post mortem:</i> Rabies fluorescent antibody test (DFA or FAT) | 2 Working days 2 Working days 2 Working days | For antemortem investigation of suspected rabies cases. Encephalitis with rapid progression, hydrophobia, dementia, hallucinations, lucid periods usually present. Suggested that all specimens should be co-submitted to rule out rabies. It is highly recommended to submit at least 3 consecutively collected saliva samples (collected at least 3-6 hours apart). Serology is of limited value to investigate clinical cases, but may be performed as part of battery of laboratory investigations. Post-mortem investigation is most conclusive. Contact Laboratory/NICD Hotline for advice | Special Viral Pathogens Laboratory Dr J Weyer 011 386 6376 082 903 9131 NICD Hotline |

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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 |
|---|--|---|------------------|--|---|--|---|
| 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 | Special Viral Pathogens Laboratory Dr J Weyer 011 386 6376 082 903 9131 NICD Hotline |
| Viral haemorrhagic fevers (Crimean-Congo haemorrhagic fever, Ebola, Marburg, Lassa, Hanta and Yellow fever) ICD-10 code for unspecified viral haemorrhagic fever, A99 | Clotted blood or serum, minimum of 1.0 ml | 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 Address to Center for Emerging Zoonotic and Parasitic Diseases, Special pathogens, cold transport on ice packs Contact Laboratory and/or NICD Hotline | VHF | Serology (Fluorescent antibody test: IgG and IgM ELISA: IgG and IgM) PCR Virus Isolation | 2 Working days 2 Working days 21 working days | Fever, Rash Headache, Arthralgia, Myalgia, Haemorrhagic manifestations, Gastrointestinal symptoms, Pathology indicators, Travel history or other exposure events Contact Laboratory and/or NICD Hotline Submission of repeat specimen critical to confirm or exclude VHF Full battery of tests (serology, PCR and isolation) recommended for most conclusive testing) | Special Viral Pathogens Laboratory Dr J Weyer 011 386 6376 082 903 9131 Contact NICD Hotline |
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| 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 | Specimen containers must be sealed in plastic bags. Adhere to national and international transportation of biological goods. Address to Centre for Emerging Zoonotic and Parasitic Diseases, Electron Microscopy Laboratory Transport at 2-8°C or room temperature | Viral screening | Transmission electron microscopy and negative staining | 3 Working days | Please contact laboratory for specimen-specific requirements. Notify the laboratory when specimens are dispatched | Electron Microscope Laboratory 011 386 6318 |

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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> | <p>Anthrax (ANTHR)</p> | <p>Microscopy, culture and special identification</p> | <p>5 days</p> | <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 011 555 0331 011 555 0306 011 555 0584</p> |

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| | <i>Meningitis</i> CSF in sterile container Blood culture plus 1 tube clotted blood and 1 tube whole blood (EDTA tube) | Transport at 2-8°C Transport blood culture at room temperature and blood tubes at 2-8°C | | | | | |
| <i>Clostridium botulinum</i> (Botulism) | 20 to 30 ml clotted blood or 10 to 15 ml serum 25 to 50 g of stool Gastric washing Vomitus Suspected food | Transport at 2-8°C | Botulinum (CLOS) | Mouse toxicity and neutralization assays, Anaerobic culture and confirmation | 4 weeks | Important Please notify laboratory prior to sending specimens. Samples should be taken as soon as possible after onset of illness. | Special Bacterial Pathogens Reference Laboratory 011 555 0331 011 555 0306 011 555 0584 |
| <i>Leptospira spp.</i> (Leptospirosis) | 1 Tube of clotted blood or serum <i>Please note:</i> Tests not done on urine, plasma, haemolysed, icteric or lipaemic blood. | Transport at 2-8°C Sample should reach laboratory within 3 days. | Leptospirosis (LEPTO) | Serology: IgM ELISA | 4 days | | Special Bacterial Pathogens Reference Laboratory 011 555 0331 011 555 0306 011 555 0584 |

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| <i>Yersinia pestis</i> (Plague) | <p>Bubonic 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)</p> | 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 | Special Bacterial Pathogens Reference Laboratory 011 555 0331 011 555 0306 011 555 0584 |
| | <p>Pneumonic Sputum in sterile container plus 2 X swabs (rotate swab in sputum sample and place into Cary Blair transport medium)</p> | Transport at 2-8°C or room temperature | | | | Samples should be taken prior to antibiotic treatment and should reach laboratory as quickly as possible | |
| | <p>Septicemic Blood culture bottle</p> | Transport at 2-8°C or room temperature | | | | Important Please notify laboratory prior to sending specimens | |
| | <p>All types of plague 1 tube clotted blood or serum</p> <p><i>Please note:</i> Paired serum taken 2-3 weeks apart is required for confirmation</p> | Transport at 2-8°C or room temperature | Plague serology (PLAGE) | Serology: ELISA | 2 days | | |
| <p>Surveillance Clotted animal blood e.g. rodent, dog</p> | Transport at 2-8°C or room temperature | Plague surveillance (RATS) | Serology: ELISA | 4 Weeks | | | |

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| Parasitology | | | | | | | |
| Parasite - <i>Borrelia duttoni</i> or <i>B. recurrentis</i> (Relapsing fever) | Unclotted, EDTA blood or blood films. <i>Clotted blood is unsuitable.</i> | Transport at ambient temperature or on ice. | Relapsing fever borrelia | Staining and microscopy | 1 day | | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |
| Parasite - <i>Babesia</i> species (Babesiosis) | Unclotted, EDTA blood or blood films. <i>Clotted blood is unsuitable.</i> | Transport at ambient temperature or on ice. | Babesia | Staining and microscopy | 1 day | | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |
| Parasite - <i>Plasmodium</i> species (Malaria) | Unclotted, EDTA blood or blood films. <i>Clotted blood is unsuitable.</i> | Transport at ambient temperature or on ice. | Malaria investigation | Staining and microscopy | 1 day | | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |
| Parasite - <i>Plasmodium</i> species (Malaria) - <i>P. falciparum</i> - <i>P. malariae</i> - <i>P. ovale</i> - <i>P. vivax</i> - <i>P. knowlesi</i> | Unclotted, EDTA blood. Blood spots blood films & RDTs may be used in exceptional circumstances. <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 PCR | Malaria PCR | 2 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 done or negative | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |

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| 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 day | | Parasitology Reference 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 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 investigation | Staining and microscopy | 1 day | *For <i>W. bancrofti</i> collect sample after 8pm, for <i>L. loa</i> at ~12pm and others at any time. | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |

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| <u>Parasite -Trypanosoma</u> species (Sleeping sickness or trypanosomiasis) | Unclotted, EDTA blood, blood films or fresh CSF (1ml). <i>Clotted blood is unsuitable.</i> | Transport at ambient temperature or on ice. Ideally CSF specimens must reach laboratory within 30 minutes of sampling. | Trypanosome investigation | Staining and microscopy | 1 day | | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |
| <u>Parasite -Human protozoa</u> 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 or duodenal aspirate/string test. Specimens, that may take longer than a day to reach the laboratory, should ideally be preserved in an equal quantity of 10% formalin. | Transport at ambient temperature or on ice. | Stool parasites (specify suspected parasite, if applicable) | Microscopic identification of all human protozoa | 1 day | | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |
| <u>Parasite – Microsporidia (unicellular intracellular parasites closely related to fungi) including</u> <i>Enterocytozoon bieneusi</i> , <i>Encephalitozoon</i> species | Stool, urine, duodenal aspirates, CSF, eye or appropriate tissue samples. | Transport at ambient temperature or on ice. Tissue biopsies in saline. | Microsporidia investigation | PCR | 2 days | | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |
| <u>Parasite – Toxoplasma gondii (protozoan)</u> | Whole blood, tissue, vitreous fluid, amniotic fluid, CSF. | Transport at ambient temperature or on ice. Tissue biopsies in saline | Toxoplasma PCR | Toxoplasma PCR | 2 days | | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |
| <u>Parasite -Entamoeba histolytica</u> (Amoebiasis) | Stool, 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 | 1 day | | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |

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| 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 or worm/s. Specimens that may take longer than a day to reach the laboratory should ideally be preserved in an equal quantity of 10% formalin. | Transport at ambient temperature or on ice. | Stool parasites (specify suspected parasite, if applicable) | Macroscopic and/or microscopic identification. | 1 day | | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |
| Parasite - <i>Enterobius vermicularis</i> (pinworm) | Early morning sticky tape swab is the optimal specimen. | Transport at ambient temperature or on ice. | <i>Enterobius vermicularis/</i> (pinworm) | Microscopy | 1 day | Eggs may be infective – handle with care. | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |

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| <u>Parasite</u> - <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</i> | Microscopy and/or culture for larvae of <i>Strongyloides stercoralis</i> . | 1 day | For disseminated infections. | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |
| <u>Parasite</u> -Human trematodes including: <i>Schistosoma mansoni/ haematobium</i> (Bilharzia, schistosomiasis) | Stool. Specimens, that may take longer than a day to reach the laboratory, should ideally be preserved in an equal quantity of 10% formalin. | Transport at ambient temperature or on ice. | Stool parasites (specify suspected parasite, if applicable) | Microscopic identification of all human trematodes. | 1 day | | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |
| <u>Parasite</u> - <i>Schistosoma haematobium</i> (Schistosomiasis, bilharzia) | Urine, minimum volume is 5ml. | Transport at ambient temperature or on ice. | <i>Schistosoma haematobium</i> | Microscopy | 1 day | | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |
| <u>Parasite</u> -Human cestodes (tapeworms) including: <i>Taenia saginata, T. solium, H. nana, H. diminuta</i> and <i>D. latum</i> | Stool. Specimens, that may take longer than a day to reach the laboratory, should ideally be preserved in an equal quantity of 10% formalin. | Transport at ambient temperature or on ice. | Stool parasites (specify suspected parasite, if applicable) | Microscopic identification of all human cestodes/ tapeworms. | 1 day | | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |
| <u>Parasite</u> -Tapeworm (adult) identification | Worm or proglottid (tapeworm segment). Submit proglottids in saline. | Transport at ambient temperature or on ice. | Tapeworm identification | Macroscopic and/or microscopic identification. | 1-2 days | Proglottids may be infective – handle with care. | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |
| <u>Parasite</u> - <i>Echinococcus</i> species (Echinococcosis, hydatid disease) | Cyst tissue, cyst fluid or sputum, minimum volume is 1ml. | Transport at ambient temperature or on ice, if transport is expected to take longer than 2 days it is best to transport at 4°C. | Echinococcus | Microscopic examination for hydatid hooklets and scolices of <i>Echinococcus</i> species. | 1 day | May be infective – handle with care. | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |

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| <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, Staining PCR | 2 weeks (Prov. result sent day 2) 2 days | | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |
| <u>Parasite -Leishmania</u> species (Leishmaniasis) | Bone marrow, liver biopsy, skin biopsy/impression smears. Submit skin biopsy in saline. | Transport at ambient temperature or on ice. | Leishmania investigation | Staining and microscopy | 1 day | | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |
| <u>Parasite -Pneumocystis jirovecii</u> (<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 days | Please send a respiratory specimen (induced or expectorated sputum, BAL etc.) for this test when PCP is suspected clinically/ radiologically, but the routine lab test (IFA) is negative. | Parasitology Reference Laboratory 011 555-0304 011 555-0311 |

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| 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 | 25 working days PCR identification from the time the samples were received at VCRL. 6 weeks for morphological identification as well as PCR identification | <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 |
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| ANTIMALARIAL RESISTANCE MONITORING AND MALARIA OPERATIONAL RESEARCH (ARMMOR) | | | | | | | |
| Parasite - <i>Plasmodium falciparum</i> (Malaria) | Unclogged, 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. | Antimalarial drug or diagnostic resistance marking | Antimalarial drug or diagnostic resistance PCR | 7 to 10 working days for antimalarial drug resistance analysis 3 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 |

Centre for Enteric Diseases

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| <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 |

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| 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 | 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 | Surveillance isolates are tested in batches | |
| | | | Enteric surveillance and reference function | Phenotypic and genotypic characterization | Project dependent and GERMS-SA Quarterly stats timelines | Surveillance isolates are tested in batches | |

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| 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: Vibrio cholerae 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 |
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| Salmonella Typhi and non-typhoidal Salmonella species | 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 | 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 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 |
| | | | | Antimicrobial susceptibility testing | 4 Working days | | |
| | | | | Enteric surveillance and reference function | Phenotypic characterization and whole- genome sequence (WGS) analysis | | |
| Shigella species | 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 | 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 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 |
| | | | | Antimicrobial susceptibility testing | 4 working days | | |
| | | | | Enteric surveillance and reference function | Phenotypic characterization and whole- genome sequence (WGS) analysis | | |

| 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 | Inoculated Dorset slopes incubated at 37°C overnight at source laboratory, prior to submission to CED- Bacteriology | 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 | 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 | | | | | |
| | CSF, blood 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 | 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 | | | |

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) | 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 |
|---|---|---|--|--|--|--|---|
| Mycology Reference Laboratory | | | | | | | |
| Fungal pathogen from clinical sources which cannot be identified by academic/ referral laboratories | Unidentified fungal pathogen from clinical source should be inoculated into an agar slope/plate (screwtop) bottle such as Dorset transport medium or potato dextrose medium | Room temperature; inform Mycology Reference Laboratory if suspected dimorphic fungus which needs to be processed in the CHARM Thermally dimorphic | Identification of fungal pathogen; antifungal susceptibility testing | Phenotypic and genotypic identification (where required) of unidentified fungal pathogens from clinical sources; Antifungal susceptibility testing | 10 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 |
| Moulds and dimorphic fungi from normally-sterile sites (surveillance) | Inoculated into an agar Slope/plate (screwtop) bottle such as Dorset transport medium or potato dextrose medium | Room temperature; inform Mycology Reference Laboratory if suspected dimorphic fungus which needs to be processed in a the CHARM Thermally dimorphic Lab | Identification of fungal pathogen; antifungal susceptibility testing; genotyping | Phenotypic and genotypic identification (where required) of unidentified fungal pathogens from clinical sources; Antifungal susceptibility testing | 10 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 |
| Cryptococcosis (surveillance) | Cryptococcal isolate should be inoculated into an agar slope/plate (screwtop) 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- 1 week | Laboratory Report and worksheet | CHARM Mycology Reference Laboratory 011 555 0381 011 555 0323 011 555 0325 |
| Candidaemia (surveillance) | Candida isolate should be inoculated into an agar slope/plate (screwtop) bottle such as Dorset transport medium | Room temperature | 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) | 1 week | Clinical history and case investigation form | CHARM Mycology Reference Laboratory 011 555 0325 011 555 0381 011 555 0323 |
| 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) | 1 week for PCR; 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 |

| 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 |
|--|--|--|--|---|---|---|--|
| 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, real-time PCR for Candida, fungal culture | 48 hours to 1 week for molecular tests depending on urgency; funga 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> ; <i>cfr</i> -linezolid resistant gene, Virulence factor <i>-pvl</i> ; vancomycin AST | 14 working days from receipt of culture | Referral isolate case Report forms FML1234 Refer to NICD using NIC1121 | CHARM AMRL-CC 011 555 0342 CHARM molecular 011 386 6395 |
| 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 and others detection/ | ID, MIC and molecular characterization of resistance mechanisms | | Highly resistant nosocomial infections | C CHARM AMRL-CC 011 555 0342 CHARM molecular 011 386 6395 |
| <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 molecular 011 386 6395 CHARM AMRL-CC 011555 0342 |
| 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) | Submit isolates with final lab report and/or lab working card Clearly indicating MALDI TOF as the test request. Test requests written on agar plates will not be accepted | CHARM AMRL-CC 011555 0342 |

| 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 on saline/formalin fixed paraffin embedded tissue | Transport at ambient temperature | Bacterial Identification | PCR and Sequencing for Bacterial Identification | 14 days from receipt of sample | Referral isolate case Report forms | CHARM AMRL-CC 011386 6395 CHARM AMRL-CC 011555 0342 |

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 investigations 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 • Escherichia coli • Haemophilus influenzae • Klebsiella aerogenes • Klebsiella oxytoca • Klebsiella pneumoniae • Moraxella catarrhalis • Proteus spp. • Pseudomonas aeruginosa • Serratia marcescens • Staphylococcus aureus • Streptococcus agalactiae [GBS] • Streptococcus pneumoniae • Streptococcus pyogenes [GAS] • Chlamydia pneumoniae • Legionella pneumophila • Mycoplasma pneumoniae | | | unknown cause | | | | |
| <p>Meningitis/Encephalitis (viral/bacterial)</p> <ul style="list-style-type: none"> • Escherichia coli K1 • Haemophilus influenzae • Listeria monocytogenes • Neisseria meningitidis • Streptococcus agalactiae • Streptococcus pneumoniae • 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) • Cryptococcus neoformans/gattii | 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 investigations forms to be completed, guidelines, other relevant info) | Department and Contact telephone no's |
|---|---|--|------------------------|---|-------------------------|---|---|
| SARS-CoV-2 COVID-19 (Coronavirus disease 2019) | <p>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)</p> <p>Other samples – discuss with Dr on call</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 swab</p> | <p>Transport in cooler box with ice packs. Sample should reach laboratory within 72hrs</p> | SARS-CoV-2 COVID-19 | <p>Real-time PCR</p> <p>Note: routine diagnostic testing available at NHLS or private pathology laboratories</p> | 2 working days | <p>Specimens should be submitted with CRDM specimen submission form available on NICD website</p> <p>COVID-19 is classified as a category 1 notifiable medical condition (NMC).</p> | <p>CRDM: 011 386 6373/0356/6390</p> <p>Queries: 011 555 6390/0356/0387/0352</p> <p>Prof Anne von Gottberg 011 555 0316</p> |
| Avian Influenza (H5, H7, H9) | <p>Any respiratory sample (e.g. Nasopharyngeal or 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 can be combined in same UTM/VTM</p> <p>Flocked swabs recommended. Alternatively, dacron or</p> | <p>Transport in cooler box with ice packs.</p> <p>Sample should reach laboratory as soon as possible and within 72hrs</p> <p>Transport as infectious substance (packaging instruction 602 of IATA Category A).</p> | Avian influenza | Real-time PCR | 24 hours | <p>Clinical features consistent with avian influenza infection PLUS meets epidemiological criteria as outlined in AI Case Investigation Document (Contact Epidemiologist)</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 6390</p> <p>011 555 0352 Dr Nicole Wolter</p> <p>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 investigations forms to be completed, guidelines, other relevant info) | Department and Contact telephone no's |
|--|--|--|---|-------------------------------|------------------|--|--|
| | rayon swabs | | | | | | |
| MERS-Coronavirus (MERS-CoV) | <p>Induced sputum, lung aspirates, combined nasopharyngeal and oropharyngeal swabs or nasopharyngeal aspirates in UTM/VTM, BAL and biopsies of respiratory tract tissues.</p> <p>Other samples - discuss with Dr on call.</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>Transport in cooler box with ice packs.</p> <p>Sample should reach laboratory as soon as possible and within 72hrs</p> <p>Transport as infectious substance (packaging instruction 602 of IATA Category A).</p> | <p>MERS-CoV</p> <p>Contact NICD hotline on 082 883 9920 for all suspected MERS coronavirus test requests</p> <p>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)</p> | Real-time PCR | 24 hours | <p>Clinical features consistent with MERS-CoV infection PLUS meets epidemiological criteria as outlined in MERS-CoV Case Investigation Document (Contact Epidemiologist)</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 0316 (Prof Anne von Gottberg)</p> |
| Severe respiratory illness of unknown cause | <p>Any respiratory sample (e.g. Nasopharyngeal or 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</p> | <p>Transport in cooler box with ice packs.</p> <p>Sample should reach laboratory as soon as possible and within 72hrs</p> | Respiratory panel (bacterial and viral) | Real-Time PCR | 24 hours | <p>Specimens should be 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>NICD Hotline 082 883 9920</p> <p>CRDM 011 555 0316 (Prof Anne von Gottberg)</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 |
|---|--|---|--|---|---|---|--|
| | should be combined in same UTM/VTM Flocked swabs recommended. Alternatively, dacron or rayon swabs | | | | | | |
| <i>Neisseria</i> species, <i>Haemophilus</i> species and <i>Streptococcus</i> species (GERMS surveillance) 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> *) *on request | Isolates inoculated onto Dorset transport medium and incubated overnight at 37°C in 5% CO ₂ Normally sterile site specimen (blood or cerebrospinal fluid [CSF] or other fluids e.g. pleural, peritoneal, synovial) Isolates inoculated onto Dorset transport medium and incubated overnight at 37°C in 5% CO ₂ Clinical samples: minimum volume of 200µl, EDTA blood | Submit isolates on Dorset transport media after overnight incubation. Inoculate as per NIC0184. Do not refrigerate. Do not batch for longer than 1 week as isolates will lose viability. Clinical specimens at cool ambient temperature (e.g. in a cooler box) | Identification of <i>Neisseria</i> species, <i>Haemophilus</i> species or <i>Streptococcus</i> species for GERMS surveillance (GERMS- SA) Bacterial meningitis screen (PCR and culture) | 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> Serotyping/ Serogrouping of <i>S. pn</i> , <i>Nm</i> , <i>Hi</i> (phenotypic and molecular) Antimicrobial susceptibility testing (disc and minimum inhibitory concentration - MIC) | PCR urgent 1-2 days Surveillance 1-2 months | Isolates submitted to NICD for national surveillance (GERMS- SA). Submit with sterile isolate form or LIS report. Specimens should be submitted with CRDM specimen submission form available on NICD website | NICD Hotline 082 883 9920 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) |
| Atypical pneumonia- causing pathogens <ul style="list-style-type: none"> <i>Mycoplasma pneumoniae</i> <i>Chlamydia pneumoniae</i>, <i>Legionella</i> spp. | Sputum (expectorated or induced) in a sterile container, and/or nasopharyngeal- oropharyngeal aspirate or combined flocked swabs preferably in universal transport medium (UTM) or Primestore. Urine (for <i>L. pneumophila</i> serogroup 1). Minimum volume 5ml in a sterile leak- proof container | Sputum to be frozen immediately and transported on dry ice UTM and urine to be stored and transported refrigerated. Primestore – ambient temperature | Atypical pneumonia PCR <i>Legionella</i> spp. | Real-time PCR for identification of atypical pneumonia- causing bacteria (<i>M. pneumoniae</i> , <i>C. pneumoniae</i> , and <i>Legionella</i> spp) Culture for <i>Legionella</i> spp. Binax NOW for <i>Legionella</i> <i>pneumophila</i> (serogroup 1) | PCR urgent 1 day/24 hours Non-urgent 2-4 days Culture 7-10 days | Specimens should be submitted with CRDM specimen submission form available on NICD website | CRDM 011 555 0315 011 555 0317 011 555 0316 (Prof Anne von Gottberg) |

| 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>Bordetella pertussis</i> and <i>Bordetella</i> spp. (Pertussis) | Sputum (expectorated or induced) in a sterile container, and/or nasopharyngeal- oropharyngeal aspirate or combined flocked swabs preferably in universal transport medium (UTM) For <i>Bordetella pertussis</i> culture, swabs should be placed in Regan Lowe (RL) | Sputum to be frozen immediately and transported on dry ice UTM to be stored and transported in cooler boxes with ice packs. RL to be stored and transported at room temperature | <i>Bordetella pertussis</i> | Real-time PCR for <i>B. pertussis</i> and other <i>Bordetella</i> spp. Culture for <i>B. pertussis</i> and other <i>Bordetella</i> spp. | PCR urgent 1 day/24 hours Non-urgent 2-4 days Culture 7-10 days | Specimens should be submitted with CRDM specimen submission form available on NICD website <i>Bordetella pertussis</i> is classified as a category 1 notifiable medical condition (NMC). | CRDM 011 555 0315 011 555 0317 011 555 0352 (Dr Nicole Wolter) 011 555 0316 (Prof Anne von Gottberg) |
| <i>Corynebacterium diphtheriae</i> (Diphtheria) | Respiratory: Oropharyngeal swab Nasopharyngeal swab or aspirate Throat swab Pseudo-membrane tissue from affected area Cutaneous: Pus/wound swabs Other: Blood/blood culture Mitral valve | Isolates on Hoyles or Dorset transport medium for identification Clinical samples (swabs – dry or in a transport medium) (for culture + PCR) Stored and transported at cool ambient temperature. | <i>Corynebacterium diphtheriae</i> identification Elek and PCR for toxin production | Phenotypic identification (MALDI-ToF) Elek for toxin production and PCR for presence of toxin gene | 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 Diphtheria is classified as a category 1 notifiable medical condition (NMC). | CRDM 011 555 0315 011 555 0317 011 555 0327 (Linda de Gouveia) 011 555 0316 (Prof Anne von Gottberg) |

| 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>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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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

| | | |
|--------------------------------------|-----------------|--------------|
| Dr Michelle Groome | +27 11 386 6400 | 082 374 7345 |
| 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.

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). The NICD Sequencing Core Facility currently supports three Illumina MiSeq sequencers. 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 (DNA or RNA) 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 Agencourt® 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. **RNA Input Recommendations:** 1-4 μg of total RNA, minimum concentration 20 ng/μL in nuclease-free ultra-pure water (do not exceed 50 μL) non-degraded with a Bioanalyzer RIN value of 8. When submitting samples, a Sample Request Form needs to be completed in full and emailed to the laboratory.

Sample Packaging and Transportation: Samples should be submitted to the laboratory in sterile tubes or reaction plates, and sample leak during transportation should be avoided. It is recommended that the cold chain be maintained during sample shipment in order to ensure that nucleic acid integrity is not compromised. Samples should be dispatched in a sealed container and marked appropriately. Courier service must be employed for sample shipment. Dispatching of samples on Fridays and weekends should be avoided so as to keep transportation time to the absolute minimum.

Expected Turnaround Time: Samples have an expected turnaround time of up to two weeks (project-dependent), and this is calculated from sample reception in the laboratory until the sequencing data is sent to the client. Urgent samples (i.e. samples from suspected outbreak cases) are prioritized, and will therefore have a shortened turnaround time. It is imperative that the laboratory is notified of priority samples before they are dispatched.

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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 recorded in the Sample Receiving Log Sheet and verification is done to ensure that each sample meets all acceptance criteria. Samples are rejected if they fall in any of the following rejection criteria: unlabelled samples; leaking samples; incorrect sample type (e.g. blood, sputum, urine, swab, etc.); samples not properly labelled; information on sample tube and Sample Request Form not corresponding; insufficient sample volume; samples with very low concentrations; samples received without completed Sample Request Form; sample tubes with illegible handwriting; and samples submitted for tests not performed in 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: Dr Arshad Ismail

Sequencing Core Facility

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