

APPENDIX 2: LABORATORY DIAGNOSIS

NOTE: Any suspicious skin lesion that is not responding to the recommended treatment should be biopsied and sent for histologic examination in formalin and a portion of the biopsy should be sent in a sterile universal bottle for microscopy and culture. In addition a sample of clotted blood should be submitted. A full description of the lesion and illness as well as treatment given should be provided.

1. Laboratory diagnosis of fungal infections

Pathogen	Specimen	Transport	Laboratory tests
Dermatomycoses	Skin scrapes, clippings of hair, skin biopsies	In sterile universal tubes	Microscopy, KOH preparation, culture
<i>Candida albicans</i>	Vaginal, oral, genital, oesophageal swabs	Amies transport medium	Gram stain microscopy Culture
<i>Cryptococcus neoformans</i>	CSF, aspirate of pleural fluid, other aspirates, tissue, blood	In sterile universal tubes	Microscopy of fluid and aspirates using India Ink stain, Culture, Cryptococcal antigen test on CSF and serum
<i>Histoplasma capsulatum</i>	Tissue biopsy, sputum, bronchoalveolar lavage, blood	In sterile tube Tissue in formalin	Histologic examination, Culture Complement fixing antibody test (CFT)
<i>Coccidioides immitis</i>	Tissue biopsy, CSF, bronchoalveolar lavage, blood	In sterile tube Tissue in formalin	Microscopy, culture, CFT
<i>Pneumocystis jiroveci</i>	Bronchoalveolar lavage, induced sputum, transbronchial biopsy	In sterile tube	Microscopy after appropriate staining with Romanosky, toluidine, silver methanamine stains, PCR

Pathogen	Specimen	Transport	Laboratory tests
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Herpes virus varicella-zoster (HHV3)	Fluid from lesions, blood	In sterile tubes	PCR or IFA on Fluid Serology on blood
Herpes simplex virus (HHV 1 and 2)	Fluid from lesions, ulcers, urethra, cervix, conjunctiva, oral mucosa, pharynx, CSF, biopsy tissue, blood	In sterile universal tubes	Cell culture, IFA ELISA and RIBA
Cytomegalovirus	Tissue biopsy (lung and liver), prostatic secretions, cervical secretions, CSF, urine, blood	In sterile tube	Histologic examination Viral culture Serum antibody
Kaposi's sarcoma Herpes Virus (HHV8)	Tissue biopsy, blood	In sterile tube Tissue in formalin	Histology of tissue PCR for HHV8, HHV8 antibody
Human papilloma virus	Tissue biopsy, Pap smear	In sterile tube	Cytology, IFA, DNA hybridization, PCR, Electron microscopy
Molluscum contagiosum virus	Tissue biopsy	Formalin	Histology, cytology, microscopy
Hepatitis B virus	Blood, liver biopsy	Sterile tube Biopsy in formalin	Antibody and antigen (HbsAg, HbeAg, HBCAb, HbsAb) Histology of tissue
Hepatitis C virus	Blood, liver biopsy	Sterile tube Biopsy in formalin	PCR for HCV-RNA Histology of tissue

3. Laboratory diagnosis of bacterial infections

Pathogen/diagnosis	Specimen	Transport	Laboratory tests
Syphilis	Ulcer exudates, CSF, blood	Wet prep for immediate dark field examination	Dark field microscopy for motile treponemes Culture and sensitivity for bacteria Blood and CSF for syphilis serology
Mycobacterium tuberculosis	Sputum, biopsy of tissue, lymph node biopsy, urine, bone marrow, CSF, pleural aspirate	In sterile tubes	Ziel Neilsen stain for acid fast bacilli, Special stains, e.g., rhodamine auramine Histology, PCR TB culture and sensitivity: all body fluids and bone marrow
Septicaemia	Blood, Always state diagnosis and site of type of specimen	In blood culture bottles	Culture and sensitivity
Pulmonary bacterial infections (pneumonia, lung abscess)	Sputum, blood, State diagnosis and site of type of specimen	In sterile tubes and blood culture bottles	Culture and sensitivity
Salmonellosis	Stool, blood, urine, Always state diagnosis and site of type of specimen	In sterile tubes and blood culture bottles	Culture and sensitivity Blood serology (Widal test)
Shigellosis	Stool	In sterile tubes	Culture and sensitivity
Campylobacter	Stool, blood	In sterile tubes	Culture and sensitivity, Serology
Clostridium difficile	Stool	In sterile tubes	Culture and sensitivity Identification of toxin in stool
Bartonella henselii	Tissue biopsy, blood	In sterile tube	Histologic examination, Microscopy after silver staining, Serology

5. Laboratory diagnosis of parasitic infections

Pathogen	Specimen	Transport	Laboratory tests
<i>Toxoplasma gondii</i>	Tissue biopsy, blood	In sterile tubes	Microscopy, histology Blood serology (IgG antibody)
<i>Cryptosporidia parvum</i>	Stool, tissue biopsy	In sterile tubes	Microscopy for ova and oocysts Modified Ziel Nielsen stain for oocysts Cryptosporidia detected by IFA on stool
<i>Strongyloides stercoralis</i>	Stool, blood	In sterile tube	Microscopy of stool concentrate for ova Culture stool for larvae Blood serology
<i>Isoospora belli</i>	Stool	In sterile tube	Microscopy of stool concentrate Formol ether concentrate
<i>Enterocytozoon bieneusi</i> (Microsporidiosis)	Stool	In sterile tube	Stool microscopy after staining by Chromotrope 2R method IFA on stool
<i>Sarcoptes scabiei</i>	Scrapes obtained from typical skin burrows	In sterile tube	Microscopic examination for mites

5. Laboratory diagnosis for sexually transmitted infections

It is recommended that all patients with STI are treated syndromically in the first instance. The following table shows the organisms that can cause the various STI syndromes and what specimens may be collected and tests performed to confirm the aetiologic diagnosis of STIs.

STI syndrome	Aetiologic agents	Specimens to be collected	Laboratory tests
Urethral discharge	<i>Neisseria gonorrhoeae</i> , <i>Chlamydia trachomatis</i> , <i>Trichomonas vaginalis</i> ,	Urethral wet prep, Urethral smear, Urethral swab, Urine	Wet prep for <i>T. vaginalis</i> Gram stain for organisms Culture and sensitivity Ligase chain reaction

	<i>Ureaplasma urealyticum</i>		and PCR (on urine and secretions)
Vaginal discharge	<i>N. gonorrhoeae</i> , <i>C. trachomatis</i> , <i>T. vaginalis</i> , <i>Candida albicans</i> , bacterial vaginosis	Vaginal wet prep, Vaginal smear, Vaginal swab, Cervical smear, Cervical swab, Urine	Wet prep for <i>T. vaginalis</i> and yeasts and clue cells Gram stain for organisms Culture and sensitivity Ligase chain reaction and PCR (on urine and secretions)
Genital ulcer	<i>Treponema pallidum</i> , <i>Haemophilus ducreyi</i> , <i>Chlamydia trachomatis</i> (Types L1, L2, L3), Herpes simplex virus, <i>Calymmatobacterium granulomatis</i>	Ulcer wet prep, Ulcer smear and swab, Deep ulcer scrape (when indicated), Fluid from vesicles Blood	Darkfield microscopy Gram stain for organisms Giemsa stain for Donovan bodies Monoclonal antibody test, IFA Culture and sensitivity Blood for syphilis serology and for RIBA and ELISA (herpes)

STI syndrome	Aetiologic agents	Specimens to be collected	Laboratory tests
Lower abdominal tenderness	<i>N. gonorrhoeae</i> , <i>C. trachomatis</i> , group B streptococci, anaerobic bacteria	Vaginal wet prep, Vaginal smear, Vaginal swab, Cervical smear, Cervical swab, Urine	Wet prep for <i>T. vaginalis</i> and yeasts and clue cells Gram stain for organisms Culture and sensitivity Ligase chain reaction and PCR (on urine and secretions)
Sexually transmitted inguinal lymphadenitis	<i>Haemophilus ducreyi</i> (chancroid), <i>Chlamydia trachomatis</i> (Types L1, L2, L3) (lymphogranuloma venereum)	Bubo aspirates	Gram stain microscopy Culture and sensitivity LCR
Acute scrotal swelling	<i>N. gonorrhoeae</i> , <i>C. trachomatis</i> , mumps virus, other bacteria	Endourethral swab and smear	Wet prep Gram stain for organisms Culture and sensitivity Ligase chain reaction and PCR (on urine and secretions)
Neonatal conjunctivitis	<i>N. gonorrhoeae</i> , <i>C. trachomatis</i> , other bacteria	Conjunctival smear and swab	Wet prep Gram stain for organisms Culture and sensitivity Ligase chain reaction and PCR (on urine and secretions)