City of Milwaukee Health Department
Public Health Laboratory

TEST REFERENCE MANUAL

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CITY OF MILWAUKEE HEALTH DEPARTMENT

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June 26, 2013

Test Reference Manual

Acanthamoeba Culture

Methodology:	Culture
Test Code:	CXACA
CPT Code:	87081
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	2-7 days
Specimen Required:	Tissue (corneal biopsy material, brain, lung,), corneal scrapings, contact lens (or solution), eye wash, CSF.
Collection:	Tissue, cornea scrapings, contact lens: Transfer specimen into sterile container containing 5 mL of Nelson's saline. Nelson's saline available upon request. Fluid (contact lens solution, eye wash, CSF): 1 mL in sterile screw cap container
Storage and Stability:	Room temperature. Do not refrigerate or freeze.
Transport:	Room temperature
Unacceptable Conditions:	Frozen, refrigerated, formalin-fixed specimens. Dry material. Slides are not acceptable. Swabs are suboptimal and may result in a false negative result.
Reference Range:	Not isolated
Limitations:	N/A
Required Information:	N/A
Additional Information:	Microscopic examination of the culture plate for the presence of cysts/trophozoites confirms positive specimen.

Adenovirus PCR

Methodology:	Qualitative Real-Time Polymerase Chain Reaction
Test Code:	RTADN
CPT Code:	87798
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-2 days
Specimen Required:	Throat or NP swabs, bronchial wash , BAL, stool or rectal swabs in Viral Transport Media (VTM)
Collection:	Collect appropriate specimen in VTM
Storage and Stability:	Refrigerated: 2-8˚C. for 7 days
Transport:	Refrigerated at 2-8˚C.
Unacceptable Conditions:	Swabs with calcium alginate, cotton tips, or wood shafts. Specimens that are insufficient, leaking, not refrigerated or not labeled
Reference Range:	Not detected
Limitations:	Assay does not differentiate adenovirus subgroups or serotypes
Required Information:	N/A
Additional Information:	N/A

Aeromonas Culture

Methodology:	Culture
Test Code:	CXAER
CPT Code:	87046
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	3-7 days
Specimen Required:	Stool
Collection:	Collect stool in appropriate leak-proof container or place in enteric transport medium such as Cary-Blair, Amies, or Stuart's. Collection kit is available upon request. Stools must be collected before antibiotic treatment is initiated for greatest chance of isolation of pathogens. If antibiotic treatment has been initiated stool must not be collected until > 48 hours after treatment has ceased.
Storage and Stability:	Refrigerated: 2-8˚C.
Transport:	Refrigerate at 2-8˚C. If unpreserved stool is not transported to the laboratory within 24 hours of collection, transfer specimen to an enteric transport media before transporting to the laboratory.
Unacceptable Conditions:	Unpreserved specimens not received on ice packs or > 24 hours old. Received in transport media not recommended for bacterial isolation or expired. Specimen collected while on antibiotic therapy
Reference Range:	Not isolated
Limitations:	N/A
Required Information:	N/A
Additional Information:	While some aeromonads are agents of gastroenteritis, there is no consensus at this time that all isolates should be considered significant.

Bacterial Identification, Referred Isolate

Methodology:	Biochemical, cellular fatty acid analysis, nucleic acid sequencing
Test Code:	RFCUL
CPT Code:	87153 87076 (anaerobic) 87077 (aerobic)
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	4-21 days dependent upon organism
Specimen Required:	Pure culture isolate
Collection:	Pure culture isolate on agar slant or plate
Storage and Stability:	Room temperature
Transport:	Room temperature
Unacceptable Conditions:	Isolate mixed or non-viable, specimen frozen
Reference Range:	N/A
Limitations:	N/A
Required Information:	N/A
Additional Information:	Includes identification of organisms of non-public health significance

Bacterial Identification, Referred Isolate of Public Health Significance

Methodology:	Biochemical, serological typing
Test Code:	RFBAC
CPT Code:	87077
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	2- 4 days
Specimen Required:	Pure culture isolate
Collection:	Pure culture isolate on agar slant or plate
Storage and Stability:	Room temperature
Transport:	Room temperature
Unacceptable Conditions:	Culture not viable or mixed, specimen frozen
Reference Range:	N/A
Limitations:	N/A
Required Information:	N/A
Additional Information:	Includes identification of *Aeromonas, Campylobacter, E. coli* 0157:H7*, Edwardsiella, Plesiomonas, Salmonella, Shigella, Vibrio, Yersinia, Listeria* and other organisms of public health significance. Serotyping is performed on all referred cultures of *E. coli, Salmonella* and *Shigella* submitted for identification.

Bacterial Molecular Strain Typing

Methodology:	Pulsed Field Gel Electrophoresis (PFGE)
Test Code:	PFGE
CPT Code:	87152
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	3-7 days
Specimen Required:	Pure culture isolate
Collection:	Pick single colonies of each strain to an agar slant and incubate prior to shipment.
Storage and Stability:	Room temperature: 1 month on slant
Transport:	Room temperature
Unacceptable Conditions:	Inaccurate identification of bacterial strains prior to PFGE testing.
Reference Range:	By report
Limitations:	Molecular subtyping by PFGE is to be used only for epidemiological and public health surveillance purposes. Results are not to be used for patient diagnosis and/or treatment. PFGE testing is not a method for identification of bacterial strains.
Required Information:	N/A
Additional Information:	PFGE testing is a useful tool for strain typing and foodborne or nosocomial outbreak investigations. At least two isolates from different individuals must be submitted in a suspected outbreak. All *E. coli* O157:H7, *Salmonella, Shigella*, *Campylobacter* and *Vibrio cholerae* strains are typed following CDC PulseNet guidelines. For PFGE testing on strains not listed above, please call the laboratory.

Blastomyces dermatitidis Identification, DNA Probe

Methodology:	Nucleic Acid Hybridization
Test Code:	BDGEN
CPT Code:	87149
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-2 days
Specimen Required:	Pure culture on agar slant
Collection:	Viable isolate on non-blood-containing fungal medium
Storage and Stability:	Room temperature. Do not freeze.
Transport:	Room temperature
Unacceptable Conditions:	Frozen or mixed cultures, leaking containers or isolate submitted on an agar plate.
Reference Range:	Not detected
Limitations:	This test does not differentiate between *B. dermatitidis* and *Paracoccidioides brasiliensis*; both are dimorphic fungi that cause endemic systemic mycoses. This test produces a positive result with the mold *Gymnascella hyalinospora* and with *Emmonsia parva.* These organisms are rarely isolated. Results should be interpreted in conjunction with other laboratory and clinical data available to the clinician.
Required Information:	N/A
Additional Information:	*B. dermatitidis* is the causative agent of blastomycoses or North American blastomycoses and is endemic in the south-central and midwestern United States. *P. brasiliensis* causes paracoccidioidomycosis or South American blastomycoses and is found almost exclusively in South and Central America. *P. brasiliensis* may be distinguished from *B. dermatitidis* by microscopic examination in the yeast phase.

Bordetella Culture

Methodology:	Culture
Test Code:	CXOBP
CPT Code:	87081
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	4-10 days
Specimen Required:	Nasopharyngeal swab (NP), nasal wash or aspirate
Collection:	NP swab: Collect and place NP swab (Calcium alginate or Dacron) in Amies with charcoal or Regan-Lowe transport media. If possible, inoculate culture plate or slant at bedside for optimal recovery. Collection kit available upon request. Nasal washing or aspirate: Collect into a sterile leak-proof container with 1-1.5 mL of sterile saline.
Storage and Stability:	Room temperature or refrigerated at 2-8°C: within 2 days If delay expected: Incubate NP swab in appropriate transport medium at 35°C. for 48 hours prior to shipping Do not incubate in CO_2 incubator.
Transport:	Refrigerate at 2-8°C.
Unacceptable Conditions:	Dry swab, throat or nares swab, cotton or rayon-tipped swabs, sputum, specimens in viral transport medium or non-charcoal containing medium. Avoid extreme temperatures.
Reference Range:	Not isolated
Limitations:	A negative result does not rule out infection with *Bordetella* species.
Required Information:	N/A
Additional Information:	*Bordetella pertussis*/*parapertussis* detection by PCR also available. Identification of *Bordetella pertussis* should be reported to the local or state public health agency.

Bordetella PCR

Methodology:	Qualitative Real-Time Polymerase Chain Reaction
Test Code:	RTBP
CPT Code:	87798 x 3
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-2 days
Specimen Required:	Nasopharyngeal swab, BAL, respiratory aspirate, or sputum
Collection:	NP: Dacron swab in sterile tube BAL, aspirate or sputum: 2 mL in sterile container
Storage and Stability:	Room temperature: 4 hours Refrigerated: 2-8˚C: 2 days Frozen: 2 weeks
Transport:	Refrigerate at 2-8˚C.
Unacceptable Conditions:	Calcium-alginate swabs, specimens in charcoal-based media
Reference Range:	Not detected
Limitations:	N/A
Required Information:	N/A
Additional Information:	This test detects and differentiates between *B. pertussis*, *B. parapertussis* and *B. holmesii* (an uncommon respiratory pathogen of humans). Test results must be correlated with culture results and/or patient history to confirm as a case of *B. pertussis* or *B. parapertussis* infection. A negative result does not rule out infection with *B. pertussis* or *B. parapertussis. Bordetella pertussis/parapertussis* culture also available.

Campylobacter Culture

Methodology:	Culture
Test Code:	CXCAM
CPT Code:	87046
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	3-7 days
Specimen Required:	Stool, rectal swab
Collection:	Place diarrheal stool, formed stool or rectal swab in Modified Cary-Blair transport medium and fill to indicated line per package insert.
Storage and Stability:	Refrigerated: 2-8˚C.
Transport:	Refrigerate at 2-8˚C. within 24 hours
Unacceptable Conditions:	Insufficient amount of sample; specimen > 24 hours old and not in appropriate transport media., non-sterile or leaking container, multiple specimens (more than one in 24 hours), dry swab
Reference Range:	Not isolated
Limitations:	N/A
Required Information:	N/A
Additional Information:	Identification of Campylobacter should be reported to the local or state public health agency.

Chlamydia pneumoniae PCR

Methodology:	Qualitative Real-Time Polymerase Chain Reaction
Test Code:	RTCPN
CPT Code:	87486
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-2 days
Specimen Required:	Throat or NP swab, BAL, or sputum
Collection:	Place swab or specimen in M4 or universal transport media or sterile container
Storage and Stability:	Refrigerated: 3 days; Frozen: 1 month
Transport:	Refrigerate at 2-8˚C.
Unacceptable Conditions:	Swabs with calcium alginate, cotton tips, or wood shafts, specimens that are insufficient, leaking, not refrigerated or not labeled
Reference Range:	Not detected
Limitations:	N/A
Required Information:	N/A
Additional Information:	N/A

Chlamydia trachomatis Culture

Methodology:	Cell Culture, Immunofluorescence
Test Code:	CTRAC
CPT Code:	87110, 87140
Requisition Required:	Microbiology
Performed:	Tuesday and Friday
Turnaround Time:	3-5 days
Specimen Required:	Cervical, urethral, rectal, throat or conjunctival swabs
Collection:	Place swabs in *Chlamydia* transport media; refrigerate immediately
Storage and Stability:	Refrigerated: 2-8˚C. for 3 days
Transport:	Refrigerate at 2-8˚C.
Unacceptable Conditions:	Dry swabs or swabs with calcium alginate or wood shafts, specimens that are insufficient, leaking, not refrigerated or not labeled
Reference Range:	Not isolated
Limitations:	Amplified DNA testing is recommended for detection of *Chlamydia trachomatis* from endocervical and urethral specimens.
Required Information:	N/A
Additional Information:	Culture is recommended for *Chlamydia trachomatis* detection in suspected sexual abuse.

Chlamydia trachomatis, Nucleic Acid Amplification

Methodology:	Target Amplification Nucleic Acid Probe
Test Code:	CTAMP
CPT Code:	87491
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1- 2 days
Specimen Required:	Urine; endocervical, vaginal, male urethral, throat or rectal swabs
Collection:	Collect first-catch urine sample or swab and transfer to appropriate APTIMA Combo 2 Assay transport tubes. Swabs and transport tubes are available upon request.
Storage and Stability:	Urine (unpreserved): Room temperature for 24 hours Urine in transport tube: Store at 2-30˚C. for 30 days Swabs in transport tube: Store at 2-30˚C. for 60 days or frozen for 12 months
Transport:	Refrigerate at 2-8˚C. or room temperature
Unacceptable Conditions:	Any urine specimen transport tube with volumes above or below allowable levels, and any swab specimen transport tube with no swab, two swabs, or a swab not provided by manufacturer.
Reference Range:	Not detected
Limitations:	Excess mucus should be removed to ensure collection of columnar epithelial cells lining the endocervix. If excess mucus is not removed, sampling of these cells is not ensured. Assay is not intended for the evaluation of suspected sexual abuse or for other medico-legal indications.
Required Information:	N/A
Additional Information:	Patient should not have urinated for at least 1 hour prior to sample collection. Culture is recommended for *Chlamydia trachomatis* detection in suspected cases of sexual abuse. Assay results should be interpreted in conjunction with other laboratory and clinical data available to the clinician.

Chlamydia trachomatis/Neisseria gonorrhoeae, Combination Nucleic Acid Amplification

Methodology:	Target Amplification Nucleic Acid Probe
Test Code:	CTAMP, GCAMP
CPT Code:	87491, 87591
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1- 2 days
Specimen Required:	Urine; endocervical, vaginal, male urethral, throat or rectal swabs
Collection:	Collect first-catch urine sample or swab and transfer to appropriate APTIMA Combo 2 Assay transport tubes. Swabs and transport tubes are available upon request.
Storage and Stability:	Urine (unpreserved): Room temperature for 24 hours Urine in transport tube: Store at 2-30˚C for 30 days Swabs in transport tube: Store at 2-30˚C for 60 days or frozen for 12 months
Transport:	Refrigerate at 2-8˚C. or room temperature
Unacceptable Conditions:	Any urine specimen transport tube with volumes above or below allowable levels, and any swab specimen transport tube with no swab, two swabs, or a swab not provided by manufacturer.
Reference Range:	Not detected
Limitations:	Excess mucus should be removed to ensure collection of columnar epithelial cells lining the endocervix. If excess mucus is not removed, sampling of these cells is not ensured. Assay is not intended for the evaluation of suspected sexual abuse or for other medico-legal indications.
Required Information:	N/A
Additional Information:	Patient should not have urinated for at least 1 hour prior to sample collection. Culture is recommended for *Chlamydia trachomatis* and *Neisseria gonorrhoeae* detection in suspected cases of sexual abuse. Assay results should be interpreted in conjunction with other laboratory and clinical data available to the clinician.

Clostridium difficile Culture

Methodology:	Culture
Test Code:	CXCD
CPT Code:	87081
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	2- 3 days
Specimen Required:	Stool
Collection:	5 mL stool in sterile, leak-proof container
Storage and Stability:	Room temperature: 2 hours Refrigerated at 2-8° C: 48 hours Frozen: 1 week
Transport:	Refrigerate at 2-8°C.
Unacceptable Conditions:	Non-sterile or leaking containers, dry specimen, stool in PVA or formalin, multiple specimens (more than one in 24 hours), or formed stools.
Reference Range:	Not isolated
Limitations:	N/A
Required Information:	N/A
Additional Information:	*Clostridium difficile* Toxin B/NAP-1 DNA Real-time PCR also available

Clostridium difficile toxin B/NAP-1 PCR

Methodology:	Qualitative Real-Time Polymerase Chain Reaction
Test Code:	RTCD
CPT Code:	87493
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-2 days
Specimen Required:	Stool
Collection:	5 mL stool in sterile, leak-proof container
Storage and Stability:	Room temperature: 24 hours Refrigerated at 2-8° C: 5 days
Transport:	Refrigerate at 2-8° C.
Unacceptable Conditions:	Non-sterile or leaking containers, dry specimen, stool in PVA or formalin, multiple specimens (more than one in 24 hours), or formed stools.
Reference Range:	Not detected
Limitations:	N/A
Required Information:	N/A
Additional Information:	This assay detects and differentiates the NAP-1 (Ribotype 027), *C. difficile* toxin B and binary toxins.

Coccidioides immitis Identification, DNA Probe

Methodology:	Nucleic Acid Hybridization
Test Code:	CIGEN
CPT Code:	87149
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-2 days
Specimen Required:	Pure culture on agar slant of non-blood-containing medium, such as Sabouraud Dextrose, Brain Heart Infusion, Mycobiotic (Mycosel), Inhibitory Mold Agar, Cottonseed Agar or Yeast Nitrogen Base Agar.
Collection:	Viable isolate on non-blood-containing fungal medium
Storage and Stability:	Room temperature. Do not freeze.
Transport:	Room temperature
Unacceptable Conditions:	Frozen, mixed cultures, leaking containers or isolate submitted on an agar plate.
Reference Range:	Not detected
Limitations:	N/A
Required Information:	N/A
Additional Information:	Results should be interpreted in conjunction with other laboratory and clinical data available to the clinician.

Corynebacterium diphtheriae Culture

Methodology:	Culture
Test Code:	CXDIP
CPT Code:	87081
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	3-7 days
Specimen Required:	Throat, nasopharyngeal swab, or skin lesions
Collection:	Swabs or skin lesions: Collect with Culturette or appropriate transport medium.
Storage and Stability:	Refrigerated: 2-8° C.
Transport:	Refrigerate at 2-8˚C. within 24 hours
Unacceptable Conditions:	Dry swab or specimen not in transport medium for > 24 hours
Reference Range:	Not isolated
Limitations:	N/A
Required Information:	N/A
Additional Information:	All *C. diphtheriae* isolates are referred for toxin testing. Identification of *Corynbacterium diphtheriae* is considered significant and should be reported to the local or state public health agency.

Cryptosporidium/Giardia Antigen Detection

Methodology:	DFA Stain, Fluorescent Microscopy
Test Code:	FACRY
CPT Code:	87272, 87269
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-3 days
Specimen Required:	Stool
Collection:	Preserved stool: Place in 10% formalin, sodium acetate-acetic acid-formalin (SAF) or ECOFIX within 1 hour of collection. O&P collection kit available upon request. Unpreserved stool: Must be received by the laboratory within 1 hour of collection. Patients should not have been given barium, bismuth, laxatives, anti-diarrheal agents or antibiotic treatment at least 1 week prior to collection.
Storage and Stability:	Preserved stool: Room temperature Unpreserved stool: Refrigerate at 2-8˚C and must be received by the laboratory within 1 hour of collection.
Transport:	Preserved stool: Room temperature Unpreserved stool: Refrigerate at 2-8˚C. Must be received by the laboratory within 1 hour of collection.
Unacceptable Conditions:	Stool preserved in PVA, MF/MIF or any other preservative other than those listed above are not suitable for use. Rectal swabs and unpreserved stool received >1 hour after collection cannot be tested.
Reference Range:	Not detected
Limitations:	This test is for the detection of *Cryptosporidium* oocysts and *Giardia* cysts only. A negative test does not rule out the possibility of other parasitic infections. If other parasitic organisms are suspected, routine ova and parasite examination(s) are suggested. Multiple specimens, collected every other day for up to 10 days, may need to be tested before ruling out *Cryptosporidium* or *Giardia* species infection.
Required Information:	N/A
Additional Information:	The presence of *Cryptosporidium* oocysts and Giardia cysts in a stool specimen does not preclude the possibility of either other parasites being present in the stool or the presence of another condition which may be causing gastrointestinal illness.

Cyclospora Detection

Methodology:	Modified Acid Fast Stain and Light Microscopy
Test Code:	EXMAF
CPT Code:	87015, 87207
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-3 days
Specimen Required:	Stool
Collection:	Unpreserved stool: Collect and place in a clean and leak proof collection vial. Preserved Stool: Collect in vial containing 10% Formalin within 1 hour of collection.
Storage and Stability:	Unpreserved: Refrigerate at 2-8˚C. Must be transported and received by the lab within 24 hours of collection. Preserved: Room temperature
Transport	Unpreserved stool: Refrigerate at 2-8˚C. (within 24 hours of collection) Preserved stool: Room temperature
Unacceptable Conditions:	Dry specimens, leaking containers, specimens contaminated with oil, barium or urine, multiple specimens (more than one in 24 hours), unpreserved specimens received >1 hour after collection, rectal swabs Frozen: Unacceptable
Reference Range:	Not detected
Limitations:	N/A
Required Information:	N/A
Additional Information:	Identification of Cyclospora is considered significant and should be reported to the local or state public health agency. If other parasitic organisms are suspected, a routine ova and parasite stool examination should be considered. Also see *Cryptosporidium/Giardia* Antigen Detection and Microsporidium Detection.

Cytomegalovirus (CMV) PCR

Methodology:	Qualitative Real-Time Polymerase Chain Reaction
Test Code:	RTCMV
CPT Code:	87496
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-2 days
Specimen Required:	Whole blood, urine, BAL, bronchial washings, biopsy specimen
Collection:	Whole blood: Lavender top (EDTA) tubes. Urine: Collect 10 mL of a first morning, clean catch urine in a sterile container Other specimens: Add 1 mL of fluid or tissue sample to VTM
Storage and Stability:	Refrigerated: 2-8˚C. for 7 days
Transport:	Refrigerate at 2-8˚C.
Unacceptable Conditions:	Quantity not sufficient, broken or leaking tube. Green-top heparin tubes unacceptable
Reference Range:	Not detected
Limitations:	Assay does not distinguish between active and latent infection
Required Information:	N/A
Additional Information:	CMV culture is also available

Cytomegalovirus (CMV) Rapid Culture

Methodology:	Shell vial, Immunofluorescence for Immediate-early Antigen
Test Code:	CMVIE
CPT Code:	87254
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-3 days
Specimen Required:	Throat swab, whole blood, urine, BAL, bronchial washings, biopsy specimen
Collection:	Whole blood: Lavender top (EDTA) tubes. Urine: Collect 10 mL of a first morning, clean catch urine in a sterile container Other specimens: Add 1 mL of fluid, tissue or swab samples to VTM
Storage and Stability:	Refrigerated: 2-8˚C. for 3 days
Transport:	Refrigerate at 2-8˚C.
Unacceptable Conditions:	Dry swabs, wooden swabs, calcium alginate swabs, and swabs in gel transports; specimens in bacterial transport media; non-sterile or leaking containers
Reference Range:	Not isolated
Limitations:	N/A
Required Information:	N/A
Additional Information:	CMV real-time PCR is also available

E. coli O157:H7 Culture

Methodology:	Culture
Test Code:	CX157
CPT Code:	87046
Requisition Required:	Microbiology
Performed:	Monday-Friday Outbreak investigations may include testing outside these routine test dates.
Turnaround Time:	3-7 days
Specimen Required:	Stool
Collection:	Collect stool in appropriate leak-proof container or place in enteric transport medium such as Cary-Blair, Amies, or Stuart's. Collection kit is available upon request. Stools must be collected before antibiotic treatment is initiated for greatest chance of isolation of pathogens. If antibiotic treatment has been initiated stool must not be collected until > 48 hours after treatment has ceased.
Storage and Stability:	Refrigerated: 2-8˚C.
Transport:	Refrigerate at 2-8˚C. If unpreserved stool is not transported to the laboratory within 24 hours of collection, transfer specimen to an enteric transport media before transporting to the laboratory.
Unacceptable Conditions:	Unpreserved specimens not received on ice packs or > 24 hours old. Received in transport media not recommended for bacterial isolation or expired transport media. Specimen collected while on antibiotic therapy
Reference Range:	No *E. coli* O157:H7 detected
Limitations:	N/A
Required Information:	N/A
Additional Information:	*E. coli* O157:H7 is considered significant and should be reported to the local or state public health agency.

Enteric Bacteria Culture

Methodology:	Culture, conventional biochemicals, Shiga-toxin EIA, serological typing
Test Code:	CXENT
CPT Code:	87045, 87046 x 4
Requisition Required:	Microbiology
Performed:	Monday-Friday Outbreak investigations may include testing outside these routine test dates.
Turnaround Time:	3-7 days
Specimen Required:	Stool
Collection:	Collect stool in appropriate leak-proof container or place in enteric transport medium such as Cary-Blair, Amies, or Stuart's. Collection kit is available upon request. Stools must be collected before antibiotic treatment is initiated for greatest chance of isolation of pathogens. If antibiotic treatment has been initiated stool must not be collected until > 48 hours after treatment has ceased.
Storage and Stability:	Refrigerated: 2-8˚C.
Transport:	Refrigerate at 2-8˚C. If unpreserved stool is not transported to the laboratory within 24 hours of collection, transfer specimen to an enteric transport media before transporting to the laboratory.
Unacceptable Conditions:	Unpreserved specimens not received on ice packs or > 24 hours old. Received in transport media not recommended for bacterial isolation or expired transport media. Specimen collected while on antibiotic therapy
Reference Range:	No *Salmonella, Shigella, Yersinia, Campylobacter* or *E. coli* O157:H7 isolated. Shiga Toxin not detected
Limitations:	N/A
Required Information:	N/A
Additional Information:	Stool culture for isolation of *Salmonella, Shigella, Campylobacter, Yersinia, Enterotoxigenic E. coli, E. coli* O157:H7 is performed by MHDL in outbreak situations through MHD-DCPD (Disease control and prevention division) department only. Identification of *Salmonella* species*, Shigella* species*, E. coli O157:H7,* Shiga toxin producing *E. coli* (STEC)*; Campylobacter species, Vibrio species, Yersinia enterocolitica, Aeromonas* species are considered significant and should be reported to the local or state public health agency. Significance of other enteric organisms should be determined based on clinical information.

Enterovirus PCR

Methodology:	Qualitative Real-Time Reverse Transcription Polymerase Chain Reaction
Test Code:	RTENT
CPT Code:	87498
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-2 days
Specimen Required:	CSF, throat swab , stool or rectal swabs in Viral Transport Media (VTM)
Collection:	CSF: 1 mL in a sterile container. Stool: Collect at least 1 mL stool in a sterile, unpreserved container Swabs: Place swabs into VTM
Storage and Stability:	Refrigerated: 2-8˚C. for 7 days
Transport:	Refrigerated at 2-8˚C.
Unacceptable Conditions:	Swabs with calcium alginate, cotton tips, or wood shafts, specimens that are insufficient, leaking, not refrigerated or not labeled
Reference Range:	Not detected
Limitations:	Assay detects human enteroviruses does not differentiate enterovirus serotypes. Weak cross-reactivity may occur with some strains of rhinovirus.
Required Information:	N/A
Additional Information:	Enteroviruses detected by culture will be specifically serotyped.

Fungal Culture (Dermatophyte), Hair, Skin or Nails

Methodology:	Culture and Microscopy
Test Code:	CXDER
CPT Code:	87101
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	Within 6 weeks
Specimen Required:	Hair, skin scrapings, nail
Collection:	Hair: Epilate 10-12 hairs. Specify the source of the specimen and include any pertinent clinical information. Skin and nails: Cleanse the area with 70% alcohol prior to specimen collection. Nail scrapings should be from a subsurface portion of the infected nail. Skin should be taken from the active border of the lesion.
Storage and Stability:	Room temperature
Transport:	Skin scrapings, nail and hair clippings should be transported dry at room temperature in a sterile Petri dish.
Unacceptable Conditions:	Specimens received frozen, in formalin, or in culture medium will be rejected. Swabs are discouraged unless the only specimen available; submit swabs in 5 mL sterile saline.
Reference Range:	Not isolated
Limitations:	Delay in transport of specimen could compromise isolation of organism.
Required Information:	N/A
Additional Information:	Drug susceptibility testing on these fungus isolates not available.

Fungal Culture, Other than Hair, Skin or Nails

Methodology:	Culture and Microscopy
Test Code:	CXFUN
CPT Code:	87102
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	Within 6 weeks
Specimen Required:	2 mL sputum or other fluids (1 mL), tissue biopsy. Blood or CSF not acceptable.
Collection:	2 mL sputum or 1 mL other fluids in sterile container. Add small amount of saline to biopsy and soft tissue specimens.
Storage and Stability:	Room temperature for 72 hours.
Transport:	Refrigerated at 2-8˚C.
Unacceptable Conditions:	Specimens received frozen, in formalin, or in culture medium will be rejected. Swabs are discouraged unless the only specimen available; submit swabs in 5 mL sterile saline.
Reference Range:	Not isolated
Limitations:	Delay in transport of specimen could compromise isolation of organism.
Required Information:	N/A
Additional Information:	Drug susceptibility testing on these fungus isolates not available.

Fungal Identification, Mold, Referred Isolate

Methodology:	Morphological procedure for identification; DNA probes or D2 region of the LSU rDNA gene sequencing
Test Code:	RFFUN
CPT Code:	87107, 87153
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	Within 4 weeks (slow growers may take longer to identify)
Specimen Required:	Pure culture on slant
Collection:	Viable mold in pure culture on agar slant.
Storage and Stability:	Room temperature
Transport:	Room temperature
Unacceptable Conditions:	Non-viable organisms, mixed cultures, isolates from environmental sources, organisms submitted on an agar plate.
Reference Range:	Culture negative for fungus
Limitations:	N/A
Required Information:	N/A
Additional Information:	N/A

Fungal Identification, Yeast, Referred Isolate

Methodology:	Morphological and biochemical procedure for identification; or sequencing
Test Code:	RFYST
CPT Code:	87106, 87153
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	Within 4 weeks (slow growers may take longer to identify)
Specimen Required:	Pure culture on slant
Collection:	Viable yeast organism in pure culture on agar slant.
Storage and Stability:	Room temperature
Transport:	Room temperature
Unacceptable Conditions:	Non-viable organisms, mixed cultures, isolates from environmental sources, organisms submitted on an agar plate.
Reference Range:	N/A
Limitations:	N/A
Required Information:	N/A
Additional Information:	N/A

Herpes Simplex Virus (HSV) Type 1 and 2 PCR

Methodology:	Qualitative Real-Time Polymerase Chain Reaction
Test Code:	RTHSV
CPT Code:	87529 x 2
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-2 days
Specimen Required:	CSF, vesicle swab
Collection:	CSF: 1 mL in a sterile container. Vesicle swab: Collect and place in VTM.
Storage and Stability:	Refrigerated: 2-8˚C. for 7 days
Transport:	Refrigerate at 2-8˚C.
Unacceptable Conditions:	Swabs with calcium alginate or cotton tips, wood shaft, specimens that are insufficient and not refrigerated or not labeled
Reference Range:	Not detected
Limitations:	N/A
Required Information:	N/A
Additional Information:	This assay detects and differentiates HSV-1 and HSV-2

Histoplasma capsulatum Identification, DNA Probe

Methodology:	Nucleic Acid Hybridization
Test Code:	HCGEN
CPT Code:	87149
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-2 days
Specimen Required:	Pure culture on slant
Collection:	Viable isolate on non-blood-containing fungal medium
Storage and Stability:	Room temperature. Do not freeze.
Transport:	Room temperature
Unacceptable Conditions:	Frozen or mixed cultures, leaking containers or isolate submitted on an agar plate.
Reference Range:	Not detected
Limitations:	N/A
Required Information:	N/A
Additional Information:	Results should be interpreted in conjunction with other laboratory and clinical data available to the clinician.

Influenza Type A and B PCR

Methodology:	Qualitative Real-Time Reverse Transcription Polymerase Chain Reaction
Test Code:	RTFLU
CPT Code:	87502
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-2 days
Specimen Required:	Throat or NP swabs, or combined throat and NP swabs
Collection:	Collect swab(s) and place in VTM
Storage and Stability:	Refrigerated: 2-8˚C. for 7 days
Transport:	Refrigerate at 2-8˚C.
Unacceptable Conditions:	Dry swabs, swabs with calcium alginate or cotton tips, wood shaft, and not refrigerated or not labeled
Reference Range:	Not detected
Limitations:	N/A
Required Information:	N/A
Additional Information:	This assay detects and differentiates seasonal H1, H3, 2009 H1N1, H5 influenza as well as influenza B.

Isospora Detection

Methodology:	Modified Acid Fast Stain , Light Microscopy
Test Code:	EXMAF
CPT Code:	87015, 87207
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	Within 3 days
Specimen Required:	Stool
Collection:	Preserve each stool collection in 10% formalin or SAF within one hour of collection.
Storage and Stability:	Preserved stool: Room temperature; Unpreserved stool: Refrigerated; Frozen: Unacceptable
Transport:	Fresh stool specimen: Refrigerated (within 1 hour) Stool preserved in 10% formalin or SAF: Room temperature
Unacceptable Conditions:	Dry specimens, leaking containers, specimens contaminated with oil, barium or urine, multiple specimens (more than one in 24 hours), unpreserved specimens received >1 hour after collection, rectal swabs
Reference Range:	Not detected
Limitations:	N/A
Required Information:	N/A
Additional Information:	A negative test does not rule out the possibility of other parasitic infections. If other parasitic organisms are suspected, routine ova and parasite examination(s) are required. For detection of *Cryptosporidium* and *Giardia*, see *Cryptospridium/Giardia* Antigen Detection. For detection of Microsporidium, see Microsporidium Detection

Legionella Culture

Methodology:	Culture
Test Code:	CXOLG
CPT Code:	87081
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	3-14 days
Specimen Required:	Lung Tissue; Pleural Fluid; Sputum; Bronchial Washings or lavage;
Collection:	Collect bronchial washings using sterile water instead of saline
Storage and Stability:	Refrigerated: 2-8˚C.
Transport:	Refrigerated: 2-8˚C.
Unacceptable Conditions:	Dry specimens, non-sterile or leaking containers, or specimens submitted in saline, formalin, or viral transport medium (VTM).
Reference Range:	Not isolated.
Limitations:	N/A
Required Information:	N/A
Additional Information:	Identification of Legionella spp. is considered significant and should be reported to the local or state public health agency.

Legionella Culture and L. pneumophila DFA Detection

Methodology:	Culture and Direct Fluorescent Antibody (DFA) Stain
Test Code:	CXLEG
CPT Code:	87081, 87278
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	Culture: 3-14 days DFA: 1-2 days
Specimen Required:	Lung tissue: Pleural fluid; Sputum; Bronchial washings or lavage
Collection:	Collect bronchial washings using sterile water instead of saline
Storage and Stability:	Refrigerated: 2-8˚C.
Transport:	Refrigerated: 2-8˚C.
Unacceptable Conditions:	Dry specimens, nonsterile or leaking containers, or specimens submitted in saline, formalin, or viral transport medium.
Reference Range:	Culture negative for *Legionella* species and No *Legionella pneumophila* detected by DFA
Limitations:	N/A
Required Information:	N/A
Additional Information:	Direct Immunofluorescent Antibody Test (DFA) conjugates are commercially available for a limited number of serogroups. The combination of low sensitivity and false-positive tests in a low-prevalence environment indicates that this test should not be performed without culture. Identification of Legionella spp. is considered significant and should be reported to the local or state public health agency.

Legionella PCR

Methodology:	Qualitative Real-Time Polymerase Chain Reaction
Test Code:	RTLEG
CPT Code:	87541; 87798
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-2 days
Specimen Required:	Broncheoalveolar lavage, tracheal aspirate, sputum, bronchoscopy specimens, pleural fluid, lung tissue, serum, urine, nasopharyngeal or oropharyngeal washes or swabs.
Collection:	NP: Dacron swab in sterile tube BAL, aspirate or sputum: 2 mL in sterile container Collect bronchial washings using sterile water instead of saline.
Storage and Stability:	Room temperature: 4 hours Refrigerated: 2-8˚C: 7 days Frozen: 6 weeks
Transport:	Refrigerate at 2-8˚C
Unacceptable Conditions:	Calcium alginate swab, inappropriate collection and labeling
Reference Range:	Not detected
Limitations:	N/A
Required Information:	N/A
Additional Information:	This assay detects and differentiates between *Legionella pneumophila* and non-pneumophila Legionella spp DNA in clinical specimens. It was developed at CDC and validated at MHDL. A negative result does not rule out infection with *Legionella pneumophila* or *Legionella* species. *Legionella* culture and DFA also available.

Legionella pneumophila Urine Antigen Detection

Methodology:	Enzyme Immunoassay (EIA)
Test Code:	UALEG
CPT Code:	87449
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-3 days
Specimen Required:	Urine, 2-5 mL
Collection:	First void preferred in sterile screw-capped container
Storage and Stability:	Refrigerated: 2-8˚C.
Transport:	Refrigerated: 2-8˚C.
Unacceptable Conditions:	
Reference Range:	No *Legionella pneumophila* serogroup 1 antigen detected
Limitations:	This test only detects *L. pneumophila* serogroup 1 antigen. Therefore, a negative result does not rule out the possibility of infection due to other serogroups or *Legionella* species.
Required Information:	N/A
Additional Information:	*Legionella pneumophila* has been estimated to cause 80-85% of *Legionella* infections in the U.S., with serogroup 1 accounting for most of these. Most current methods for the diagnosis of *Legionella* infection require a high quality respiratory specimen. Unfortunately, many patients with *Legionella* infection do not produce sputum. The detection *of L. pneumphila* serogroup 1 soluble antigen in urine by EIA is a highly sensitive and specific method for the diagnosis of infections in these cases. Antigenuria can occur 2-3 days after infection and may persist for prolonged periods after treatment in some patients.

Measles Virus (Rubeola) PCR

Methodology:	Qualitative Real-Time Reverse Transcription Polymerase Chain Reaction
Test Code:	RTMEA
CPT Code:	87798
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-2 days
Specimen Required:	Combined Throat and NP swabs ; Urine (minimum volume: 10mL)
Collection:	Specimens should be collected within the first 3 days of illness, but no later than 10 days after onset of rash. Swabs: Place into one vial of VTM. Urine: Collect 10-15 mL in a sterile container. First-voided morning urine usually contains the highest concentration of infected cells.
Storage and Stability:	Refrigerated: 2-8˚C. for 7 days
Transport:	Refrigerate at 2-8˚C.
Unacceptable Conditions:	Swabs with calcium alginate, cotton tips, or wood shafts. Specimens that are insufficient, leaking, not refrigerated or not labeled.
Reference Range:	Not detected
Limitations:	N/A
Required Information:	N/A
Additional Information:	N/A

Measles (Rubeola) Virus IgG Antibody

Methodology:	Enzyme-Linked Immunosorbent Assay (ELISA)
Test Code:	MEIGG
CPT Code:	86765
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-2 days
Specimen Required:	1 mL serum (minimum volume: 0.5mL)
Collection:	Collect in a sterile transfer tube or Serum Separator Tube (SST)
Storage and Stability:	Refrigerated: 2-8˚C. for up to 7 days. If a delay in transport is anticipated, store at -20˚C.
Transport:	Refrigerate at 2-8˚C .
Unacceptable Conditions:	Icteric, lipemic, hemolyzed or heat inactivated serum
Reference Range:	Interpretation / Index Value Negative / ≤ 0.90 Equivocal / 0.91-1.09 Positive / ≥ 1.10
Limitations:	IgG testing of a single serum should not be used for diagnostic purposes. Samples collected too early in the course of infection may not have detectable levels of IgG. A second sample may be collected after 2-7 weeks to detect seroconversion.
Required Information:	N/A
Additional Information:	The presence of IgG indicates the level of antibody detected can usually be considered protective. Equivocal indicates an insufficient level for protection. Absent indicates the patient is susceptible to infection.

Measles (Rubeola) Virus IgM Antibody

Methodology:	Enzyme-Linked Immunosorbent Assay (ELISA)
Test Code:	MEIGM
CPT Code:	86765
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-2 days
Specimen Required:	1 mL serum (minimum volume: 0.5mL).
Collection:	Collect in sterile tube or SST tube. Acute serum should be collected 1-7 days after the onset of rash.
Storage and Stability:	Refrigerated: 2-8˚C for up to 7 days. If a delay in transport is anticipated, store at -20˚C.
Transport:	Refrigerate at 2-8˚C
Unacceptable Conditions:	Grossly hemolyzed or lipemic samples
Reference Range:	Interpretation / Index Value Negative / ≤ 0.90 Equivocal / 0.91-1.09 Positive / ≥ 1.10
Limitations:	The absence of IgM does not rule out measles infection, but may indicate that the patient is susceptible to infection. The presence of measles IgM is indicative of a recent exposure, but cannot differentiate between primary infection and vaccination.
Required Information:	N/A
Additional Information:	In non-immunized or susceptible individuals, the detection of measles-specific IgM antibody is suggestive of an acute infection, particularly in the absence of IgG antibody. IgM antibody is often positive on the day of rash onset. However, in the first 72 hours after rash onset, up to 20% of tests for IgM may give false-negative results. Tests that are negative in the first 72 hours after rash onset should be repeated. In the absence of classical measles symptoms positive IgM results should be interpreted with caution and false positives are known to occur. An acute infection should be corroborated with the clinical presentation.

Microsporidia Detection

Methodology:	Modified Trichrome Stain, Light Microscopy
Test Code:	EXMSP
CPT Code:	87015, 87207
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	2-3 days
Specimen Required:	Stool
Collection:	Preserve each stool collection in 10% formalin within one hour of collection.
Storage and Stability:	Preserved stool: Room temperature
Transport:	Fresh stool: Refrigerated (within 1 hour) Preserved stool in 10% formalin: Ambient
Unacceptable Conditions:	Dry specimens, leaking containers, specimens contaminated with oil, barium or urine, multiple specimens (more than one in 24 hours), unpreserved specimens received >1 hour after collection, rectal swabs. Frozen: Unacceptable
Reference Range:	No Microsporidia spores seen
Limitations:	N/A
Required Information:	N/A
Additional Information:	A negative test indicates no visible parasites consistent with Microsporidia and does not rule out the possibility of other parasitic infections.

Mumps Virus PCR

Methodology:	Qualitative Real-Time Reverse Transcription Polymerase Chain Reaction
Test Code:	RTMUM
CPT Code:	87798
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-2 days
Specimen Required:	Buccal/oral swab and urine
Collection:	Urine: Collect 10-15 mL in a sterile container (minimum volume: 10 mL) Buccal/Oral swab: Collect and place in VTM
Storage and Stability:	Refrigerated: 2-8˚C. for up to 7 days
Transport:	Refrigerate at 2-8˚C.
Unacceptable Conditions:	Swabs with calcium alginate, cotton tips, or wood shafts. Specimens that are insufficient, leaking, not refrigerated or not labeled.
Reference Range:	Not detected
Limitations:	Mumps virus may not be detectable in urine samples for up to 4 days following onset of symptoms.
Required Information:	N/A
Additional Information:	Buccal/oral swabs should be collected 3-5 days from the time symptoms are evident. Urine specimens may be collected at 3-5 days post onset of symptoms. Collection after 5 days may be more advantageous because virus shedding in urine appears to lag behind the appearance in buccal/oral swabs, but continues longer.

Mumps Virus IgG Antibody

Methodology:	Enzyme-Linked Immunosorbent Assay (ELISA)
Test Code:	MUIGG
CPT Code:	86735
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-2 days
Specimen Required:	1 mL serum (minimum volume: 0.5mL)
Collection:	Collect in a sterile transfer tube or Serum Separator Tube (SST)
Storage and Stability:	Refrigerated: 2-8˚C. for up to 7 days. If a delay in transport is anticipated, store at -20˚C.
Transport:	Refrigerate at 2-8˚C.
Unacceptable Conditions:	Icteric, lipemic, hemolyzed or heat inactivated serum.
Reference Range:	Interpretation / Index Value Negative / ≤ 0.90 Equivocal / 0.91-1.09 Positive / ≥ 1.10 The presence of IgG indicates the level of antibody detected can usually be considered protective. Equivocal indicates an insufficient level for protection. Absent indicates the patient is susceptible to infection.
Limitations:	IgG testing of a single serum should not be used for diagnostic purposes. Positive IgG results in neonates must be interpreted with caution since maternal antibody is transferred from the mother to the fetus before birth.
Required Information:	N/A
Additional Information:	N/A

Mycobacteria Smear and Culture

Methodology:	Acid fast stain, conventional culture methods, DNA probes, and biochemical testing
Test Code:	CXAFB
CPT Code:	87015, 87206,87116, 87118, 87555
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	6 weeks
Specimen Required:	Sputum; Tissue; Exudate; Urine; Stool; Blood; Body Fluids
Collection:	Sputum (early morning; deep productive cough): 5-7 mL in sterile container, collected in a series of 3 specimens over 3-5 days submitted on day of collection. Other respiratory specimens (BAL, bronchial wash, etc.): 5-10mL in sterile container Stool: 1 g in sterile container Tissue Biopsy: 1 g in sterile container Urine: 40 mL, first-morning, clean catch in sterile container (24-hour pooled specimens are unacceptable) collected in a series of 3 specimens over 3-5 days submitted on day of collection.
Storage and Stability:	Refrigerate at 2-8˚C. Ambient: Blood
Transport:	Transport specimen as soon as possible. If transport is delayed over one hour, refrigerate specimen, unless blood.
Unacceptable Conditions:	Specimens received frozen, in formalin, or in culture medium; Swabs; Saliva; Gastric specimens not neutralized prior to transport; Refrigerated blood specimens, Blood in EDTA
Reference Range:	No acid fast bacilli present
Limitations:	Delay in transport of specimen could compromise isolation of organism. Negative results obtained from specimens submitted on swabs are not reliable. A negative test result does not rule out infection with mycobacteria. Improper specimen collection and handling may compromise assay performance. The extent of identification of Mycobacteria other than tuberculosis (MOTT) is dependent on the clinical significance of the isolate.
Required Information:	N/A
Additional Information:	Susceptibility testing is performed on all initial M. tuberculosis isolates. Identification of *Mycobacterium tuberculosis* complex is considered a significant finding and should be reported to the local or state public health agency.

Mycobacterium tuberculosis Complex PCR

Methodology:	Qualitative Real-Time Polymerase Chain Reaction
Test Code:	RTTBC
CPT Code:	87556
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	24 hours
Specimen Required:	Sputum
Collection:	Collect in sterile, leak-proof container with lid secured tightly and place in sealed biohazard bag for transport.
Storage and Stability:	Refrigerated at 2-8˚C.
Transport:	Refrigerate at 2-8˚C.
Unacceptable Conditions:	Saliva
Reference Range:	Not detected
Limitations:	N/A
Required Information:	N/A
Additional Information:	This assay detects but does not differentiate DNA from all members of the *M. tuberculosis* Complex (*M. tuberculosis, M. bovis, M. bovis* BCG*, M. africanum, M. microti,* and *M. canetti*).

Mycoplasma hominis Culture

Methodology:	Culture
Test Code:	CXMH
CPT Code:	87109
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	2-7 days
Specimen Required:	Urine, urethral or cervical swab, semen
Collection:	Place specimen into M4 or appropriate media for Mycoplasma transport.
Storage and Stability:	Room temperature: 8 hours Refrigerated: 2-8°C. for 48 hours in transport media Frozen: 1 month (-70°C)
Transport:	Refrigerate at 2-8°C. If transport time will exceed 24 hours, freeze specimen and transport on dry ice.
Unacceptable Conditions:	M4-RT, swabs in culturettes, and dry swabs
Reference Range:	No *Mycoplasma hominis* isolated
Limitations:	N/A
Required Information:	N/A
Additional Information:	Specimens are cultured using agar-broth technique. Confirmation is by microscopy.

Mycoplasma pneumoniae Culture

Methodology:	Culture
Test Code:	CXMO
CPT Code:	87109
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	2-6 weeks
Specimen Required:	Respiratory: Throat, sputum, etc. Fluids: BAL, bronchial wash CSF, lung, joint, amniotic, pericardial
Collection:	Place specimen into M4 or appropriate media for Mycoplasma transport. Transport media available upon request.
Storage and Stability:	Refrigerated: 2-8°C. for 48 hours in transport media Frozen: 1 month (-70°C.)
Transport:	Refrigerate at 2-8°C.
Unacceptable Conditions:	Dry swab, calcium alginate swab, swab with wooden shaft
Reference Range:	Not isolated
Limitations:	N/A
Required Information:	N/A
Additional Information:	Specimens are cultured using agar-broth technique.

Mycoplasma pneumoniae PCR

Methodology:	Qualitative Real-Time Polymerase Chain Reaction
Test Code:	RTMPN
CPT Code:	87581
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-2 days
Specimen Required:	Bronchial wash or BAL preferred; Throat or NP swabs, and tissue biopsy
Collection:	Place specimen into M4 or appropriate media for Mycoplasma transport.
Storage and Stability:	Refrigerated and frozen samples are stable for up to 7 days.
Transport:	Refrigerated at 2-8˚C.
Unacceptable Conditions:	Swabs with calcium alginate, cotton tips, or wood shafts, specimens that are insufficient, leaking, not refrigerated or not labeled
Reference Range:	Not detected
Limitations:	N/A
Required Information:	N/A
Additional Information:	N/A

Mycoplasma species PCR

Methodology:	Qualitative Real-Time Polymerase Chain Reaction
Test Code:	RTMPS
CPT Code:	87801
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-2 days
Specimen Required:	Urethral or cervical swab preferred, urine, semen.
Collection:	Place specimen into M4 or appropriate media for Mycoplasma transport.
Storage and Stability:	Refrigerated and frozen samples are stable for up to 7 days
Transport:	Refrigerated at 2-8˚C.
Unacceptable Conditions:	Swabs with calcium alginate, cotton tips, or wood shafts, specimens that are insufficient, leaking, not refrigerated or not labeled
Reference Range:	Not detected
Limitations:	Assay does not differentiate Mycoplasma or Ureaplasma species
Required Information:	N/A
Additional Information:	N/A

Neisseria gonorrhoeae, Nucleic Acid Amplification

Methodology:	Target Amplification Nucleic Acid Probe
Test Code:	GCAMP
CPT Code:	87591
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1- 2 days
Specimen Required:	Urine; endocervical, vaginal, male urethral, throat or rectal swabs
Collection:	Collect first-catch urine sample or swab and transfer to appropriate APTIMA Combo 2 Assay transport tubes. Swabs and transport tubes are available upon request.
Storage and Stability:	Urine (unpreserved): Room temperature for 24 hours Urine in transport tube: Store at 2-30˚C. for 30 days Swabs in transport tube: Store at 2-30˚C. for 60 days or frozen for 12 months
Transport:	Refrigerate at 2-8˚C. or room temperature
Unacceptable Conditions:	Any urine specimen transport tube with volumes above or below allowable levels, and any swab specimen transport tube with no swab, two swabs, or a swab not provided by manufacturer.
Reference Range:	Not detected
Limitations:	Excess mucus should be removed to ensure collection of columnar epithelial cells lining the endocervix. If excess mucus is not removed, sampling of these cells is not ensured. Assay is not intended for the evaluation of suspected sexual abuse or for other medico-legal indications.
Required Information:	N/A
Additional Information:	Patient should not have urinated for at least 1 hour prior to sample collection. Culture is recommended for *Neisseria gonorrhoeae* detection in suspected cases of sexual abuse. Assay results should be interpreted in conjunction with other laboratory and clinical data available to the clinician.

Neisseria gonorrhoeae, Referred Isolate

Methodology:	Biochemicals
Test Code:	RFGC
CPT Code:	87077, 87184
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	Within 4 days
Specimen Required:	Pure isolate of oxidase-positive, Gram-negative diplococci
Collection:	Submit pure isolate on chocolate agar slant or plate, or Thayer-Martin Improved plate, inside CO2 transport bag.
Storage or Stability:	No longer than 2 days from most recent subculture of the isolate
Transport:	Ambient
Unacceptable Conditions:	Refrigerated specimen; isolate on plated agar medium that has been transported/submitted WITHOUT CO2 Jar/Bag (unless the subculture is ≥ one day old)
Reference Range:	Culture negative for *Neisseria gonorrhoeae*, Isolate identified as: Neisseria (indicate species)
Limitations:	N/A
Required Information:	N/A
Additional Information:	Sentinel surveillance to monitor antimicrobial resistance in *N. gonorrhoeae* in the United States is sponsored by the Centers for Disease Control and Prevention (CDC) in collaboration with local and state health departments. MHDL also participates in this program and performs antimicrobial susceptibility testing for Azithromycin, Cefixime, Ceftriaxone and Ciprofloxacin. Identification of *Neisseria gonorrhoeae* is considered significant and should be reported to the local or state public health agency.

Norovirus PCR

Methodology:	Qualitative Real-Time Reverse Transcription Polymerase Chain Reaction
Test Code:	RTNOR
CPT Code:	87798 x 2
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-2 days
Specimen Required:	Stool or vomitus
Collection:	Collect at least 1 mL stool or vomitus in a sterile, unpreserved container
Storage and Stability:	Refrigerated: 2-8˚C. for up to 7 days
Transport:	Refrigerate at 2-8˚C.
Unacceptable Conditions:	Stool samples preserved in formalin or PVA; quantity not sufficient, broken or leaking tube.
Reference Range:	Not detected
Limitations:	N/A
Required Information:	N/A
Additional Information:	The assay detects and differentiates Norovirus Genogroups I and II. Norovirus sequencing (CaliciNet) is performed only for epidemiological investigation and public health surveillance purposes.

Ova & Parasite Examination, Intestinal

Methodology:	Concentration, Light Microscopy, Trichrome Stain and *Cryptosporidium/Giardia* DFA Stain
Test Code:	EXSTO
CPT Code:	87177, 87209, 87272, 87269
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	Within 2 days
Specimen Required:	Stool
Collection:	Preserve each stool collection in 10% formalin and modified PVA within one hour of collection. Recommended collection: Three separate stool specimens at least 24 hours apart. An individual requisition must be submitted for each specimen. Collection kit available upon request.
Storage or Stability:	Preserved stool: Ambient: 9 months;
Transport:	Fresh stool specimen: Ambient (within 1 hour) Stool preserved in 10% formalin and modified PVA: Ambient
Unacceptable Conditions:	Dry specimens, leaking containers, specimens contaminated with oil, barium or urine, multiple specimens (more than one in 24 hours), unpreserved specimens received >1 hour after collection, rectal swabs. Refrigerated or frozen.
Reference Range:	No ova or parasites seen
Limitations:	The ova and parasite exam does not include a test to specifically detect *Cyclospora, Isospora* or *Microsporidium.* For *Cyclospora* and *Isospora*, refer to Cyclospora or Isospora Detection. For *Microsporidium*, refer to Microsporidium Detection.
Required Information:	N/A
Additional Information:	Travel history, compromised immune status, clinical symptoms, previous parasitic infection, contact with either infected individuals or contaminated food/ water source or linked to a possible or known outbreak. Identification of *Cryptosporidium* spp. is considered significant and should be reported to the local or state public health agency.

Parainfluenza Virus Types 1, 2 and 3 PCR

Methodology:	Qualitative Real-Time Reverse Transcription Polymerase Chain Reaction
Test Code:	RTPIV
CPT Code:	87798 x 3
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-2 days
Specimen Required:	Throat or NP swabs, Bronchial wash or BAL
Collection:	Place specimen into Viral Transport Media (VTM)
Storage and Stability:	Refrigerated: 2-8˚C. for 7 days
Transport:	Refrigerate at 2-8˚C.
Unacceptable Conditions:	Swabs with calcium alginate, cotton tips, or wood shafts, specimens that are insufficient, leaking, not refrigerated or not labeled
Reference Range:	Not detected
Limitations:	N/A
Required Information:	N/A
Additional Information:	This assay detects and differentiates Parainfluenza Virus Types 1, 2 and 3 only.

Human Parechovirus PCR

Methodology:	Qualitative Real-Time Reverse Transcription Polymerase Chain Reaction
Test Code:	RTPEV
CPT Code:	87798
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-2 days
Specimen Required:	CSF, throat swabs, or stool
Collection:	Place specimen into Viral Transport Media (VTM)
Storage and Stability:	Refrigerated: 2-8˚C. for 7 days
Transport:	Refrigerate at 2-8˚C.
Unacceptable Conditions:	Swabs with calcium alginate, cotton tips, or wood shafts, specimens that are insufficient, leaking, not refrigerated or not labeled
Reference Range:	Not detected
Limitations:	N/A
Required Information:	N/A
Additional Information:	Echovirus 21 & 22 have been reclassified as Parechovirus 1 & 2

Plesiomonas Culture

Methodology:	Culture
Test Code:	CXPLE
CPT Code:	87046
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	3-7 days
Specimen Required:	Stool
Collection:	Collect stool in appropriate leak-proof container or place in enteric transport medium such as Cary-Blair, Amies, or Stuart's. Collection kit is available upon request. Stools must be collected before antibiotic treatment is initiated for greatest chance of isolation of pathogens. If antibiotic treatment has been initiated stool must not be collected until > 48 hours after treatment has ceased.
Storage and Stability:	Refrigerated: 2-8˚C.
Transport:	Refrigerate at 2-8˚C. If unpreserved stool is not transported to the laboratory within 24 hours of collection, transfer specimen to an enteric transport media before transporting to the laboratory.
Unacceptable Conditions:	Unpreserved specimens not received on ice packs or > 24 hours old. Received in transport media not recommended for bacterial isolation or expired transport media. Specimen collected while on antibiotic therapy
Reference Range:	Not isolated
Limitations:	N/A
Required Information:	N/A
Additional Information:	*P. shigelloides* has been implicated as a cause of gastroenteritis, which has been associated with drinking untreated water, eating raw seafood or travel to tropical countries.

Respiratory Virus Molecular Panel

Methodology:	Multiplex nucleic acid amplification
Test Code:	RTRVP
CPT Code:	87633
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-2 days
Specimen Required:	NP and/or throat swabs
Collection:	Place swabs in Viral Transport Media (VTM)
Storage and Stability:	Refrigerated: 2-8˚C. for 7 days
Transport:	Refrigerate at 2-8˚C.
Unacceptable Conditions:	Swabs with calcium alginate, cotton tips, or wood shafts, specimens that are insufficient, leaking, not refrigerated or not labeled.
Reference Range:	Not detected
Limitations:	N/A
Required Information:	N/A
Additional Information:	Detects Influenza A and B, Parainfluenza virus 1, 2, 3, 4a and 4b, Adenovirus subgroups B, C and E, RSV subtypes A and B, Human rhinovirus, Human metapneumovirus, and Coronavirus NL63, OC43 and 229E.

Respiratory Syncytial Virus (RSV) PCR

Methodology:	Qualitative Real-Time Reverse Transcription Polymerase Chain Reaction
Test Code:	RTRSV
CPT Code:	87798
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-2 days
Specimen Required:	Throat or NP swabs, Bronchial wash or BAL
Collection:	Place specimen into Viral Transport Media (VTM)
Storage and Stability:	Refrigerated: 2-8˚C. for 7 days
Transport:	Refrigerate at 2-8˚C.
Unacceptable Conditions:	Swabs with calcium alginate, cotton tips, or wood shafts, specimens that are insufficient, leaking, not refrigerated or not labeled.
Reference Range:	Not detected
Limitations:	N/A
Required Information:	N/A
Additional Information:	Detects and differentiates RSV subtypes A and B

Rubella Virus PCR

Methodology:	Qualitative Real-Time Reverse Transcription Polymerase Chain Reaction
Test Code:	RTRUB
CPT Code:	87798
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-2 days
Specimen Required:	Combined Throat and NP swabs; Urine
Collection:	Urine: Collect 10-15 mL in a sterile container (minimum volume: 10 mL) Throat and NP swabs: Collect and place in VTM
Storage and Stability:	Refrigerated: 2-8˚C. for 7 days
Transport:	Refrigerate at 2-8˚C.
Unacceptable Conditions:	Swabs with calcium alginate, cotton tips, or wood shafts, specimens that are insufficient, leaking, not refrigerated or not labeled.
Reference Range:	Not detected
Limitations:	N/A
Required Information:	N/A
Additional Information:	N/A

Rubella Virus IgG Antibody

Methodology:	Qualitative Enzyme-Linked Immunosorbent Assay (ELISA)
Test Code:	RUIGG
CPT Code:	86762
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-2 days
Specimen Required:	1 mL serum (minimum volume: 0.5mL).
Collection:	Collect in a sterile transfer tube or Serum Separator Tube (SST)
Storage or Stability:	Refrigerate at 2-8˚C.
Transport:	Refrigerated: 2-8˚C. for up to 7 days. If a delay in transport is anticipated, store at -20˚C.
Unacceptable Conditions:	Icteric, lipemic, hemolyzed or heat inactivated serum
Reference Range:	Interpretation — Index Value Negative — $\leq$ 0.90 Equivocal — 0.91-1.09 Positive — $\geq$ 1.10
Limitations:	Rubella IgG is used to determine the immune status of an individual. IgG testing of a single serum should not be used for diagnostic purposes.
Required Information:	N/A
Additional Information:	The presence of IgG indicates the level of antibody detected can usually be considered protective. Equivocal indicates an insufficient level for protection. Absent indicates the patient is susceptible to infection.

Rubella Virus IgM Antibody

Methodology:	Qualitative Enzyme-Linked Immunosorbent Assay (ELISA)
Test Code:	RUIGM
CPT Code:	86762
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-2 days
Specimen Required:	1 mL serum (minimum volume: 0.5mL).
Collection:	Collect in sterile tube or SST tube.
Transport:	Refrigerated: 2-8˚C for up to 7 days. If a delay in transport is anticipated, store at -20˚C.
Storage or Stability:	Refrigerate at 2-8˚C
Unacceptable Conditions:	Grossly hemolyzed or lipemic samples
Reference Range:	Interpretation — Index Value Negative — ≤ 0.90 Equivocal — 0.91-1.09 Positive — ≥ 1.10
Limitations:	Previously vaccinated individuals may not have a detectable IgM response.
Required Information:	N/A
Additional Information:	The presence of IgM indicates an active or recent infection.

Salmonella Culture

Methodology:	Culture, Conventional biochemicals, serological typing
Test Code:	CXSAL
CPT Code:	87045
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	3-7 days
Specimen Required:	Stool
Collection:	Collect stool in appropriate leak-proof container or place in enteric transport medium such as Cary-Blair, Amies, or Stuart's. Collection kit is available upon request. Stools must be collected before antibiotic treatment is initiated for greatest chance of isolation of pathogens. If antibiotic treatment has been initiated stool must be collected after 48 hours
Storage and Stability:	Refrigerated: 2-8˚C
Transport:	Refrigerate at 2-8˚C. If unpreserved stool is not transported to the laboratory within 24 hours of collection, place specimen in enteric transport media.
Unacceptable Conditions:	Unpreserved specimens not refrigerated, > 24 hours from time of collection, inappropriate or expired transport media, or collected while on antibiotic therapy
Reference Range:	No Salmonella isolated
Limitations:	N/A
Required Information:	N/A
Additional Information:	Identification of *Salmonella* spp. is considered significant and should be reported to the local or state public health department immediately.

Select Agents of Public Health Significance, Screening and Identification

Methodology:	Conventional Biochemical, serological, real-time PCR, Time-resolved Fluorescence
Test Code:	
CPT Code:	
Requisition Required:	Microbiology
Performed:	Monday-Friday, with notification Saturday and Sunday
Turnaround Time:	Preliminary screening report: 1-2 days; Confirmation: 3- 7 days
Specimen Required:	Call the laboratory
Collection:	Call the laboratory
Storage and Stability:	Room temperature
Transport:	Call the laboratory
Unacceptable Conditions:	N/A
Reference Range:	N/A
Limitations:	N/A
Required Information:	N/A
Additional Information:	Select agents may include: *Francisella* spp., *Bacillus anthracis, Brucella* spp., *Yersinia* spp., and *Burkholderia* spp. Contact the laboratory for identification of organisms not on this list.

Shigella Culture

Methodology:	Culture, Conventional biochemicals, serological typing
Test Code:	CXSHI
CPT Code:	87045
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	2-5 days
Specimen Required:	Stool
Collection:	Collect stool in appropriate leak-proof container or place in enteric transport medium such as Cary-Blair, Amies, or Stuart's. Collection kit is available upon request. Stools must be collected before antibiotic treatment is initiated for greatest chance of isolation of pathogens. If antibiotic treatment has been initiated stool must be collected after 48 hours
Storage and Stability:	Refrigerated: 2-8˚C
Transport:	Refrigerate at 2-8˚C. If unpreserved stool is not transported to the laboratory within 24 hours of collection, place specimen in enteric transport media.
Unacceptable Conditions:	Unpreserved specimens not refrigerated, > 24 hours from time of collection, inappropriate or expired transport media, or collected while on antibiotic therapy
Reference Range:	No Shigella isolated
Limitations:	N/A
Required Information:	
Additional Information:	Identification of *Shigella* spp. is considered significant and should be reported to the local or state public health agency.

Syphilis Confirmation, TP-PA

Methodology:	Passive Particle Agglutination
Test Code:	TPPA
CPT Code:	86780
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	2-3 days
Specimen Required:	1-3 ml serum
Collection:	3-7 ml whole blood in serum separator tube
Storage and Stability:	Refrigerated: 2-8°C up to 7 days
Transport:	Refrigerate at 2-8°C within 48 hours of collection
Unacceptable Conditions:	CSF or other body fluids
Reference Range:	Nonreactive
Limitations:	The TP-PA test may be reactive in persons from areas where yaws or pinta was, or is, endemic. Samples from patients with HIV, Leprosy, Toxoplasmosis, H. pylori, or drug addiction may react, on occasion, with either the sensitized or the unsensitized particles, causing false-positive or inconclusive results. A reactive TP-PA test will remain reactive following treponemal infection; they should not be used to evaluate response to therapy.
Required Information:	N/A
Additional Information:	Interpretation of results must be used in conjunction with the patient's clinical symptoms, medical history and other clinical and/or laboratory findings to produce an overall clinical diagnosis.

Syphilis Screen, VDRL, CSF

Methodology:	Slide microflocculation agglutination
Test Code:	VDRLC
CPT Code:	86592
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-3 days
Specimen Required:	Cerebrospinal fluid (CSF)
Collection:	0.5 -1 mL in sterile tube
Storage or Stability:	Refrigerated: 2-8°C within 24 hours Frozen: >24 hours
Transport:	Refrigerate at 2-8°C
Unacceptable Conditions:	Insufficient volume, visibly contaminated or presence of gross blood. Transported at room temperature.
Reference Range:	Nonreactive
Limitations:	May not detect a recent infection, or infection in a person with a severely compromised immune system
Required Information:	Patient name with date of birth/collection date & time
Additional Information:	A reactive VDRL test on CSF indicates past or present syphilis infection of the central nervous system. The VDRL-CSF is the only standardized test for neurosyphilis. In the case of a weakly reactive or reactive result, a titer will be performed.

Syphilis Screen, VDRL, Serum

Methodology:	Slide microflocculation agglutination
Test Code:	VDRL
CPT Code:	86592
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-3 days
Specimen Required:	Serum
Collection:	3-8 ml of whole blood with no anticoagulants
Storage and Stability:	Refrigerated: 2-8°C up to 7 days
Transport:	Refrigerate at 2-8°C
Unacceptable Conditions:	Excessively hemolyzed, grossly contaminated with bacteria, or otherwise extremely turbid
Reference Range:	Nonreactive
Limitations:	This test is intended for screening only, and requires appropriate confirmatory testing. A non-reactive result does not rule out a new syphilis infection.
Required Information:	Patient name with date of birth/collection date & time
Additional Information:	For a weakly reactive or reactive result, a titer will be added.

Ureaplasma urealyticum Culture

Methodology:	Culture
Test Code:	CXUU
CPT Code:	87109
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	2-7 days
Specimen Required:	Urethral or cervical swab preferred, urine, semen.
Collection:	Place specimen into M4 or appropriate media for Mycoplasma transport
Storage and Stability:	Room temperature: 8 hours; Refrigerated: 48 hours in transport media; Frozen: 1 month (-70°C)
Transport:	Refrigerated. If transport time will exceed 24 hours, freeze specimen and transport on dry ice. Place each specimen in a separate, individually sealed bag.
Unacceptable Conditions:	M4-RT, swabs in culturettes, and dry swabs
Reference Range:	Not isolated
Limitations:	N/A
Required Information:	N/A
Additional Information:	Specimens are cultured using agar-broth technique. Confirmation is by microscopy.

Varicella-Zoster Virus (VZV) PCR

Methodology:	Qualitative Real-Time Polymerase Chain Reaction
Test Code:	RTVZV
CPT Code:	87798
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	1-2 days
Specimen Required:	CSF or vesicle swab
Collection:	CSF: 1 mL in a sterile container. Vesicle swab: Collect and place in VTM.
Storage and Stability:	Refrigerated: 2-8˚C for 7 days
Transport:	Refrigerate at 2-8˚C.
Unacceptable Conditions:	Swabs with calcium alginate, cotton tips, or wood shafts, specimens that are insufficient, leaking, not refrigerated or not labeled
Reference Range:	Not detected
Limitations:	N/A
Required Information:	N/A
Additional Information:	This assay may be useful in distinguishing VZV infection from the vesicles or rashes associated with herpes simplex virus (HSV), measles, rubella, pox viruses and other causes. HSV, measles, and rubella RT-PCRs are also available.

Virus Isolation and Identification

Methodology:	Cell Culture
Test Code:	VIRUS
CPT Code:	87252, 87253
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	2- 14 days
Specimen Required:	Collect appropriate specimen, e.g. NP and/or throat swabs, stools or rectal swabs, genital swab, CSF, whole blood
Collection:	Urine: Collect 10-15 mL in a sterile container (minimum volume: 10 mL) Swabs, Biopsy/tissue specimens: Collect and place in VTM Bronchial washes, BALs, or CSF: 1 ml in VTM Liquid stool (1 ml) or marble size solid stool collect and place in VTM Whole blood: 2 ml in tube containing EDTA or heparin
Storage and Stability:	Refrigerated: 2-8˚C for 7 days
Transport:	Refrigerate at 2-8˚C.
Unacceptable Conditions:	Dry swabs, wooden swabs, calcium alginate swabs, and swabs in gel transports; Rectal swabs or stool preserved in formalin, SAF, or PVA; Specimens in bacterial transport media; non-sterile or leaking containers
Reference Range:	Not isolated
Limitations:	Several viruses, such as Norovirus are not culturable. These viruses are best detected by nucleic acid amplification tests (NAATs).
Required Information:	N/A
Additional Information:	Multiple cell lines are used to isolate and identify viruses

Yersinia Culture

Methodology:	Culture
Test Code:	CXYER
CPT Code:	87046
Requisition Required:	Microbiology
Performed:	Monday-Friday
Turnaround Time:	3-7 days
Specimen Required:	Stool
Collection:	Collect stool in appropriate leak-proof container or place in enteric transport medium such as Cary-Blair, Amies, or Stuart's. Collection kit is available upon request. Stools must be collected before antibiotic treatment is initiated for greatest chance of isolation of pathogens. If antibiotic treatment has been initiated stool must not be collected until > 48 hours after treatment has ceased.
Storage and Stability:	Refrigerated: 2-8˚C
Transport:	Refrigerate at 2-8˚C. If unpreserved stool is not transported to the laboratory within 24 hours of collection, transfer specimen to an enteric transport media before transporting to the laboratory.
Unacceptable Conditions:	Unpreserved specimens not received on ice packs or > 24 hours old. Received in transport media not recommended for bacterial isolation or expired transport media. Specimen collected while on antibiotic therapy
Reference Range:	Not isolated
Limitations:	N/A
Required Information:	N/A
Additional Information:	Identification of *Y. pestis* is considered significant and should be reported to the local or state public health department immediately.