
Test Code 6109	C-Peptide, Serum or Plasma	C PEP
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Methodology: Chemiluminescent Immunoassay
Performed: Monday – Friday
Reported: 1 - 2 days

Specimen Required: **Collect:** Serum or heparinized plasma specimen; gold, red, or green top tube. Collect on ice. Fasting specimen unless otherwise directed.
Transport: 1 mL serum, frozen. (Min: 0.5 mL)
Remarks: Centrifuge, remove serum or plasma and freeze ASAP
Unacceptable Conditions: EDTA or Sodium Fluoride plasma samples.
Stability: Ambient: 2-3 hrs, Refrigerated: Unstable, Frozen: 1 week

Reference Interval: 1.1 – 5.0 ng/mL

Interpretive Data: Reference Interval applies to fasting specimens.

CPT Code: 84681

Test Code 5080	C-Reactive Protein (mg/dl)	CRP
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Methodology: Turbidimetric
Performed: Sunday-Saturday
Reported: same day

Specimen Required: **Collect:** One 6 ml gold top or plain red. (Min: 6 mL) Fasting is recommended.
Transport: Centrifuged gold top or 1 mL serum (Min: 0.5 mL) at ambient or 2–8°C.
Remarks: Separate serum from cells ASAP.
Unacceptable Conditions: Severely lipemic, contaminated, or hemolyzed samples.
Stability: Ambient: 8 hours ; Refrigerated: 3 days; Frozen: 2 weeks

Reference Interval: 0 – 0.8 mg/dL

Interpretive data: CRP is part of the body's non-specific inflammatory response to infection or injury.

NOTE: For cardiac risk assessment, see **high sensitivity CRP**.

CPT Code: 86140

Methodology: Nephelometry
 Performed: Monday – Friday
 Reported: 1-2 days

Specimen Required: **Collect:** One 6 ml gold top tube or plain red. Separate ASAP.
Transport: Centrifuged gold top or 1 mL serum at 2-8°C. (Min: 0.3 mL)
Remarks: Separate serum from cells ASAP.
Unacceptable Conditions: Severely lipemic, contaminated, or hemolyzed samples.
Stability: Ambient: 8 hours; Refrigerated: 3 days; Frozen: 1 month

Interpretive Data:

hsCRP Result	Comment
> 1.0 mg/L	Based on this marker, the risk of cardiovascular disease is low. The reference suggests that hsCRP be measured twice, 2 weeks apart, and the average be used for risk assessment. Reference: Pearson, T.A. et al; Circulation 2003; 107: 499-511.
1.0 – 3.0 mg/L	Based on this marker, the risk of cardiovascular disease is moderate. The reference suggests that hsCRP be measured twice, 2 weeks apart, and the average be used for risk assessment. Reference: Pearson, T.A. et al; Circulation 2003; 107: 499-511.
> 3.0 mg/L	Based on this marker, the risk of cardiovascular disease is high. The reference suggests that hsCRP be measured twice, 2 weeks apart, and the average be used for risk assessment. Values greater than 10 mg/L may indicate acute infection or inflammation. Reference: Pearson, T.A. et al; Circulation 2003; 107: 499-511.

CPT Code: 86141

C3

Refer to Complement Component 3.

C4

Refer to Complement Component 4.

CA 125

Refer to Cancer Antigen 125.

CA 19-9

Refer to Cancer Antigen-GI (CA 19-9).

CA 27.29

Refer to Cancer Antigen 27.29.

Test Code 4107	Calcium, Urine, 24-Hour	U-CAL24
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Methodology: Spectrophotometric
Performed: Monday – Saturday
Reported: Next day

Specimen Required: **Collect:** 24-hour urine collection . **Urine must be refrigerated during collection.**
Transport: Entire collection at 2–8°C.
Remarks: If less than 24 hour collection, specify exact number of hours and order Calcium, Urine, Timed.
Stability: Ambient: Unstable; Refrigerated: 14 days; Frozen: Indefinitely

Reference Interval: 0 – 12 years: 0 – 160 mg/24 hrs
> 12 years: 50 – 300 mg/24 hrs (dependent upon dietary intake)

CPT Code: 82340

Test Code 4108	Calcium, Urine, Random	U-CA /DL
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Methodology: Spectrophotometric
Performed: Monday – Saturday
Reported: Same day

Specimen Required: **Collect:** Random urine in clean, dry container with secure lid. (Min: 2 mL)
Transport: Random urine promptly at ambient; or refrigerate and transport at 2–8°C.
Stability: Ambient: Unstable; Refrigerated: 14 days; Frozen: Indefinitely

Reference Interval: None available

CPT Code: 82340

Test Code 4109	Calcium, Urine, Timed (Not 24-Hour)	U-CA-TIME
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Methodology: Spectrophotometric
Performed: Monday – Saturday
Reported: Next day

Specimen Required: **Collect:** Timed urine collection. **Urine must be refrigerated during collection.**
Transport: Entire urine collection at 2- 8°C.
Remarks: **Must specify hours of collection.**
Stability: Ambient: Unstable; Refrigerated: 14 days; Frozen: Indefinitely

Reference Interval: None available

CPT Code: 82340

Campylobacter Culture

Refer to Culture-Stool
CPT Code: 87046

Test Code 6111 **Cancer Antigen 19-9 (GI)** **CA - GI**

Methodology: Chemiluminescent Immunoassay
Performed: (Monday - Friday)
Reported: same day

Specimen Required: **Collect:** One 6 mL SST
Transport: 1 mL serum at 2-8°C or frozen.
Remarks: Separate serum from cells ASAP.
Stability: Ambient: 8 hours; Refrigerated: 48 hours; Frozen: 2 months.

Reference Interval: 0 – 35 U/mL

Interpretive Data: The ADVIA Centaur CA 19-9 Assay result is performed at MMCI Laboratory. Results obtained with different assay methods or kits cannot be used interchangeably. CA 19-9 is useful in monitoring pancreatic, hepatobiliary, gastric, hepatocellular and colorectal cancer. The CA 19-9 assay value, regardless of level, should not be interpreted as absolute evidence of the presence or absence of malignant disease.

CPT Code: 86301

Test Code 6116 **Cancer Antigen 27.29** **CA 27.29**

Methodology: Chemiluminescent Immunoassay
Performed: Referral – ARUP (Sunday – Saturday)
Reported: 2 – 5 days

Specimen Required: **Collect:** One 4 mL SST or one 4 mL PST.
Transport: 1 mL serum or plasma, frozen. (Min: 0.5 mL)
Pediatric Collect/Transport: 0.3mL serum or plasma, frozen.
Remarks: Separate serum from cells ASAP.
Stability: Ambient: 8 hours; Refrigerated: 2 days; Frozen: 3 months

Reference Interval: 0 – 40 U/mL

Interpretive Data: The Bayer Advia Centaur immunoassay method is used. Results obtained with different assay methods or kits cannot be used interchangeably. The CA 27-29 assay is intended for use as an aid in monitoring patients previously treated for Stage II or III breast cancer. Serial testing in patients who are clinically free of disease should be used in conjunction with other clinical methods used for the early detection of cancer recurrence. The test is also intended for use as an aid in the management of breast cancer patients with metastatic disease by monitoring the progression or regression of disease in response to treatment. Patients with confirmed breast carcinoma frequently have CA 27.29 levels within the reference interval. Elevated levels of CA 27.29 can be observed in patients with non-malignant diseases. Therefore, this result cannot be interpreted as absolute evidence of the presence or absence of malignant disease and should always be used in conjunction with other diagnostic procedures, including information from the patient's clinical evaluation.

CPT Code: 86300

Test Code 5060 **Carboxyhemoglobin** **CO**

Methodology: Co-oximetry (spectrophotometric)
Performed: Sunday – Saturday
Reported: Immediate

Specimen Required: **Collect:** Whole blood collected in any anticoagulated vacutainer (sodium and lithium heparin preferred).
Transport: 1 mL whole blood
Pediatric Collect/Transport: One heparinized microtainer.
Remarks: **Do not freeze.** Avoid hemolysis. Samples with excessive turbidity should be avoided.
Stability: Refrigerated: 3 days. Best if analyzed immediately.

Reference Interval: 0 – 5.0%
Toxic: > 15%

CPT Code: 82375

Test Code 6157 **Carcinoembryonic Antigen** **CEA**

Methodology: Chemiluminescent Immunoassay
Performed: Sunday – Saturday
Reported: Next day

Specimen Required: **Collect:** One 6 ml gold top or plain red tube.
Transport: 1 mL serum (Min: 0.5 mL) at 2–8°C.
Remarks: Separate serum from cells ASAP and refrigerate.
Stability: Ambient: 8 hours; Refrigerated: 48 hours; Frozen: 1 month

Reference Interval: 0.0 – 4.0 ng/mL

Interpretive Data: Results obtained with different assay methods or kits cannot be used interchangeably. Measurement of CEA has been shown to be clinically relevant in the management of patients with colorectal, breast, lung, prostatic, pancreatic, and ovarian carcinoma. Smokers may have slightly elevated levels of CEA. The CEA assay value, regardless of level, should not be interpreted as evidence for the presence or absence of malignant disease and is not recommended for use as a screening procedure to detect the presence of cancer in the general population.

CPT Code: 82378

Test Code 5489 **Cardiolipin Antibodies, IgG** **CARDIO IGG**

Methodology: Enzyme-Linked Immunosorbent Assay
Performed: Variable
Reported: 5-7 days

Specimen Required: **Collect:** One gold top or plain red.
Transport: 1 mL serum at 2–8°C. (Min: 0.5 mL)
Remarks: Centrifuge and separate serum from cells ASAP.
Unacceptable Conditions: Heparinized plasma; severely lipemic, icteric or hemolyzed samples.
Stability: After separation from clot: Ambient: Unstable; Refrigerated: 3 days; Frozen 1 year (avoid repeated freeze/thaw cycles)

Reference Interval:

Cardiolipin Antibody, IgG
< 23 GPL: Negative for Anti-Cardiolipin IgG
≥ 23 GPL: Positive for Anti-Cardiolipin IgG

Interpretive Data: Anti-Cardiolipin antibodies are frequently found in patients with Systemic Lupus Erythematosus (SLE). They are also found in patients with other autoimmune diseases, as well as some individuals with no apparent previous underlying disease. Elevated levels of anti-cardiolipin antibodies have been reported to be significantly associated with the presence of both venous and arterial thrombosis, thrombocytopenia, and recurrent fetal loss.

CPT Code: 86147

Methodology: Enzyme-Linked Immunosorbent Assay
Performed: Variable
Reported: 5-7 days

Specimen Required: **Collect:** One gold top or plain red.
Transport: 1 mL serum at 2–8°C. (Min: 0.5 mL)
Remarks: Centrifuge and separate serum from cells ASAP.
Unacceptable Conditions: Heparinized plasma; severely lipemic, icteric or hemolyzed samples.
Stability: After separation from clot: Ambient: Unstable; Refrigerated: 3 days; Frozen 1 year (avoid repeated freeze/thaw cycles)

Reference Interval:

Cardiolipin Antibody, IgM
< 11 GPL: Negative for Anti-Cardiolipin IgM
≥ 11 GPL: Positive for Anti-Cardiolipin IgM

Interpretive Data: Anti-Cardiolipin antibodies are frequently found in patients with Systemic Lupus Erythematosus (SLE). They are also found in patients with other autoimmune diseases, as well as some individuals with no apparent previous underlying disease. Elevated levels of anti-cardiolipin antibodies have been reported to be significantly associated with the presence of both venous and arterial thrombosis, thrombocytopenia, and recurrent fetal loss.

Positive results for IgM only should be carefully interpreted.

CPT Code: 86147

Cardioquin

Refer to Quinidine.

Methodology: High Performance Liquid Chromatography
Performed: Referral – ARUP (Sunday, Tuesday – Saturday)
Reported: 2 – 5 days

Specimen Required: **Collect:** One 10 mL green (heparin). Collect on ice. (Min: 7 mL).
Transport: 4 mL plasma (green, heparin), frozen. (Min: 2.5 mL)
Pediatric Collect/Transport: 1.5 mL plasma (green, heparin), frozen.
Remarks: Patient should be calm and in a supine position for 30 minutes prior to collection. Plasma should be separated from cells ASAP (within 1 hour).
Stability: Ambient: Unacceptable; Refrigerated: 2 days; Frozen: 1 month (-20°C), up to 1 year (-70°C)

Reference Interval:

Components	Reference Interval	
Epinephrine	Age	Epinephrine
	2 – 10 days	36 – 400 pg/mL
	11 days – 3 mos	55 – 200 pg/mL
	4 mos – 11 mos	55 – 440 pg/mL
	12 mos – 23 mos	36 – 640 pg/mL
	24 mos – 35 mos	18 – 440 pg/mL
	3 – 17 yrs	18 – 400 pg/mL
18+ years	10 – 200 pg/mL	
Norepinephrine	Age	Norepinephrine
	2 – 10 days	170 – 1180 pg/mL
	11 days – 3 mos	370 – 2080 pg/mL
	4 mos – 11 mos	270 – 1120 pg/mL
	12 mos – 23 mos	68 – 1810 pg/mL
	24 mos – 35 mos	170 – 1470 pg/mL
	3 years – 17 years	85 – 1250 pg/mL
18+ years	80 – 520 pg/mL	
Dopamine	2 days and older: 0 – 20 pg/mL	

Note: Medications which may interfere with catecholamines and metabolites include amphetamines and amphetamine-like compounds, appetite suppressants, bromocriptine, buspirone, caffeine, carbidopa-levodopa (Sinemet), clonidine, dexamethasone, diuretics (in doses sufficient to deplete sodium), ethanol, isoproterenol, labetalol, methyldopa (Aldomet), MAO inhibitors, nicotine, nose drops, propafenone (Rythmol), reserpine, theophylline, tricyclic antidepressants, and vasodilators. The effects of drugs on catecholamine results may not be predictable.

For optimum results, patient should be supine with venous catheter in place for 30 minutes prior to collection. “Upright” ranges typically show norepinephrine up to 700 pg/mL, epinephrine up to 900 pg/mL, and dopamine essentially unchanged. Children, particularly those under 2 years of age, often show an elevated catecholamine response to stress.

CPT Code: 82384

Methodology: High Performance Liquid Chromatography/Tandem Mass Spectrometry

Performed: Referral – ARUP (Sunday, Tuesday – Saturday)

Reported: 3 – 5 days

Specimen Required:

Collect: 24-hour or random urine. Refrigerate during collection.

Transport: 5 mL aliquot from a well-mixed 24-hour or random collection at 2–8°C. (Min: 2.5 mL)

Submit sample in an ARUP Standardized Transport Tube. Record total volume and collection time interval on transport tube and test request form.

Pediatric Collect/Transport: 2.5 mL aliquot from a well-mixed 24-hour or random collection at 2–8°C .

Submit sample in an ARUP Standardized Transport Tube. Record total volume and collection time interval on transport tube and test request form.

Remarks: Adequate refrigeration is the most important aspect of specimen preservation.

Stability: Ambient: 24 hours; Refrigerated: 1 month; Frozen: 6 months

Reference Interval:

Components	Reference Interval
Dopamine	60 – 440 µg/d
Epinephrine	0 – 25 µg/d
Norepinephrine	0 – 100 µg/d

The urine catecholamines-to-creatinine ratios will be reported whenever the patient is under 18 years, the urine collection is random, other than 24 hours or the urine volume is less than 400 mL/24 hours.

Components	Age	Reference Interval
Dopamine	0 – 11 mos	240 – 1290 ug/g crt
	1 yr – 3 yrs	80 – 1220 ug/g crt
	4 yrs – 10 yrs	220 – 720 ug/g crt
	11 yrs – 17 yrs	120 – 450 ug/g crt
	18+ yrs	0 – 250 ug/g crt
Epinephrine	0 – 11 mos	0 – 380 ug/g crt
	1 yr – 3 yrs	0 – 82 ug/g crt
	4 yrs – 10 yrs	5 – 93 ug/g crt
	11 yrs – 17 yrs	3 – 58 ug/g crt
	18+ yrs	0 – 20 ug/g crt
Norepinephrine	0 – 11 mos	25 – 310 ug/g crt
	1 yr – 3 yrs	25 – 290 ug/g crt
	4 yrs – 10 yrs	27 – 110 ug/g crt
	11 yrs – 17 yrs	4 – 105 ug/g crt
	18+ yrs	0 – 45 ug/g crt
Creatinine (24-hour)	Male:	Female:
	3-8 years: 140-700mg/d	3-8 years: 140-700 mg/d
	9-12 years: 300-1300 mg/d	9-12 years: 300-1300 mg/d
	13-17 years: 500-2300 mg/d	13-17 years: 400-1600g/d
	18-50 years: 1000-2500 mg/d	18-50 years: 700-1600 mg/d
	51-80 years: 600-2000 mg/d	51-80 years: 500-1400 mg/d
81 years and older: 600-2000 mg/d	81 years and older: 400-1300 mg/d	

Note: Secreting neuroendocrine tumors are typically associated with catecholamine concentrations several times higher than the upper reference intervals. Large elevations can also be seen in life threatening illnesses and drug interferences. Common reasons for slight and moderate elevations may include intense physical activity, emotional and physical stress, drug interferences and improper specimen collection.

Medications which may physiologically interfere with catecholamines and metabolites include amphetamines and amphetamine-like compounds, appetite suppressants, bromocriptine, buspirone, caffeine, carbidopa-levodopa (Sinemet), clonidine, dexamethasone, diuretics (in doses sufficient to deplete sodium), ethanol, isoproterenol, methyl dopa (Aldomet), MAO inhibitors, nicotine, nose drops, propafenone (Rythmol), reserpine, theophylline, tricyclics and vasodilators. The effects of drugs on catecholamine results may not be predictable. Reference: Optimal collection and storage conditons for catecholamine measurements in human plasma and urine. (Clinical Chemistry 1993)

CPT Code: 82384

Methodology: Automated Cell Count with Automated and/or Manual Differential
Performed: Sunday – Saturday
Reported: 1 hour

Specimen Required: Collect: One lavender (Min: 2 mL). Neonate: one full lavender microtainer.
Transport: Whole blood (lavender, EDTA) at ambient or 2–8°C.
Unacceptable Conditions: Frozen and/or clotted samples.
Stability: Ambient: 24 hours; Refrigerated 3 days

Reference Interval:

Adult and Pediatric Reference Range ("Hematology Of Infancy & Childhood", Nathan, 1987)

AGE	WBC (K/ μ L)	Neut %	Lymph %	Mono %	Eos %	Baso %	RBC (M/ μ L)	HGB (g/dL)	HCT %	MCV fL	MCH C (g/DL)	PLT (K/ μ L)
Birth-1 Month	9.0-30.0											
2 - 23 Months	5.0-19.5											
1 - 3 Years	6.0-17.5											
4 - 7 Years	5.5-15.5											
8 - 13 Years	4.5-13.5											
14 - 17 Years	4.5-13.0											
Birth - 2 Months		20-87	20-60	2-10	0-6	0-3						
3 Mo - 2 Years		17-49	20-60	2-10	0-6	0-3						
3 - 10 Years		33-35	20-60	2-10	0-6	0-3						
11-17 Years		45-70	20-40	2-10	0-6	0-3						
Birth - 3 Days							4.00-6.60	14.5-22.5	45.0-67.0			
4 - 7 Days							3.90-6.30	13.5-21.5	42.0-66.0			
8 - 14 Days							3.60-6.20	12.5-20.5	39.0-63.0			
15 Days - 1 Mo							3.00-5.40	10.0-18.0	31.0-55.0			
2 Months							2.70-4.90	9.0-14.0	28.0-42.0			
3 - 5 Months							3.10-4.50	9.5-13.5	29.0-42.0			
6 Mo - 1 Year							3.70-5.30	9.5-13.5	29.0-41.0			
2 - 5 Years							3.90-5.30	10.5-13.5	33.0-39.0			
6 - 11 Years							4.00-5.20	11.5-13.5	34.0-40.0			
12-17 Years							4.50-5.30	11.5-15.5	35.0-45.0			
Newborn										98-118	31-37	
2 Weeks										95-126	31-37	
1 Month										88-126	31-37	
3 Months										77-115	28-37	
5 Months										74-108	30-36	
6 Mo - 1 Year										70-86	30-36	
2 - 5 Years										75-87	31-37	
6 - 12 Years										77-95	31-37	
13 - 17 Years										78-98	31-37	
18 or > Years	3.6-9.2	45-80	20-40	2-10	0-6	0-3	M-4.38-5.58 F-3.70-5.14	M-13.7-17.3 F-12.0-15.5	M-39.0-49.0 F-35.0-46.0	80-100	31-37	140-400

CPT Code: 85025

CCP AB, IGG

Refer to Cyclic Citrullinated Peptide Antibody IgG.

CEA

Refer to Carcinoembryonic Antigen.

Cell Count, Body Fluid

Refer to Body Fluid – Cell Count

Cell Count, CSF

Refer to CSF – Cell Count & Differential

Test Code 3728	Centromere Antibody	CENTROMER
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Methodology: Indirect Fluorescent Antibody
Performed: Monday – Friday
Reported: 1 – 3 days

Specimen Required: **Collect:** One SST. (Min: 3 mL)
Transport: 1 mL serum at 2–8°C. (Min: 0.5 mL)
Remarks: Separate serum from cells ASAP and refrigerate.
Unacceptable Conditions: Samples with high degree of hemolysis, lipemia or microbial growth.
Stability: Refrigerated: 1 week; Frozen: Stable

Reference Interval:

CPT Code: 86255

Test Code 6162	Ceruloplasmin	CERU
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Methodology: Turbidimetry
Performed: Referral – ARUP (Sunday – Saturday)
Reported: 2 – 5 days

Specimen Required: **Collect:** One 4 mL SST.
Transport: 0.5 mL serum at 2-8°C. (Min: 0.3 mL)
Pediatric Collect/Transport: 0.2 mL serum at 2-8°C.
Remarks: Separate serum from cells ASAP.
Unacceptable Conditions: Hemolyzed samples.
Stability: Ambient: 8 hours; Refrigerated: 3 days; Frozen: 1 month

Reference Interval: Normal: 20 – 60 mg/dL

CPT Code: 82390

Cervical Culture

Refer to Culture-Cervix.

CH100

Refer to Complement Activity Enzyme Immunoassay, Total .

CH50

Refer to Complement Activity Enzyme Immunoassay, Total.

Chlamydia and Gonorrhea

Refer to Chlamydia trachomatis and Neisseria gonorrhea

Test Code 3771

Chlamydia trachomatis Culture (Genital)

V CHLAM

Methodology: Cell Culture
Performed: Referral – ARUP (Sunday - Saturday)
Reported: 4 – 6 days

Specimen Required: **Collect:** Cervical, urethral, rectal or eye swab. Infants - nasopharyngeal aspirate/washing. Preserve specimen in *Chlamydia* transport media (Microtest M4 immediately). **Source of specimen is required.**
Transport: Cervical, urethral, rectal or eye swab or nasopharyngeal aspirate or wash in *Chlamydia* transport media (Microtest M4) at 2–8°C to insure organism viability for culture. Submit specimen according to Diagnostic Substance Shipping Guidelines.
Pediatrics: Also acceptable for newborns: nasopharyngeal aspirate/washing/swab. Preserve specimen in *Chlamydia* transport media (Microtest M4) immediately. Source of specimen is preferred. Submit specimen according to Diagnostic Substance Shipping Guidelines.
Remarks: **Do not freeze.**
Unacceptable Conditions: Urine Samples. Samples not collected in *Chlamydia* culture transport media.
Stability: Ambient: 1 hour; Refrigerated: 48 hours; Frozen: Unacceptable.

Reference Interval: Culture negative for *Chlamydia trachomatis*.

Note: *Chlamydia* species other than *C. trachomatis* (i.e. *C. pneumoniae*, *C. psittaci*) can also be isolated from respiratory secretions but requires additional incubation time. **Order** *Chlamydia pneumoniae* Culture (Respiratory).

Amplified or direct DNA probe testing is recommended for endocervical, urethral, and conjunctival specimens. Specimens must be collected and transported with test-specific kits provided by the manufacturer. Culture is recommended as the standard for *Chlamydia trachomatis* detection if suspected sexual abuse and for suspected failure of therapy.

CPT Code(s): 87110 Culture

Test Code 3915

Chlamydia Trachomatis by DNA Probe

CHLAM PROB

Methodology: DNA Probe, using Strand Displacement Amplification
Performed: Monday - Friday
Reported: 1 – 3 days

Specimen Required: **Collect:**
Endocervical swabs: Use Culturette Direct Swab, pink for females. Remove excess mucus with cleaning swab (large swab) and discard. Collect specimen using Culturette Direct Swab. Place swab into transport tube and cap tube.
Urethral swabs: Use Culturette Direct Swab, blue for males. Collect specimen using Culturette Direct Swab. Place swab into transport tube and cap tube.
Urine: Collect in plastic, preservative free, sterile urine container. Collect first 15-20 mL of voided urine optimal, maximum volume 60 mL.
Transport: Swab specimens acceptable 4-6 days at 2-27 ° C.
Urine: 4-6 days at 2-8 ° C.
Remarks: This assay should not be used for the evaluation for suspected sexual abuse or for other medico-legal indications.
For females, urine is not the specimen of choice. Testing urine specimens only as sole test for identifying CT or GC may miss infected individuals (17% of females for CT, 13.8% for GC).
Unacceptable Conditions: Large white swab used for preparatory cleaning is unacceptable for testing. Specimens other than endocervical, urethral, or voided urine are not acceptable. Moderate or grossly bloody specimens may cause inhibition in the assay.
Stability: Swab specimens: 4-6 days at 2-27° C.
Urine specimens: 4-6 days at 2-8° C.

Reference Interval: Negative

Note: Culture is recommended as the standard for *Chlamydia trachomatis* in suspected sexual abuse and for suspected failure of therapy

CPT Code: 87491

Test Code 4171	Chloride, CSF	CSF-CL
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Methodology: Ion Selective Electrode
Performed: Sunday – Saturday
Reported: 1 - 2 hours

Specimen Required: **Collect:** CSF in clean glass or plastic container with secure lid.
Transport: 1 mL CSF. (Min: 0.5 mL) promptly at ambient temperature. Refrigerate and transport at 2–8°C if delivery will be delayed.
Stability: Ambient: 24 hours; Refrigerated: 7 days; Frozen: Indefinitely

Reference Interval: Newborn – 2 weeks: 96 – 106 mEq/L
> 2 weeks: 100 – 112 mEq/L

CPT Code: 82438

Test Code 4129	Chloride, Serum or Plasma	CL
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Methodology: Ion Selective Electrode
Performed: Sunday – Saturday
Reported: 2 – 4 hours

Specimen Required: **Collect:** One SST. If STAT: green (heparin). (Min: 3 mL)
Transport: SST or green (heparin) promptly at ambient. Separate and refrigerate serum or plasma (Min: 0.5 mL) and transport at 2–8°C if delivery will be delayed.
Stability: Ambient: 24 hours; Refrigerated: 7 days; Frozen: Indefinitely

Reference Interval: Newborn – 2 weeks: 96 – 106 mEq/L
> 2 weeks: 97 – 109 mEq/L

CPT Code: 82435

Test Code 5333	Chloride, Sweat	CL-SWEAT
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Methodology: Iontophoresis with amperometric-coulometric titration
Performed: Monday – Friday between 8 a.m. and 2 p.m. by arrangement
Reported: 2 hours

Specimen Required: **Collect:** Collection performed by technologist. **Inpatient testing must be scheduled with the Laboratory. Outpatient testing must be scheduled with Patient Scheduling.**
Remarks: Recommend waiting until patient is well hydrated and afebrile to maximize sweat collection. Inpatients must be removed from mist tent and oxygen prior to collection.

Reference Interval: < 60 mEq/L (Borderline: 40 – 60 mEq/L)

Interpretive Data: Sweat electrolyte levels are also elevated in other conditions, including Addison’s disease, congenital adrenal hyperplasia, G6PDH deficiency, hypothyroidism, and nephrotic syndrome.

CPT Code: 89360

Test Code 4130	Chloride, Urine (Random)	U-CL /L
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Methodology: Ion-selective electrode
Performed: Sunday – Saturday
Reported: Same day

Specimen Required: **Collect:** Random urine collection in clean container with secure lid. Acceptable: Timed urine collection.
Transport: Entire collection, or 5 mL aliquot from a well-mixed random or timed collection; at 2–8°C. If timed collection, specify hours of collection. (Min: 0.5 mL)

Reference Interval: Not determined. Dependent on dietary chloride intake.

CPT Code: 82436

Test Code 4133	Cholesterol, Total, Serum	CHOL
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Methodology: Enzymatic
Performed: Sunday – Saturday
Reported: 2 – 4 hours

Specimen Required: **Collect:** One 6 ml gold top or plain red. (Min: 3 mL)
Transport: Centrifuged gold top, or 1 mL serum (Min: 0.5 mL); at ambient or 2–8°C.
Remarks: Fasting recommended.
Stability: Ambient: 24 hours; Refrigerated: 3 days; Frozen: 1 month

Reference Interval: 125 – 200 mg/dL

CPT Code: 82465

Test Code 2868	Cholesterol Crystals, Body Fluid	BF-CHOLE
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Methodology: Light & Polarized Microscopy
Performed: Monday – Saturday
Reported: 2 hours

Specimen Required: **Collect:** Pleural, pericardial, peritoneal, synovial and/or bile fluid in EDTA or heparin tube. (Min: 1 mL)
Transport: Transport immediately at ambient; or refrigerate and transport at 2–8°C. Do not freeze.
Remarks: Specify source of fluid.
Unacceptable Conditions: Frozen samples.
Stability: Ambient: 4 hours; Refrigerated: 24 hours

Reference Interval: Negative

CPT Code: 89060

Cholinesterase, Serum

Refer to Pseudocholinesterase, Total.

CPT Code: 82480

Test Code 6172	Chromium, Serum	CR S
Methodology:	Inductively Coupled Plasma/Mass Spectrometry (DRC)	
Performed:	Referral – ARUP (Tuesday, Friday)	
Reported:	2 – 5 days	
Specimen Required:	<p>Collect: One 7 mL dark blue, no additives.</p> <p>Transport: 2 mL serum in an ARUP Standardized Transport Tube at 20-25°C. (Min: 0.5 mL)</p> <p>Pediatric Collect/Transport: 0.5 mL serum ARUP Standardized Transport Tube at 20-25°C.</p> <p>Remarks: Centrifuge and pour off serum into an ARUP Standardized Transport Tube ASAP. Do not allow serum to remain on cells.</p> <p>Unacceptable: Serum separator tubes and gels.</p> <p>Stability: If the sample is drawn and stored in the appropriate container, the trace element values do not change with time.</p>	
Reference Interval:	0.0 – 2.1 µg/L	
Interpretive Data:	Elevated results from non-certified trace element-free tubes may be due to contamination. Elevated concentrations of trace elements in serum should be confirmed with a second specimen collected in a trace element-free tube, such as royal blue sterile tube (no additive).	
CPT Code:	82495	

Test Code 6173	Chromosome Analysis, Amniotic Fluid	CHROM-AMN
Methodology:	Cytogenetic analysis of amniotic fluid	
Performed:	Referral – Genzyme (Monday-Friday)	
Reported:	Preliminary report phoned to physician in 7-10 days. Final report 28 days. On request, reports are also faxed to the referring physician.	
Specimen Required:	<p>Collect: 25–30 mL of amniotic fluid by aseptic technique and place in sterile, screw-capped tubes. Do not leave specimen in syringe.</p> <p>Transport: Amniotic fluid at ambient temperature. Wrap parafilm around cap to prevent leaks.</p> <p>Remarks: Sample and completed cytogenetic requisition must be received immediately upon collection. Label tubes with patient's name, hospital number and date of collection. Do not freeze sample or expose to extreme temperatures.</p> <p>Unacceptable Conditions: Samples frozen or exposed to extreme temperatures.</p> <p>Stability: Ambient: 24 hours.</p>	
Interpretive Data:	By detailed written report.	
CPT Code(s):	88267 Analysis; 88235 Amniotic Chromosome culture; 88280 Additional karyotype; 88291 Interpret	

Test Code 6174 **Chromosome Analysis, Blood** **CHROM-BL**

Methodology: Cytogenetic analysis of peripheral blood routinely
Performed: Referral – Genzyme Monday - Friday
Reported: On newborns, preliminary report in 2–4 days. This is followed by a written report and copy of karyotype. On other blood samples, the report is available in 10–15 working days.

Specimen Required: **Collect:** One 10 mL green (sodium heparin). (Pediatric Min: 2–3 mL)
Transport: Whole blood (green, sodium heparin) at ambient temperature. Include copy of most recent CBC report.
Remarks: Sample and completed cytogenetic requisition must be received immediately upon collection. Label tube with patient's name, hospital number and date of collection. **Do not freeze sample or expose to extreme temperatures.**
Unacceptable Conditions: Samples frozen or exposed to extreme temperatures.
Stability: Ambient: 24 hours.

Interpretive Data: By written report

CPT Code(s): 88262 Chromosome analysis; 88230 Blood Chromosome culture; 88280 Additional cells analyzed; 88291 Interpretation

Test Code 6176 **Chromosome Analysis, Bone Marrow** **CHROM-BON**

Performed: Referral – Genzyme
Reported: Preliminary report phoned to attending physician within 2–3 days.
Final report within 2-7 days.

Specimen Required: **Collect:** 2-4 mL bone marrow aseptically into a sterile green top tube containing sodium heparin. Invert several times to prevent clotting.
Transport: Bone marrow in green (sodium heparin) tube sent immediately to lab.
Remarks: A completed cytogenetics requisition, and a copy of the patient's most recent CBC must accompany the specimen. Label tube with patient's name and date of collection. **Do not freeze sample or expose to extreme temperatures.**
Unacceptable Conditions: Samples frozen or exposed to extreme temperatures.
Stability: Ambient: 24 hours.

Interpretive Data: By report.

CPT Code(s): 88262 Chromosome analysis; 88237 Bone marrow culture; 88291 Interp.

Test Code 6181	Chromosome Analysis, Tissue	CHROM-TB
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Performed: Referral –genzyme
Reported: 1 – 3 weeks

Specimen Required: **Collect:** 3-4 mm biopsy or 50-100 mg of tissue, place in sterile, screw top tube filled with sterile Hanks balanced scaled solution (available from cytogenetics Laboratory) or in sterile saline. **DO NOT** place in formalin.
Transport: 1-3 cu cm biopsy in a sterile, screw-top tube filled with tissue culture transport.
Remarks: Samples must be received immediately after collection. Label tube with patient's name and date of collection. Do not freeze sample or expose to extreme temperatures.
Unacceptable Conditions: Samples in formalin, frozen or exposed to extreme temperatures.
Stability: Ambient: 24 hours.

Reference Interval: By report.

Note: These studies involve culturing of living cells; therefore, times given represent average times which are subject to multiple variables. Hard copy reports are generated following completion of a case. After specimen receipt, results are generally available in an average 7–12 days. A detailed report and a copy of a representative karyotype will follow.

CPT Code(s): 88262 Chromosome analysis; 88233 Tissue Culture; 88280 Chromosome analysis; 88291 Interp.

Test Code 4138	Citric Acid, Urine	CITRIC U
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Methodology: Enzymatic
Performed: Referral – ARUP (Sunday – Saturday)
Reported: 2-5 days

Specimen Required: **Collect:** 24-hour urine. Random samples are also acceptable. Refrigerate during collection.
Transport: 4 mL aliquot from a 24-hour or random collection at 2-8°C. Submit sample in an ARUP Standardized Transfer Tube. (Min: 0.5 mL)
Pediatric Collect/Transport: 0.5 mL aliquot from a 24-hour or random collection at 2-8°C. Submit sample in an ARUP Standardized Transfer Tube.
Remarks: **Adjust pH to ≤ 2 by adding 6M HCl in 1 mL increments.** Samples previously preserved with boric acid are acceptable. Record total volume, collection time interval, and pH on transport tube and test request form.
Stability: Ambient: 8 hours; Refrigerated: 1 week; Frozen: indefinitely.

Reference Interval: 320-1240 mg/d

Note: Reference interval for random urine has not been established.

CPT Code: 82507

CK, Total, Serum (Creatine Kinase)

Refer to Creatine Kinase, Serum

CK Isoenzymes, Serum (CK MM, MB, & BB)

Refer to Creatine Kinase Isoenzymes (MM, MB, BB) by Electrophoresis

Test Code 3317

Clostridium difficile Toxin

C DIF TOX

Methodology: Enzyme Immunoassay
Performed: Daily (batch) - Microbiology
Reported: 24 hours

Specimen Required: **Collect:** Stool, unpreserved. Stool is collected without preservative. Since diarrhea is the major symptom with this disease state, **formed stools are inappropriate for testing and such specimens will be rejected and testing canceled. Cancellation notices will be issued.** Formed stools for epidemiology purposes will be accepted, but this must be noted with order.
Transport: 1 g stool, at 2–8°C if transport time is ≤ 24 hours, or frozen if transport time is > 24 hours. Deliver promptly to laboratory. Refrigerate specimen if delay exceeds 2 hour (up to 24 hours)
Remarks: Testing should be performed within 48 hours on specimens kept at 2–8°C. Delays in testing after 48 hours require specimen to be frozen at -70°C.
Unacceptable Conditions: Formed stool and stool preserved in bacterial transport media, formalin, SAF, or PVA.

Reference Interval: Negative

Clinical Significance: *Clostridium difficile* is an important cause of antibiotic-associated diarrhea, which in its most serious form can result in the clinical syndrome of pseudomembranous colitis and significant mortality. Although *C. difficile* may be part of the normal bacterial intestinal flora, it may become an opportunistic pathogen following the patient's treatment with antibiotics and subsequent alteration of the normal intestinal flora. The clinical symptoms associated with the disease are thought to be due the toxins produced by the organism.

Limitations of the Procedure: The level of toxin has not been shown to have a definitive correlation with the presence or severity of disease; thus, assay results should be interpreted by a physician in conjunction with clinical and other laboratory findings. No one single laboratory test can consistently confirm the diagnosis of antibiotic-associated diarrhea due to *C. difficile*. If a physician suspects *C. difficile* as a causative agent and the initial testing is negative, an additional specimen should be submitted for repeat testing or consultation is available for suggesting alternative testing. Results may remain positive after treatment; testing should not be ordered to determine a "test of cure".

CPT Code: 87324

Test Code 5058

Clozapine

CLOZAPINE

Methodology: High Performance Liquid Chromatography
Performed: Referral – ARUP (Monday – Friday)
Reported: 2 – 5 days

Specimen Required: **Collect:** One 5 mL plain red. (Min: 3 mL) (Also acceptable: plasma from heparin, EDTA, sodium fluoride; potassium oxalate.)
Transport: 1 mL serum or plasma at 2–8°C. (Min: 0.6 mL)
Pediatric Collect/Transport: 0.6 mL serum or plasma at 2–8°C.
Remarks: Avoid use of serum separator tubes and gels
Stability: Ambient: 1 day; Refrigerated: 2 months; Frozen: 2 months

Reference Interval: Therapeutic range not established

Interpretive Data: A therapeutic range has not been established, however, a clozapine level of 100 ng/mL is suggested as the minimum therapeutic threshold. Data suggests that concentrations between 200 and 700 mg/mL correlate more with response; however, non-response does occur within this range. For refractory schizophrenia, at least 350 ng/mL of clozapine is suggested to achieve a therapeutic response. After initial therapeutic response occurs, the dose should be progressively reduced to the minimum level necessary to maintain clinical remission.

The likelihood of seizures and other side effects increase with clozapine levels greater than 1200 ng/mL and/or dosages greater than 600 mg/d.

CPT Code: 80299

Clozaril

Refer to Clozapine.

CMV Antibodies, IgG & IgM

Refer to Cytomegalovirus Antibodies, IgG & IgM.

CMV Culture

Refer to Culture-Virus._

Cobalamin

Refer to Vitamin B12.

Cocaine (Benzoylcegonine), Qualitative, Urine

Refer to Drugs of Abuse, Urine (DAU7 Panel) for Medical Purposes

Test Code 3781

Cold Agglutinins

COLD

Methodology: Hemagglutination
Performed: Referral – ARUP (Monday – Friday)
Reported: 2 – 5 dyas

Specimen Required: **Collect:** One 4 mL SST. Keep in warm water (37°C) until processed for transport by laboratory.
Transport: 1 mL serum at 2-8°C. (Min: 0.5 mL).
Pediatric Collect/Transport: 0.25 mL serum at 2-8°C.
Remarks: Refrigeration of whole blood before separation of serum from cells will adversely affect test results.
Unacceptable Conditions: Refrigeration of whole blood specimen. Plasma, CSF, severely hemolyzed, lipemic or contaminated samples.
Stability: After separation from clot: Ambient: 2 days; Refrigerated: 2 weeks; Frozen: 1 year (avoid repeat freeze/thaw cycles)

Reference Interval: <1:32 Negative

Interpretive Data: Titers of 1:32 or higher are considered elevated by this technique. Elevated titers are rarely seen except in primary atypical pneumonia and in certain hemolytic anemias. If the agglutination is not reversible after incubation at 37°C, then the reaction is not due to cold agglutinins.

Primary atypical pneumonia can be caused by *Mycoplasma pneumoniae*, influenza A, influenza B, parainfluenze, and adenoviruses. However, a fourfold rise in the cold agglutinins usually begins to appear late in the first week or during the second week of the disease and begins to decrease between the fourth and sixth week. Low titers of cold agglutinins have been demonstrated in malaria, peripheral vascular disease, and common respiratory disease.

CPT Code: 86157

Methodology: Enzyme-Linked Immunosorbent Assay
Performed: Referral – ARUP (Monday – Friday)
Reported: 1 – 2 days

Specimen Required: **Collect:** One 7 mL plain red. (Min: 3 mL). Allow to clot for 1 hour at room temperature.
Transport: 1 mL serum, frozen. (Min: 0.5 mL)
Pediatric Collect/Transport: 0.15 mL serum, frozen.
Remarks: **CRITICAL FROZEN. Separate samples must be submitted when multiple tests are ordered.** Allow to clot for 1 hour at room temperature. Separate serum from cells ASAP and freeze. Plasma samples are not recommended. Do not use serum separator tubes or gels.
Unacceptable Conditions: Samples left to clot at 2-8°C. Samples subjected to repeated freeze/thaw cycles. Samples collected in serum separator tubes. Non-frozen samples.
Stability: Ambient: 2 hours; Refrigerated: Unacceptable; Frozen: 2 weeks.

Reference Interval: Low: < 60 CAE Units Normal: 60 – 144 CAE Units High: >144 CAE Units

CPT Code: 86162

Complement CH100, Total

Refer to Complement Activity Enzyme Immunoassay, Total

Test Code 5054

Complement Component 3 (C 3)

C 3

Methodology: Nephelometry
Performed: Monday – Friday
Reported: 1 – 2 days

Specimen Requirements: **Collect:** One 6 mL gold top or plain red. (Min: 3 mL)
Transport: 0.5 mL serum, critical frozen. (Min: 0.3 mL)
Remarks: Allow to clot for 30 min. to 1 hour at ambient temperature. Separate serum from cells ASAP (within two hours) and freeze at -20°C. Submit separate samples if multiple tests are ordered.
Unacceptable Conditions: Non-frozen and plasma samples.
Stability: Ambient: < 6 hours; Refrigerated: < 24 hours.

Reference Interval: 79 - 152 mg/dL

CPT Code: 86160

Test Code 5056

Complement Component 4 (C 4)

C 4

Methodology: Nephelometry
Performed: Monday – Friday
Reported: 1 – 2 days

Specimen Requirements: **Collect:** One 6 mL gold top or plain red. (Min: 3 mL)
Transport: 0.5 mL serum, critical frozen. (Min: 0.3 mL)
Remarks: Allow to clot for 30 min. to 1 hour at ambient temperature. Separate serum from cells ASAP (within two hours) and freeze at -20°C. Submit separate samples if multiple tests are ordered.
Unacceptable Conditions: Non-frozen and plasma samples.
Stability: Ambient: < 6 hours; Refrigerated: < 24 hours.

Reference Interval: 16 – 38 mg/dL

CPT Code: 86160

Test Code 4007

Comprehensive Metabolic Panel

CMP

Methodology: Refer to individual components

Performed: Sunday – Saturday

Reported: 2 – 4 hours (STAT: 1 hour)

Specimen Required: **Collect:** One 6 ml gold top or plain red. If STAT, green (heparin). (Min: 3 mL)
Transport: Gold, red, or green (heparin) promptly at ambient. Do not remove cap.
If transport will be delayed, separate serum or plasma from cells, refrigerate and transport at 2–8°C . (Min: 0.5 mL serum)
Remarks: Fasting recommended.
Stability: Ambient: 4 hours; Refrigerated: 7 days; Frozen: Indefinitely

Reference Interval: By report.

Note: CMP components are: Albumin, Alkaline Phosphatase, Bun, Calcium, Carbon Dioxide, Chloride, Creatinine, Glucose, Potassium, SGOT (AST), SGPT (ALT), Sodium, Total Bilirubin, Total Protein.

CPT Code: 80053

Congo Red Stain Only

Histology

Coombs, Direct

Refer to Direct Antiglobulin Test

Coombs, Indirect

Refer to Antibody Screen (Indirect Antiglobulin)

Copper Stain Only

Histology

Test Code 6195**Copper, Serum****COPPER**

Methodology: Inductively Coupled Plasma/Mass Spectrometry
Performed: Referral – ARUP (Monday - Friday)
Reported: 2 – 5 days

Specimen Required: **Collect:** One 7 mL dark blue, (no additives).
Transport: 2 mL serum in an ARUP Standardized Transport Tube at 20-25°C. (Min: 0.5 mL)
Pediatric Collect/Transport: 0.5 mL serum in an ARUP Standardized Transport Tube at 20-25°C.
Remarks: Centrifuge and pour off serum into an ARUP Standardized Transport Tube ASAP. Do not allow serum to remain on cells.
Unacceptable Conditions: Serum separator tubes and gels.
Stability: If the sample is drawn and stored in the appropriate container, the trace element values do not change with time.

Reference Interval:

Age	Male	Female
0 up to 30 days	26 – 32 µg/dL	26 – 32 µg/dL
1 – 5 months	59 – 70 µg/dL	50 – 70 µg/dL
6 months – 4 years	27 – 153 µg/dL	27 – 153 µg/dL
5 – 16 years	67 – 147 µg/dL	67 – 147 µg/dL
17 – 60 years	70 – 140 µg/dL	80 – 155 µg/dL
61 years & over	85 – 170 µg/dL	85 – 190 µg/dL

Interpretive Data: Serum copper increases in pregnancy. Values at term have been observed as high as 118-302 µg/dL

Elevated results from non-certified trace element-free tubes may be due to contamination. Elevated concentrations of trace elements in serum should be confirmed with a second specimen collected in a trace element-free tube, such as royal blue sterile tube (no additive).

CPT Code: 82525

Coproporphyrin, Urine

Refer to Porphyrins, Urine.

Cordarone

Refer to Amiodarone & Metabolite.

Test Code 6210**Cortisol, Serum****CORTISOL**

Methodology: Chemiluminescent Immunoassay
Performed: Sunday – Saturday
Reported: Same day

Specimen Required: **Collect:** One 6 ml gold top or plain red. (Min: 6 mL)
Transport: Centrifuged gold top or 1 mL serum (Min: 0.5 mL); at 2–8°C.
Remarks: Separate serum from cells and refrigerate if transport will be delayed.
Unacceptable: Plasma samples, gross hemolysis, samples stored at room temperature longer than 8 hours.
Stability: Ambient: 8 hours; Refrigerated: 2 days; Frozen: Stable

Reference Interval: 8 am: 4.0 – 26.0 ug/dL
4 pm: 3.0 – 17.0 ug/dL

CPT Code: 82533

Methodology: High Performance Liquid Chromatography/Tandem Mass Spectrometry

Performed: Referral – ARUP (Monday – Saturday)

Reported: 2 – 5 days

Specimen Required: **Collect:** 24-hour urine. Urine must be refrigerated during collection.
Transport: 5 mL aliquot from a 24-hour collection at 2-8°C. (Min: 1.5 mL). Record total volume and collection time interval on transport tube and test request form.
Pediatric Collect/Transport: 1 mL aliquot from a 24-hour collection at 2-8°C. Record total volume and collection time interval on transport tube and test request form.
Unacceptable Conditions: Samples with preservatives or acidified samples.
Stability: Ambient: 2 days; Refrigerated: 1 week; Frozen: 1 month

Reference Interval:

Age Group	Gender	Cortisol (µg/day)
3 - 8 years	Female and male	< 18
9 – 12 years	Female and male	< 37
13 – 17 years	Female and male	< 56
18 years and older	Female	<45
18 years and older	Male	< 60

		Cortisol (ug/g creatinine)
0-2 years	Female and Male	<120 ug/g
3-8 years	Female and Male	<90 ug/g
9-12 years	Female and Male	<55 ug/g
13-17 years	Female and Male	<42 ug/g
18 years and older	Female and Male	<85 ug/g

Note: Reference intervals based on literature from Robert L. Taylor, et al. Validation of a High-Throughput Liquid Chromatography-Tandem Spectrometry Method for Urine Cortisol and Cortisone. Clinical Chemistry 48:9, p 1511-1519 (20002)

CPT Code: 82530

Corynebacterium diphtheriae Culture

Refer to Culture-Corynebacterium diphtheriae

Coxsackie Virus Culture

Refer to Culture-Virus

Test Code 4163 **Creatinine, 24-Hour Urine** **U-CREA24**

Methodology: Spectrophotometric
Performed: Sunday – Saturday
Reported: Next day

Specimen Required: **Collect:** 24-hour urine. **Sample must be refrigerated during collection.**
Transport: Entire collection, or 5 mL aliquot from a well-mixed 24-hour collection; at 2–8°C.
Remarks: If less than 24 hour collection, refer to Creatinine, Timed Urine. Specify total volume and hours of collection.
Stability: Ambient: Unstable; Refrigerated: 5 days; Frozen: Indefinitely

Reference Interval: Male: 1200 – 2000 mg/24 hr Female: 800 – 1500 mg/24 hr

CPT Code: 82570

Test Code 4166 **Creatinine, Timed Urine (not 24-Hour collection)** **U-CREA-TM**

Methodology: Spectrophotometric
Performed: Sunday – Saturday
Reported: Next day

Specimen Required: **Collect:** Timed urine collection. **Refrigerate during collection.**
Transport: Entire urine collection, or 5 mL aliquot from a well-mixed timed collection; at 2–8°C.
Remarks: Specify total volume and hours of collection.
Stability: Ambient: Unstable; Refrigerated: 5 days; Frozen: Indefinitely.

Reference Interval: None available.

CPT Code: 82570

Test Code 5035 **Creatinine, Amniotic Fluid** **AMNI-CREA**

Methodology: Spectrophotometric
Performed: Sunday – Saturday
Reported: 1 – 2 hours

Specimen Required: **Collect:** Amniotic fluid in clean, dry container with secure lid. (Min: 0.5 mL)
Transport: Amniotic fluid promptly at ambient temperature. Refrigerate at 2–8°C if transport must be delayed.
Remarks: Protect from light if other amniotic testing is anticipated.
Stability: Ambient: Unstable.

Reference Interval: None available.

Note: Available for fetal lung maturity testing.

CPT Code: 82570

Test Code 1594	Crossmatch – Irradiated Pre-Storage Leuko-reduced Packed Cells	RO LR XM
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Methodology: Immediate Spin Tube Method
Performed: Daily – Blood Bank
Reported: 3 hours

Specimen Required: **Collect:** 6 ml pink top tube
Transport: Immediately at ambient temperature or at 2–8°C.
Remarks: Typenex if no hospital identification band on patient.
Unacceptable Conditions: No gel separation tubes or hemolyzed serum
Stability: Ambient: 24 hours at room temperature; 72 hours at 2-6°C

CPT Code: 86920

Test Code 1593	Crossmatch – Pre-Storage Leuko-reduced Packed Cells	LRXMPC
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Methodology: Immediate Spin Tube Method
Performed: Daily – Blood Bank
Reported: 2 hours

Specimen Required: **Collect:** 6 ml pink top tube.
Transport: Immediately at ambient temperature or at 2–8°C.
Remarks: Typenex if no hospital identification band on patient.
Unacceptable Conditions: No gel separation tubes or hemolyzed serum
Stability: Ambient: 24 hours; 72 hours at 2-6°C

CPT Code: 86920

Test Code 1597	Crossmatch – Washed Cells	XM WRBC
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Methodology: Immediate Spin Tube Method
Performed: Daily – Blood Bank
Reported: 2 hours

Specimen Required: **Collect:** 6 ml pink top.
Transport: Immediately at ambient temperature or at 2–8°C.
Remarks: Typenex if no hospital identification band on patient.
Unacceptable Conditions: No gel separation tubes or hemolyzed serum
Stability: Ambient: 24 hours; 72 hours at 2-8°C

CPT Code: 86920

CRP

Refer to C-Reactive Protein and C-Reactive Protein, high sensitivity

Test Code 3782	Cryoglobulin (Qualitative)	CRYGB
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Methodology: Cold Precipitation
Performed: Referral – ARUP (Sunday – Saturday)
Reported: 4 – 6 days

Specimen Required: **Collect:** Whole blood must be drawn in a pre-warmed (37°) syringe and kept at 37°C. Immediately after blood has been obtained, transfer sample to a pre-warmed (37°C) plain red (Min: 6 ml) and keep sample at 37°C until clotting is complete. Sample may be drawn directly into a pre-warmed collection tube and maintained at 37°C until centrifugation. Let clot for one hour at 37°C centrifuge, if possible.
Transport: 3 mL serum at 20-25°C. (Min: 3 ml)
Pediatric Collect/Transport: 1 mL serum at 20-25°C.
Remarks: Fasting sample recommended. **Do not refrigerate or freeze at any time.** Proper collection and transport of specimen is critical to the outcome of the assay. Quantities less than 3 mL may affect the sensitivity of the assay.
Unacceptable Conditions: Refrigerated or frozen samples, sample collected in serum separator tubes.
Stability: Ambient: 1 week; Refrigerated: Unacceptable; Frozen: Unacceptable.

Reference Interval: Negative at 72 hours.

Note: The sample is examined daily for the presence or absence of cryoglobulins over a period of 3 days. Cryoglobulins are usually associated with certain plasma cell and lymphoproliferative disorders, but have also been demonstrated in collagen vascular diseases, and infections such as infectious mononucleosis and cytomegalovirus disease. They may also be found in low levels in apparently healthy individuals

CPT Code: 82595

Test Code 1615	Cryoprecipitate (1 Unit)	CRYO-1
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Methodology: Thawed at 37°C
Performed: Daily

Specimen Required: **Collect:** Any color tube if blood type is unknown.
Transport: Any color at ambient temperature or 2–8°C.
Remarks: Any color top tube required if blood type is unknown..
Stability: Ambient: 24 hours; 72 hours at 2-8°C.

CPT Code: 36430

Test Code 1616	Cryoprecipitate (4 Units)	CRYO-4
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Methodology: Thawed at 37°C
Performed: Daily

Specimen Required: **Collect:** Any color tube if blood type is unknown.
Transport: Any color at ambient temperature or 2–8°C.
Remarks: Any color tube required if blood type is unknown..
Stability: Ambient: 24 hours; 72 hours at 2-8°C.

CPT Code: 36430 x 4

Test Code 1617	Cryoprecipitate (6 Units)	CRYO-6
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Methodology: Thawed at 37°C
Performed: Daily

Specimen Required: **Collect:** Any color tube is blood type is unknown.
Transport: Any color at ambient temperature or 2-8°C.
Remarks: Any color tube required if blood type is unknown..
Stability: Ambient: 24 hours; 72 hours at 2-8°C.

CPT Code: 36430 x 6

Test Code 1618 **Cryoprecipitate (8 Units)** **CRYO-8**

Methodology: Thawed at 37°C
Performed: Daily

Specimen Required: **Collect:** Any color tube if blood type is unknown.
Transport: Any color at ambient temperature or 2–8°C.
Remarks: Any color tube required if blood type is unknown..
Stability: Ambient: 24 hours; 72 hours at 2-8°C.

CPT Code: 36430 x 8

Test Code 1619 **Cryoprecipitate (10 Units)** **CRYO-10**

Methodology: Thawed at 37°C
Performed: Daily

Specimen Required: **Collect:** Any color tube if blood type is unknown.
Transport: Any color at ambient temperature or 2–8°C.
Remarks: Any color tube required if blood type is unknown..
Stability: Ambient: 24 hours; 72 hours at 2-8°C.

CPT Code: 36430 x 10

Test Code 3321 **Cryptococcus Antigen** **CRYPTO AG**

Methodology: Enzyme Immunoassay
Performed: Referral – OSF (St. Francis) (Sunday – Saturday)
Reported: 1–2 days

Specimen Required: **Collect:** CSF, 6 mL SST or plain red (Min: 3 mL)
Transport: CSF (1 mL), plain red, or serum (Min: 0.5 mL) at 2–8°C.
Stability: Refrigerated: 7 days; Frozen: Indefinitely

Reference Interval: Negative.

Interpretive Data: A negative result does not exclude the possibility of cryptococcal infection.

CPT Code: 86403

Cryptococcus Exam

Refer to India Ink Exam

Test Code 3322	Cryptosporidium Antigen by EIA	CRYPTOSPO
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Methodology: Enzyme Immunoassay
Performed: Monday-Friday
Reported: Same day

Specimen Required: **Collect:** Stool. (Min: 1 g). Preserve in 10% formalin.
 Transport: Send preserved stool (10% formalin) at 20-25°C.
 Remarks: Kits for preservation are available from Methodist Medical Center laboratory.
 Unacceptable Conditions: Treatment with PVA fixative, Cary-Blair transport media or delayed transport of unpreserved specimen.
 Stability: Ambient: 7 days (formalin); Refrigerated: 48 hours (unpreserved); Frozen: > 7 days at -20°C.

Reference Interval: Negative

CPT Code: 87328

Test Code 2606	CSF - Cell Count & Differential	CSF COUNT
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Methodology: Hemacytometer Cell Count/Microscopic Differential
Performed: Daily
Reported: 1 hour

Specimen Required: **Collect:** CSF in clean glass or plastic container with secure lid
 Transport: 0.5 mL CSF at ambient or 2–8°C. Deliver immediately
 Remarks: **Do not freeze.**
 Unacceptable Conditions: Frozen samples.
 Stability: Ambient: 4 hours; Refrigerated: 24 hours

Reference Interval: By report.

CPT Code: 89051

Test Code 3355	Culture – Abscess	CULT ABS
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Methodology: Standard reference procedures for aerobic bacterial, culture and identification. Anaerobe culture available on properly collected specimens. (order # 3360)
Performed: Sunday – Saturday
Reported: Varies

Specimen Required: **Collect:** Purulent material.
 Transport: Sterile capped syringe, sterile tube **or** anaerobic vial. Swab in transport media. Transport immediately to Methodist laboratory at ambient (20–25 °C).
 Unacceptable Conditions: Non-sterile or leaking container, dry material or swab, syringe with needle attached.
 Stability: Ambient: 24 hours

Reference Interval: By report.

Note: Identification and susceptibility tests are billed separately from culture. Gram stain #3540 should be ordered separately if required.

CPT Code: 87070

Methodology: Standard reference procedures for bacterial stain, anaerobic culture and identification.
Performed: Sunday – Saturday
Reported: Varies

Specimen Required: **Collect:** Aspirates, body fluids, tissues or material collected from areas without normal flora.
Transport: Sterile anaerobe vial, sterile anaerobe swab. Send at ambient temperature.
Remarks: Aspirated specimens are optimal. Contact laboratory prior to collection of specimen for consultation on collection containers or transport.
 Culture for Actinomyces or C. botulinum must be specifically requested on the test request form.
Unacceptable Conditions: Specimen from site with normal anaerobic flora, non-sterile or leaking container, non-anaerobic container, delayed transport to lab.
Stability: Ambient: 24 hours.

Reference Interval: See report.

Note: Gram stain, identification and susceptibility tests are billed separately from culture.

CPT Code: 87075

Culture - Blood

Culture Types for Blood

The detection of microorganisms in blood has great diagnostic and prognostic importance. A complete computer order or test requisition (particularly time of collection, diagnosis, and antimicrobial therapy) is essential for timely and appropriate laboratory processing of the specimens.

The following guidelines are provided in order to aid in determination of how many cultures to draw, when they should be drawn, and which blood culture collection system should be utilized, including optimum volume(s) of blood.

1. In most adult infections, cultures of two to three separate venipunctures (17 mL per venipuncture), initially, are sufficient. Studies have shown the following positive blood culture yields within a 24-hour period in patients without endocarditis:

First venipuncture (Set) = 80%
 First and Second Venipunctures (Set) = 90%
 First, Second and Third Venipunctures (Set) = 99%

Based on these results, the laboratory will not process more than three blood culture sets per 24 hours per patient.

2. In suspected acute sepsis, meningitis, osteomyelitis, arthritis, or acute untreated bacterial pneumonia, obtain at least two blood culture sets before starting therapy.
3. For fever of unknown origin (FUO), obtain two separate blood culture sets initially. 24 to 36 hours later, obtain two more prior to the expected temperature elevation. The yield beyond four culture sets is virtually nil. Include FUO as part of the diagnosis on the requisition.
4. For suspected infective endocarditis:

Acute: Obtain three blood culture sets during the first one to two hours of evaluation.
Subacute: Obtain three blood culture sets on Day 1(25 minutes or more apart). If all three are negative at 24 hours, obtain three more.

5. There exists a direct correlation between the volume of blood culture and the recovery rate of clinically significant organisms. For adult patients, each blood culture bottle should receive 5 to 10 mL of blood. This also provides an optimum 1:10 dilution. For pediatric patients, 1-5 mL of blood injected into one blood culture bottle is sufficient.

Culture – Blood (AFB)

Refer to Culture – TB (Acid Fast Bacilli)

Test Code 3373

Culture – Blood (Fungus)

CULT BLDF

Methodology: Standard reference procedures for culture and identification of fungi/yeast.
Performed: Sunday – Saturday
Reported: Preliminaries : Negative at 1 week or as soon as found positive.
Final:Negative at 4 weeks.

Specimen Required: **Collect:** 5 mLs blood in a SPS tube or Myco/F lytic blood culture vial using aseptic techniques, as defined for blood culture collection.
Transport: Transport immediately to laboratory at ambient temperature.
Remarks: Please notify laboratory if unusual organisms or conditions are suspected. Direct fungal smears are not performed on blood specimens.
Unacceptable Conditions: Greater than 3 blood culture sets per 24 hours.
Stability: Ambient: 24 hours

Reference Interval: No fungi/yeast isolated. Identification are performed on positive cultures.

Note: Identification and susceptibility tests are billed separately from culture.

CPT Code: 87103

Test Code 3371

Culture – Blood – Aerobic & Anaerobic

CULT BARD

Methodology: Bactec® continuous monitoring system. Standard reference procedure for identification of aerobic and anaerobic microorganisms.
Performed: Sunday – Saturday
Reported: Preliminaries – 24, 48 hours
Final – 5 days **Positives are reported as soon as detected.**

Specimen Required: **Collect:** Blood in a Bactec® aerobic bottle and standard anaerobic bottle using aseptic techniques, as defined for blood culture collection. If SPS tubes are used, completely fill two (2) SPS tubes.
Transport: Blood culture bottles. Transport immediately to laboratory at ambient temperature.
Remarks: Please notify laboratory if unusual organisms or conditions are suspected.
Unacceptable Conditions: Greater than 3 blood culture sets per 24 hours.
Stability: Ambient: 24 hours

Reference Interval: No growth
Identification and susceptibility are performed on positive cultures.

Note: Identification and susceptibility tests are billed separately from culture. If routine and fungus cultures are required, order #3374 and the laboratory will add on the (#3373) Fungus culture.

CPT Code: 87040

Test Code 3375

Culture – Body Fluid (Gram Stain #3540 Included)

CULT BFLD

Methodology: Standard reference procedure for bacterial stain, culture and identification. Anaerobe culture performed on properly collected specimens.
Performed: Sunday – Saturday
Reported: Varies

Specimen Required: **Collect:** Aspirate.
Transport: Sterile capped syringe, sterile tube or anaerobe vial. Deliver promptly to laboratory..
Remarks: Client is notified of positive stain/culture.
Unacceptable Conditions: Non-sterile or leaking containers, specimens submitted in blood culture bottles, specimens submitted in anticoagulant other than SPS, syringe with needle attached.
Stability: Ambient: 24 hours; Refrigerated: 24 hours.

Reference Interval: No growth.
Identification and susceptibility performed on positive cultures.

Note: Gram stain, identification and susceptibility tests are billed separately from culture.

CPT Code(s): 87070 culture, 87205 Gram stain

 **Methodist**

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Department of Pathology 04/2007

Test Code 3379	Culture – Bone Marrow	CULT BMAR
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Methodology: Standard reference procedure for aerobic culture and identification
Performed: Sunday – Saturday
Reported: Varies

Specimen Required: **Collect:** Aspirate or biopsy
 Transport: Sterile SPS vacutainer tube (aspirates). Sterile container (biopsies). Deliver to laboratory promptly.
 Remarks: Client is notified of positive culture.
 Unacceptable Conditions: Non-sterile or leaking container, dry specimen, specimens submitted in anticoagulant other than SPS.
 Stability: Ambient: 24 hours.

Reference Interval: No growth.
 Identification and susceptibility performed on positive cultures..

Note: Requests for Fungal culture (3421) and TB culture (3480) must be ordered separately.
 Identification and susceptibility tests are billed separately.

CPT Code: 87070

Test Code 3380	Culture – Bronchial Specimen – Aerobic (Gram stain #3540 included)	CULT BRON
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Methodology: Standard reference procedure for aerobic bacterial stain, culture and identification.
Performed: Sunday – Saturday
Reported: Varies

Specimen Required: **Collect:** Bronchial brushings, BAL secretions, washings or biopsy.
 Transport: Sterile, leak-proof container. Send immediately to laboratory. Store at 2–8°C if processing is delayed.
 Unacceptable Conditions: Non-sterile or leaking containers
 Stability: Ambient: 2 hours; Refrigerated: 24 hours.

Reference Interval: By report..

Note: Gram stain, identification, susceptibility tests and anerobe culture(s) are billed separately from culture.
 If anaerobic culture required order Culture-Bronchial specimen – Anaerobic (order # 3385) (CPT: 87075)

CPT Code(s): 87070 culture, 87205 Gram stain

Test Code 3391	Culture – Catheter Tip - Aerobic	CULT CATH
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Methodology: Standard reference procedure for aerobic bacterial culture and identification
Performed: Sunday – Saturday
Reported: Varies.

Specimen Required: **Collect:** 2” section of vascular catheter tip (indicate type).
 Transport: Sterile container. Deliver to laboratory promptly.
 Remarks: Culture is considered positive if greater than 15 colonies are isolated..
 Unacceptable Conditions: Non-sterile container, catheter tip submitted in fluid (water, saline). Foley catheter tips are not acceptable for culture.
 Stability: Ambient: 2 hours; Refrigerated: 24 hours.

Reference Interval: No growth. Identification performed on positive cultures.

Note: Identification tests and susceptibilities are billed separately from culture.

CPT Code: 87070

Test Code 3406	Culture – CSF Bacterial Culture (Gram stain #3540 included)	CULT CSF
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Methodology: Standard reference procedure for aerobic bacterial stain, culture and identification.
Performed: Sunday – Saturday
Reported: Varies

Specimen Required: **Collect:** Cerebrospinal fluid.
Transport: Sterile container. Deliver to laboratory promptly. **Do not refrigerate**
Remarks: Positive stain/culture are critical values and customer is notified immediately.
Unacceptable Conditions: Non-sterile container or leaking container.
Stability: Ambient: 24 hours.

Reference Interval: No growth.
Identification and susceptibility tests are performed on positive cultures.

Note: Gram stain, identification and susceptibility test are billed separately from culture.

CPT Code(s): 87070 culture, 87205 Gram Stain

Test Code 3396	Culture – Cervix	CULT CERV
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Methodology: Standard reference procedures for aerobic bacterial culture and identification.
Performed: Sunday – Saturday
Reported: Varies

Specimen Required: **Collect:** Cervical
Transport: Swab in transport media. Deliver to laboratory promptly at ambient temperature.
Unacceptable Conditions: Dry swab.
Remarks: Gram stain (#3540; CPT code 3540) must be ordered separately if required.
Stability: Ambient: 24 hours.

Reference Interval: By report.

Note: Identification and susceptibility test are billed separately from culture.

CPT Code: 87070

Test Code 3403	Culture – <i>Corynebacterium diphtheriae</i>	CULT DIPH
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Methodology: Standard reference procedures for *C. diphtheriae* culture and identification.
Performed: Referral – ARUP (Sunday – Saturday)
Reported: Varies

Specimen Required: **Collect:** Nasopharynx, throat, wound swab. **Source of specimen is required.**
Transport: Swab in bacterial transport media at 20-25°C.
Remarks: Culture of nasopharynx plus throat at the site of membrane or inflammation significantly increases recovery. Culture base of cleansed wound, if present.
Stability: Ambient: 48 hours; Refrigerated: Unacceptable; Frozen: Unacceptable.

Reference Interval: No *C. diphtheriae* isolated

Note: If the organism is isolated, identification and toxin testing will be confirmed by the Centers for Disease Control.

CPT Code: 87081

Test Code 3411	Culture – Ear	CULT EAR
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Methodology: Standard reference procedures for aerobic bacterial culture and identification.
Performed: Sunday – Saturday
Reported: Varies

Specimen Required: **Collect:** Drainage, aspirate.
Transport: Swab in transport media, sterile container or sterile syringe. Deliver to laboratory promptly at ambient temperature.
Remarks: Gram Stain (#3540; CPT code 87205) must be ordered separately if required.
Unacceptable Conditions: Non-sterile or leaking container, dry swab.
Stability: Ambient: 24 hours.

Reference Interval: By report.

Note: Identification and susceptibility test are billed separately from culture.

CPT Code: 87070

Test Code 3416	Culture – Eye	CULT EYE
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Methodology: Standard reference procedures for aerobic bacterial culture and identification.
Performed: Sunday – Saturday
Reported: Varies

Specimen Required: **Collect:** Drainage, fluid, scrapings.
Transport: Swab in transport media or sterile container. Deliver to laboratory promptly ambient temperature.
Remarks: Media is available for direct inoculation, particularly of corneal scrapings. If Gram's stain is required, it is best to prepare smears at time of collection. Must be ordered separately (Gram stain #3540)
Unacceptable Conditions: Non-sterile or leaking container, dry swab.
Stability: Ambient: 24 hours.

Reference Interval: By growth.
Identification performed on positive cultures.

Note: Identification and susceptibility test are billed separately from culture.

CPT Code: 87070

Test Code 3421	Culture – Fungus	CULT FUNG
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Methodology: Standard reference procedures for fungal culture.
Performed: Sunday – Saturday
Reported: Culture: Preliminary: negative at 1 week or as soon as found positive
Final: negative at 4 weeks.

Specimen Required: **Collect:** Any body site or fluid. (Min: 5 mL fluid)
Transport: Sterile container or swab in transport media. Deliver to laboratory promptly at ambient temperature for CSF, and at 2-8°C for all other specimens.
Remarks: Indicate suspected organisms(s). Additional patient history may be helpful. Include the patient's occupation, history of travel or residence abroad, and any animal contacts. A single specimen may be cultured for both bacteria and fungi. Vaginal, throat, urine and stool specimens are processed as a fungus culture but are finalized at 1 week since yeast is the most likely etiologic agent. For blood specimens, refer to Culture – Blood (fungus included) code #3374.
Unacceptable Conditions: Non-sterile, insufficient volume or leaking container.
Stability: Ambient: varies(see transport above);Refrigerated: varies(see transport above).

Reference Interval: No fungi/yeast isolated.

Note: Fungal stain must be ordered separately if required. (Fungal stain/KOH Prep #3560)
Mold identification is billed separately from culture

CPT Code: 87102-culture
87210-Fungal Stain

Test Code 3436	Culture – Gastric Aspirate (Gram Stain #3540 Included)	CULT GAST
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Methodology: Standard reference procedures for aerobic bacterial stain, culture and identification
Performed: Sunday – Saturday
Reported: Varies

Specimen Required: **Collect:** Gastric aspirate.
Transport: Sterile container. Deliver to laboratory promptly at ambient temperature.
Unacceptable Conditions: Non-sterile or leaking container, dry specimen.
Stability: Ambient: 24 hours

Reference Interval: By report.

Note: Gram stain, identification and susceptibility tests are billed separately from culture.

CPT Code(s): 87070 culture, 87205 Gram Stain

Test Code 3426	Culture – GC Screen	CULT GC
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Methodology: Standard reference procedures for *N. gonorrhoeae* culture and identification
Performed: Sunday – Saturday
Reported: Varies

Specimen Required: **Collect:** Any site or fluid.
Transport: Swab in Amie's with charcoal. Sterile container (fluids only). Deliver to laboratory promptly at ambient temperature.
Remarks: Submit slide for Gram stain if required. Gram stain must be ordered separately. (Gram stain #3540). **Do not refrigerate specimen.**
Unacceptable Conditions: Delayed transport of dry swab, non-sterile or leaking container, refrigerated or frozen specimens.
Stability: Ambient: 24 hours

Reference Interval: No *Neisseria gonorrhoeae* isolated.

Note: Gram stain, identification and susceptibility tests are billed separately from culture.

CPT Code: 87081

Test Code 3443	Culture – Legionella species	CULT LEGI
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Methodology: Standards reference procedures for Legionella culture and identification
Performed: Referral – ARUP (Sunday – Saturday)
Reported: Preliminary: as soon as found positive
Final: negative at 7 days

Specimen Required: **Collect:** Respiratory tract secretions and aspirates (preferred), tissue, fluid, sputum, abscess material, and 7 ml blood in an Isolator tube. **Source of specimen required.**
Transport: Sterile container. Send immediately to ARUP at 2-8° C. If delay in transport (greater than 24 hours) occurs, freeze at -20°C or, preferably -70°C and transport frozen. **Do not freeze blood specimen .** Transport at 2-8°C.
Remarks: To prevent drying, submit specimen in sterile, non-bacteriostatic water. DO NOT use saline in specimen collection. Client is notified of positive DFA or culture.
Unacceptable Conditions: Specimen submitted in saline, formalin or viral transport medium; urine, dry specimen, non-sterile or leaking container.
Stability: Ambient: 2 hours; Refrigerated: 24 hours; Frozen: 7 days.

Reference Interval: No Legionella isolated.

Note: PCR is also available for respiratory specimens at ARUP, see Legionella Species by PCR.

CPT Code: 87081

Test Code 3450	Culture – Nasopharyngeal	CULT NASO
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Methodology: Standard reference procedures for cultures and identification.
Performed: Sunday – Saturday
Reported: Varies

Specimen Required: **Collect:** Nasopharyngeal swabs.
Transport: Swabs in bacterial transport media. Transport promptly to laboratory at ambient temperature.
Unacceptable Conditions: Non-sterile container. Dry swabs.
Stability: Ambient: 2 hours; Refrigerated: 24 hours.

Reference Interval: By report.

Note: Identification and susceptibility tests are billed separately from culture.

CPT Code: 87070

Test Code 3460	Culture – Prostate	CULT PROS
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Methodology: Standard reference procedures for cultures and identification.
Performed: Sunday – Saturday
Reported: Varies

Specimen Required: **Collect:** Sterile container.
Transport: Transport promptly to laboratory at ambient temperature
Unacceptable Conditions: Non-sterile container.
Remarks: Gram stain must be ordered separately if required. (Gram stain #3540)
Stability: Ambient: 2 hours; Refrigerated: 24 hours.

Reference Interval: By report.

Note: Identification and susceptibility tests are billed separately from culture.

CPT Code: 87070 culture

Test Code 3470	Culture – Sputum (Gram Stain #3540 included)	CULT SPUT
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Methodology: Standard reference procedures for cultures and identification.
Performed: Sunday – Saturday
Reported: Varies

Specimen Required: **Collect:** Sputum, purulent sputum is more critical than volume.
Transport: Sterile, leak-proof container. Transport promptly to laboratory at ambient temperature
Remarks: All sputums will be screened for oral pharyngeal contamination. Specimens with > 25 epithelial cells/LPF will be rejected.
Unacceptable Conditions: Non-sterile or leaking container, multiple specimens (more than one in 24 hours), dry specimen, poor quality sputum (presence of greater than 25 epithelial cells per 100 x field).
Stability: Ambient: 2 hours; Refrigerated: 24 hours

Reference Interval: By report.

Note: Gram stain, identification, susceptibility tests are billed separately from culture.

CPT Code(s): 87070 culture, 87205 Gram stain

Test Code 3566 **Culture – Staphylococcus (MRSA Screen)** **CULT MRSA**

Methodology: Standard reference procedures for aerobic bacterial culture and identification.
Performed: Sunday – Saturday
Reported: Varies

Specimen Required: **Collect:** Any site or fluid.
Transport: Sterile, leak-proof container. Swab in transport media. Transport promptly to laboratory at ambient temperature.
Remarks: All Staphylococcus aureus isolates from clinically significant sites are screened for methicillin susceptibility.
Unacceptable Conditions: Dry specimen, non-sterile or leaking container.
Stability: Ambient: 24 hours

Reference Interval: No Staphylococcus aureus isolated.

Note: Identification and susceptibility tests are billed separately from culture.

CPT Code: 87081

Test Code 3475 **Culture – Stool** **CULT STOO**

Methodology: Standard reference procedures for *Salmonella*, *Shigella*, *Aeromonas*, and *Campylobacter* culture and identification.
Performed: Sunday – Saturday
Reported: Varies

Specimen Required: **Collect:** Stool.
Transport: Swab or stool in transport media (Cary-Blair). Transport promptly to laboratory.
Remarks: Indicate suspected organisms and available patient history, especially travel. Diarrhea that develops after 3 days hospitalization is likely due to Clostridium difficile toxin. Routine cultures should not be performed on patients hospitalized for more than 3 days. Recommended that no more than 2 bacteriology specimens be processed per patient without consultation. (2 separate bowel movements)
Unacceptable Conditions: Non-sterile or leaking container, multiple specimens (more than one in 24 hours), dry specimen, delayed transport without use of appropriate preservative.
Stability: Ambient: 2 hours; Refrigerated: 24 hours.

Reference Interval: No *Salmonella*, *Shigella*, *Campylobacter* or *E. coli O157* isolated.

Note: Vibrio cholera culture (#3521), referred test (ARUP # 0060136) see Stool Culture - Vibrio in ARUP User's Guide
Campylobacter Culture only (#3544); Yersinia Culture only (3527) **CPT Code for all three tests - #3521, 3544, 3527 is 87046.** Shiga Toxin/*E. coli* (3327) CPT 83898

CPT Code: 87045

Test Code 3316 **Culture – Streptococcus Group B (Streptococcus agalactiae)** **STREP B**

Methodology: Standard reference procedures for aerobic bacterial culture and identification
Performed: Sunday – Saturday
Reported: Varies

Specimen Required: **Collect:** Vagina and Rectum
Transport: Swab in transport media. Transport promptly to laboratory at ambient temperature.
Remarks: Screened for the presence or absence of Group B Streptococcus only.
Unacceptable Conditions: Non-sterile container or dry swab.
Stability: Ambient: 24 hours

Reference Interval: No Group B Streptococcus isolated.

CPT Code: 87081

Test Code 3480	Culture – TB (Acid-Fast Bacilli) (Acid-fast Stain #3300 included)	CULT AFB
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Methodology: Standard reference procedures for stain and culture.
Performed: Referral – ARUP (Sunday – Saturday)
Reported: Stain: 24 hours
Final: Negative at 7 weeks.
Positive cultures are reported as soon as detected

Specimen Required: **Collect:** Sputum, CSF(>=5ml), gastric aspirate (5-10 ml), urine (>=40ml), body fluid(<=5ml), tissue, blood in sterile SPS tube (10 ml), whole blood drawn into Myco/F Lytic vial (5 ml). **Source of specimen is required.**
Transport: Sputum, gastric aspirate, urine, body fluid or tissue in a sterile, leak-proof container; send immediately to laboratory at 2-8°C. Blood in sterile SPS tube. Send immediately to laboratory at 20-25° C.
Remarks: Collection of early morning specimens of urine and sputum on each of 3 consecutive days is optimum. Gastric lavage specimens must be neutralized with sodium carbonate, if transport is delayed for more than a four hours.
Unacceptable Conditions: Multiple same site specimens (more than one in 24 hours), dry material, non-sterile or leaking container, improper volume of sputum or fluids (less than 5 cc), material collected and transported on a swab. Blood submitted in a coagulant other than SPS.
Stability: Ambient: 24 hours; Refrigerated: 1 week

Reference Interval: No acid fast bacilli isolated.
Identification ordered and performed on positives.
Susceptibility performed on all initial isolates of *M. tuberculosis* complex.
Susceptibility performed on *Mycobacterium* other than *M. tuberculosis* complex isolates by request only.
Susceptibility test of *M. gordonae* from sputum is inappropriate.

Turn Around Times (General Guide)

Event: Receipt of specimen to stain report
Time: < 24 hours

Receipt of specimen to detection of growth
Average time: 21 days (Exceptions: range of four days to seven weeks, depending on type of organism recovered and specimen received.)

Detection of growth or receipt of isolate to final identification of the organism.
Average time: five to seven days (Exceptions: range of two days to three weeks; slowly growing mycobacteria may require additional time for identification. If the culture is mixed with other flora requiring a decontamination procedure, a significant delay could occur.)

Susceptibility testing performed and results reported.
Time: 28 days (Exceptions: Mixed cultures, slow-growing isolates)

For AFB culture on blood refer to Blood Culture, AFB & Fungal.

CPT Code(s): 87116 Culture, 87206 AFB Stain, 87015 Concentration.

Test Code 3490	Culture – Throat	CULT THRO
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Methodology: Standard reference procedures for culture and identification of *Streptococcus pyogenes* (Grp A)
Performed: Sunday – Saturday
Reported: Varies

Specimen Required: **Collect:** Throat
Transport: Swab in transport media. Transport promptly to laboratory at ambient temperature.
Unacceptable Conditions: Non-sterile container.
Stability: Ambient: 24 hours.

Reference Interval: Negative for Beta hemolytic *Streptococcus Group A.*

CPT Code: 87081

Test Code 3495	Culture – Tissue (Gram Stain #3540 included)	CULT TIS
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Methodology: Standard reference procedures for culture and identification.
Performed: Sunday – Saturday
Reported: Varies

Specimen Required: **Collect:** Tissue, biopsy.
Transport: Sterile container. Transport promptly to laboratory at ambient temperature.
Remarks: Use sterile nonbacteriostatic saline to prevent drying.
Unacceptable Conditions: Non-sterile or leaking container, dry specimen, formalinized specimen.
Stability: Ambient: 24 hours.

Reference Interval: No growth.
Identification performed on positive cultures.

Note: Anaerobe culture performed on properly collected specimens. Gram stain and Anaerobe culture are billed separately from culture.

Identification and susceptibility tests are billed separately from culture.

CPT Code(s): 87070 culture, 87205 Gram stain.

Test Code 3505	Culture – Urethral	CULT URET
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Methodology: Standard reference procedures for aerobic bacterial culture and identification.
Performed: Sunday – Saturday
Reported: Varies

Specimen Required: **Collect:** Urethral.
Transport: Swab in transport media. Transport promptly to laboratory at ambient temperature.
Remarks: Gram stain (#3540, CPT code 87205) must be ordered separately if required.
Unacceptable Conditions: Dry swab
Stability: Ambient: 24 hours.

Reference Interval: By report.

CPT Code: 87070

Test Code 3507	Culture – Urine Catheterized Urine or Suprapubic Aspiration	CULT URCA
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Methodology: Standard reference procedures for bacterial culture and identification.
Performed: Sunday – Saturday
Reported: Varies

Specimen Required: **Collect:** Catheterized urine or suprapubic aspiration
Transport: Sterile, leak-proof container. Transport promptly to laboratory at 2-8°C.
If using boric acid transport tube transport at ambient temperature.
Remarks: Refer to Specimen Collection section of User’s Guide. Suprapubic aspirates submitted in sterile capped syringe are acceptable for anaerobic culture.
Unacceptable Conditions: Non-sterile or leaking container, multiple specimens (more than one in 24 hours), 24-hour or pooled specimen, delayed transport to the lab (greater than 2 hours at room temperature or greater than 24 hours at 2-8°C), urine from catheter bag, Foley catheter tips.
Stability: Refrigerated: 24 hours; Boric Acid Tube: 48hours.

Reference Interval: By report.

Note: Identification and susceptibility tests are billed separately from culture.

CPT Code: 87088

Test Code 3508	Culture – Urine – Cystoscopy	CULT CYST
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Methodology: Standard reference procedures for bacterial culture and identification.
Performed: Monday – Friday
Reported: Varies

Specimen Required: **Collect:** Cystoscopic urines.
Transport: Sterile, leak-proof container. Transport promptly to laboratory at 2-8°C.
Unacceptable Conditions: Non-sterile or leaking container, delayed transport to the lab (greater than 2 hours at room temperature or greater than 24 hours at 2-8°C),
Stability: Refrigerated: 24 hours; Boric Acid tube: 48hours.

Reference Interval: By report.

Note: Identification and susceptibility tests are billed separately from culture.

CPT Code: 87088

Test Code 3509

Culture – Urine – Voided Midstream Collection

CULT URVD

Methodology: Standard reference procedures for bacterial culture and identification.
Performed: Sunday - Saturday
Reported: Varies

Specimen Required: **Collect:** Clean catch urines
Transport: Sterile, leak-proof container. Transport promptly to laboratory at 2–8°C.
If using boric acid transport tube transport at ambient temperature.
Remarks: Refer to Specimen Collection section of User’s Guide.
Unacceptable Conditions: Non-sterile or leaking container, multiple specimens (more than one in 24 hours), 24-hour or pooled specimen, delayed transport to the laboratory (greater than 2 hours at room temperature or greater than 24 hours at 2–8°C).
Stability: Refrigerated: 24 hours; Boric Acid tube: 48 hours.

Reference Interval: By report.

Note: Identification and susceptibility tests are billed separately from culture.

CPT Code: 87088

Test Code 3568

Culture – Virus

CULT VIRUS

Methodology: Cell Culture
Performed: Referral – ARUP (Sun-Sat)
Reported: Varies
Final negative: within 14 days.

Specimen Required: **Collect:** CSF (min. 1.0ml), eye swab, nasal washing/aspirate, nasopharyngeal swab, stool, throat swabs, tissue, biopsy, lesion, tracheal aspirate, urine or one 5 mL lavender (EDTA) for bone marrow and whole blood. **Source of specimen required.**
Transport: CSF, nasal washings/aspirate, urine, stool or tracheal aspirate in sterile leak-proof container at 2–8°C; eye swab, nasopharyngeal swab, throat swab or tissue in multi-purpose transport media (Microtest M4) at 2–8°C; 5 mL whole blood (lavender, EDTA) at 2–8°C
Remarks: Do not freeze. Transfer specimen to transport media as soon as possible after collection. Stool is not the optimal specimen for enterovirus detection, as patients may have prolonged asymptomatic gastrointestinal shedding. Polio vaccine virus may be isolated from immunized infants. (Antigen detection is available for **Respiratory Syncytial Virus** (3594), **Rotavirus** (3596), **Influenzae virus A/B** (3552))
Unacceptable Conditions: Dry swabs, Specimens received in formalin or preservatives other than multitest media (Microtest M4).
Stability: Ambient: 2 hours; Refrigerated: 3 days

Reference Interval: No virus isolated.

Note: CSF is a poor culture media for virus. Suggest submission of rectal and throat swabs for viral isolation along with CSF cultures. Suggest amplification testing for CSF specimens.

CPT Code: 87252 x 5

Test Code 3525 **Culture – Wound (Gram stain #3540 Included)** **CULT WD**

Methodology: Standard reference procedures for bacterial culture and identification. Anaerobe culture available on properly collected specimens (Anaerobic culture #3360)
Performed: Sunday – Saturday
Reported: Varies

Specimen Required: **Collect:** Purulent material..
Transport: Sterile capped syringe, sterile tube or anaerobe vial. Swab in transport media. Transport promptly to laboratory at ambient temperature.
Remarks: Anaerobic culture will not be performed unless specimen is submitted in appropriate anaerobic transport system.
Unacceptable Conditions: Non-sterile or leaking container, dry material or swab, syringe with needle attached.
Stability: Ambient: 24 hours.

Reference Interval: By report.
Note: Gram stain, identification and susceptibility tests are billed separately from culture.

CPT Code: 87070

Test Code 6229 **Cyclosporine, A (Blood)** **CYA**

Methodology: Fluorescent Polarization Immunoassay
Performed: Referral – ARUP (Sunday – Saturday)
Reported: 2 – 5 days

Specimen Required: **Collect:** One 5 mL lavender (EDTA). (Min: 3 mL lavender)
Transport: 1 mL whole blood (lavender, EDTA). Transfer well-mixed whole blood to a plastic vial to shipping. (Min: 0.2 mL)
Pediatric Collect/Transport: 0.2 mL whole blood (lavender, EDTA). Transfer well-mixed whole blood to a plastic vial prior to shipping.
Remarks: Stable at room temperature for up to 7 days, longer if frozen.
Stability: Ambient: 7 days; Refrigerated: 7 days; Frozen: 5 months.

Reference Interval: Therapeutic ranges for kidney and heart transplant patients:
Up to 3 months post-transplant: 350 – 525 ng/mL
> 3 mos post-transplant: 145 – 350 ng/mL
Therapeutic ranges for liver transplant patients: 290 – 525 ng/mL Toxic: > 700 ng/mL

CPT Code: 80158

Test Code 6235 **Cyclosporine, OSF** **CYCLO-SF**

Methodology: Fluorescent Polarization Immunoassay
Performed: Referral – OSF (St. Francis)
Reported: 2 days

Specimen Required: **Collect:** One lavender (EDTA) tube. (Min: 3 mL)
Transport: Whole blood, lavender (EDTA) at ambient or 2–8°C.
Remarks: Do not separate plasma from cells.
Stability: Ambient: 7 days; Refrigerated: 7 days; Frozen: 5 months.

Reference Interval: Therapeutic ranges for kidney and heart transplant patients:
Up to 3 months post-transplant: 350 – 525 ng/mL
> 3 mos post-transplant: 145 – 350 ng/mL
Therapeutic ranges for liver transplant patients: 290 – 525 ng/mL
Toxic: > 700 ng/mL

CPT Code: 80158

Methodology: Polymerase Chain Reaction/Oligonucleotide Ligation
Performed: Referral – ARUP (Monday, Wednesday, Friday)
Reported: 2 – 3 weeks

Specimen Required: **Collect:** One 5 mL lavender (EDTA). Also acceptable: yellow (ACD), or 2 buccal swabs.
Transport: 5 mL whole blood or 2 buccal swabs at 2-8°C. (Min: 1 mL)
Pediatric Collection/Transport: 1 mL whole blood at 2-8°C.
Remarks: Do not freeze.
Unacceptable Conditions: Serum, frozen whole blood, clotted whole blood, and severely hemolyzed samples.
Stability: Ambient: 24 hours; Refrigerated: 5 days; Frozen: Unacceptable

Reference Interval:

Negative: The sample is negative for the mutations screened, including the 25 CF mutations recommended by the American College of Medical Genetics.

Interpretive Data:

Samples are tested by PCR and oligonucleotide ligation assay (OLA) for 32 mutations including the standard 25 mutations panel recommended by the American College of Medical Genetics: F508del, I507del, G542X, G551D, W1282X, N1303K, R553X, 621+1GT, R117H, 1717-1GA, A455E, R560T, R1162X, G85E, R334W, R347P, 711+1GT, 1898+1GA, 2184delA, 1078delT, 3849+10kbCT, 2789+5GA, 3659delC, I148T, 3120+1GA, R347H, V520F, S549N, S549R, 3905insT, 3876delA, and 394delTT. For samples positive for R117H, the IVS-8/poly T variant is analyzed by PCR and OLA. For samples positive for I148T, the mutation 3199del6 is analyzed by PCR and fluorescent hybridization probes.

Cystic fibrosis (CF) is a common autosomal recessive genetic disorder with an incidence of approximately 1:3,000 births. CF is caused by mutations in the cystic fibrosis transmembrane regulator (CFTR) gene. Over 1,000 mutations in CFTR have been described.

*This test is performed pursuant to an agreement with Roche Molecular Systems, Inc.

Due to the unique nature of genetic testing, patients should receive pre- and post-test counseling. Informed consent is recommended. Consent forms are available from Methodist Reference Lab.

The table below is included when the patient results are Negative for carrier screening.

Estimated Carrier Risk

Ethnic group	Detection rate	Before test	After negative test
Ashkenazi Jewish	97%	1/25	~1 in 830
European Caucasian	90%	1/25	~1 in 250
African American	69%	1/65	~1 in 207
Hispanic Americana	57%	1/46	~1 in 105

This is a pooled set of data and requires additional information to accurately predict risk for specific Hispanic populations.

Note: Residual carrier risk after a negative test is modified by the presence of a positive family history of CF (i.e., having a first, second, or third degree relative affected with CF) and/or by a mixture of various ethnic groups. For these specific situations, accurate risk assessment requires standard Bayesian analysis and genetic counseling. Data from Standards and Guidelines for CFTR Mutation Testing. Genetics in Medicine 2002 vol 4(5); 379-391. www.acmg.net/pages/acmg.

Note:

It is critical to note on the test form (1) whether the test is to rule out affected or carrier status, (2) ethnicity, and (3) family history of CF. Risk assessment is dependent on this information.

CPT Code(s): 83890 Isolation; 83892 Digestion; 83901 Multiplex amplification; 83896 x32 Nucleic acid probes; 83894 Gel separation; 83912 Interpretation and report

Test Code 7225 **Cytology, Autocyte Pap Smear** **AUTOCYTE**
Methodology: AutoCyte PREP™ System Cytopathologic Evaluation
Performed: Cytology (Monday – Friday)
Reported: Within 5 working days

Specimen Required: **Collect:** Cervical and endocervical sample.

- Insert the Rover Cervex-Brush® into the endocervical canal. Apply gentle pressure until the bristles form against the ectocervix. Maintaining **gentle** pressure, hold the stem between the thumb and forefinger and rotate the brush five times in a clockwise direction.
- Placing the thumb against the back of the brush pad, disconnect the entire brush from the stem, and drop the brush into the CytoRich® preservative vial.
- Place the cap on the vial and tighten. Label the vial and then complete MMCI cytology lab requisition form.
- Record the patient’s clinical information and medical history on the cytology requisition form.
- Place the vial and requisition in a specimen bag for transport to the laboratory.

***(Cervical cytobrush may be used to collect endocervical sample from patients to ensure adequate sampling of the transformation zone. Disconnect the entire brush from the stem, and drop the brush into the preservative vial).**

Transport: Vial and requisition at ambient temperature.

Remarks: This test requires an “AutoCyte PREP™ System” special collection kit that must be ordered separately through MMCI Reference Laboratory. **AutoCyte specimen vial without any brush will not be accepted.**

Unacceptable Conditions: Samples not collected in an “AutoCyte PREP™ System” special collection kit provided from MMCI. Expired CytoRich® vials will not be processed.

Reference Interval: By report.

CPT Code: 88142 or 88143

Test Code **Cytology, Body Cavity Fluid** **SPEC CF**
Methodology: Routine Cytopathologic Evaluation (Peritoneal, Pericardial, Pleural and Pelvic washings)
Performed: Cytology (Monday – Friday)
Reported: Next day (unless special studies required)

Specimen Required: **Collect:** The sample in a clean container using standard collection protocol.
Remarks: Label the container with patient’s name, date and time of specimen collection, and patient location. Submit the specimen along with the completed anatomical pathology requisition to the laboratory. **Transport the specimen immediately.** If transport of the specimen must be delayed, add approximately 1 mL (1000 Units) of Heparin for each 1000 mL of collected fluid. Specimens collected after hours should be preserved as above with Heparin. If Heparin is not available, refrigerate specimen **immediately** after collection and ship to laboratory as soon as possible.

CPT Code: 88108

Test Code **Cytology, Breast Nipple Secretion** **SPEC CY**
Methodology: Routine Cytopathologic Evaluation
Performed: Cytology (Monday – Friday)
Reported: Next day (unless special studies required)

Specimen Required: **Collect:** Label glass slides (single-end frosted) with patient’s name and specimen site in pencil on frosted end. Collect a small amount of nipple secretion directly onto one of the slides. Oppose a second glass slide onto the first, gently and quickly pull the two slides apart in a horizontal motion to distribute the material in a thin film over both slides. Immediately fix specimen on slides either by spray fixative or in 95% ethyl alcohol.

CPT Code: 88161

Test Code	Cytology, Bronchial Washing, Bronchial Lavage, Bronchial Brushings	SPEC CB
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Methodology: Routine Cytopathologic Evaluation
Performed: Cytology (Monday – Friday)
Reported: Next day (Unless special studies required)

Specimen Required: **Collect: I. Bronchial Brushing** - Upon standard bronchoscopy technique, identify the lesion in question and obtain a brushing sample of the lesion. Upon withdrawing the brush, agitate the brush vigorously in a 5 to 10 mL of sterile saline in the specimen container.
II. Bronchial Washings – Using the standard bronchoscopy technique, lavage the area of the bronchus to be sampled. Collect the washings in a clean specimen container.
III. Bronchoalveolar lavage - Using standard bronchoscopy technique, lavage the areas in question with normal saline. Collect specimen in a clean specimen container.

- Label the container with patient’s name, date and time of specimen collection and anatomical site of specimen. Submit the specimen along with the completed anatomical pathology requisition to the laboratory

Remarks: Keep specimen refrigerated until transport is possible. If transport of the specimen will be delayed (more than 2-4 hours), add an equal volume of Saccomanno fixative.

CPT Code(s): 88108 Preparation and interpretation (eg. saccomanno technique); 88312 x 3 Special stains

Test Code	Cytology, CSF	SPEC CSF
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Methodology: Routine Cytopathologic Evaluation
Performed: Cytology (Monday – Friday)
Reported: Next day (Unless special studies required)

Specimen Required: **Collect:** Cerebrospinal Fluid. Using standard aspiration technique, collect the specimen in a sterile plastic syringe. Remove the needle from the syringe and place the specimen in a 10-15 mL centrifuge tube.
Transport: Transport specimen immediately. If transport of the specimen must be delayed. The specimen must be refrigerated or kept on wet ice.
Remarks: Label the container with patient’s name, date and time of specimen collection, and patient location. Submit the specimen along with the completed anatomical pathology requisition to the laboratory. Note whether the sample was collected via an Omayo reservoir, ventricular tap.

CPT Code(s):

Cytology, Fine Needle Aspirate

Methodology: Routine Cytopathologic Evaluation
Performed: Cytology (Monday – Friday)
Reported: Next day (unless special studies required)

Specimen Required: **Collect:** Label the frosted end of glass slides in pencil with patient’s name and anatomical site of specimen. Perform fine needle aspiration of the lesion with the usual techniques familiar to the procedure performer. Place bevel of needle against center of glass slide and express a small drop of aspirated material. Place a second slide on top of the first, allow weight of slide to spread the drop, then quickly pull slides apart. **Fix both slides immediately** with spray fixative or place slides in container of 95% alcohol. The aspirations should be repeated as needed. Submit the specimen along with the completed anatomical pathology requisition to laboratory.
Remarks: Avoid delay in fixation of the smears. Avoid excess bloody aspirations. Always attempt to prepare thin smears.

CPT Code: 88173

Methodology: Routine Cytopathologic Evaluation
Performed: Cytology (Monday – Friday)
Reported: Next day (unless special studies required)

Specimen Required: **Collect:** Label one end of a glass slide with patient's name, date, and area from which the sample is to be obtained. Use a clean wooden spatula for collection of the specimen. Collect the sample from mucosal surface or inner cheek.
Transport: The scrapings should be immediately smeared on slide and immersed in 95% ethyl alcohol or spray fixed.

CPT Code: 88161

Test Code	Cytology, Pap 1 Slide Screening Test	GYN 1
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Methodology: Routine Cytopathologic Evaluation
Performed: Cytology (Monday – Friday)
Reported: Within 5 days

Specimen Required: **Collect:** Whenever possible, cervical/vaginal smears should be collected in the second half of the menstrual cycle to avoid contamination by obscuring blood. Patient should be instructed not to use vaginal douche and refrain from sexual intercourse for 48 hours prior to the sampling. Place the patient in lithotomy position. Visualize the cervix as fully as possible using a non-lubricated vaginal speculum. Obtain a specimen by one or more the following means:

- a. **Cervical Scraping:** A specimen may be collected from the visualized cervix by means of a spatula or commercial aspirator or scraper. Rotate the spatula about the circumference of the external os, scraping the mucosa of this critical area. Take care not to induce excessive bleeding. A similar scraping may be used to sample any focal area of the vagina or cervix.
- b. **Cervical-Endocervical:** Special pointed-tip collection spatulas and endocervical brushes are available and are designed to obtain ecto- and endocervical material. This specimen provides a comprehensive sampling of the most critical area of the uterine cervix. Insert the thin tip of the spatula into the cervix and rotate the spatula about the circumference of the external os. Take care not to induce excessive bleeding. Cytobrushes are recommended for endocervical sample. Insert the brush into the cervix and twist at least 360°, taking care not to induce bleeding.
- c. **Vaginal:** A specimen may be collected by use of a spatula or scraper.
- d. **Hormonal Evaluation:** A smear from the lateral vaginal wall is required. This smear must be prepared on a glass slide separate from that used for cervical-endocervical evaluation.

Remarks: The sample must be quickly smeared and immediately fixed to avoid air drying of the cellular sample.

Note: The ICD 9 code used must reflect the appropriate reason for testing; diagnostic or screening. The following examples of appropriate common ICD-9 codes:

<u>Abnormal</u>	<u>Screening</u>
795.0 Abnormal PAP Recheck	V72.6 Lab Exam
622.1 Dysplasia	V72.3 Routine Gyn Exam & PAP
V15.89 Personal history presenting health hazard	V76.2 PAP Only
	V22.1 Pregnancy Check
	V24.2 Post-partum check

CPT Code: HCPCS Code P3000

Methodology: Routine Cytopathologic Evaluation
Performed: Cytology (Monday – Friday)
Reported: Within 5 days

Specimen Required: **Collect:** Whenever possible, cervical/vaginal smears should be collected in the second half of the menstrual cycle to avoid contamination by obscuring blood. Patient should be instructed not to use vaginal douche and refrain from sexual intercourse for 48 hours prior to the sampling. Place the patient in lithotomy position. Visualize the cervix as fully as possible using a non-lubricated vaginal speculum. Obtain a specimen by one or more the following means:

- e. **Cervical Scraping:** A specimen may be collected from the visualized cervix by means of a spatula or commercial aspirator or scraper. Rotate the spatula about the circumference of the external os, scraping the mucosa of this critical area. Take care not to induce excessive bleeding. A similar scraping may be used to sample any focal area of the vagina or cervix.
- f. **Cervical-Endocervical:** Special pointed-tip collection spatulas and endocervical brushes are available and are designed to obtain ecto- and endocervical material. This specimen provides a comprehensive sampling of the most critical area of the uterine cervix. Insert the thin tip of the spatula into the cervix and rotate the spatula about the circumference of the external os. Take care not to induce excessive bleeding. Cytobrushes are recommended for endocervical sample. Insert the brush into the cervix and twist at least 360°, taking care not to induce bleeding.
- g. **Vaginal:** A specimen may be collected by use of a spatula or scraper.
- h. **Hormonal Evaluation:** A smear from the lateral vaginal wall is required. This smear must be prepared on a glass slide separate from that used for cervical-endocervical evaluation.

Remarks: The sample must be quickly smeared and immediately fixed to avoid air drying of the cellular sample.

Note: The ICD 9 code used must reflect the appropriate reason for testing: diagnostic or screening. The following examples of appropriate common ICD-9 codes:

Abnormal
 795.0 Abnormal PAP Recheck
 622.1 Dysplasia
 V15.89 Personal history
 presenting health hazard

Screening
 V72.6 Lab Exam
 V72.3 Routine Gyn Exam & PAP
 V76.2 PAP Only
 V22.1 Pregnancy Check
 V24.2 Post-partum check

CPT Code: 88164

Methodology: Routine Cytopathologic Evaluation

Performed: Cytology (Monday – Friday)

Reported: Within 5 days

Specimen Required:

Collect: Whenever possible, cervical/vaginal smears should be collected in the second half of the menstrual cycle to avoid contamination by obscuring blood. Patient should be instructed not to use vaginal douche and refrain from sexual intercourse for 48 hours prior to the sampling. Place the patient in lithotomy position. Visualize the cervix as fully as possible using a non-lubricated vaginal speculum. Obtain a specimen by one or more the following means:

- i. **Cervical Scraping:** A specimen may be collected from the visualized cervix by means of a spatula or commercial aspirator or scraper. Rotate the spatula about the circumference of the external os, scraping the mucosa of this critical area. Take care not to induce excessive bleeding. A similar scraping may be used to sample any focal area of the vagina or cervix.
- j. **Cervical-Endocervical:** Special pointed-tip collection spatulas and endocervical brushes are available and are designed to obtain ecto- and endocervical material. This specimen provides a comprehensive sampling of the most critical area of the uterine cervix. Insert the thin tip of the spatula into the cervix and rotate the spatula about the circumference of the external os. Take care not to induce excessive bleeding. Cytobrushes are recommended for endocervical sample. Insert the brush into the cervix and twist at least 360°, taking care not to induce bleeding.
- k. **Vaginal:** A specimen may be collected by use of a spatula or scraper.
- l. **Hormonal Evaluation:** A smear from the lateral vaginal wall is required. This smear must be prepared on a glass slide separate from that used for cervical-endocervical evaluation.

Remarks: The sample must be quickly smeared and immediately fixed to avoid air drying of the cellular sample.

Note: The ICD 9 code used must reflect the appropriate reason for testing; diagnostic or screening. The following examples of appropriate common ICD-9 codes:

Abnormal

795.0 Abnormal PAP Recheck
622.1 Dysplasia
V15.89 Personal history
presenting health hazard

Screening

V72.6 Lab Exam
V72.3 Routine Gyn Exam & PAP
V76.2 PAP Only
V22.1 Pregnancy Check
V24.2 Post-partum check

CPT Code: HCPCS Code P3000

Methodology: Routine Cytopathologic Evaluation
Performed: Cytology (Monday – Friday)
Reported: Within 5 days

Specimen Required: **Collect:** Whenever possible, cervical/vaginal smears should be collected in the second half of the menstrual cycle to avoid contamination by obscuring blood. Patient should be instructed not to use vaginal douche and refrain from sexual intercourse for 48 hours prior to the sampling. Place the patient in lithotomy position. Visualize the cervix as fully as possible using a non-lubricated vaginal speculum. Obtain a specimen by one or more the following means:

- m. Cervical Scraping:** A specimen may be collected from the visualized cervix by means of a spatula or commercial aspirator or scraper. Rotate the spatula about the circumference of the external os, scraping the mucosa of this critical area. Take care not to induce excessive bleeding. A similar scraping may be used to sample any focal area of the vagina or cervix.
- n. Cervical-Endocervical:** Special pointed-tip collection spatulas and endocervical brushes are available and are designed to obtain ecto- and endocervical material. This specimen provides a comprehensive sampling of the most critical area of the uterine cervix. Insert the thin tip of the spatula into the cervix and rotate the spatula about the circumference of the external os. Take care not to induce excessive bleeding. Cytobrushes are recommended for endocervical sample. Insert the brush into the cervix and twist at least 360°, taking care not to induce bleeding.
- o. Vaginal:** A specimen may be collected by use of a spatula or scraper.
- p. Hormonal Evaluation:** A smear from the lateral vaginal wall is required. This smear must be prepared on a glass slide separate from that used for cervical-endocervical evaluation.

Remarks: The sample must be quickly smeared and immediately fixed to avoid air drying of the cellular sample.

Note: The ICD 9 code used must reflect the appropriate reason for testing; diagnostic or screening. The following examples of appropriate common ICD-9 codes:

<u>Abnormal</u>	<u>Screening</u>
795.0 Abnormal PAP Recheck	V72.6 Lab Exam
622.1 Dysplasia	V72.3 Routine Gyn Exam & PAP
V15.89 Personal history presenting health hazard	V76.2 PAP Only
	V22.1 Pregnancy Check
	V24.2 Post-partum check

CPT Code: 88164

Methodology: Routine Cytopathologic Evaluation
Performed: Cytology (Monday – Friday)
Reported: Next day (unless special studies required)

Specimen Required: **Collect:**
Unacceptable Conditions:

CPT Code: 88312

Test Code	Cytology, Sputum	SPEC CS
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Methodology: Routine Cytopathologic Evaluation
Performed: Cytology (Monday – Friday)
Reported: Next day (unless special studies required)

Specimen Required: **Collect:** The optimal time for specimen collection is within 15 to 30 minutes after waking and before eating breakfast. Brushing of teeth or rinsing of mouth thoroughly with water will reduce contamination by saliva. Instruct the patient to inhale and exhale deeply, forcing air from the lungs, using the diaphragm. Repeat until the patient coughs and is able to produce a sputum specimen. Collect the specimen in a clean specimen container. Label the container with patient’s name, date and time of specimen collection, and patient location. Submit the specimen, along with the completed anatomical pathology requisition, to the laboratory. Keep the specimen refrigerated or on wet ice. If transport of the specimen will be delayed more than 2-4 hours, mix the specimen with an equal volume of Saccomanno Fixative. Keep specimen refrigerated until transport.
Remarks: Induced sputum specimen may be collected when patient is unable to produce sputum as described above.

CPT Code: 88108

Test Code	Cytology, Tzanck Smear	SPEC CZ
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Methodology: Routine Cytopathologic Evaluation
Performed: Cytology (Monday – Friday)
Reported: Next day (unless special studies required)

Specimen Required: **Specimen Required:** Direct smear of material collected from a skin lesion, usually a vesicle. Two or more clean glass slides fixative (95% ethyl alcohol), skin scraping spatula, or needle, test request form.
Collection Procedure: Label the slides with the patient’s full name in pencil on the frosted end. Alcohol so the sides are completely covered. The typical lesion is a vesicle. Puncture the vesicle and quickly smear the fluid contents of the vesicle evenly. Immediately immerse the slide in container filled with 95% ethyl alcohol. Repeat the process with the second slide, if necessary, for better diagnostic yield. Repeat the process for additional areas, if necessary. Submit the specimen and the completed test request form to the Cytopathology Laboratory.

CPT Code: 88161

Test Code	Cytology, Urine	SPEC CU
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Methodology: Routine Cytopathologic Evaluation
Performed: Cytology (Monday – Friday)
Reported: Next day (unless special studies required)

Specimen Required: **Collect:** For purposes of obtaining the greatest yield of diagnostic material, a second-morning voided urine specimen should be obtained, if possible. A midstream, clean-catch specimen is recommended to avoid vaginal contamination in female patients. A midstream specimen, not necessarily clean catch, is recommended for male patients. If the patient must be catheterized to obtain the specimen, this should be noted on the specimen test request form as catheterization can lead to artifacts which may be misinterpreted without the knowledge that the specimen was catheterized. Submit the specimen to the Cytopathology Laboratory along with the completed Cytology test request form. If transport of the specimen will be delayed more than 24 hours, add an equal volume of 50% ethyl alcohol (if sample size is too large to accommodate this volume, a well-mixed aliquot of the specimen with an equal volume of fixative may be utilized). If transport time will be less than 24 hours, or fixative is not available, the specimen should be refrigerated or kept on wet ice until transported to the lab

CPT Code: 88108

Methodology: Enzyme-Linked Immunosorbent Assay
Performed: Referral – ARUP (Sunday – Saturday)
Reported: 2 – 5 days

Specimen Required:

Collect: One 4 mL SST.

Transport: 1 mL serum at ambient or 2 – 8°C. (Min: 0.3 mL)

Remarks: Separate serum from cells ASAP. Acute and convalescent samples must be labeled as such; parallel testing is preferred and convalescent samples must be received within 30 days from receipt of the acute samples. **Please mark sample plainly as "acute" or "convalescent"**. No established reference ranges for CSF.

Unacceptable Conditions: Plasma, severely lipemic, contaminated, heat inactivated or hemolyzed samples.

Stability: After separation from clot; Ambient: 2 days; Refrigerated: 2 weeks; Frozen: 1 year (avoid repeated freeze/thaw cycles)

Reference Interval:

Components	Reference Interval
Cytomegalovirus Antibody, IgG	< 0.90 IV: Negative – No significant level of detectable CMV IgG antibody 0.9 – 1.09 IV: Equivocal – Repeat testing in 10-14 days may be helpful. > 1.09 IV: Positive – IgG antibody to CMV detected which may indicate a current or previous CMV infection.
Cytomegalovirus Antibody, IgM	< 0.90 EU: Negative – No significant level of detectable CMV IgM antibody. 0.90 – 1.10 EU: equivocal – Repeat testing in 10-14 days may be helpful. > 1.10 EU: Positive – IgM antibody to CMV detected which may indicate a current or recent infection.

Interpretive Data: IV = Index Value EU = ELISA units

CPT Code(s): 86644 CMV IgG; 86645 CMV Ig