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Information regarding Current Procedural Terminology (CPT)

Test Number	Mnemonic	Test Name	New Test	Test Name Change	Specimen Requirements	Methodology	Note	Interpretive Data	Reference Interval	Component Charting Name	Component Change	Reflex Pattern	Result Type	Ask at Order Prompt	Numeric Map	Unit of Measure	CPT Code	Pricing Change	Inactivation w/ Replacement	Inactivation w/o Replacement
0020098	LEAD-WB	Lead, Whole Blood (Venous)			x															
0020498	ULYTE	Electrolytes, Urine			x															
0020605	ZPP	Zinc Protoporphyrin (ZPP), Whole Blood			x															
0020610	FEP	Erythrocyte Porphyrin (EP), Whole Blood			x															
0020614	ZPP IND	Zinc Protoporphyrin (ZPP), Whole Blood Industrial			x															
0020799	HEP D AB	Hepatitis Delta Virus Antibody																	x	
0025000	ARS U	Arsenic, Urine with Reflex to Fractionated			x															
0025016	LEAD-IND	Lead, Industrial, Whole Blood			x															
0049090	HEINZ	Heinz Body Stain			x															
0049191	GBM-G IFA	Glomerular Basement Membrane Antibody, IgG (IFA)			x															
0050292	HERP I	Herpes Simplex Virus Type 1 Glycoprotein G-Specific Antibody, IgG by CIA			x			x								x				

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0050294	HERP II	Herpes Simplex Virus Type 2 Glycoprotein G-Specific Antibody, IgG by CIA			x			x	x							x				
0050608	MCC MAT	Maternal Cell Contamination, Maternal Specimen	x																	
0051152	HERP PAN 2	Herpes Simplex Type 1 and Type 2 Glycoprotein G-Specific Antibodies, IgG by CIA			x			x	x							x				
0051596	MCC-FETAL	Maternal Cell Contamination, Fetal Specimen	x																	
0054440	MEASLGCSF	Measles (Rubeola) Antibody, IgG, CSF						x	x											
0054442	MUMPSCSF	Mumps Virus Antibody IgG, CSF						x	x											
0061164	FECLACTO	Lactoferrin, Fecal by ELISA			x															
0070015	ALDOST	Aldosterone, Serum			x															
0070016	ALDO 30	Aldosterone 30 Minute			x															
0070017	ALDO 60	Aldosterone 60 Minute			x															
0070073	A/RA	Aldosterone/Renin Activity Ratio			x			x	x											

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0070105	RENIN	Renin Activity			x			x												
0080432	B2M U	Beta-2 - Microglobulin, Urine			x															
0092066	TPMT RBC	Thiopurine Methyltransferase, RBC			x			x												
0092570	CDCO FENU	Fentanyl and Metabolite, Urine, Quantitative						x												
2001575	RENIND	Renin, Direct			x															
2001956	GJB6 DEL	Hearing Loss, Nonsyndromic, Connexin 30 (GJB6) 2 Deletions																		x
2002257	OSM FRG	Osmotic Fragility, Erythrocyte			x															
2005164	NMDA G CSF	N-methyl-D-Aspartate Receptor (NMDAR) Antibody, IgG by CBA-IFA, CSF With Reflex to Titer			x															
2005792	HB CASCADE	Hemoglobin Evaluation Reflexive Cascade			x															
2006352	XCI	X-Chromosome Inactivation Analysis																		x

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2008403	GBM-G PAN	Glomerular Basement Membrane Antibody, IgG by Multiplex Bead Assay and IFA			x															
2010841	PCCAANNA C	Paraneoplastic Antibodies (PCCA/ANNA) by IFA with Reflex to Titer and Immunoblot, CSF			x															
2011478	U ARS RAND	Arsenic, Random Urine with Reflex to Fractionated			x															
2011699	AQP4 CSF	Aquaporin-4 (AQP4) Antibody, IgG by CBA-IFA With Reflex to Titer, CSF			x															
2011776	CDCO FNSP	Fentanyl and Metabolite, Serum or Plasma, Quantitative						x							x					
2012049	HLA B1502	HLA-B*15:02 Genotyping, Carbamazepine Hypersensitivity																	x	
2012166	DPYD	Dihydropyrimidine Dehydrogenase (DPYD)									x									

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2013305	MEFAP	Meningitis/Encephalitis Panel by PCR			x															
2013444	SMA DD FE	Spinal Muscular Atrophy (SMA) Copy Number Analysis, Fetal									x									
3000894	HHACASCADE	Hereditary Hemolytic Anemia Cascade			x															
3001257	AMPA CSF	Alpha-Amino-3-hydroxy-5-methyl-4-isoxazolepropionic Acid Receptor (AMPAR) Antibody, IgG by CBA-IFA With Reflex to Titer, CSF			x															
3001267	GABA-B CSF	Gamma Aminobutyric Acid Receptor, Type B (GABA-BR) Antibody, IgG by CBA-IFA With Reflex to Titer, CSF			x															
3001283	CNS PAN	Autoimmune CNS Demyelinating Disease Reflexive Panel			x															

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3001393	HLA B5801	HLA-B*58:01 Genotyping, Allopurinol Hypersensitivity																	x	
3001457	EX REANLYZ	Exome Reanalysis (Originally Tested at ARUP - No Specimen Required)			x		x													
3001635	BWS-RSS DD	Beckwith-Wiedemann Syndrome (BWS) and Russell-Silver Syndrome (RSS) by Methylation-Specific MLPA			x															
3001986	CASPR2GCSF	Contactin-Associated Protein-2 (CASPR2) Antibody, IgG by CBA-IFA With Reflex to Titer, CSF			x															
3001992	LGI1IGGCSF	Leucine-Rich, Glioma-Inactivated Protein 1 (LGI1) Antibody, IgG by CBA-IFA With Reflex to Titer, CSF			x															
3002216	B SUBSETS	B Cell Subset Analysis			x			x	x											

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3002598	PETH	Phosphatidylethanol (PEth), Whole Blood, Quantitative			x															
3002644	HB A2F COL	Hemoglobin (Hb) A2 and F by Column with Reflex to Electrophoresis			x															
3002645	HGB F	Hemoglobin F with Reflex to Electrophoresis			x															
3002886	SOX1 CSF	SOX1 Antibody, IgG by Immunoblot, CSF			x															
3003144	DELDUP	Deletion/Duplication Analysis by MLPA					x					x								
3003279	GIPPCR	Gastrointestinal Pathogens Panel by PCR			x															
3004510	AMPHI CSF	Amphiphysin Antibody IgG, CSF			x															
3004512	DPPX CSF	Dipeptidyl Aminopeptidase-Like Protein 6 (DPPX) Antibody, IgG by CBA-IFA With Reflex to Titer, CSF			x															
3004517	PNSPAN CSF	Paraneoplastic Reflexive Panel, CSF			x															

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3005949	ALD/DR	Aldosterone and Renin Direct, With Ratio			x				x											
3006003	GABA-A CSF	Gamma-Aminobutyric Acid Receptor, Type A (GABA-AR) Antibody, IgG by CBA-IFA with Reflex to Titer, CSF			x															
3006013	IGLON5 CSF	IgLON Family Member 5 (IgLON5) Antibody, IgG by CBA-IFA With Reflex to Titer, CSF			x															
3006023	ITPR1 CSF	Inositol 1,4,5-Trisphosphate Receptor Type 1 (ITPR1) Antibody, IgG by CBA-IFA With Reflex to Titer, CSF			x															
3006039	MGLUR1 CSF	Metabotropic Glutamate Receptor 1 (mGluR1) Antibody, IgG by CBA-IFA With Reflex to Titer, CSF			x															

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3006202	AIENCDEMC	Autoimmune Encephalopathy/Dementia Panel, CSF			x															
3006205	AIEPC	Autoimmune Epilepsy Panel, CSF			x															
3006209	AIMYC	Autoimmune Myelopathy Panel, CSF			x															
3006211	AIPEDC	Autoimmune Pediatric CNS Disorders, CSF			x															
3006235	AISPSC	Autoimmune Stiff-Person Disorders, CSF			x															
3016583	EXOME PRO	Exome Sequencing			x		x											x		
3016589	EXOME FRPT	Exome Sequencing, Familial Control			x		x													
3016596	CMA RAPID	Cytogenomic SNP Microarray - RAPID	x																	
3016616	SCKLHB	Hemoglobin S Evaluation with Reflex to RBC Solubility			x															

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3016853	MOG CSF	Myelin Oligodendrocyte Glycoprotein (MOG) Antibody, IgG by CBA-IFA With Reflex to Titer, CSF			x															
3017001	CV2 CSF	CV2 Antibody, IgG by CBA-IFA With Reflex to Titer, CSF			x															
3017101	HGBEL RFX	Hemoglobin Evaluation by HPLC With Reflex to Electrophoresis and/or RBC Solubility			x															
3017156	THROMRISK	Thrombotic Risk Reflex Panel			x	x	x					x					x			
3017440	MA2/TA CSF	Ma2/Ta Antibody, IgG by Immunoblot, CSF			x															
3017752	ENCEPH-CSF	Encephalitis Panel With Reflex to Herpes Simplex Virus Types 1 and 2 Glycoprotein G-Specific Antibodies, IgG, CSF							x											

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3018508	KLHL11 CSF	Kelch-Like Protein 11 Antibody, IgG by CBA-IFA, With Reflex to Titer, CSF			x															
3018966	AIMDC 2	Autoimmune Movement Disorder Panel, CSF			x															
3018967	NEURORCSF3	Autoimmune Neurologic Disease Panel With Reflex, CSF			x															
3018970	H5 PCR	Influenza A (H5) Virus by Qualitative NAAT			x															
3019126	11Q FISH	11Q Aberrations by FISH									x									
3019841	UGT1A1DPYD	UPD Glucuronosyltransferase 1A1 (UGT1A1) and Dihydropyrimidine Dehydrogenase (DPYD) Genotyping									x									
3019876	BG DELDUP	Beta Globin (HBB) Deletion/Duplication by MLPA	x																	
3019943	WGS PRO	Genome Sequencing			x															

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3019947	RWGS PRO	Rapid Genome Sequencing			x															
3019951	WGS FM	Genome Sequencing, Familial Comparator			x															
3019953	RWGS FM	Rapid Genome Sequencing, Familial Comparator			x															
3020201	SF1 IHC	SF-1 Non-GYN by Immunohistochemistry	x																	
3020347	PJIPCR	Prosthetic Joint Infection Panel by PCR	x																	
3020444	TD REQUEST	ThinPrep PAP Test With Reflex to HPV if Abnormal	x																	
3020664	IGGLM332B4	Laminin 332 and p200 Antibodies, IgG by IIF	x																	
3020683	HLA-B5801	HLA-B*58:01 Genotyping, Allopurinol Hypersensitivity	x																	

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3020687	HLA-B1502	HLA-B*15:02 Genotyping, Carbamazepine Hypersensitivity	x																	
3020699	WBBMDNAEXT	DNA Extract and Hold for Whole Blood and Bone Marrow	x																	
3020774	CDIFF EIA	Toxigenic Clostridioides difficile GDH Antigen and Toxin by EIA, Stool	x																	

TEST CHANGE

Lead, Whole Blood (Venous)

0020098, LEAD-WB

Specimen Requirements:	
Patient Preparation:	
Collect:	Royal blue (K2EDTA) or royal~~), Royal~~ blue (NaHep~~), or tan (K2EDTA~~).
Specimen Preparation:	Transport 3 or 6 mL whole blood in the original collection tube (royal blue K2EDTA or NaHep). (Min: 0.5 mL) ~~OR Transport 3 mL whole blood in the original collection tube (tan). (Min: 0.5 mL)~~
Transport Temperature:	Room temperature. Also acceptable: Refrigerated.
Unacceptable Conditions:	Serum. Specimens collected in tubes other than royal blue (K2EDTA) or~~),~~ royal blue (NaHep~~), or tan (K2EDTA~~). Clotted specimens. Capillary pediatric EDTA collection tubes, refer to Lead, Whole Blood (Capillary) 0020745.
Remarks:	
Stability:	Ambient: Indefinitely; Refrigerated: Indefinitely; Frozen: Unacceptable
Methodology:	Quantitative Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)
Note:	
CPT Codes:	83655
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

Reference intervals are based on the CDC's Blood Lead Reference Value (BLRV). Thresholds and time intervals for retesting, medical evaluation, and response vary by state and regulatory body. Contact your State Department of Health and/or applicable regulatory agency for specific guidance on medical management recommendations.

Elevated results may be due to skin- or collection-related contamination, including the use of tubes that are not certified to be trace element free. If an elevated result is suspected to be due to contamination, confirmation with a second specimen collected in a certified trace element-free tube is recommended.

Methodology: Inductively Coupled Plasma-Mass Spectrometry (ICP-MS).

Reference Interval:

Test Number	Components	Reference Interval
	Lead, Whole Blood (Venous)	Less than or equal to 3.4 ug/dL

TEST CHANGE

Electrolytes, Urine

0020498, ULYTE

Specimen Requirements:	
Patient Preparation:	
Collect:	24-hour or random urine. Refrigerate during collection.
Specimen Preparation:	Do not adjust specimen pH. Transfer a 1 mL aliquot of urine from a well-mixed collection to an ARUP standard transport tube~~Standard Transport Tube~~. (Min: 0.5 mL) Record total volume and collection time interval on transport tube and test request form.
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	
Remarks:	
Stability:	Ambient: 7 days~~48 hours~~; Refrigerated: 2 weeks; Frozen: 1 months
Methodology:	Quantitative Ion-Selective Electrode
Note:	Reference intervals are not established for random urines.
CPT Codes:	82436; 84133; 84300
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

Per 24h calculations are provided to aid interpretation for collections with a duration of 24 hours and an average daily urine volume. For specimens with notable deviations in collection time or volume, ratios of analytes to a corresponding urine creatinine concentration may assist in result interpretation.

Reference Interval:

<table>
<tr><th>Test Number</th><th>Components</th><th>Reference Interval</th></tr>
<tr><td></td><td>Chloride, Urine mmol/day - ULYTE</td><td>140-250 mmol/day</td></tr>
<tr><td></td><td>Creatinine, Urine - per 24h</td><td></td></tr>
<tr><td></td><td></td><td>
<table>
<tr><th>Age</th><th>Male (mg/d)</th><th>Female (mg/d)</th></tr>
<tr><td>3-8 years</td><td>140-700</td><td>140-700</td></tr>
<tr><td>9-12 years</td><td>300-1300</td><td>300-1300</td></tr>
<tr><td>13-17 years</td><td>500-2300</td><td>400-1600</td></tr>
<tr><td>18-50 years</td><td>1000-2500</td><td>700-1600</td></tr>
<tr><td>51-80 years</td><td>800-2100</td><td>500-1400</td></tr>
<tr><td>81 years and older</td><td>600-2000</td><td>400-1300</td></tr>
</table>
</td></tr>
<tr><td></td><td>Potassium, Urine mmol/day - ULYTE</td><td>25-125 mmol/day</td></tr>
<tr><td></td><td>Sodium, Urine mmol/day - ULYTE</td><td>51-286 mmol/day</td></tr>
</table>

TEST CHANGE

Zinc Protoporphyrin (ZPP), Whole Blood

0020605, ZPP

Specimen Requirements:	
Patient Preparation:	
Collect:	Lavender (EDTA), royal blue (K2EDTA), royal blue (NaHep), ~~tan (K2EDTA),~~ or pink (K2EDTA).
Specimen Preparation:	Transport 3 or 6 mL whole blood in the original collection tube. (Min: 0.2 mL)
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Clotted, frozen, or hemolyzed specimens.
Remarks:	
Stability:	Ambient: 30 hours; Refrigerated: 5 weeks; Frozen: Unacceptable
Methodology:	Quantitative Hematofluorometry
Note:	Elevated ZPP results are seen in early and late iron deficiency, the anemia of chronic disease, chronic lead poisoning, and erythropoietic protoporphyria. Elevated bilirubin or riboflavin and hemolyzed, clotted, or improperly aliquoted specimens may falsely increase the ZPP concentration. A more specific test for free protoporphyrin is Porphyrins, Serum Total (0080429). Erythrocyte Porphyrin (EP), Whole Blood (0020610), measures free protoporphyrin and zinc protoporphyrin.
CPT Codes:	84202
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

This test was performed on the ProtoFluor Z system manufactured by Helena Laboratories. The result is not comparable to results obtained from extraction-based methods or from the AVIV ZPP system.

Reference Interval:

~~0-69 umol ZPP/ mol Hem~~

Test Number	Components	Reference Interval
	Zinc Protoporphyrin (ZPP) WholeBld Ratio	0-69 umol ZPP/ mol Hem

ARUP LABORATORIES | *A nonprofit enterprise of the University of Utah and its Department of Pathology*

Effective Date: April 20, 2026

TEST CHANGE

Erythrocyte Porphyrin (EP), Whole Blood

0020610, FEP

Specimen Requirements:	
Patient Preparation:	
Collect:	Royal blue (EDTA), lavender (EDTA), or pink (K2EDTA~~), or Tan (K2EDTA~~). Use royal blue tube when also testing for lead.
Specimen Preparation:	Protect from light during collection, storage, and shipment. Transfer 1 mL whole blood to an ARUP amber transport tube.~~Amber Transport Tube.~~ (Min: 0.5 mL)
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Specimens not collected in EDTA. Clotted specimens.
Remarks:	Specimen should be tested for lead FIRST to avoid potential contamination problems. Specimens not protected from light acceptable with a disclaimer.
Stability:	Ambient: Unacceptable; Refrigerated: 2 weeks; Frozen: 1 month
Methodology:	Fluorometry
Note:	Elevated EP results are seen in early and late iron deficiency, in the anemia of chronic disease, and in chronic lead poisoning (typically when blood lead is greater than 25 ug/dL). Elevated protoporphyrin (as in erythropoietic protoporphyria) and zinc coproporphyrin (usually associated with childbirth) can increase the apparent EP signal. A more specific test for free protoporphyrin is Porphyrins, Serum Total (0080429). Specimens which are hemolyzed, clotted, or improperly aliquoted may show false elevations.
CPT Codes:	84202
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

~~This test was developed and its performance characteristics determined by ARUP Laboratories. It has not been cleared or approved by the US Food and Drug Administration. This test was performed in a CLIA certified laboratory and is intended for clinical purposes.~~

Deleted Cells

Deleted Cells

Reference Interval:

Refer to report~~0-35 ug/dL~~

Test Number	Components	Reference Interval
	Erythrocyte Porphyrin (EP)	0-35 µg/dL

TEST CHANGE

Zinc Protoporphyrin (ZPP), Whole Blood Industrial

0020614, ZPP IND

Specimen Requirements:	
Patient Preparation:	
Collect:	Lavender (EDTA), royal blue (K2EDTA), royal blue (NaHep), ~~tan (K2EDTA)~~ or pink (K2EDTA).
Specimen Preparation:	Transport 3 or 6 mL whole blood in the original collection tube. (Min: 0.2 mL)
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Clotted, frozen, or hemolyzed specimens.
Remarks:	
Stability:	Ambient: 30 hours; Refrigerated: 5 weeks; Frozen: Unacceptable
Methodology:	Quantitative Hematofluorometry
Note:	Elevated ZPP results are seen in early and late iron deficiency, the anemia of chronic disease, chronic lead poisoning, and erythropoietic protoporphyria. Elevated bilirubin or riboflavin and hemolyzed, clotted, or improperly aliquoted specimens may falsely increase the ZPP concentration.
CPT Codes:	84202
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

For occupational exposure to lead, OSHA requires ZPP whole blood concentration to be reported in units of ug/dL. For adults, conversion of ZPP to units of ug/dL assumes a hematocrit of 45%. This test was performed on the ProtoFluor Z system manufactured by Helena Laboratories. The result is not comparable to results obtained from extraction-based methods or from the AVIV ZPP system.

Reference Interval:

Test Number	Components	Reference Interval
	Zinc Protoporphyrin (ZPP) WholeBld Ratio	0-69 umol ZPP/ mol Hem
	Zinc Protoporphyrin (ZPP), Whole Blood	0-40 microg/dL

TEST CHANGE

Arsenic, Urine with Reflex to Fractionated

0025000, ARS U

Specimen Requirements:	
Patient Preparation:	Diet, medication, and nutritional supplements may introduce interfering substances. Patients should be encouraged to discontinue nutritional supplements, vitamins, minerals, nonessential over-the-counter medications (upon the advice of their physician), and avoid shellfish and seafood for 48 to 72 hours. High concentrations of iodine may interfere with elemental testing. Collection of urine specimens from patients receiving iodinated or gadolinium-based contrast media should be avoided for a minimum of 72 hours post exposure. Collection from patients with impaired kidney function should be avoided for a minimum of 14 days post contrast media exposure.
Collect:	24-hour or random urine collection. Specimen must be collected in a plastic container and refrigerated during collection. ARUP studies indicate that refrigeration of urine alone, during and after collection, preserves specimens adequately if tested within 14 days of collection.
Specimen Preparation:	Transfer an 8 mL aliquot from a well-mixed collection to ARUP Trace Element-Free Transport Tubes (ARUP supply #43116) available online through eSupply using ARUP Connect(TM) or contact ARUP Client Services at ~~(~~800~~-)~~ 522-2787. (Min: 2 mL)
Transport Temperature:	Refrigerated. Also acceptable: Room temperature or frozen.
Unacceptable Conditions:	Acid preserved urine. Specimens collected within 72 hours after administration of iodinated or gadolinium-based contrast media. Specimens contaminated with blood or fecal material. Specimens transported in nontrace element-free transport tube (with the exception of the original device).
Remarks:	Record total volume and collection time interval on transport tube and on test request form.
Stability:	Ambient: 1 week; Refrigerated: 2 weeks; Frozen: 2 months~~1 year~~
Methodology:	Quantitative High Performance Liquid Chromatography (HPLC) / Quantitative Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)
Note:	If total arsenic concentration is found to be elevated based on reference intervals, then Arsenic, Fractionated, will be added to determine the proportion of organic, inorganic, and methylated forms. Additional charges apply.
CPT Codes:	82175; if reflexed, add 82175
New York DOH Approval Status:	This test is New York DOH approved.
Interpretive Data:	

The ACGIH Biological Exposure Index (BEI) for arsenic in urine is 35 ug/L measured at the end of the work week. The ACGIH BEI is based on the sum of inorganic and methylated species. For specimens with elevated total arsenic results, fractionation is automatically performed to determine the proportions of inorganic, methylated, and organic species.

Elevated results may be due to skin or collection-related contamination, including the use of collection containers that are not certified to be trace element-free. If an elevated result is suspected to be due to contamination, confirmation with a second specimen collected in a certified trace element-free container is recommended.

Methodology: Inductively Coupled Plasma - Mass Spectrometry (ICP-MS)

Reference Interval:

<table>
<tr><th>Test Number</th><th>Components</th><th>Reference Interval</th></tr>
<tr><td></td><td>Arsenic, Urine - per 24h</td><td>Less than or equal to 49.9 microg/d</td></tr>
<tr><td></td><td>Arsenic, Urine - per volume</td><td>Less than or equal to 34.9 microg/L</td></tr>
<tr><td></td><td>Arsenic, Urine - ratio to CRT</td><td>Less than or equal to 29.9 microg/g CRT</td></tr>
<tr><td></td><td>Creatinine, Urine - per 24h</td><td></td></tr>
<tr><td></td><td></td><td>
<table>
<tr><th>Age</th><th>Male (mg/d)</th><th>Female (mg/d)</th></tr>
<tr><td>3-8 years</td><td>140-700</td><td>140-700</td></tr>
<tr><td>9-12 years</td><td>300-1300</td><td>300-1300</td></tr>
<tr><td>13-17 years</td><td>500-2300</td><td>400-1600</td></tr>
<tr><td>18-50 years</td><td>1000-2500</td><td>700-1600</td></tr>
<tr><td>51-80 years</td><td>800-2100</td><td>500-1400</td></tr>
<tr><td>81 years and older</td><td>600-2000</td><td>400-1300</td></tr>
</table>
</td></tr>
</table>

TEST CHANGE

Lead, Industrial, Whole Blood

0025016, LEAD-IND

Specimen Requirements:	
Patient Preparation:	Collect from patient aged 16 years or older.
Collect:	Royal blue(K2EDTA) or royal~~), Royal~~ blue (NaHep~~) or tan (K2EDTA~~).
Specimen Preparation:	Transport 3 or 6 mL whole blood in the original collection tube (royal blue K2EDTA or NaHep) .~~)~~ (Min: 0.5 mL) ~~OR Transport 3 mL whole blood (tan) (Min: 0.5 mL)~~
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Serum. Specimens collected in tubes other than r~~R~~oyal blue(K2EDTA or ~~), Royal blue (~~NaHep~~), or tan (K2EDTA~~). Hemolyzed or clotted specimens.
Remarks:	
Stability:	Ambient: 30 hours; Refrigerated: 5 weeks; Frozen: Unacceptable
Methodology:	Quantitative Inductively Coupled Plasma-Mass Spectrometry (ICP-MS) / Hematofluorometry
Note:	
CPT Codes:	83655; 84202
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

Interpretive Data
Reference intervals are based on the CDC's Blood Lead Reference Value (BLRV). Thresholds and time intervals for retesting, medical evaluation, and response vary by state and regulatory body. Contact your State Department of Health and/or applicable regulatory agency for specific guidance on medical management recommendations. Actions described by OSHA in 1978 and finalized in 1983 are shown below.

Elevated results may be due to skin- or collection-related contamination, including the use of tubes that are not certified to be trace element free. If an elevated result is suspected to be due to contamination, confirmation with a second specimen collected in a certified trace element-free tube is recommended.

Methodology: Inductively Coupled Plasma-Mass Spectrometry (ICP-MS).

"Occupational Safety and Health Standards: Lead (1983). 29 CFR Part 1910.1025 App C" Action required for workers with Elevated Lead Values OSHA, Occupational Exposure to Lead, 1978

No. of Tests	Lead	Action Required

1	Greater than equal to 40.0 ug/dL	Notification of worker in writing; medical examination of worker and consultation.
3 (average)	Greater than or equal to 50.0 ug/dL	Removal of worker from job with potential lead exposure.
1	Greater than or equal to 60.0 ug/dL	Removal of worker from job with potential lead exposure.
2	Less than 40.0 ug/dL	Reinstatement of worker in job with potential lead exposure is based upon symptoms and medical evaluation.

OSHA requirements in effect since 1978 call for the measurement of whole blood lead and zinc protoporphyrins (ZPP) (NCCLS document C42-A, Nov. 1996) to evaluate the occupational exposure to lead. OSHA requires ZPP whole blood testing to be reported in units of ug/dL. For adults, conversion of ZPP units if ug/dL whole blood assumes a hematocrit of 45 percent. Conversion factor: umol/mol heme x 0.584= ug/dL.

Reference Interval:

Test Number	Components	Reference Interval
	Lead, Industrial, Whole Blood	Less than or equal to 3.4 µg/dL
	Zinc Protoporphyrin (ZPP) WholeBld Ratio	0-69 umol ZPP/ mol Hem
	Zinc Protoporphyrin (ZPP), Whole Blood	0-40 microg/dL

TEST CHANGE

Heinz Body Stain

0049090, HEINZ

Specimen Requirements:	
Patient Preparation:	
Collect:	Lavender (EDTA), p~~P~~ink (K2EDTA), or green (sodium~~Green (Sodium~~ or lithium heparin~~Lithium Heparin~~).
Specimen Preparation:	Transport 5 mL whole blood in original tube.~~.~~ (Min: 2 mL) Also acceptable: whole blood in an ARUP standard transport tube.
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Samples greater than 96 hours old. Specimens from infants under 6 months of age; test results are unreliable.
Remarks:	
Stability:	Ambient: U~~u~~nacceptable; Refrigerated: 96 hours; Frozen: Unacceptable
Methodology:	Supravital Stain
Note:	
CPT Codes:	85441; 85445
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

Refer to report.

Reference Interval:

~~Effective August 17, 2015.~~
~~Direct: Negative~~
~~Induced: Normal~~

Test Number	Components	Reference Interval
	Heinz Body Stain, Direct	Negative
	Heinz Body Stain, Induced	Normal

TEST CHANGE

Glomerular Basement Membrane Antibody, IgG (IFA)

0049191, GBM-G IFA

Specimen Requirements:	
Patient Preparation:	
Collect:	Serum separator tube.
Specimen Preparation:	Separate serum from cells ASAP or within 2 hours of collection. Transport 1 mL serum. (Min: 0.5 mL)
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	
Remarks:	
Stability:	After separation from cells: Ambient: 48 hours; Refrigerated: 2 weeks; Frozen: 30 days~~1 year~~ (avoid repeated freeze/thaw cycles)
Methodology:	Indirect Fluorescent Antibody (IFA)
Note:	
CPT Codes:	86255
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

When present, IgG antibody to glomerular basement membrane (GBM) antigen detected by either indirect fluorescent antibody (IFA) or multiplex bead assay helps support a diagnosis of Goodpasture syndrome. However, the combined result of both assays performed during initial evaluation improves the diagnostic sensitivity for disease. A positive result in one or both assays should be confirmed by renal biopsy.

This test was developed and its performance characteristics determined by ARUP Laboratories. It has not been cleared or approved by the US Food and Drug Administration. This test was performed in a CLIA certified laboratory and is intended for clinical purposes.

Reference Interval:

~~Negative~~

Test Number	Components	Reference Interval
	GBM Antibody, IgG by IFA	Negative

TEST CHANGE

Herpes Simplex Virus Type 1 Glycoprotein G-Specific Antibody, IgG by CIA

0050292, HERP I

Specimen Requirements:	
Patient Preparation:	
Collect:	Serum separator tube (SST) or plasma separator tube (PST). Also acceptable: green (lithium heparin) or lavender (K2EDTA or K3EDTA).
Specimen Preparation:	Allow serum tube~~specimen~~ to clot completely at room temperature. Separate serum from cells ASAP or within 2 hours of collection. Transfer 1 mL serum to an ARUP standard transport tube. (Min: 0.5 mL)
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Contaminated, heat-inactivated, grossly hemolyzed, lipemic, or severely icteric specimens.
Remarks:	
Stability:	After separation from cells: Ambient: 48 hours; Refrigerated: 14 days~~2 weeks~~; Frozen: 12 weeks (May have up to 5~~1 year (avoid repeated~~ freeze/thaw cycles.)~~)~~
Methodology:	Semi-Quantitative Electroc~~C~~hemiluminescent Immunoassay (ECLIA)
Note:	For CSF s~~S~~pecimens, refer to Herpes Simplex Virus Type 1 Glycoprotein G-Specific Antibody, IgG by ELISA, CSF (ARUP test code 0050379).
CPT Codes:	86695
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

Individuals infected with HSV may not exhibit detectable IgG antibody to type-specific HSV antigens 1 and 2 in the early stages of infection. Detection of antibody presence in these cases may only be possible using a nontype-specific screening test.

~~False positive results are possible. Consider additional testing for results less than or equal to 3.0 IV for type specific assays.~~

HSV 1 Glycoprotein G Ab, IgG~~Effective February 18, 2020~~	
REFERENCE	INTERPRETIVE

INTERVAL~~0.89 IV or less~~	COMMENT~~Negative - No significant level of detectable IgG antibody to HSV type 1 glycoprotein G.~~
0.99 COI or less~~90-1.09 IV~~	Negative: No significant level of detectable~~Equivocal - Questionable presence of~~ IgG antibody to HSV type 1 glycoprotein G. ~~Repeat testing in 10-14 days may be helpful.~~
1.00 COI~~10 IV~~ or greater	Positive: ~~-~~ IgG antibody to HSV type 1 glycoprotein G detected, which may indicate a current or past HSV infection.

Reference Interval:

Test Number	Components	Reference Interval
	HSV 1 Glycoprotein G Ab, IgG	≤0.99 COI

HOTLINE NOTE: There is a unit of measure change associated with this test. Refer to the Hotline Test Mix for interface build information.

TEST CHANGE

Herpes Simplex Virus Type 2 Glycoprotein G-Specific Antibody, IgG by CIA

0050294, HERP II

Specimen Requirements:	
Patient Preparation:	
Collect:	Serum separator tube (SST) or plasma separator tube (PST). Also acceptable: green (lithium heparin) or lavender (K2EDTA or K3EDTA). ~~Serum Separator Tube (SST).~~
Specimen Preparation:	Allow serum tube ~~specimen~~ to clot completely at room temperature. Separate from cells ASAP or within 2 hours of collection. Transfer 1 mL serum to an ARUP standard transport tube. ~~Standard Transport Tube.~~ (Min: 0.5 mL)
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Contaminated, heat-inactivated, grossly hemolyzed, lipemic, or severely icteric specimens.
Remarks:	
Stability:	After separation from cells: Ambient: 48 hours; Refrigerated: 14 Days ~~2 weeks~~; Frozen: 12 weeks (May have up to 5~~1 year (avoid repeated~~ freeze/thaw cycles.)~~)~~
Methodology:	Semi-Quantitative Electroc~~C~~hemiluminescent Immunoassay (ECLIA)
Note:	For CSF specimens refer to Herpes Simplex Virus Type 2 Glycoprotein G-Specific Antibody, IgG by ELISA, CSF (ARUP test code 0050359).
CPT Codes:	86696
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

Individuals infected with HSV may not exhibit detectable IgG antibody to type-specific HSV antigens 1 and 2 in the early stages of infection. Detection of antibody presence in these cases may only be possible using a nontype ~~non-type~~ specific screening test.

~~False positive results are possible. Consider additional testing for results less than or equal to 3.0 IV for type specific assays.~~

HSV 2 Glycoprotein G Antiboyd, IgG ~~Effective February 18, 2020~~	

REFERENCE INTERVAL~~0.89 IV or less~~	INTERPRETIVE COMMENT~~Negative - No significant level of detectable IgG antibody to HSV type 2 glycoprotein G.~~
0.99 COI or less~~90-1.09 IV~~	Negative: No significant level of detectable~~Equivocal - Questionable presence of~~ IgG antibody to HSV type 2 glycoprotein G. ~~Repeat testing in 10-14 days may be helpful.~~
1.00 COI~~10 IV~~ or greater	Positive: ~~-~~ IgG antibody to HSV type 2 glycoprotein G detected, which may indicate a current or past HSV infection.

Reference Interval:

Test Number	Components	Reference Interval
	HSV 2 Glycoprotein G Antibody, IgG	≤0.99 COI

HOTLINE NOTE: There is a unit of measure change associated with this test. Refer to the Hotline Test Mix for interface build information.

NEW TEST

Click for Pricing

Maternal Cell Contamination, Maternal Specimen

0050608, MCC MAT

Specimen Requirements:	
Patient Preparation:	
Collect:	Lavender (K2EDTA), pink (K2EDTA), or yellow (ACD solution A or B)
Specimen Preparation:	Transport 2 mL whole blood. (Min: 1 mL)
Transport Temperature:	Preferred transport temp: Refrigerated. Also acceptable: Room temperature
Unacceptable Conditions:	Serum or plasma. Frozen, clotted, or severely hemolyzed samples.
Remarks:	A separate clinical report is not issued for this test. Maternal cell contamination results are reported as a component of the associated fetal diagnostic test(s) or as a component of MCC-FETAL (Maternal Cell Contamination, Fetal Specimen, ARUP test code 0051596) when requested as an isolated maternal cell contamination study.
Stability:	Room temperature: 1 week; Refrigerated: 1 month; Frozen: Unacceptable
Methodology:	Polymerase Chain Reaction (PCR) / Fragment Analysis
Note:	Do not order as a standalone test. This test must be paired with fetal or cord blood testing for one or more of the following assays. Achondroplasia (FGFR3) 2 Mutations, Fetal 0051265; Alpha Globin (HBA1 and HBA2) Sequencing and Deletion/Duplication, Fetal 3019566; Alpha Thalassemia (HBA1 and HBA2) Deletion/Duplication with reflex to Hb Constant Spring, Fetal 3003656; Angelman Syndrome and Prader-Willi Syndrome by Methylation-Specific MLPA, Fetal 3019803; Beta Globin (HBB) Sequencing, Fetal 3004550; Cystic Fibrosis (CFTR) Expanded Variant Panel, Fetal 2013662; Cytogenomic SNP Microarray - Fetal 2002366; Duchenne/Becker Muscular Dystrophy (DMD) Deletion/Duplication, Fetal 2011231; Familial Targeted Sequencing, Fetal 3005869; Fragile X (FMR1) with Reflex to Methylation Analysis, Fetal 2009034; Galactosemia, (GALT) 9 Mutations, Fetal 0051270; Hemophilia A (F8) 2 Inversions, Fetal 2001755;

	Holoprosencephaly Panel, Sequencing and Deletion/Duplication, Fetal 2008863; Huntington Disease (HD) CAG Repeat Expansion, Fetal 3019937; Kell K/k (KEL) Antigen Genotyping, Fetal 3016676; Maternal Cell Contamination, Fetal Specimen 0051596; Noonan Spectrum Disorders Panel, Sequencing, Fetal 2010769; Platelet Antigen Genotyping Panel, Fetal 3016673; Red Blood Cell Antigen Genotyping, Fetal 3016639; RhC/c (RHCE) Antigen Genotyping, Fetal 3016679; RhD Gene (RHD) Copy Number, Fetal 3016640; RhE/e (RHCE) Antigen Genotyping, Fetal 3016682; Skeletal Dysplasia Panel, Sequencing and Deletion/Duplication, Fetal 2012010; Spinal Muscular Atrophy (SMA) Copy Number Analysis, Fetal 2013444; Tuberous Sclerosis Complex Panel, Sequencing and Deletion/Duplication, Fetal 3002096; Maternal blood submitted without a corresponding fetal/cord blood test may incur processing charges.
CPT Codes:	CPT code is covered under Maternal Cell Contamination, Fetal Sample (0051596) or the gene specific fetal tests (refer to list under the Note section).
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

A potential risk associated with testing on prenatal or cord blood samples is maternal cell contamination (MCC). MCC can occur if maternal blood or tissue comes into contact with a prenatal or cord blood sample, such as during prenatal diagnostic procedures such as chorionic villus sampling, amniocentesis, or extraction of fetal blood from the umbilical cord (cord blood). If significant MCC is present in a fetal or cord blood specimen, the maternal DNA may interfere with the interpretation of diagnostic genetic testing performed on the fetal/cord blood specimen. Therefore, the results of prenatal testing may be compromised.

MCC testing is ideally performed by obtaining both fetal and maternal specimens for genotyping using short tandem repeat markers (STRs). The STR patterns from the maternal and fetal specimens are compared to assess for the presence of maternal cells.

Reference Interval:

HOTLINE NOTE: Refer to the Hotline Test Mix for interface build information.

TEST CHANGE

Herpes Simplex Type 1 and Type 2 Glycoprotein G-Specific Antibodies, IgG by CIA

0051152, HERP PAN 2

Specimen Requirements:	
Patient Preparation:	
Collect:	Serum separator tube or plasma separator tube (PST). Also acceptable: green (lithium heparin) or lavender (K2EDTA or K3EDTA).
Specimen Preparation:	Separate serum from cells ASAP or within 2 hours of collection. Transfer 1 mL serum to an ARUP standard transport tube. (Min: 0.5 mL) Parallel testing is preferred and convalescent specimens must be received within 30 days from receipt of the acute specimen. Mark specimens plainly as "acute" or "convalescent."
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Contaminated, heat-inactivated, grossly icteric, hemolyzed, lipemic, or severely icteric specimens.
Remarks:	
Stability:	After separation from cells: Ambient: 48 hours; Refrigerated: 14 Days; Frozen: 12 weeks (May have up to 5 freeze/thaw cycles.)
Methodology:	Semi-Quantitative Electrochemiluminescent Immunoassay (ECLIA)
Note:	For CSF, refer to Herpes Simplex Virus Type 1 Glycoprotein G-Specific Antibody, IgG by ELISA, CSF (ARUP test code 0050379) and Herpes Simplex Virus Type 2 Glycoprotein G-Specific Antibody, IgG by ELISA, CSF (ARUP test code 0050359).
CPT Codes:	86695; 86696
New York DOH Approval Status:	This test is New York DOH approved.
Interpretive Data:	

Individuals infected with HSV may not exhibit detectable IgG antibody to type-specific HSV antigens 1 and 2 in the early stages of infection. Detection of antibody presence in these cases may only be possible using a nontype-specific screening test.

~~False positive results are possible. Consider additional testing for results less than or equal to 3.0 IV for type specific assays.~~

HSV 1 Glycoprotein G Ab,	~~Interpretation~~

IgGComponent	
REFERENCE INTERVAL	INTERPRETIVE COMMENT
0.99 COI or Less	Negative: No significant level of detectable IgG antibody to HSV type 1 glycoprotein G.
1.00 COI or greaterHerpes Simplex Virus Type 1 Glycoprotein G-Specific Antibody, IgG by CIA	Positive:0.89 IV or less: Negative. No significant level of detectable IgG antibody to HSV type 1 glycoprotein G. 0.90-1.09 IV: Equivocal. Questionable presence of IgG antibody to HSV type 1 glycoprotein G. Repeat testing in 10-14 days may be helpful. 1.10 IV or greater: Positive. IgG antibody to HSV type 1 glycoprotein G detected, which may indicate a current or past HSV infection.

HSV 2 Glycoprotein G Antibody, IgG

REFERENCE INTERVAL	INTERPRETIVE COMMENT
0.99 COI or Less	Negative - No significant level of detectable IgG antibody to HSV type 2 glycoprotein G.
1.00 COI or GreaterHerpes Simplex Virus Type 2 Glycoprotein G-Specific Antibody, IgG by CIA	Positive -0.89 IV or less: Negative. No significant level of detectable IgG antibody to HSV type 2 glycoprotein G. 0.90-1.09 IV: Equivocal. Questionable presence of IgG

	~~antibody to HSV type 2 glycoprotein G. Repeat testing in 10-14 days may be helpful. 1.10 IV or greater: Positive.~~ IgG antibody to HSV type 2 glycoprotein G detected, which may indicate a current or past HSV infection.	

Reference Interval:

Test Number	Components	Reference Interval
	HSV 1 Glycoprotein G Ab, IgG	≤0.99 COI
	HSV 2 Glycoprotein G Antibody, IgG	≤0.99 COI

HOTLINE NOTE: There is a unit of measure change associated with this test. Refer to the Hotline Test Mix for interface build information.

NEW TEST

Click for Pricing

Maternal Cell Contamination, Fetal Specimen

0051596, MCC-FETAL

Specimen Requirements:	
Patient Preparation:	
Collect:	Cultured amniocytes, cultured CVS, or amniotic fluid OR cord blood in lavender (EDTA), pink (K2EDTA), or yellow (ACD solution A or B) Note: If a prenatal/cord blood specimen has already been submitted for a diagnostic test at ARUP, a second prenatal/cord blood specimen is NOT required. If a prenatal/cord blood specimen has not yet been submitted, submit only 1 prenatal/cord blood specimen for BOTH the MCC-FETAL test order AND diagnostic test order. For questions regarding collection please contact ARUP's genetic counselor at 800-242-2787 ext. 2141.
Specimen Preparation:	Cultured amniocytes or cultured CVS: Two T-25 flasks at 80 percent confluency. (Min: one T-25 flask at 80 percent confluency). When a cultured specimen is submitted to ARUP, a backup culture must be retained at the client's institution until testing is complete. If ARUP receives a cultured specimen below the minimum confluence, Cytogenetics Grow and Send (ARUP test code 0040182) will be added on by ARUP, and additional charges will apply. OR Direct amniotic fluid: 30 mL (Min: 15 mL). If clients are unable to culture specimens, Cytogenetics Grow and Send should be added to the initial order. OR Cord blood specimen: 2 mL (Min: 1 mL).
Transport Temperature:	Preferred transport temp: room temperature. Cultures are CRITICAL ROOM TEMPERATURE and must be received within 48 hours of collection due to viability of cells.
Unacceptable Conditions:	Serum or plasma. Frozen, clotted, or severely hemolyzed samples. Buccal swab or brush.
Remarks:	Refer to Maternal Cell Contamination, Maternal Sample (MCC MAT, ARUP test code 0050608) for maternal specimen requirements.
Stability:	Cultured amniocytes or cultured CVS: Room temperature: 2 days; Refrigerated: Unacceptable; Frozen: Unacceptable Amniotic fluid (direct): Room temperature: 2 days; Refrigerated: 3 days; Frozen: 1 month

	Cord blood: Room temperature: 1 week; Refrigerated: 1 month; Frozen: Unacceptable
Methodology:	Polymerase Chain Reaction (PCR) / Fragment Analysis
Note:	
CPT Codes:	81265
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

A potential risk associated with testing on prenatal or cord blood samples is maternal cell contamination (MCC). MCC can occur if maternal blood or tissue comes into contact with a prenatal or cord blood sample, such as during prenatal diagnostic procedures such as chorionic villus sampling, amniocentesis, or extraction of fetal blood from the umbilical cord (cord blood). If significant MCC is present in a fetal or cord blood specimen, the maternal DNA may interfere with the interpretation of diagnostic genetic testing performed on the fetal/cord blood specimen. Therefore, the results of prenatal testing may be compromised.

MCC testing is ideally performed by obtaining both fetal and maternal specimens for genotyping using short tandem repeat markers (STRs). The STR patterns from the maternal and fetal specimens are compared to assess for the presence of maternal cells.

Reference Interval:

HOTLINE NOTE: Refer to the Hotline Test Mix for interface build information.

ARUP LABORATORIES | *A nonprofit enterprise of the University of Utah and its Department of Pathology*

Effective Date: April 20, 2026

TEST CHANGE

Measles (Rubeola) Antibody, IgG, CSF

0054440, MEASLGCSF

Specimen Requirements:	
Patient Preparation:	
Collect:	CSF.
Specimen Preparation:	Transfer 0.5 mL CSF to an ARUP standard transport tube.~~Standard Transport Tube.~~ (Min: 0.3 mL) New York State Clients: 1 mL (Min: 0.075 mL)
Transport Temperature:	Refrigerated. Also acceptable: Frozen. New York State Clients: Refrigerated
Unacceptable Conditions:	Contaminated, heat-inactivated, hemolyzed, or xanthochromic specimens.
Remarks:	
Stability:	Ambient: 8 hours; Refrigerated: 2 weeks; Frozen: 1 year. New York State Clients: Ambient: 1 week; Refrigerated: 2 weeks; Frozen: 1 month
Methodology:	Semi-Quantitative Chemiluminescent Immunoassay (CLIA)
Note:	
CPT Codes:	86765
New York DOH Approval Status:	Specimens from New York clients will be sent out to a New York DOH approved laboratory, if possible.

Interpretive Data:

The detection of antibodies to rubeola in CSF may indicate central nervous system infection. However, consideration must be given to possible contamination by blood or transfer of serum antibodies across the blood-brain barrier.

~~This test was developed and its performance characteristics determined by ARUP Laboratories. It has not been cleared or approved by the US Food and Drug Administration. This test was performed in a CLIA certified laboratory and is intended for clinical purposes.~~

13.4 AU/mL or less	Negative - No significant level of IgG antibody to measles (rubeola) virus detected.
13.5-16.4 AU/mL	Equivocal - Repeat testing in 10-14 days may be helpful.
16.5 AU/mL or greater	Positive - IgG antibody to measles (rubeola) detected, which

Inserted Cells

	may indicate a current or past measles (rubeola) infection.

Reference Interval:

Test Number	Components	Reference Interval
	Measles, Rubeola, Antibody IgG CSF	Less than or equal to 13.4 AU/mL

~~Effective September 3, 2019~~

~~13.4 AU/mL or less~~	~~Negative - No significant level of IgG antibody to measles (rubeola) virus detected.~~
~~13.5-16.4 AU/mL~~	~~Equivocal - Repeat testing in 10-14 days may be helpful.~~
~~16.5 AU/mL or greater~~	~~Positive - IgG antibody to measles (rubeola) detected, which may indicate a current or past measles (rubeola) infection.~~

ARUP LABORATORIES | A nonprofit enterprise of the University of Utah and its Department of Pathology

Effective Date: April 20, 2026

TEST CHANGE

Mumps Virus Antibody IgG, CSF

0054442, MUMPSCSF

Specimen Requirements:	
Patient Preparation:	
Collect:	CSF.
Specimen Preparation:	Transfer 0.5 mL CSF to an ARUP standard transport tube.~~Standard Transport Tube.~~ (Min: 0.3 mL) New York State Clients: 1 mL (Min: 0.1 mL)
Transport Temperature:	Refrigerated. Also acceptable: Frozen. New York State Clients: Refrigerated
Unacceptable Conditions:	Contaminated, heat-inactivated, hemolyzed, or xanthochromic specimens.
Remarks:	
Stability:	Ambient: 8 hours; Refrigerated: 2 weeks; Frozen: 1 year New York State Clients: Ambient: 1 week; Refrigerated: 2 weeks; Frozen: 1 month
Methodology:	Semi-Quantitative Chemiluminescent Immunoassay (CLIA)
Note:	
CPT Codes:	86735
New York DOH Approval Status:	Specimens from New York clients will be sent out to a New York DOH approved laboratory, if possible.

Interpretive Data:

The detection of antibodies to mumps virus in CSF may indicate central nervous system infection. However, consideration must be given to possible contamination by blood or transfer of serum antibodies across the blood-brain barrier.

~~This test was developed and its performance characteristics determined by ARUP Laboratories. It has not been cleared or approved by the US Food and Drug Administration. This test was performed in a CLIA certified laboratory and is intended for clinical purposes.~~

8.9 AU/mL or less	Negative - No significant level of detectable IgG mumps virus antibody.
9.0-10.9 AU/mL	Equivocal - Repeat testing in 10-14 days may be helpful.
11.0 AU/mL or greater	Positive - IgG antibody to mumps virus detected, which may indicate a current or past

Inserted Cells

	mumps virus infection.

Reference Interval:

Test Number	Components	Reference Interval
	Mumps Virus Antibody IgG CSF	Less than or equal to 8.9 AU/mL

~~Effective August 20, 2012~~

~~8.9 AU/mL or less~~	~~Negative - No significant level of detectable IgG mumps virus antibody.~~
~~9.0-10.9 AU/mL~~	~~Equivocal - Repeat testing in 10-14 days may be helpful.~~
~~11.0 AU/mL or greater~~	~~Positive - IgG antibody to mumps virus detected, which may indicate a current or past mumps virus infection.~~

TEST CHANGE

Lactoferrin, Fecal by ELISA

0061164, FECLACTO

Specimen Requirements:	
Patient Preparation:	
Collect:	Stool.
Specimen Preparation:	Transfer 5 g stool to an unpreserved stool transport vial (ARUP supply #40910). Available online through eSupply using ARUP Connect(TM) or contact Client Services at 800-522-2787. (Min: 1 g)~~(800) 522-2787. (Min: 1 g) Also acceptable: Place 5 g stool in enteric transport media (Gary-Blair) (ARUP Supply #29799). Available online through eSupply using ARUP Connect(TM) or contact ARUP Client Services at (800) 522-2787.~~
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Specimens in any transport media ~~than indicated above~~.
Remarks:	
Stability:	~~Unpreserved:~~ Ambient: 2 weeks; Refrigerated: 2 weeks; Frozen: 2 weeks ~~Preserved: Ambient: 1 week; Refrigerated: 2 weeks; Frozen: 2 weeks~~
Methodology:	Qualitative Enzyme-Linked Immunosorbent Assay (ELISA)
Note:	
CPT Codes:	83630
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

A positive result is indicative of the presence of lactoferrin, a marker for fecal leukocytes. A negative result does not exclude the presence of intestinal inflammation.

Reference Interval:

~~Negative~~

Test Number	Components	Reference Interval
	Lactoferrin, Fecal by ELISA	Negative

TEST CHANGE

Aldosterone, Serum

0070015, ALDOST

Specimen Requirements:	
Patient Preparation:	Blood should be obtained in seated position in the morning without venous stasis (release tourniquet~~Collect midmorning~~ after venipuncture and wait ~~patient has been sitting, standing or walking for~~ at least ~~2 hours and seated for~~ 5 seconds before withdrawing blood). ~~15 minutes.~~ Refer to the Additional Technical Information for specific patient preparation recommendations.
Collect:	Serum separator tube~~Separator Tube~~ (SST) or plain red~~Plain Red~~.
Specimen Preparation:	Separate from cells ASAP or within 2 hours of collection. Transfer 1 mL serum to an ARUP standard transport tube.~~Standard Transport Tube.~~ (Min: 0.5 mL)
Transport Temperature:	Frozen.
Unacceptable Conditions:	EDTA plasma.
Remarks:	
Stability:	After separation from cells: Ambient: 8 hours; Refrigerated: 5 days; Frozen: 1 month
Methodology:	Quantitative Chemiluminescent Immunoassay (CLIA)
Note:	Refer to the Additional Technical Information for Endocrine Society recommendations for patient preparation, specimen collection, medications for hypertension control during confirmatory testing for primary aldosteronism, and factors that may lead to false-positive or false-negative aldosterone-renin ratio (ARR) results.
CPT Codes:	82088
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

Normal serum levels of aldosterone are dependent on the sodium intake and whether the patient is upright or supine. High sodium intake will tend to suppress serum aldosterone, whereas low sodium intake will elevate serum aldosterone. The reference intervals for serum aldosterone are based on normal sodium intake.

Age	Posture Unspecified	Supine	Upright
0-6 days	5.0-102.0 ng/dL		
1-3 weeks	6.0-179.0 ng/dL		
1-11 months	7.0-99.0 ng/dL		
1-2 years	7.0-93.0 ng/dL		
3-10 years	4.0-44.0 ng/dL		
11-14 years	4.0-31.0 ng/dL		
15 years and older	Less than or equal to 31.0 ng/dL	Less than or equal to 16.0 ng/dL	4.0-31.0 ng/dL

Reference Interval:

~~Effective May 16, 2011~~

Test Number	Components	Reference Interval
	Aldosterone	

Age	Posture Unspecified (ng/dL)	Supine (ng/dL)	Upright (ng/dL)
0-6 days	5.0-102.0		
1-3 weeks	6.0-179.0		
1-11 months	7.0-99.0		
1-2 years	7.0-93.0		
3-10 years	4.0-44.0		
11-14 years	4.0-31.0		
15 years and older	31.0 or less	16.0 or less	4.0-31.0

TEST CHANGE

Aldosterone 30 Minute

0070016, ALDO 30

Specimen Requirements:	
Patient Preparation:	Blood should be obtained in seated position in the morning without venous stasis (release tourniquet~~Collect midmorning~~ after venipuncture and wait ~~patient has been sitting, standing or walking for~~ at least ~~2 hours and seated for~~ 5 seconds before withdrawing blood). ~~15 minutes.~~ Refer to the Additional Technical Information for specific patient preparation recommendations.
Collect:	Serum separator tube~~Separator Tube~~ (SST) or plain red~~Plain Red~~.
Specimen Preparation:	Separate from cells ASAP or within 2 hours of collection. Transfer 1 mL serum to an ARUP standard transport tube.~~Standard Transport Tube.~~ (Min: 0.5 mL)
Transport Temperature:	Frozen.
Unacceptable Conditions:	EDTA plasma.
Remarks:	
Stability:	After separation from cells: Ambient: 8 hours; Refrigerated: 5 days; Frozen: 1 month
Methodology:	Quantitative Chemiluminescent Immunoassay (CLIA)
Note:	Refer to the Additional Technical Information for Endocrine Society recommendations for patient preparation, specimen collection, medications for hypertension control during confirmatory testing for primary aldosteronism, and factors that may lead to false-positive or false-negative aldosterone-renin ratio (ARR) results.
CPT Codes:	82088
New York DOH Approval Status:	This test is New York DOH approved.
Interpretive Data:	

Reference Interval:

~~Greater than 7.0 ng/dL~~

Test Number	Components	Reference Interval
	Aldosterone 30m	Greater than 7.0 ng/dL

TEST CHANGE

Aldosterone 60 Minute

0070017, ALDO 60

Specimen Requirements:	
Patient Preparation:	Blood should be obtained in seated position in the morning without venous stasis (release tourniquet~~Collect midmorning~~ after venipuncture and wait ~~patient has been sitting, standing or walking for~~ at least ~~2 hours and seated for~~ 5 seconds before withdrawing blood). ~~15 minutes.~~ Refer to the Additional Technical Information for specific patient preparation recommendations.
Collect:	Serum separator tube~~Separator Tube~~ (SST) or plain red~~Plain Red~~
Specimen Preparation:	Separate from cells ASAP or within 2 hours of collection. Transfer 1 mL serum to an ARUP standard transport tube.~~Standard Transport Tube.~~ (Min: 0.5 mL)
Transport Temperature:	Frozen.
Unacceptable Conditions:	EDTA plasma.
Remarks:	
Stability:	After separation from cells: Ambient: 8 hours; Refrigerated: 5 days; Frozen: 1 month
Methodology:	Quantitative Chemiluminescent Immunoassay (CLIA)
Note:	Refer to the Additional Technical Information for Endocrine Society recommendations for patient preparation, specimen collection, medications for hypertension control during confirmatory testing for primary aldosteronism, and factors that may lead to false-positive or false-negative aldosterone-renin ratio (ARR) results.
CPT Codes:	82088
New York DOH Approval Status:	This test is New York DOH approved.
Interpretive Data:	

Reference Interval:

~~Greater than 7.0 ng/dL~~

Test Number	Components	Reference Interval
	Aldosterone 60m	Greater than 7.0 ng/dL

ARUP LABORATORIES | A nonprofit enterprise of the University of Utah and its Department of Pathology

Effective Date: April 20, 2026

TEST CHANGE

Aldosterone/Renin Activity Ratio

0070073, A/RA

Specimen Requirements:	
Patient Preparation:	Blood should be obtained in seated position in the morning without venous stasis (release tourniquet after venipuncture and wait at least 5 seconds before withdrawing blood). If the patient is supine, ensure that the patient is in this position for at least 30 minutes prior to collection. ~~Collect midmorning after patient has been sitting, standing, or walking for at least 2 hours, and seated for 5-15 minutes. Refer to the Additional Technical Information for specific patient preparation recommendations.~~
Collect:	Serum separator tube ~~Separator Tube~~ (SST) AND lLavender (K2EDTA) or pPink (K2EDTA). Do not collect in refrigerated tubes nor store tubes on ice. ~~.~~
Specimen Preparation:	Separate from cells ASAP or within 2 hours of collection. Serum: Transfer 1 mL serum to an ARUP standard transport tube. ~~Standard Transport Tube.~~ (Min: 0.5 mL) AND Plasma: Transfer 2 mL EDTA plasma to an ARUP standard transport tube ~~Standard Transport Tube~~ and freeze immediately. (Min: 1.2 mL) Storage at refrigerated temperatures may cause falsely elevated results. Do not collect in refrigerated tubes. Process blood at room temperature and centrifuge tubes in a nonrefrigerated centrifuge.
Transport Temperature:	Both specimens should be collected and submitted together for testing. Serum: Frozen. Plasma: CRITICAL FROZEN. Separate specimens must be submitted when additional tests are ordered.
Unacceptable Conditions:	Plasma collected in citrate, heparin, or oxalate. Hemolyzed specimens.
Remarks:	
Stability:	Serum: Ambient: 8 hours; Refrigerated: 5 days; Frozen: 1 month Plasma: Ambient: 6 hours; Refrigerated: Unacceptable; Frozen: 1 month
Methodology:	Quantitative Chemiluminescent Immunoassay (CLIA) / Quantitative Enzyme-Linked Immunosorbent Assay (ELISA)
Note:	Refer to the Additional Technical Information for Endocrine Society recommendations for patient preparation, specimen collection, medications for hypertension control during confirmatory testing for primary aldosteronism, and factors that may lead to false-positive or false-negative ARR results.
CPT Codes:	82088; 84244
New York DOH Approval Status:	This test is New York DOH approved.
Interpretive Data:	
~~This test was developed and its performance characteristics determined by ARUP Laboratories. It has not been cleared or approved by the US Food and Drug Administration. This test was performed in a CLIA certified laboratory and is intended for clinical purposes.~~	
Reference Interval:	

Deleted Cells

Deleted Cells

Test Number	Components	Reference Interval
	Aldosterone	

Age	Posture Unspecified (ng/dL)	Supine (ng/dL)	Upright (ng/dL)
0-6 days	5.0-102.0		
1-3 weeks	6.0-179.0		
1-11 months	7.0-99.0		
1-2 years	7.0-93.0		
3-10 years	4.0-44.0		
11-14 years	4.0-31.0		
15 years and older	31.0 or less	16.0 or less	4.0-31.0

	Aldosterone/Renin Activity Calculation	Less than or equal to 20
	Renin Activity	

Age	Supine (ng/mL/hr) Normal sodium diet	Upright (ng/mL/hr) Normal sodium diet
Cord blood	4.0-32.0	Not Available
Newborn (1-7 days)	2.0-35.0	Not Available
1-12 months	2.4-37.0	Not Available
13 months-3 years	1.7-11.2	Not Available
4-5 years	1.0-6.5	Less than or equal to 15
6-10 years	0.5-5.9	Less than or equal to 17
11-15 years	0.5-3.3	Less than or equal to 16
Adult	0.2-1.6	0.5-4.0

TEST CHANGE

Renin Activity

0070105, RENIN

Specimen Requirements:	
Patient Preparation:	Blood should be obtained in seated position in the morning without venous stasis (release tourniquet after venipuncture and wait at least 5 seconds before withdrawing blood). If the patient is supine, ensure that the patient is in this position for at least 30 minutes prior to collection. ~~Collect midmorning after patient has been sitting, standing, or walking for at least 2 hours and seated for 5-15 minutes. Refer to the Additional Technical Information for specific patient preparation recommendations.~~
Collect:	Lavender (EDTA) or pink (K2EDTA). Do not collect in refrigerated tubes nor store tubes on ice.
Specimen Preparation:	Separate from cells ASAP or within 2 hours of collection. Transfer 2 mL plasma to an ARUP standard transport tube and freeze immediately. (Min: 1.2 mL) Storage at refrigerated temperatures may cause falsely elevated results. Do not collect in refrigerated tubes. Process blood at room temperature and centrifuge tubes in a nonrefrigerated centrifuge.
Transport Temperature:	CRITICAL FROZEN. Separate specimens must be submitted when multiple tests are ordered.
Unacceptable Conditions:	Serum. Specimens collected in citrate, heparin, or oxalate. Hemolyzed specimens.
Remarks:	
Stability:	After separation from cells: Ambient: Unacceptable; Refrigerated: Unacceptable; Frozen: 1 month
Methodology:	Quantitative Enzyme-Linked Immunosorbent Assay (ELISA)
Note:	Refer to the Additional Technical Information for Endocrine Society recommendations for patient preparation, specimen collection, medications for hypertension control during confirmatory testing for primary aldosteronism, and factors that may lead to false-positive or false-negative aldosterone-renin ratio (ARR) results.
CPT Codes:	84244
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

Plasma renin activity measures enzyme ability to convert angiotensinogen to angiotensin I and is limited by the availability of angiotensinogen. Plasma renin activity is not an accurate indicator of enzyme activity when angiotensinogen is decreased.

Reference Interval:

<table>
<tr><th>Test Number</th><th>Components</th><th>Reference Interval</th></tr>
<tr><td></td><td>Renin Activity</td><td></td></tr>
<tr><td></td><td></td><td>
<table>
<tr><th>Age</th><th>Supine (ng/mL/hr) Normal sodium diet</th><th>Upright (ng/mL/hr) Normal sodium diet</th></tr>
<tr><td>Cord blood</td><td>4.0-32.0</td><td>Not Available</td></tr>
<tr><td>Newborn (1-7 days)</td><td>2.0-35.0</td><td>Not Available</td></tr>
<tr><td>1-12 months</td><td>2.4-37.0</td><td>Not Available</td></tr>
<tr><td>13 months-3 years</td><td>1.7-11.2</td><td>Not Available</td></tr>
<tr><td>4-5 years</td><td>1.0-6.5</td><td>Less than or equal to 15</td></tr>
<tr><td>6-10 years</td><td>0.5-5.9</td><td>Less than or equal to 17</td></tr>
<tr><td>11-15 years</td><td>0.5-3.3</td><td>Less than or equal to 16</td></tr>
<tr><td>Adult</td><td>0.2-1.6</td><td>0.5-4.0</td></tr>
</table>
</td></tr>
</table>

TEST CHANGE

Beta-2 -Microglobulin, Urine

0080432, B2M U

Specimen Requirements:	
Patient Preparation:	Void the urinary bladder, then drink a large glass of water (around 500 mL or 17 oz) and collect a urine specimen within 1 hour.
Collect:	Random urine.
Specimen Preparation:	Transfer one 3 mL aliquot from a well-mixed random collection to an ARUP standard transport tube~~Standard Transport Tube~~. (Min: 1 mL) If pH is greater than 8, lower pH to 6-8 by adding 1M HCL. If pH less than 6, increase pH to 6-8 by adding 5% NaOH. Titrate with appropriate preservative until pH of 6-8 has been reached. Record the pH on the transport tube and test request form.
Transport Temperature:	Frozen
Unacceptable Conditions:	Grossly hemolyzed specimens. Urine pH less than 2 or greater than 10.
Remarks:	
Stability:	Ambient: 8 hours; Refrigerated: 48 hours; Frozen: 2 months
Methodology:	Quantitative Chemiluminescent Immunoassay (CLIA)
Note:	
CPT Codes:	82232
New York DOH Approval Status:	This test is New York DOH approved.
Interpretive Data:	

Reference Interval:

Test Number	Components	Reference Interval
	Beta-2-Microglobulin, ratio to CRT	0-300 microg/g CRT
	Beta-2-Microglobulin, Urine	0-300 microg/L

TEST CHANGE

Thiopurine Methyltransferase, RBC

0092066, TPMT RBC

Specimen Requirements:	
Patient Preparation:	
Collect:	Lavender (EDTA), pink (K2EDTA), or green (sodium or lithium heparin).
Specimen Preparation:	Transport 5 mL whole blood in the original collection tube. (Min: 3 mL)
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Gel separator tubes. Specimens collected in sodium fluoride/potassium oxalate (gray). Hemolyzed, frozen, or room temperature specimens.
Remarks:	
Stability:	Ambient: 3 hours; Refrigerated: 6 days; Frozen: Unacceptable
Methodology:	Enzymatic Assay / Quantitative Liquid Chromatography-Tandem Mass Spectrometry
Note:	This assay measures only enzyme activity.
CPT Codes:	84433
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

The TPMT, RBC assay is used as a screen to detect individuals with low and intermediate TPMT activity who may be at risk for myelosuppression when exposed to standard doses of thiopurines, including azathioprine (Imuran) and 6-mercaptopurine (Purinethol). TPMT is the primary metabolic route for inactivation of thiopurine drugs in the bone marrow. When TPMT activity is low, it is predicted that proportionately more 6-mercaptopurine can be converted into the cytotoxic 6-thioguanine nucleotides that accumulate in the bone marrow causing excessive toxicity. The activity of TPMT is measured by the nanomoles of 6-methylmercaptopurine (inactive metabolite) produced per 1 mL of packed red blood cells, (U/mL).

TPMT phenotype testing does not replace the need for clinical monitoring of patients treated with thiopurine drugs. Genotype for TPMT cannot be inferred from TPMT activity (phenotype). Phenotype testing should not be requested for patients currently treated with thiopurine drugs. Current TPMT phenotype may not reflect future TPMT phenotype, particularly in patients who received blood transfusion within 30-60 days of testing. TPMT enzyme activity can be inhibited by several drugs such as: naproxen (Aleve), ibuprofen (Advil, Motrin), ketoprofen (Orudis), furosemide (Lasix), sulfasalazine (Azulfidine), mesalamine (Asacol), olsalazine (Dipentum), mefenamic acid (Ponstel), thiazide diuretics, and benzoic acid inhibitors. TPMT inhibitors may contribute to falsely low results; patients should abstain from these drugs for at least 48 hours prior to TPMT testing. Falsely low results may also occur as a result of inappropriate specimen handling and hemolysis.

~~This test was developed and its performance characteristics determined by ARUP Laboratories.~~

~~It has not been cleared or approved by the US Food and Drug Administration. This test was performed in a CLIA certified laboratory and is intended for clinical purposes.~~

Reference Interval:

~~Normal TPMT activity: 24.0-44.0 U/mL - Individuals are predicted to be at low risk of bone marrow toxicity (myelosuppression) as a consequence of standard thiopurine therapy; no dose adjustment is recommended.~~

~~Intermediate TPMT activity: 17.0-23.9 U/mL - Individuals are predicted to be at intermediate risk of bone marrow toxicity (myelosuppression), as a consequence of standard thiopurine therapy; a dose reduction and therapeutic drug management is recommended.~~

~~Low TPMT activity: < 17.0 U/mL - Individuals are predicted to be at high risk of bone marrow toxicity (myelosuppression) as a consequence of standard thiopurine dosing. It is recommended to avoid the use of thiopurine drugs.~~

~~High TPMT activity: > 44.0 U/mL - Individuals are not predicted to be at risk for bone marrow toxicity (myelosuppression) as a consequence of standard thiopurine dosing, but may be at risk for therapeutic failure due to excessive inactivation of thiopurine drugs. Individuals may require higher than the normal standard dose. Therapeutic drug management is recommended.~~

Test Number	Components	Reference Interval
	Thiopurine Methyltransferase	Normal TPMT activity: 24.0-44.0 U/mL - Individuals are predicted to be at low risk of bone marrow toxicity (myelosuppression) as a consequence of standard thiopurine therapy; no dose adjustment is recommended. Intermediate TPMT activity: 17.0-23.9 U/mL - Individuals are predicted to be at intermediate risk of bone marrow toxicity (myelosuppression), as a consequence of standard thiopurine therapy; a dose reduction and therapeutic drug management is recommended. Low TPMT activity: < 17.0 U/mL - Individuals are predicted to be at high risk of bone marrow toxicity (myelosuppression) as a consequence of standard thiopurine dosing. It is recommended to avoid the use of thiopurine drugs. High TPMT activity: > 44.0 U/mL - Individuals are not predicted to be at risk for bone marrow toxicity (myelosuppression) as a consequence of standard thiopurine dosing, but may be at risk for therapeutic failure due to excessive inactivation of thiopurine drugs. Individuals may require higher than the normal standard dose. Therapeutic drug management is recommended.

TEST CHANGE

Fentanyl and Metabolite, Urine, Quantitative

0092570, CDCO FENU

Specimen Requirements:	
Patient Preparation:	
Collect:	Random urine.
Specimen Preparation:	Transfer 4 mL urine with no additives or preservatives to an ARUP standard transport tube. (Min: 0.5 mL)
Transport Temperature:	Room temperature.
Unacceptable Conditions:	Specimens exposed to repeated freeze/thaw cycles.
Remarks:	
Stability:	Ambient: 1 month; Refrigerated: 1 month; Frozen: 9 months
Methodology:	Quantitative Liquid Chromatography-Tandem Mass Spectrometry
Note:	Compare to Fentanyl, Quantitative, with medMATCH, Urine.
CPT Codes:	80354 (Alt code: G0480)
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

Cutoff concentration:

Fentanyl: 1.0 ng/mL

Norfentanyl: 2.0 ng/mL

For medical purposes only; not valid for forensic use.

The absence of expected drug(s) and/or drug metabolite(s) may indicate noncompliance, inappropriate timing of specimen collection relative to drug administration, poor drug absorption, diluted/adulterated urine, or limitations of testing. The concentration value must be greater than or equal to the cutoff to be reported as positive. Interpretive questions should be directed to the laboratory.

Reference Interval:

TEST CHANGE

Renin, Direct

2001575, RENIND

Specimen Requirements:	
Patient Preparation:	Blood should be obtained in seated position in the morning without venous stasis (release tourniquet after venipuncture and wait at least 5 seconds before withdrawing blood).~~Collect midmorning (i.e., 7am - 10am) after patient has been sitting, standing, or walking for at least 30 minutes and seated for 5-15 minutes.~~ If the patient is supine, ensure that the patient is in this position for at least 30 minutes prior to collection.~~ Fasting specimens are recommended but not required.~~
Collect:	Lavender (EDTA). ~~) from a supine or upright patient..~~ Do not collect in refrigerated tubes nor store tubes on ice.~~ Process blood at room temperature and centrifuge tubes in a non-refrigerated centrifuge.~~
Specimen Preparation:	Separate from cells ASAP or within 2 hours of collection. Transfer 2 mL plasma to an ARUP standard transport tube~~Standard Transport Tube~~ and freeze immediately. (Min: 1 mL) Storage at refrigerated temperatures may cause falsely elevated results. Do not collect in refrigerated tubes. Process blood at room temperature and centrifuge tubes in a nonrefrigerated centrifuge.
Transport Temperature:	CRITICAL FROZEN. Separate specimens must be submitted when multiple tests are ordered.~~Frozen~~
Unacceptable Conditions:	Serum. Specimens collected in citrate, heparin, or oxalate. Grossly hemolyzed or refrigerated specimens.
Remarks:	
Stability:	Ambient: 8 hours; Refrigerated: Unacceptable; Frozen: 4 weeks
Methodology:	Quantitative Chemiluminescent Immunoassay (CLIA)
Note:	Do not use this test for patients treated with c~~C~~athepsin B. Menstruating females and those taking estrogen-containing medications may have lower renin direct concentrations, resulting in falsely high aldosterone-renin ratio (ARR). In these cases, order Aldosterone/Renin Activity Ratio (ARUP t~~T~~est code 0070073). Refer to the Additional Technical Information for Endocrine Society recommendations for patient preparation, specimen collection, medications for hypertension control during confirmatory testing for primary aldosteronism, and factors that may lead to false-positive or false-negative ARR results.
CPT Codes:	84244
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

Reference Interval:

~~Upright<=40 yr: 4.2-52.2 pg/mL~~
~~Upright >40 yr: 3.6-81.6 pg/mL~~
~~Supine<=40 yr: 3.2-33.2 pg/mL~~
~~Supine >40 yr: 2.5-45.1 pg/mL~~

Test Number	Components	Reference Interval
	Direct Renin	

Age	Upright (pg/mL)	Supine (pg/mL)
Less than or equal to 40 years	4.2-52.2	3.2-33.2
Greater than 40 years	3.6-81.6	2.5-45.1

TEST CHANGE

Osmotic Fragility, Erythrocyte

2002257, OSM FRG

Specimen Requirements:	
Patient Preparation:	
Collect:	Green (sodium or lithium heparin) or lavender (EDTA).
Specimen Preparation:	Transport 5mL whole blood in original tube. ~~-~~ (Min: 1mL) Specimens should be refrigerated within 30 minutes after collection. Also acceptable: whole blood in an ARUP standard transport tube.
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Grossly hemolyzed specimens.
Remarks:	
Stability:	Ambient: Unacceptable; Refrigerated: 72 hours; Frozen: Unacceptable
Methodology:	Spectrophotometry
Note:	
CPT Codes:	85555
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

For patients with acute hemolysis, a normal red cell osmotic fragility test result cannot exclude an osmotic fragility abnormality since the osmotically labile cells may be hemolyzed and not present. Recommend testing during a state of prolonged homeostasis with stable hematocrit.

Reference Interval:

Refer to report~~Within normal curve limits.~~

Test Number	Components	Reference Interval
	Osmotic Fragility	Within normal curve limits.

TEST CHANGE

N-methyl-D-Aspartate Receptor (NMDAR) Antibody, IgG by CBA-IFA, CSF With Reflex to Titer

2005164, NMDA G CSF

Specimen Requirements:	
Patient Preparation:	
Collect:	CSF.
Specimen Preparation:	Transfer 1~~0.5~~ mL CSF to an ARUP standard transport tube. (Min: 0.3~~15~~ mL)
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Contaminated, hemolyzed, or severely lipemic specimens.
Remarks:	
Stability:	Ambient: 48 hours; Refrigerated: 2 weeks; Frozen: 1 year (avoid repeated freeze/thaw cycles)
Methodology:	Semi-Quantitative Cell-Based Indirect Fluorescent Antibody
Note:	If NMDA CSF antibody IgG is positive, then an NMDA CSF antibody IgG titer is reported. Additional charges apply.
CPT Codes:	86255; if reflexed, add 86256
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

NMDA receptor antibody is found in a subset of patients with autoimmune limbic encephalitis and may occur with or without associated tumor. Decreasing antibody levels may be associated with therapeutic response. In addition, positive results have been reported in patients with nonautoimmune phenotypes. A negative test result does not rule out a diagnosis of autoimmune limbic encephalitis. Results should be interpreted in correlation with the patients clinical history and other laboratory findings.

This indirect fluorescent antibody assay utilizes full-length GluN1 transfected cell lines for the detection and semiquantification of NMDA receptor IgG antibody.

Reference Interval:

~~Less than 1:1~~

Test Number	Components	Reference Interval
	NMDA Receptor Ab IgG CBA-IFA, CSF	Less than 1:1

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Effective Date: April 20, 2026

TEST CHANGE

Hemoglobin Evaluation Reflexive Cascade

2005792, HB CASCADE

Specimen Requirements:	
Patient Preparation:	
Collect:	Lavender (K2EDTA~~K 2 EDTA~~) or pink (K2EDTA~~K 2 EDTA~~).
Specimen Preparation:	Transport 5mL whole blood in original tube.~~.~~ (Min: 3 mL) Also acceptable: whole blood in an ARUP standard transport tube.
Transport Temperature:	Refrigerated. Separate specimens must be submitted when multiple tests are ordered.
Unacceptable Conditions:	
Remarks:	Patient history form, including information from a recent CBC, is required for interpretation.
Stability:	Ambient: Unacceptable; Refrigerated: 1 week; Frozen: Unacceptable
Methodology:	High Performance Liquid Chromatography (HPLC) / Capillary Electrophoresis / RBC Solubility / Polymerase Chain Reaction (PCR) / Fluorescence Resonance Energy Transfer (FRET) / Sequencing / Massively Parallel Sequencing
Note:	The Hemoglobin Evaluation Reflexive Cascade begins with HPLC analysis. If an abnormal hemoglobin is detected or if the CBC data is suggestive of a hemoglobinopathy, appropriate testing will be performed at an additional charge. Depending on findings, one or more reflexive tests may be required in order to provide a clinical interpretation. Tests added may include electrophoresis, solubility testing, mutational analysis and/or sequencing. Quantitation of hemoglobin by HPLC or electrophoresis is most definitive in individuals one year of age and older. If quantitation of hemoglobin was performed before one year of age, repeat testing is recommended. Abnormal hemoglobin variants may require additional testing, which increases TAT up to 21 days.
CPT Codes:	83021. If reflexed additional CPT codes may apply; refer to the reflexed test code for applicable codes.
New York DOH Approval Status:	Specimens from New York clients will be sent out to a New York DOH approved laboratory, if possible.
Interpretive Data:	
~~This test was developed and its performance characteristics determined by ARUP Laboratories. It has not been cleared or approved by the US Food and Drug Administration. This test was performed in a CLIA certified laboratory and is intended for clinical purposes.~~	

Deleted Cells

Deleted Cells

Reference Interval:

~~Effective August 19, 2013~~

<table>
<tr><th>Test Number</th><th>Components</th><th>Reference Interval</th></tr>
<tr><td></td><td>Hemoglobin - Other</td><td>0.0%</td></tr>
<tr><td></td><td>Hemoglobin A</td><td></td></tr>
<tr><td></td><td></td><td><table>
<tr><th>Age</th><th>Reference Intervals (%)</th></tr>
<tr><td>0 - 1 month</td><td>7.6 - 54.8</td></tr>
<tr><td>2 months</td><td>14.7 - 70.1</td></tr>
<tr><td>3 months</td><td>26.6 - 81.8</td></tr>
<tr><td>4 months</td><td>43.0 - 89.5</td></tr>
<tr><td>5 months</td><td>60.8 - 94.0</td></tr>
<tr><td>6 - 8 months</td><td>78.2 - 96.6</td></tr>
<tr><td>9 - 12 months</td><td>86.1 - 97.2</td></tr>
<tr><td>13 - 23 months</td><td>85.1 - 97.7</td></tr>
<tr><td>2 years and older</td><td>95.0 - 97.9</td></tr>
</table></td></tr>
<tr><td></td><td>Hemoglobin A2</td><td></td></tr>
<tr><td></td><td></td><td><table>
<tr><th>Age</th><th>Reference Intervals (%)</th></tr>
<tr><td>0 - 1 month</td><td>0.0 - 1.4</td></tr>
<tr><td>2 months</td><td>0.0 - 2.0</td></tr>
<tr><td>3 months</td><td>0.1 - 2.6</td></tr>
<tr><td>4 months</td><td>0.8 - 3.0</td></tr>
<tr><td>5 months</td><td>1.5 - 3.3</td></tr>
<tr><td>6 - 8 months</td><td>1.8 - 3.5</td></tr>
<tr><td>9 - 12 months</td><td>1.9 - 3.5</td></tr>
<tr><td>13 - 23 months</td><td>1.9 - 3.5</td></tr>
<tr><td>2 years and older</td><td>2.0 - 3.5</td></tr>
</table></td></tr>
<tr><td></td><td>Hemoglobin C</td><td>0.0%</td></tr>
<tr><td></td><td>Hemoglobin E</td><td>0.0%</td></tr>
<tr><td></td><td>Hemoglobin F</td><td></td></tr>
</table>

		Age	Reference Intervals (%)
		0 - 1 month	45.8 - 91.7
		2 months	32.7 - 85.2
		3 months	14.5 - 73.7
		4 months	4.2 - 56.9
		5 months	1.0 - 38.1
		6 - 8 months	0.9 - 19.4
		9 - 12 months	0.6 - 11.6
		13 - 23 months	0.0 - 8.5
		2 years and older	0.0 - 2.1
	Hemoglobin S	0.0%	

TEST CHANGE

Glomerular Basement Membrane Antibody, IgG by Multiplex Bead Assay and IFA

2008403, GBM-G PAN

Specimen Requirements:	
Patient Preparation:	
Collect:	Serum separator tube.
Specimen Preparation:	Separate serum from cells ASAP or within 2 hours of collection. Transfer 1 mL serum to an ARUP Standard Transport Tube. (Min: 0.3 mL)
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	
Remarks:	
Stability:	After separation from cells: Ambient: 48 hours; Refrigerated: 2 weeks; Frozen: 30 days~~1 year~~ (avoid repeated freeze/thaw cycles)
Methodology:	Semi-Quantitative Multiplex Bead Assay / Qualitative Indirect Fluorescent Antibody (IFA)
Note:	
CPT Codes:	83516; 86255
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

When present, IgG antibody to glomerular basement membrane (GBM) antigen detected by either indirect fluorescent antibody (IFA) or multiplex bead assay helps support a diagnosis of Goodpasture syndrome. However, the combined result of both assays performed during initial evaluation improves the diagnostic sensitivity for disease. A positive result in one or both assays should be confirmed by renal biopsy.

This test was developed and its performance characteristics determined by ARUP Laboratories. It has not been cleared or approved by the US Food and Drug Administration. This test was performed in a CLIA certified laboratory and is intended for clinical purposes.

Component	Interpretation	
Glomerular Basement Membrane Antibody, IgG by Multiplex Bead Assay	19 AU/mL or less 20-25 AU/mL 26 AU/mL or greater	Negative Equivocal Positive

Reference Interval:

Test Number	Components	Reference Interval
	GBM Ab, IgG by Multiplex Bead Assay	0-19 AU/mL
	GBM Antibody, IgG by IFA	Negative

TEST CHANGE

Paraneoplastic Antibodies (PCCA/ANNA) by IFA with Reflex to Titer and Immunoblot, CSF

2010841, PCCAANNA C

Specimen Requirements:	
Patient Preparation:	
Collect:	CSF
Specimen Preparation:	Transfer 2 mL ~~CSF~~ to ~~an~~ ARUP standard transport tube. (Min: 1~~0.75~~ mL)
Transport Temperature:	Refrigerated
Unacceptable Conditions:	Contaminated, heat-inactivated, hemolyzed, or lipemic specimens.
Remarks:	
Stability:	Ambient: 24 hours; Refrigerated: 2 weeks; Frozen: 1 year (avoid repeated freeze/thaw cycles)
Methodology:	Semi-Quantitative Indirect Fluorescent Antibody (IFA) / Qualitative Immunoblot
Note:	PCCA/ANNA antibodies are screened by IFA. If the IFA screen is indeterminate then the Immunoblot will be added. If the IFA screen is positive at 1:1, then a specific titer (PCCA or ANNA) and immunoblot will be added. Additional charges apply.
CPT Codes:	86255; if reflexed add 84182 x4 and/or 86256
New York DOH Approval Status:	This test is New York DOH approved.
Interpretive Data:	

Reference Interval:

Test Number	Components	Reference Interval
	Paraneoplastic Abs (PCCA/ANNA) IgG, CSF	None Detected

TEST CHANGE

Arsenic, Random Urine with Reflex to Fractionated

2011478, U ARS RAND

Specimen Requirements:	
Patient Preparation:	Diet, medication, and nutritional supplements may introduce interfering substances. Patients should be encouraged to discontinue nutritional supplements, vitamins, minerals, nonessential over-the-counter medications (upon the advice of their physician), and avoid shellfish and seafood for 48 to 72 hours. High concentrations of iodine may interfere with elemental testing. Collection of urine specimens from patients receiving iodinated or gadolinium-based contrast media should be avoided for a minimum of 72 hours post exposure. Collection from patients with impaired kidney function should be avoided for a minimum of 14 days post contrast media exposure.
Collect:	Random urine.
Specimen Preparation:	Transfer an 8 mL aliquot from a well-mixed collection to ARUP Trace Element-Free Transport Tubes (ARUP supply #43116), available online through eSupply using ARUP Connect(TM) or contact ARUP Client Services at 800-522-2787. (Min: 2 mL)
Transport Temperature:	Refrigerated. Also acceptable: Room temperature or frozen.
Unacceptable Conditions:	Acid-preserved urine. Specimens collected within 72 hours after administration of iodinated or gadolinium-based contrast media.
Remarks:	
Stability:	Ambient: 1 week; Refrigerated: 2 weeks; Frozen: 2 months~~1 year~~
Methodology:	Quantitative High Performance Liquid Chromatography (HPLC) / Quantitative Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)
Note:	If total arsenic concentration is found to be elevated based on reference intervals, then Arsenic, Fractionated, will be added to determine the proportion of organic, inorganic, and methylated forms. Additional charges apply.
CPT Codes:	82175; if reflexed, add 82175
New York DOH Approval Status:	This test is New York DOH approved.
Interpretive Data:	

The ACGIH Biological Exposure Index (BEI) for arsenic in urine is 35 ug/L measured at the end of the work week. The ACGIH BEI is based on the sum of inorganic and methylated species. For specimens with elevated total arsenic results, fractionation is automatically performed to determine the proportions of inorganic, methylated, and organic species.

Elevated results may be due to skin or collection-related contamination, including the use of collection containers that are not certified to be trace element-free. If an elevated result is suspected to be due to contamination, confirmation with a second specimen collected in a certified trace element-free container is recommended.

Methodology: Inductively Coupled Plasma - Mass Spectrometry (ICP-MS)

Reference Interval:

Test Number	Components	Reference Interval
	Arsenic, Urine - per volume	Less than or equal to 34.9 microg/L
	Arsenic, Urine - ratio to CRT	Less than or equal to 29.9 microg/g CRT

TEST CHANGE

Aquaporin-4 (AQP4) Antibody, IgG by CBA-IFA With Reflex to Titer, CSF

2011699, AQP4 CSF

Specimen Requirements:	
Patient Preparation:	
Collect:	CSF.
Specimen Preparation:	Transfer 1~~0.5~~ mL CSF to an ARUP standard transport tube. (Min: 0.3~~15~~ mL)
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Hemolyzed, contaminated specimens or severely lipemic specimens.
Remarks:	
Stability:	Ambient: 48 hours; Refrigerated: 2 weeks; Frozen: 1 month.
Methodology:	Semi-Quantitative Cell-Based Indirect Fluorescent Antibody
Note:	If AQP4 antibody IgG is positive, then an AQP4 antibody IgG titer is reported. Additional charges apply.
CPT Codes:	86052; if reflexed, add 86256
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

Neuromyelitis optic (NMO) commonly presents with optic neuritis or longitudinally extensive transverse myelitis. Approximately 75% of patients with NMO have antibodies to the aquaporin-4 (AQP4) receptor. While the absence of AQP4 receptor antibodies does not rule out a diagnosis of NMO, presence of this antibody is diagnostic for NMO.

This indirect fluorescent antibody assay utilizes AQP4 receptor transfected cell lines for the detection and semiquantification of AQP4 IgG antibody.

Reference Interval:

Refer to report~~Less than 1:1~~

Test Number	Components	Reference Interval
	NMO/AQP4 Ab IgG CBA-IFA Screen, CSF	Less than 1:1

TEST CHANGE

Fentanyl and Metabolite, Serum or Plasma, Quantitative

2011776, CDCO FNSP

Specimen Requirements:	
Patient Preparation:	
Collect:	Plain red, lavender (K2EDTA), lavender (K3EDTA), green (sodium heparin), gray (potassium oxalate/sodium fluoride), or pink (K2EDTA).
Specimen Preparation:	Separate from cells ASAP or within 2 hours of collection. Transfer 4 mL serum or plasma to an ARUP standard transport tube. (Min: 2 mL)
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Whole blood. Serum separator tubes, light blue (sodium citrate), or plasma separator tubes. Specimens exposed to repeated freeze/thaw cycles.
Remarks:	
Stability:	Ambient: 1 week; Refrigerated: 2 weeks; Frozen: 3 years
Methodology:	Quantitative Liquid Chromatography-Tandem Mass Spectrometry
Note:	
CPT Codes:	80354 (Alt code: G0480)
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

Cutoff Concentration:

Fentanyl: 0.1 ng/mL

Norfentanyl: 0.4 ng/mL

For medical purposes only; not valid for forensic use.

The absence of expected drug(s) and/or drug metabolite(s) may indicate noncompliance, inappropriate timing of specimen collection relative to drug administration, poor drug absorption, or limitations of testing. The concentration value must be greater than or equal to the cutoff to be reported as positive. Interpretive questions should be directed to the laboratory.

Reference Interval:

HOTLINE NOTE: There is a numeric map change associated with this test. Refer to the Hotline Test Mix for interface build information.

TEST CHANGE

Dihydropyrimidine Dehydrogenase (DPYD)

2012166, DPYD

Specimen Requirements:	
Patient Preparation:	
Collect:	Lavender (EDTA), pink (K2EDTA), or yellow (ACD solution A or B).
Specimen Preparation:	Transport 3 mL whole blood. (Min: 1 mL)
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Plasma or serum. Heparinized specimens. Frozen specimens in glass collection tubes.
Remarks:	
Stability:	Ambient: 72 hours; Refrigerated: 1 week; Frozen: 1 month.
Methodology:	Polymerase Chain Reaction (PCR) / Fluorescence Monitoring
Note:	
CPT Codes:	81232
New York DOH Approval Status:	This test is New York DOH approved.
Interpretive Data:	
Refer to report.	
Reference Interval:	

HOTLINE NOTE: There is a component change associated with this test. One or more components have been added or removed. Refer to the Hotline Test Mix for interface build information.

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Effective Date: April 20, 2026

TEST CHANGE

Meningitis/Encephalitis Panel by PCR

2013305, MEFAP

Specimen Requirements:	
Patient Preparation:	N/A
Collect:	CSF
Specimen Preparation:	Transfer 0.5 mL CSF to a sterile ARUP standard transport tube~~Standard Transport Tube~~ (ARUP supply #43115) available online through eSupply using ARUP Connect(TM) or contact ARUP Client Services at ~~(~~800~~-)~~ 522-2787. (Min: 0.25 mL) Do not centrifuge.
Transport Temperature:	Refrigerated
Unacceptable Conditions:	N/A
Remarks:	N/A
Stability:	Ambient: 24 hours; Refrigerated: 1 week; Frozen: 1 week~~Unacceptable~~
Methodology:	Qualitative Polymerase Chain Reaction (PCR)
Note:	This panel includes *Cryptococcus neoformans/gattii*, Cytomegalovirus (CMV), Enterovirus, *Escherichia coli* K1, *Haemophilus influenzae*, Herpes simplex virus 1(HSV-1), Herpes simplex virus 2(HSV-2), Human herpesvirus 6 (HHV-6), Human parechovirus, *Listeria monocytogenes*, *Neisseria meningitidis, Streptococcus agalactiae, Streptococcus pneumoniae*, Varicella-zoster virus (VZV).
CPT Codes:	87483
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

The meningitis/encephalitis panel is NOT a replacement for CSF bacterial and/or fungal culture and Cryptococcal antigen testing for at-risk patients. Non-K1 *E. coli* serotypes and nonencapsulated~~non-encapsulated~~ strains of *Neisseria meningitidis* are NOT detected. The panel does NOT differentiate active from latent herpes virus infections. Test results should be interpreted in the context of host factors and other laboratory information.

Reference Interval:

~~Not Detected~~

Deleted Cells

TEST CHANGE

Spinal Muscular Atrophy (SMA) Copy Number Analysis, Fetal

2013444, SMA DD FE

Specimen Requirements:	
Patient Preparation:	
Collect:	Fetal Cultured amniocytes or Cultured CVS AND Maternal Whole Blood Specimen: Lavender (EDTA), pink (K2EDTA), or yellow (ACD solution A or B).
Specimen Preparation:	Cultured Amniocytes or Cultured CVS: Transfer cultured amniocytes or cultured CVS to two T-25 flasks at 80 percent confluence (Min: one T-25 flask at 80 percent confluence). Backup cultures must be retained at the client's institution until testing is complete. If ARUP receives a sample below the minimum confluence, Cytogenetics Grow and Send (ARUP test code 0040182) will be added on by ARUP, and additional charges will apply. If clients are unable to culture specimens, Cytogenetics Grow and Send should be added to initial order. Maternal Whole Blood Specimen: Transport 2 mL whole blood. (Min: 1 mL)
Transport Temperature:	Cultured Amniocytes or Cultured CVS: CRITICAL ROOM TEMPERATURE. Must be received within 48 hours of collection due to viability of cells. Maternal Whole Blood Specimen : Room temperature.
Unacceptable Conditions:	
Remarks:	
Stability:	Cultured Amniocytes or Cultured CVS: Room temperature: 48 hours; Refrigerated: Unacceptable; Frozen: Unacceptable Maternal Whole Blood Specimen: Room Temperature: 7 days; Refrigerated: 1 month; Frozen: Unacceptable
Methodology:	Multiplex Ligation-Dependent Probe Amplification (MLPA)
Note:	
CPT Codes:	81329; 81265 Fetal Cell Contamination (FCC)
New York DOH Approval Status:	This test is New York DOH approved.
Interpretive Data:	
Refer to report.	
Reference Interval:	
By report	

HOTLINE NOTE: There is a component change associated with this test. One or more components have been added or removed. Refer to the Hotline Test Mix for interface build information.

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Effective Date: April 20, 2026

TEST CHANGE

Hereditary Hemolytic Anemia Cascade

3000894, HHACASCADE

Specimen Requirements:	
Patient Preparation:	
Collect:	Three lavender~~3 whole blood Lavender~~ (K2EDTA) or p~~P~~ink (K2EDTA) specimens and 3-5 peripheral blood smears.
Specimen Preparation:	Transport the 3 whole blood specimens in the original tube. Also acceptable: whole blood in ARUP standard transport tubes. ~~Transfer specimens using ARUP kit (ARUP supply # 54388) available online through eSupply using ARUP Connect or contact ARUP Client Services at (800) 522-2787.~~
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	
Remarks:	Submit with Order: Patient history form, including information from a recent CBC, is required for interpretation.
Stability:	Ambient: Unacceptable; Refrigerated: 1 week; Frozen: Unacceptable
Methodology:	High Performance Liquid Chromatography (HPLC) / Electrophoresis / RBC Solubility / Polymerase Chain Reaction (PCR) / Fluorescence Resonance Energy Transfer (FRET) / Sequencing / Spectrophotometry / Visual Identification / Quantitative Enzymatic Assay / Quantitative Flow Cytometry / Cytochemical Stain / Multiplex Ligation-Dependent Probe Amplification (MLPA) / Massively Parallel Sequencing
Note:	The Hereditary Hemolytic Anemia Cascade begins with initial standard tests to detect possible causes of hemolytic anemia. If the results of the initial tests are suggestive of an abnormal or unstable hemoglobin, RBC membrane instability, or an enzyme or protein deficiency; or if the CBC data is suggestive of a hemoglobinopathy, appropriate testing will be performed at an additional charge. Depending on findings, one or more reflex tests may be required in order to provide a clinical interpretation. Tests added may include electrophoresis, solubility testing, mutational analysis, and/or sequencing. Quantitation of hemoglobin by HPLC or electrophoresis is most definitive in individuals one year and older. If quantitation of hemoglobin was performed before age one, repeat testing is recommended. Abnormal hemoglobin variants may require additional testing, which increases TAT up to 21 days.
CPT Codes:	84220; 88184; 82955; 83021. Reflex components billed separately. Additional CPT codes may apply: 85555; 85060;

	83068; 81269; 81259; 81363; 81364; 81249; 81404; 81405; 85660; 83020; 81479.
New York DOH Approval Status:	Specimens from New York clients will be sent out to a New York DOH approved laboratory, if possible.
Interpretive Data:	
Reference Interval:	Refer to report

Inserted Cells

TEST CHANGE

Alpha-Amino-3-hydroxy-5-methyl-4-isoxazolepropionic Acid Receptor (AMPAR) Antibody, IgG by CBA-IFA With Reflex to Titer, CSF

3001257, AMPA CSF

Specimen Requirements:	
Patient Preparation:	
Collect:	CSF.
Specimen Preparation:	Transfer 1~~0.5~~ mL CSF to an ARUP standard transport tube. (Min: 0.3~~15~~ mL)
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Hemolyzed, contaminated, or severely lipemic specimens.
Remarks:	
Stability:	Ambient: 48 hours; Refrigerated: 2 weeks; Frozen: 1 month
Methodology:	Semi-Quantitative Cell-Based Indirect Fluorescent Antibody
Note:	If Alpha-Amino-3-hydroxy-5-methyl-4-isoxazolepropionic Acid (AMPA) Receptor Antibody, IgG by IFA with Reflex to Titer, CSF IgG is positive, then an Alpha-amino-3-hydroxy-5-methyl-4-isoxazolepropionic Acid (AMPA) Receptor Antibody Titer, IgG, CSF is reported. Additional charges apply.
CPT Codes:	86255; if reflexed, add 86256
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

Alpha-amino-3-hydroxy-5-methyl-4-isoxazoleproprionic acid receptor (AMPAR) antibody is found in a subset of patients with autoimmune limbic encephalitis and may occur with or without associated tumor. Decreasing antibody levels may be associated with therapeutic response. A negative test result does not rule out a diagnosis of autoimmune encephalitis. Results should be interpreted in correlation with the patients clinical history and other laboratory findings.

This indirect fluorescent antibody assay utilizes AMPAR transfected cell lines for detection and semiquantification of AMPAR IgG antibody.

Reference Interval:

~~Less than 1:1~~

Test Number	Components	Reference Interval
	AMPA Receptor Ab IgG CBA-IFA Screen, CSF	Less than 1:1

TEST CHANGE

Gamma Aminobutyric Acid Receptor, Type B (GABA-BR) Antibody, IgG by CBA-IFA With Reflex to Titer, CSF

3001267, GABA-B CSF

Specimen Requirements:	
Patient Preparation:	
Collect:	CSF.
Specimen Preparation:	Transfer 1~~0.5~~ mL CSF to an ARUP standard transport tube. (Min: 0.3~~15~~ mL)
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Hemolyzed, contaminated, or severely lipemic specimens.
Remarks:	
Stability:	Ambient: 48 hours; Refrigerated: 2 weeks; Frozen: 1 month
Methodology:	Semi-Quantitative Cell-Based Indirect Fluorescent Antibody
Note:	If Gamma Aminobutyric Acid Receptor, Type B (GABA-BR) Antibody, IgG by IFA with Reflex to Titer, CSF is positive, then a Gamma Aminobutyric Acid Receptor, Type B (GABA-BR) Antibody Titer, IgG, CSF is performed. Additional charges apply.
CPT Codes:	86255; if reflexed, add 86256
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

Gamma-amino butyric acid receptor, type B (GABA-BR) antibody is found in a subset of patients with autoimmune epilepsy and other autoimmune neurologic phenotypes; it may occur with or without associated tumor. Decreasing antibody levels may be associated with therapeutic response. A negative test result does not rule out a diagnosis of autoimmune neurologic disease. Results should be interpreted in correlation with the patients clinical history and other laboratory findings.

This indirect fluorescent antibody assay utilizes GABA-BR transfected cell lines for the detection and semiquantification of GABA-BR IgG antibody.

Reference Interval:

~~Less than 1:1~~

Test Number	Components	Reference Interval
	GABA-BR Ab IgG CBA-IFA Screen, CSF	Less than 1:1

TEST CHANGE

Autoimmune CNS Demyelinating Disease Reflexive Panel

3001283, CNS PAN

Specimen Requirements:	
Patient Preparation:	
Collect:	Serum separator tube~~Separator Tube~~ (SST).
Specimen Preparation:	~~Separate from cells ASAP or within 2 hours of collection.~~ Transfer 4~~1~~ mL ~~serum~~ to ~~an~~ ARUP standard transport tube.~~Standard Transport Tube.~~ (Min: ~~0.~~3 mL)
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Hemolyzed, contaminated, or severely lipemic specimens.
Remarks:	
Stability:	After separation from cells: Ambient: 48 hours; Refrigerated: 2 weeks; Frozen: 1 month (avoid repeated freeze/thaw cycles)
Methodology:	Semi-Quantitative Cell-Based Indirect Fluorescent Antibody
Note:	If Aquaporin-4 Receptor Antibody, IgG by IFA with Reflex to Titer, Serum is positive, then an Aquaporin-4 Receptor Antibody, IgG by IFA, Serum Titer will be added. If Myelin Oligodendrocyte Glycoprotein (MOG) Antibody, IgG by IFA with Reflex to Titer, Serum is positive, then a Myelin Oligodendrocyte Glycoprotein (MOG) Antibody Titer, IgG will be added. Additional charges apply.
CPT Codes:	86362; 86052; if reflexed, add 86256 x2
New York DOH Approval Status:	This test is New York DOH approved.
Interpretive Data:	

Refer to report.~~Refer to report.~~

~~This test was developed and its performance characteristics determined by ARUP Laboratories. It has not been cleared or approved by the US Food and Drug Administration. This test was performed in a CLIA certified laboratory and is intended for clinical purposes.~~

Reference Interval:

Test Number	Components	Reference Interval
	MOG Ab IgG CBA-IFA Screen, Serum	Less than 1:10
	NMO/AQP4 Ab IgG CBA-IFA Screen, Serum	Less than 1:10

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Effective Date: April 20, 2026

TEST CHANGE

Exome Reanalysis (Originally Tested at ARUP - No Specimen Required)

3001457, EX REANLYZ

Specimen Requirements:	
Patient Preparation:	
Collect:	No new specimen is required to process this test; please release test order to ARUP upon order. New York State Clients: ARUP cannot facilitate testing for New York patients. Please work directly with a New York-approved laboratory.
Specimen Preparation:	
Transport Temperature:	
Unacceptable Conditions:	
Remarks:	Patient History Form for Exome/Genome Reanalysis (REQUIRED): fax to Genetic Counselors at 801-584-5236.
Stability:	
Methodology:	Bioinformatic Processing and Variant Analysis
Note:	Only the proband will receive an updated report. The most current list of American College of Medical Genetics and Genomics (ACMG) recommended genes will be examined for the proband if consent for reporting of secondary findings~~ACMG variants~~ was originally provided. Please see the Exome/Genome Reanalysis Patient History form for a description of variant types reported at reanalysis.
CPT Codes:	81417
New York DOH Approval Status:	Specimens from New York clients will be sent out to a New York DOH approved laboratory, if possible.
Interpretive Data:	
Refer to report.	
Reference Interval:	
~~By report.~~	

Deleted Cells

TEST CHANGE

Beckwith-Wiedemann Syndrome (BWS) and Russell-Silver Syndrome (RSS) by Methylation-Specific MLPA

3001635, BWS-RSS DD

Specimen Requirements:	
Patient Preparation:	
Collect:	Lavender (EDTA) or~~),~~ pink (K2EDTA~~), or yellow (ACD solution A~~)
Specimen Preparation:	Transport 3 mL whole blood. (Min: 1 mL)
Transport Temperature:	Refrigerated. Also acceptable: Ambient.
Unacceptable Conditions:	
Remarks:	
Stability:	Ambient: 1 week; Refrigerated: 1 month; Frozen: Unacceptable New York State Clients: Preferred Ambient: 4 days; Refrigerated: 4 days; Frozen: 4 days Specimens are preferred to be received within 4 days of collection. Extraction will be attempted for specimens received after 4 days, and DNA yield will be evaluated to determine if testing may proceed.
Methodology:	Qualitative Methylation-Specific Multiplex Ligation-Dependent Probe Amplification (MS-MLPA)
Note:	
CPT Codes:	81401
New York DOH Approval Status:	Specimens from New York clients will be sent out to a New York DOH approved laboratory, if possible.
Interpretive Data:	
Refer to report.	
Reference Interval:	
Refer to~~By~~ report	

TEST CHANGE

Contactin-Associated Protein-2 (CASPR2) Antibody, IgG by CBA-IFA With Reflex to Titer, CSF

3001986, CASPR2GCSF

Specimen Requirements:	
Patient Preparation:	
Collect:	CSF.
Specimen Preparation:	Transfer 1~~0.5~~ mL CSF to an ARUP standard transport tube. (Min: 0.3~~15~~ mL)
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Contaminated, hemolyzed, or severely lipemic specimens.
Remarks:	
Stability:	Ambient: 48 hours; Refrigerated: 2 weeks; Frozen: 1 month
Methodology:	Semi-Quantitative Cell-Based Indirect Fluorescent Antibody
Note:	If CASPR2 antibody IgG is positive, then CASPR2 antibody IgG titer will be added. Additional charges apply.
CPT Codes:	86255; if reflexed, add 86256
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

Contactin-associated protein-2 (CASPR2) IgG antibody may occur as part of the voltage-gated potassium channel (VGKC) complex antibodies.

The presence of CASPR2 IgG antibody is associated with a wide spectrum of clinical manifestations, including acquired neuromyotonia, limbic encephalitis, painful neuropathy, and Morvan syndrome. Tumors such as thymoma, small cell lung cancer, and other rarer tumors may occur. The full spectrum of clinical disorders and tumors associated with the CASPR2 IgG antibody continues to be defined. Results should be interpreted in correlation with the patient's clinical history and other laboratory findings.

This indirect fluorescent antibody assay utilizes CASPR2 transfected cell lines for the detection and semiquantification of the CASPR2 IgG antibody.

Reference Interval:

Refer to report~~Less than 1:1~~

Test Number	Components	Reference Interval
	CASPR2 Ab IgG CBA-IFA Screen, CSF	Less than 1:1

TEST CHANGE

Leucine-Rich, Glioma-Inactivated Protein 1 (LGI1) Antibody, IgG by CBA-IFA With Reflex to Titer, CSF

3001992, LGI1IGGCSF

Specimen Requirements:	
Patient Preparation:	
Collect:	CSF.
Specimen Preparation:	Transfer 10.5 mL CSF to an ARUP standard transport tube. (Min: 0.315 mL)
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Contaminated, hemolyzed, or severely lipemic specimens.
Remarks:	
Stability:	Ambient: 48 hours; Refrigerated: 2 weeks; Frozen: 1 month
Methodology:	Semi-Quantitative Cell-Based Indirect Fluorescent Antibody
Note:	If LGI1 antibody IgG is positive, then LGI1 antibody IgG titer will be added. Additional charges apply.
CPT Codes:	86255; if reflexed, add 86256
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

Leucine-rich, glioma-inactivated 1 protein (LGI1) IgG antibody may occur as part of the voltage-gated potassium channel (VGKC) complex antibodies.

The presence of LGI1 IgG antibody is mainly associated with limbic encephalitis, hyponatremia, and myoclonic movements. LGI1 IgG antibody is rarely associated with tumors but may occur infrequently in Morvan syndrome, neuromyotonia, and idiopathic epilepsy. The full spectrum of clinical disorders associated with the LGI1 IgG antibody continues to be defined. Results should be interpreted in correlation with the patient's clinical history and other laboratory findings.

This indirect fluorescent antibody assay utilizes LGI1 transfected cell lines for the detection and semiquantification of the LGI1 IgG antibody.

Reference Interval:

Less than 1:1

Test Number	Components	Reference Interval
	LGI1 Ab IgG CBA-IFA Screen, CSF	Less than 1:1

TEST CHANGE

B Cell Subset Analysis

3002216, B SUBSETS

Specimen Requirements:	
Patient Preparation:	
Collect:	Lavender (K2EDTA) or pPink (K2EDTA).
Specimen Preparation:	Transport 4 mL whole blood. (Min: 2 mL) Specimens must be analyzed within 48 hours of collection.
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Clotted or hemolyzed specimens.
Remarks:	
Stability:	Ambient: Unacceptable; Refrigerated: 48 hours; Frozen: Unacceptable
Methodology:	Flow Cytometry
Note:	
CPT Codes:	86355; 86356 x6
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

This panel identifies B-cell dysregulation. B cells start development in the bone marrow (stem cell, pro-B, pre-B), then transition to the spleen and lymph nodes where some mature by acquiring CD27 and switching immunoglobulin class from IgD and IgM to IgG or IgA. Class-switched B-cells may further progress to plasmablasts and finally plasma cells. Different disorders may block different parts of this pathway, disrupting immunoglobulin production.

This panel can also be used to monitor B-cell reconstitution after bone marrow transplantation or targeted B-cell depletion therapy.

This panel can assist in the diagnosis and subclassification of common variable immune ~~deficiencycommon variable immune~~ deficiency (CVID). CVID is a heterogeneous group of disorders characterized by low antibody production, defective antibody responses, and recurrent infections. Most cases of CVID have a severe reduction in class switched memory B cells (CD27+, IgD-, IgM-) that correlates with granulomatous disease; many also have an expanded population of CD21low, CD38low B-cells that correlates with splenomegaly. Increased transitional B-cells (CD38+, IgM+) in CVID correlates with lymphadenopathy. Most CVID patients have a low percentage of plasmablasts (CD38+, IgM-) that has a correlation with autoimmune cytopenia.

Class switched memory B-cells are also low in ALPS, but are typically increased in SLE and infection.

Please note, reference intervals~~referenceintervals~~ for CD20+ B-cells were not established for patients less than 16 years of age. For all other B-cell subsets, reference intervals for populations younger than 16 years are adopted from literature. Piatosa B, Wolska-Kusnierz B,

Pac M, et al. B-cell subsets in healthy children: reference values for evaluation of B-cell maturation process in peripheral blood. Cytometry B Clin Cytom. 2010;78(6):372-381.

Reference Interval:

<table>
<tr><th>Test Number</th><th>Components</th><th>Reference Interval</th></tr>
<tr><td></td><td>Activated CD21low CD38-</td><td></td></tr>
<tr><td></td><td></td><td><table>
<tr><td>Age</td><td>Cells/{u}L</td></tr>
<tr><td>0-7 days</td><td>0-80</td></tr>
<tr><td>8 days-1 month</td><td>0-20</td></tr>
<tr><td>2-4 months</td><td>0-50</td></tr>
<tr><td>5-8 months</td><td>0-50</td></tr>
<tr><td>9-14 months</td><td>0-40</td></tr>
<tr><td>15-23 months</td><td>10-60</td></tr>
<tr><td>2-4 years</td><td>10-60</td></tr>
<tr><td>5-9 years</td><td>10-40</td></tr>
<tr><td>10-15 years</td><td>10-30</td></tr>
<tr><td>16 years and older</td><td>3-26</td></tr>
</table></td></tr>
<tr><td></td><td>Activated CD21low CD38- %</td><td></td></tr>
<tr><td></td><td></td><td><table>
<tr><td>Age</td><td>Percent</td></tr>
<tr><td>0-7 days</td><td>0.5-22.0</td></tr>
<tr><td>8 days-1 month</td><td>0.4-2.2</td></tr>
<tr><td>2-4 months</td><td>0.5-2.9</td></tr>
<tr><td>5-8 months</td><td>0.4-3.3</td></tr>
<tr><td>9-14 months</td><td>0.5-4.5</td></tr>
<tr><td>15-23 months</td><td>1.0-5.7</td></tr>
<tr><td>2-4 years</td><td>1.7-5.4</td></tr>
<tr><td>5-9 years</td><td>2.3-10.0</td></tr>
<tr><td>10-15 years</td><td>2.7-8.7</td></tr>
<tr><td>16 years and older</td><td>1.2-9.0</td></tr>
</table></td></tr>
<tr><td></td><td>CD19+ B cells</td><td></td></tr>
</table>

		Age	Cells/{u}L
		0-7 days	200-800
		8 days-1 month	700-1800
		2-4 months	700-2400
		5-8 months	700-2800
		9-14 months	400-2900
		15-23 months	600-1900
		2-4 years	400-1700
		5-9 years	300-600
		10-15 years	200-600
		16 years and older	110-450
	CD19+ B cells %		
		Age	Reference Intervals
		0-7 days	6.0-25.0
		8 days-1 month	10.0-31.0
		2-4 months	18.0-38.0
		5-8 months	16.0-34.0
		9-14 months	14.0-28-0
		15-23 months	16.0-34.0
		2-4 years	14.0-29.0
		5-9 years	10.0-24.0
		10-15 years	9.4-23.0
		16 years and older	5.3-25.0
	CD20+		
		Age	Cells/{u}L
		0-15 years	N/A
		16 years and older	110-450
	CD20+ %		

Inserted Cells

Inserted Cells

		Age / Reference Intervals 0-15 years: N/A 16 years and older: 90.6-102.8
	Class-switched CD27+IgD-IgM-	
		Age / Cells/{u}L 0-7 days: 10-30 8 days-1 month: 10-90 2-4 months: 10-170 5-8 months: 20-140 9-14 months: 10-100 15-23 months: 30-180 2-4 years: 20-220 5-9 years: 40-140 10-15 years: 30-110 16 years and older: 6-81~~11-61~~
	Class-switched CD27+IgD-IgM- %	
		Age / Percent 0-7 days: 1.0-7.2 8 days-1 month: 1.5-7.1 2-4 months: 0.3-9.0 5-8 months: 1.6-7.0 9-14 months: 1.4-12.0 15-23 months: 3.9-14.0 2-4 years: 4.7-21.0 5-9 years: 11.0-30.0 10-15 years: 8.7-26.0 16 years and older: ~~3~~5.1-25.8~~22.0~~
	Non switched CD27+IgD+IgM+	

Inserted Cells

Inserted Cells

		Age	Cells/{u}L
		0-7 days	10-40
		8 days-1 month	20-50
		2-4 months	20-200
		5-8 months	30-120
		9-14 months	20-140
		15-23 months	30-170
		2-4 years	20-180
		5-9 years	20-100
		10-15 years	20-70
		16 years and older	9-935-46
	Non switched CD27+IgD+IgM+ %		
		Age	Percent
		0-7 days	2.6-12.0
		8 days-1 month	1.7-6.5
		2-4 months	2.5-8.7
		5-8 months	2.8-7.4
		9-14 months	3.0-11.0
		15-23 months	4.1-14.0
		2-4 years	2.7-20.0
		5-9 years	5.2-20.0
		10-15 years	4.6-18.0
		16 years and older	2.4.5-45.9-15.0
	Plasmablasts CD38+IgM-		

		Age	Cells/{u}L
		0-7 days	0-10
		8 days-1 month	0-30
		2-4 months	0-40
		5-8 months	0-60
		9-14 months	0-30
		15-23 months	10-40
		2-4 years	10-50
		5-9 years	0-30
		10-15 years	0-20
		16 years and older	1-8
	Plasmablasts CD38+IgM- %		
		Age	Percent
		0-7 days	0.2-3.2
		8 days-1 month	0.2-2.7
		2-4 months	0.4-3.3
		5-8 months	0.2-4.0
		9-14 months	0.4-5.5
		15-23 months	0.5-3.0
		2-4 years	0.6-4.0
		5-9 years	0.6-5.3
		10-15 years	0.6-6.5
		16 years and older	0.4-4.1
	Total Memory CD27+		

		Age	Cells/{u}L
		0-7 days	20-70
		8 days-1 month	30-100
		2-4 months	40-230
		5-8 months	50-270
		9-14 months	40-190
		15-23 months	50-330
		2-4 years	50-390
		5-9 years	60-230
		10-15 years	50-200
		16 years and older	19-17023-110
	Total Memory CD27+ %		
		Age	Percent
		0-7 days	3.6-14.0
		8 days-1 month	3.1-11.0
		2-4 months	3.2-12.0
		5-8 months	5.3-12.0
		9-14 months	4.1-21.0
		15-23 months	9.5-27.0
		2-4 years	7.8-37.0
		5-9 years	18.6-47.0
		10-15 years	13.3-48.0
		16 years and older	11.4-52.710.0-33.0
	Transitional CD38+IgM+		

		Age	Cells/{u}L
		0-7 days	0-210
		8 days-1 month	50-570
		2-4 months	130-940
		5-8 months	100-300
		9-14 months	20-210
		15-23 months	30-200
		2-4 years	20-200
		5-9 years	10-40
		10-15 years	10-60
		16 years and older	1-17
	Transitional CD38+IgM+ %		
		Age	Percent
		0-7 days	1.2-42.0
		8 days-1 month	4.1-44.0
		2-4 months	11.0-38.0
		5-8 months	7.2-20.0
		9-14 months	3.6-13.0
		15-23 months	3.3-17.0
		2-4 years	3.1-12.0
		5-9 years	4.6-8.3
		10-15 years	1.4-13.0
		16 years and older	0.~~7~~5-3.8~~9~~

TEST CHANGE

Phosphatidylethanol (PEth), Whole Blood, Quantitative

3002598, PETH

Specimen Requirements:	
Patient Preparation:	
Collect:	Lavender (K2 or K3EDTA), pink (K2EDTA), dark green (lithium heparin), or gray (potassium oxalate).
Specimen Preparation:	Transport 2~~1~~ mL whole blood in the original collection tube.~~-~~ (Min: 1~~0.5~~ mL)
Transport Temperature:	Refrigerated. Also acceptable: Frozen.
Unacceptable Conditions:	Gel separator tubes, plain red, light blue (citrate), or yellow (SPS or ACD solution).
Remarks:	
Stability:	Ambient: 3 hours; Refrigerated: 2 weeks; Frozen: 1 month (-20 degrees C)
Methodology:	Quantitative Liquid Chromatography-Tandem Mass Spectrometry
Note:	
CPT Codes:	80321 (Alt code: G0480)
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

Phosphatidylethanol (PEth) is a group of phospholipids formed in the presence of ethanol, phospholipase D, and phosphatidylcholine. PEth is known to be a direct alcohol biomarker. The predominant PEth homologues are PEth 16:0/18:1 (POPEth) and PEth 16:0/18:2 (PLPEth), which account for 37-46% and 26-28% of the total PEth homologues, respectively. PEth is incorporated into the phospholipid membrane of red blood cells and has a general half-life of 4-10 days and a window of detection of 2-4 weeks. However, the window of detection is longer in individuals who chronically or excessively consume alcohol. Serial monitoring of PEth may be helpful in monitoring alcohol abstinence over time. PEth results should be interpreted in the context of the patient's clinical and behavioral history. Patients with advanced liver disease may have falsely elevated PEth concentrations (Nguyen VL, et al, Alcoholism: Clinical and Experimental Research, 2018).

Reference Interval:

Refer to report

TEST CHANGE

Hemoglobin (Hb) A2 and F by Column with Reflex to Electrophoresis

3002644, HB A2F COL

Specimen Requirements:	
Patient Preparation:	
Collect:	Lavender (EDTA) or pink (K2EDTA).
Specimen Preparation:	Transport 5 mL whole blood in original tube. ~~.~~ (Min: 0.2 mL) Also acceptable: whole blood in an ARUP standard transport tube.
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Frozen or room temperature specimens.
Remarks:	
Stability:	Ambient: Unacceptable; Refrigerated: 1 week; Frozen: Unacceptable
Methodology:	High Performance Liquid Chromatography (HPLC) / Electrophoresis
Note:	Recommend quantitation of hemoglobin for definitive diagnosis after 1 year of age. If abnormal peaks suggestive of a hemoglobin variant are detected, then capillary electrophoresis~~Capillary Electrophoresis~~ will be added to aid in confirmation and identification of the variant. Additional charges apply
CPT Codes:	83021; if reflexed, add 83020
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

In laboratory testing to confirm a diagnosis of a beta-thalassemia trait diagnosis, Hb A2 levels should be considered in conjunction with family history and additional laboratory data, including serum iron and iron binding capacity, red cell morphology, hemoglobin, hematocrit, and mean corpuscular volume (MCV).

Patients with a combination of iron deficiency and beta-thalassemia may have a normal A2 level. In these cases, elevated A2 level cannot be used to screen for beta-thalassemia in these cases.

Patient State	Hb A2 Level	Hb F Level
Heterozygous beta thalassemia	4-9%	1-5%
Homozygous beta thalassemia	Normal or Increased	80-100%
Heterozygous HPFH	Less than 1.5%	10-20%
Homozygous HPFH	Absent	100%

Reference Interval:

~~Age-Defined Normal Hemoglobin Reference Intervals~~

Test Number	Components	Reference Interval
	Hemoglobin A2	
		Age: Reference Intervals (%) 0-1 month: 0.0-1.4 2 months: 0.0-2.0 3 months: 0.1-2.6 4 months: 0.8-3.0 5 months: 1.5-3.3 6-8 months: 1.8-3.5 9-12 months: 1.9-3.5 13-23 months: 1.9-3.5 2 years and older: 2.0-3.5
	Hemoglobin F	
		Age: Reference Intervals (%) 0-1 month: 45.8-91.7 2 months: 32.7-85.2 3 months: 14.5-73.7 4 months: 4.2-56.9 5 months: 1.0-38.1 6-8 months: 0.9-19.4 9-12 months: 0.6-11.6 13-23 months: 0.0-8.5 2 years and older: 0.0-2.1

TEST CHANGE

Hemoglobin F with Reflex to Electrophoresis

3002645, HGB F

Specimen Requirements:	
Patient Preparation:	
Collect:	Lavender (EDTA) or pink (K2EDTA).
Specimen Preparation:	Transport 3 mL whole blood in original tube.~~.~~ (Min: 0.2 mL) Also acceptable: whole blood in an ARUP standard transport tube.
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Frozen or room temperature specimens.
Remarks:	
Stability:	Ambient: Unacceptable; Refrigerated: 1 week; Frozen: Unacceptable
Methodology:	High Performance Liquid Chromatography (HPLC) / Electrophoresis
Note:	This assay measures percentage of hemoglobin F only. If abnormal peaks suggestive of a hemoglobin variant are detected, then capillary electrophoresis~~Capillary Electrophoresis~~ will be added to aid in confirmation and identification of the variant. Additional charges apply. For complete hemoglobin evaluation, order Hemoglobin Evaluation with Reflex to Electrophoresis and/or RBC Solubility (0050610).
CPT Codes:	83021; if reflexed, add 83020
New York DOH Approval Status:	This test is New York DOH approved.
Interpretive Data:	
Refer to report.	
Reference Interval:	

Age-Defined Normal Hemoglobin Reference Intervals

Test Number	Components	Reference Interval
	Hemoglobin F	
		Age: Reference Intervals (%) 0-1 month: 45.8-91.7 2 months: 32.7-85.2 3 months: 14.5-73.7 4 months: 4.2-56.9 5 months: 1.0-38.1 6-8 months: 0.9-19.4 9-12 months: 0.6-11.6 13-23 months: 0.0-8.5 2 years and older: 0.0-2.1

TEST CHANGE

SOX1 Antibody, IgG by Immunoblot, CSF

3002886, SOX1 CSF

Specimen Requirements:	
Patient Preparation:	
Collect:	CSF
Specimen Preparation:	Transfer 21 ~~1~~ mL ~~CSF~~ to ~~an~~ ARUP standard transport tube. ~~Standard Transport Tube.~~ (Min: 10 ~~.60~~ mL)
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Contaminated, heat-inactivated, hemolyzed, or lipemic specimens.
Remarks:	
Stability:	Ambient: 48 hours; Refrigerated: 2 weeks; Frozen: 1 month
Methodology:	Qualitative Immunoblot
Note:	
CPT Codes:	84182
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

SOX1 antibody is detected in patients with Lambert-Eaton myasthenic syndrome (LEMS) and in patients with paraneoplastic cerebellar degeneration (PCD), paraneoplastic and nonparaneoplastic neuropathy. SOX1 antibody is associated with small cell lung cancer. A negative test result does not rule out a diagnosis of LEMS or other causes of paraneoplastic neurological syndrome.

Reference Interval:

~~Negative~~

Test Number	Components	Reference Interval
	SOX1 Antibody, IgG by Immunoblot, CSF	Negative

TEST CHANGE

Deletion/Duplication Analysis by MLPA

3003144, DELDUP

Specimen Requirements:	
Patient Preparation:	
Collect:	Contact ARUP's genetic counselor at 800-242-2787 ext. 5100 prior to test submission. A disease-specific patient history form is available at https://ltd.aruplab.com/api/ltd/pdf/104
Specimen Preparation:	
Transport Temperature:	
Unacceptable Conditions:	
Remarks:	Submission of a completed patient history form is required. If testing is ordered to assess for a large deletion/duplication previously identified in a family member, submission of the family member's laboratory report is required. Testing will begin once all required documentation is received.
Stability:	
Methodology:	Multiplex Ligation-Dependent Probe Amplification (MLPA)
Note:	Deletion/duplication analysis by MLPA is offered for the following genes: *F8, ~~HBB,~~ MLH1, ~~/~~MSH2, MSH6, SDHB, SDHC, SDHD, SHOX*
CPT Codes:	CPT codes vary based on gene.
New York DOH Approval Status:	Specimens from New York clients will be sent out to a New York DOH approved laboratory, if possible.
Interpretive Data:	
Refer to report.	
Reference Interval:	

HOTLINE NOTE: There is a reflexive pattern change associated with this test. One or more orderable or component has been added or removed to the reflexive pattern. Refer to the Hotline Test Mix for interface build information.

TEST CHANGE

Gastrointestinal Pathogens Panel by PCR

3003279, GIPPCR

Specimen Requirements:	
Patient Preparation:	
Collect:	Stool.
Specimen Preparation:	Transfer stool to enteric transport media (Cary-Blair) (ARUP supply #29799) available online through eSupply using ARUP Connect(TM) or contact ARUP Client Services at (800) 522-2787. (Min: 0.5 mL)
Transport Temperature:	Refrigerated
Unacceptable Conditions:	Unpreserved stool, stool in media other than Cary-Blair, rectal swabs, specimens outside stability.
Remarks:	This test is New York DOH approved; however, per NYDOH regulations, testing cannot be performed for New York City clients.
Stability:	In enteric transport media: Ambient: 4 days, Refrigerated: 7 4 days, Frozen: Unacceptable.
Methodology:	Qualitative Polymerase Chain Reaction (PCR)
Note:	This assay detects *Campylobacter* spp. (*C. jejuni, C. coli, C. upsaliensis*), *Plesiomonas shigelloides*, *Salmonella* spp., *Vibrio* spp. (*V. parahaemolyticus, V. vulnificus, V. cholerae*) including specific identification of *V. cholerae*, *Yersinia enterocolitica,* Enteroaggregative *Escherichia coli* (EAEC), Enteropathogenic *Escherichia coli* (EPEC), Enterotoxigenic *Escherichia coli* (ETEC) *lt/st*, Shiga-like toxin-producing *Escherichia coli* (STEC) *stx1/stx2* including specific identification of *E. coli* O157, *Shigella*/Enteroinvasive *Escherichia coli* (EIEC), *Cryptosporidium* spp., *Cyclospora cayetanensis*, *Entamoeba histolytica*, *Giardia lamblia* (also known as *G. intestinalis* and *G. duodenalis*), Adenovirus F40/41, Astrovirus, Norovirus GI/GII, Rotavirus A, and Sapovirus (Genogroups I, II, IV, and V).
CPT Codes:	87507
New York DOH Approval Status:	This test is New York DOH approved.
Interpretive Data:	
Reference Interval:	

TEST CHANGE

Amphiphysin Antibody IgG, CSF

3004510, AMPHI CSF

Specimen Requirements:	
Patient Preparation:	
Collect:	CSF.
Specimen Preparation:	Transfer 2 mL~~1mL CSF~~ to ~~an~~ ARUP standard transport tube.~~Standard Transport Tube.~~ (Min: 1~~0.60~~ mL)
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Contaminated, heat-inactivated, hemolyzed, or lipemic specimens.
Remarks:	
Stability:	Ambient: 48 hours; Refrigerated: 2 weeks; Frozen: 1 month
Methodology:	Qualitative Immunoblot
Note:	
CPT Codes:	84182
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

Amphiphysin antibody is present in about 5 percent of patients with stiff-person syndrome and is found variably in other causes of paraneoplastic neurological syndrome (PNS). Amphiphysin antibody is mainly associated with small cell lung cancer and breast tumors.

~~This test was developed and its performance characteristics determined by ARUP Laboratories. It has not been cleared or approved by the U.S. Food and Drug Administration. This test was performed in a CLIA-certified laboratory and is intended for clinical purposes.~~

Reference Interval:

Refer to report~~Negative~~

Test Number	Components	Reference Interval
	Amphiphysin Antibody, CSF	Negative

TEST CHANGE

Dipeptidyl Aminopeptidase-Like Protein 6 (DPPX) Antibody, IgG by CBA-IFA With Reflex to Titer, CSF

3004512, DPPX CSF

Specimen Requirements:	
Patient Preparation:	
Collect:	Separate CSF.
Specimen Preparation:	Transfer 1~~0.5~~ mL CSF to an ARUP standard transport tube. (Min: 0.3~~15~~ mL)
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Hemolyzed, contaminated, or severely lipemic specimens.
Remarks:	
Stability:	Ambient: 48 hours; Refrigerated: 2 weeks; Frozen: 1 month
Methodology:	Semi-Quantitative Cell-Based Indirect Fluorescent Antibody
Note:	If DPPX antibody IgG is positive, then DPPX antibody IgG titer will be added. Additional charges apply.
CPT Codes:	86255; if reflexed, add 86256
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

DPPX antibody is found in a subset of patients with autoimmune encephalitis, and is often associated with prodromal gastrointestinal symptoms and unintentional weight loss. It may occur with or without associated tumor. Decreasing antibody levels may be associated with therapeutic response. A negative test result does not rule out a diagnosis of autoimmune neurologic disease. Results should be interpreted in correlation with the patients clinical history and other laboratory findings.

This indirect fluorescent antibody assay utilizes DPPX transfected cells for the detection and semiquantification of the DPPX IgG antibody.

Reference Interval:

~~Less than 1:1~~

Test Number	Components	Reference Interval
	DPPX Ab IgG CBA-IFA Screen, CSF	Less than 1:1

TEST CHANGE

Paraneoplastic Reflexive Panel, CSF

3004517, PNSPAN CSF

Specimen Requirements:	
Patient Preparation:	
Collect:	CSF.
Specimen Preparation:	Transfer 42 mL ~~CSF~~ to ~~an~~ ARUP standard transport tube. (Min: 21 mL)~~).~~
Transport Temperature:	Refrigerated
Unacceptable Conditions:	Contaminated, heat-inactivated, hemolyzed, or lipemic specimens
Remarks:	
Stability:	Ambient: 48 hours; Refrigerated: 2 weeks; Frozen: 1 month
Methodology:	Semi-Quantitative Indirect Fluorescent Antibody (IFA) / Qualitative Immunoblot / Semi-Quantitative Cell-Based Indirect Fluorescent Antibody
Note:	Purkinje Cell (PCCA) antibody and neuronal nuclear (ANNA) antibody IgG are screened by IFA. If the IFA screen is indeterminate, then a Neuronal Nuclear Antibodies (Hu, Ri, Yo, Tr/DNER) IgG by Immunoblot will be added. If the IFA screen is positive at 1:1 or greater, then a PCCA/ANNA antibodies titer and Neuronal Nuclear Antibodies (Hu, Ri, Yo, Tr/DNER) IgG by Immunoblot will be added. Additional charges apply. If CV2 Antibody IgG Screen by IFA is positive, then CV2 Antibody IgG Titer by IFA will be added. Additional charges apply.
CPT Codes:	86255 x2; 84182 x3; if reflexed, add 84182 x4; 86256 per titer
New York DOH Approval Status:	This test is New York DOH approved.
Interpretive Data:	
Refer to report	

Reference Interval:

Test Number	Components	Reference Interval
	Amphiphysin Antibody, CSF	Negative
	CV2 Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	Ma2/Ta Antibody, IgG by Immunoblot, CSF	Negative
	Paraneoplastic Abs (PCCA/ANNA) IgG, CSF	None Detected
	SOX1 Antibody, IgG by Immunoblot, CSF	Negative

TEST CHANGE

Aldosterone and Renin Direct, With Ratio

3005949, ALD/DR

Specimen Requirements:	
Patient Preparation:	Blood should be obtained in seated position in the morning without venous stasis (release tourniquet after venipuncture and wait at least 5 seconds before withdrawing blood). ~~Collect midmorning (i.e., 7am-10am) after patient has been sitting, standing, or walking for at least 30 minutes and seated for 5-15 minutes.~~ If the patient is supine, ensure that the patient is in this position for at least 30 minutes prior to collection. ~~Fasting specimens are recommended but not required.~~
Collect:	Serum separator tube (SST) AND lavender (EDTA). ~~) from a supine or upright patient.~~ Do not collect in refrigerated tubes nor store tubes on ice. ~~Process blood at room temperature and centrifuge tubes in a nonrefrigerated centrifuge.~~
Specimen Preparation:	Separate from cells ASAP or within 2 hours of collection. Serum: Transfer 1 mL serum to an ARUP standard transport tube (Min: 0.5mL) AND Plasma: Transfer 2 mL EDTA plasma to an ARUP standard transport tube and freeze immediately. (Min: 1 mL) Storage at refrigerated temperatures may cause falsely elevated results. Do not collect in refrigerated tubes. Process blood at room temperature and centrifuge tubes in a nonrefrigerated centrifuge. ~~(Min: 1 mL)~~
Transport Temperature:	Both specimens should be collected and submitted together for testing. Serum: Frozen. Also acceptable: Refrigerated. Plasma: CRITICAL FROZEN. Separate specimens must be submitted when additional tests are ordered. ~~Frozen~~
Unacceptable Conditions:	Refrigerated plasma or plasma collected in citrate, heparin, or oxalate. Grossly hemolyzed specimens.
Remarks:	
Stability:	Serum: Ambient: 8 hours; Refrigerated: 5 days; Frozen: 1 month Plasma: Ambient: 8 hours; Refrigerated: Unacceptable; Frozen: 1 month
Methodology:	Qualitative Chemiluminescent Immunoassay (CLIA)
Note:	Do not use this test for patients treated with cathepsin B. Menstruating females and those taking estrogen containing medications may have lower renin direct concentrations, resulting in falsely high aldosterone-renin ratio (ARR). In these cases, order Aldosterone/Renin Activity Ratio (ARUP test code 0070073). Refer to the Additional Technical Information for Endocrine Society recommendations for patient preparation,

	specimen collection, medications for hypertension control during confirmatory testing for primary aldosteronism, and factors that may lead to false-positive or false-negative ARR results.
CPT Codes:	Refer to Aldosterone (0070015) and Renin, Direct (2001575)
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

Normal serum levels of aldosterone are dependent on the sodium intake and whether the patient is upright or supine. High sodium intake will tend to suppress serum aldosterone, whereas low sodium intake will elevate serum aldosterone. The reference intervals for serum aldosterone are based on normal sodium intake.

Reference Interval:

Test Number	Components	Reference Interval
	Aldosterone/Direct Renin Calculation	Less than or equal to 4.0

TEST CHANGE

Gamma-Aminobutyric Acid Receptor, Type A (GABA-AR) Antibody, IgG by CBA-IFA with Reflex to Titer, CSF

3006003, GABA-A CSF

Specimen Requirements:	
Patient Preparation:	
Collect:	CSF.
Specimen Preparation:	Transfer 1~~0.5~~ mL CSF to an ARUP standard transport tube. (Min: 0.3~~1~~5 mL)
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Grossly hemolyzed or contaminated specimens.
Remarks:	
Stability:	Ambient: 48 hours; Refrigerated: 2 weeks; Frozen: 1 month (Three freeze/thaw cycles are acceptable)
Methodology:	Semi-Quantitative~~Semiquantitative~~ Cell-Based Indirect Fluorescent Antibody
Note:	If GABA-AR antibody IgG is positive, then GABA-AR antibody IgG titer will be added. Additional charges apply.
CPT Codes:	86255; if reflexed, add 86256
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

Gamma-aminobutyric acid receptor, type A (GABA-AR) antibody is found in a subset of patients with autoimmune encephalitis or autoimmune epilepsy and may occur with or without an associated tumor. A negative test result does not rule out a diagnosis of autoimmune limbic encephalitis or autoimmune epilepsy. Interpretation of any antineural antibody test requires clinical correlation.

This indirect fluorescent antibody assay utilizes GABA-AR transfected cell lines for detection and semiquantification of GABA-AR IgG antibody.

Reference Interval:

~~Less than 1:1~~

Test Number	Components	Reference Interval
	GABA-AR Ab IgG CBA IFA Screen, CSF	Less than 1:1

TEST CHANGE

IgLON Family Member 5 (IgLON5) Antibody, IgG by CBA-IFA With Reflex to Titer, CSF

3006013, IGLON5 CSF

Specimen Requirements:	
Patient Preparation:	
Collect:	Separate CSF.
Specimen Preparation:	Transfer 10~~.5~~ mL CSF to an ARUP standard transport tube. (Min: 0.3~~15~~ mL)
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Grossly hemolyzed or contaminated specimens.
Remarks:	
Stability:	Ambient: 48 hours; Refrigerated: 2 weeks; Frozen: 1 month (Three freeze/thaw cycles are acceptable)
Methodology:	Semi-Quantitative~~Semiquantitative~~ Cell-Based Indirect Fluorescent Antibody
Note:	If IgLON5 antibody IgG is positive, then IgLON5 antibody IgG titer will be added. Additional charges apply.
CPT Codes:	86255; if reflexed, add 86256
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

IgLON Family Member 5 (IgLON5) antibody is found in a subset of patients with autoimmune encephalitis or other autoimmune neurologic/neurodegenerative disorders and may occur with or without associated tumor. A negative test result does not rule out a diagnosis of an autoimmune neurologic disorder. Interpretation of any antineural antibody test requires clinical correlation.

This indirect fluorescent antibody assay utilizes IgLON5 transfected cell lines for detection and semiquantification of IgLON5 IgG antibody.

Reference Interval:

~~Less than 1:1~~

Test Number	Components	Reference Interval
	IgLON5 Ab IgG CBA IFA Screen, CSF	Less than 1:1

TEST CHANGE

Inositol 1,4,5-Trisphosphate Receptor Type 1 (ITPR1) Antibody, IgG by CBA-IFA With Reflex to Titer, CSF

3006023, ITPR1 CSF

Specimen Requirements:	
Patient Preparation:	
Collect:	Separate CSF.
Specimen Preparation:	Transfer 1~~0.5~~ mL CSF to an ARUP standard transport tube. (Min: 0.3~~1~~5 mL)
Transport Temperature:	Refrigerated
Unacceptable Conditions:	Grossly hemolyzed or contaminated specimens.
Remarks:	
Stability:	Ambient: 48 hours; Refrigerated: 2 weeks; Frozen: 1 month (Three freeze/thaw cycles are acceptable)
Methodology:	Semi-Quantitative~~Semiquantitative~~ Cell-Based Indirect Fluorescent Antibody
Note:	If ITPR1 antibody IgG is positive, then ITPR1 antibody IgG titer will be added. Additional charges apply.
CPT Codes:	86255; if reflexed, add 86256
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

Inositol 1, 4, 5-trisphosphate receptor type 1 (ITPR1) antibody is found in a subset of patients with autoimmune cerebellar ataxia, encephalitis, neuropathy, or myelopathy and may occur with or without associated tumor. A negative test result does not rule out a diagnosis of autoimmune cerebellar ataxia or related autoimmune neurologic disorders. Interpretation of any antineural antibody test requires clinical correlation.

This indirect fluorescent antibody assay utilizes ITPR1 transfected cell lines for detection and sem-quantification of ITPR1 IgG antibody.

Reference Interval:

~~Less than 1:1~~

Test Number	Components	Reference Interval
	ITPR1 Ab IgG CBA IFA Screen, CSF	Less than 1:1

TEST CHANGE

Metabotropic Glutamate Receptor 1 (mGluR1) Antibody, IgG by CBA-IFA With Reflex to Titer, CSF

3006039, MGLUR1 CSF

Specimen Requirements:	
Patient Preparation:	
Collect:	Separate CSF.
Specimen Preparation:	Transfer 1~~0.5~~ mL CSF to an ARUP standard transport tube. (Min: 0.3~~1~~5 mL)
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Grossly hemolyzed or contaminated specimens.
Remarks:	
Stability:	Ambient: 48 hours; Refrigerated: 2 weeks; Frozen: 1 month (Three freeze/thaw cycles are acceptable)
Methodology:	Semi-Quantitative~~Semiquantitative~~ Cell-Based Indirect Fluorescent Antibody
Note:	If mGluR1 antibody IgG is positive, then mGluR1 antibody IgG titer will be added. Additional charges apply.
CPT Codes:	86255; if reflexed, add 86256
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

Metabotropic glutamate receptor 1 (mGluR1) antibody is found in a subset of patients with autoimmune cerebellar ataxia or autoimmune encephalitis and may occur with or without associated tumor. A negative test result does not rule out a diagnosis of autoimmune cerebellar ataxia or limbic encephalitis. Interpretation of any antineural antibody test requires clinical correlation.

This indirect fluorescent antibody assay utilizes mGluR1 transfected cell lines for detection and semiquantification of mGluR1 IgG antibody.

Reference Interval:

Test Number	Components	Reference Interval
	mGluR1 Ab IgG CBA IFA Screen, CSF	Less than 1:1

TEST CHANGE

Autoimmune Encephalopathy/Dementia Panel, CSF

3006202, AIENCDEMC

Specimen Requirements:	
Patient Preparation:	N/A
Collect:	CSF
Specimen Preparation:	Transfer 4~~three 1~~ mL ~~CSF aliquots~~ to ARUP standard transport tube~~s~~. (Min: 2~~0.5~~ mL~~/aliquot~~)
Transport Temperature:	Frozen
Unacceptable Conditions:	Fluid other than CSF. Grossly hemolyzed specimens
Remarks:	
Stability:	Ambient: 24 hours; Refrigerated: 1 week; Frozen: 1 month (avoid repeated freeze/thaw cycles)
Methodology:	Semi-Quantitative Cell-Based Indirect Fluorescent Antibody / Semi-Quantitative Indirect Fluorescent Antibody (IFA) / Qualitative Immunoblot / Semi-Quantitative Enzyme-Linked Immunosorbent Assay (ELISA)
Note:	If NMDA CSF antibody IgG is positive, then titer will be added. Additional charges apply. If AMPA CSF antibody IgG is positive, then titer will be added. Additional charges apply. If GABA-BR CSF antibody IgG is positive, then titer will be added. Additional charges apply. If CASPR2 CSF antibody IgG is positive, then titer will be added. Additional charges apply. PCCA/ANNA CSF antibody IgG is screened by IFA. If the IFA screen is indeterminate, then a Neuronal Nuclear Antibodies (Hu, Ri, Yo, and Tr/DNER) IgG by Immunoblot will be performed. If the IFA screen is positive at 1:10 or greater, then a PCCA/ANNA antibodies titer and Neuronal Nuclear Antibodies (Hu, Ri, Yo, Tr/DNER) IgG by Immunoblot will be performed. Additional charges apply. If LGI1 CSF antibody IgG is positive, then titer will be added. Additional charges apply. If CV2 CSF antibody IgG is positive, then titer will be added. Additional charges apply. If DPPX CSF antibody IgG by IFA is positive, then titer will be added. Additional charges apply. If IgLON5 CSF antibody IgG by IFA is positive, then titer will be added. Additional charges apply. If mGluR1 CSF antibody IgG by IFA is positive, then titer will be added. Additional charges apply.
CPT Codes:	86341; 84182 x3; 86255 x10; if reflexed, add 84182 x4; 86256 per titer

New York DOH Approval Status: This test is New York DOH approved.

Interpretive Data:

Refer to report

Reference Interval:

Test Number	Components	Reference Interval
	AMPA Receptor Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	Amphiphysin Antibody, CSF	Negative
	CASPR2 Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	CV2 Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	DPPX Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	GABA-BR Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	Glutamic Acid Decarboxylase Antibody CSF	0.0-5.0 IU/mL
	IgLON5 Ab IgG CBA IFA Screen, CSF	Less than 1:1
	LGI1 Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	Ma2/Ta Antibody, IgG by Immunoblot, CSF	Negative
	mGluR1 Ab IgG CBA IFA Screen, CSF	Less than 1:1
	NMDA Receptor Ab IgG CBA-IFA, CSF	Less than 1:1
	Paraneoplastic Abs (PCCA/ANNA) IgG, CSF	None Detected
	SOX1 Antibody, IgG by Immunoblot, CSF	Negative

TEST CHANGE

Autoimmune Epilepsy Panel, CSF

3006205, AIEPC

Specimen Requirements:	
Patient Preparation:	
Collect:	CSF
Specimen Preparation:	Transfer 4~~three 1~~ mL ~~CSF aliquots~~ to ARUP standard transport tube~~s~~. (Min: 2~~0.5~~ mL~~/aliquot~~)
Transport Temperature:	Frozen
Unacceptable Conditions:	Fluid other than CSF. Grossly hemolyzed specimens.
Remarks:	
Stability:	Ambient: 24 hours; Refrigerated: 1 week; Frozen: 1 month (avoid repeated freeze/thaw cycles)
Methodology:	Semi-Quantitative Cell-Based Indirect Fluorescent Antibody / Semi-Quantitative Indirect Fluorescent Antibody (IFA) / Qualitative Immunoblot / Semi-Quantitative Enzyme-Linked Immunosorbent Assay (ELISA)
Note:	If NMDA CSF antibody IgG is positive, then titer will be performed. Additional charges apply. If CV2 CSF antibody IgG is positive, then titer will be added. Additional charges apply. PCCA/ANNA CSF antibody IgG is screened by IFA. If the IFA screen is indeterminate, then a Neuronal Nuclear Antibodies (Hu, Ri, Yo, and Tr/DNER) IgG by Immunoblot will be performed. If the IFA screen is positive at 1:10 or greater, then a PCCA/ANNA antibodies titer and Neuronal Nuclear Antibodies (Hu, Ri, Yo, Tr/DNER) IgG by Immunoblot will be performed. Additional charges apply. If LGI1 CSF antibody IgG is positive, then titer will be added. Additional charges apply. If CASPR2 CSF antibody IgG is positive, then titer will be added. Additional charges apply. If AMPA CSF antibody IgG is positive, then titer will be added. Additional charges apply. If GABA-BR CSF antibody IgG is positive, then titer will be added. Additional charges apply. If DPPX CSF antibody IgG by IFA is positive, then titer will be added. Additional charges apply. If GABA-AR CSF antibody IgG by IFA is positive, then titer will be added. Additional charges apply. If mGluR1 CSF antibody IgG by IFA is positive, then titer will be added. Additional charges apply.
CPT Codes:	86341; 84182 x3; 86255 x10; if reflexed, add 84182 x4; 86256 per titer

New York DOH Approval Status: This test is New York DOH approved.

Interpretive Data:

Refer to report

Reference Interval:

Test Number	Components	Reference Interval
	AMPA Receptor Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	Amphiphysin Antibody, CSF	Negative
	CASPR2 Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	CV2 Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	DPPX Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	GABA-AR Ab IgG CBA IFA Screen, CSF	Less than 1:1
	GABA-BR Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	Glutamic Acid Decarboxylase Antibody CSF	0.0-5.0 IU/mL
	LGI1 Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	Ma2/Ta Antibody, IgG by Immunoblot, CSF	Negative
	mGluR1 Ab IgG CBA IFA Screen, CSF	Less than 1:1
	NMDA Receptor Ab IgG CBA-IFA, CSF	Less than 1:1
	Paraneoplastic Abs (PCCA/ANNA) IgG, CSF	None Detected
	SOX1 Antibody, IgG by Immunoblot, CSF	Negative

TEST CHANGE

Autoimmune Myelopathy Panel, CSF

3006209, AIMYC

Specimen Requirements:	
Patient Preparation:	
Collect:	CSF
Specimen Preparation:	Transfer 4~~three 1~~ mL ~~CSF aliquots~~ to ARUP standard transport tube~~s~~. (Min: 2~~0.5~~ mL~~/aliquot~~)
Transport Temperature:	Frozen
Unacceptable Conditions:	Fluid other than CSF. Grossly hemolyzed specimens
Remarks:	
Stability:	After separation from cells: Ambient: 24 hours; Refrigerated: 1 week; Frozen: 1 month (avoid repeated freeze/thaw cycles)
Methodology:	Semi-Quantitative Cell-Based Indirect Fluorescent Antibody / Semi-Quantitative Indirect Fluorescent Antibody (IFA) / Qualitative Immunoblot / Semi-Quantitative Enzyme-Linked Immunosorbent Assay (ELISA)
Note:	If CV2 CSF antibody IgG is positive, then titer will be added. Additional charges apply. PCCA/ANNA antibody IgG is screened by IFA. If the IFA screen is indeterminate, then a Neuronal Nuclear Antibodies (Hu, Ri, Yo, and Tr/DNER) IgG by Immunoblot will be performed. If the IFA screen is positive at 1:10 or greater, then a PCCA/ANNA antibodies titer and Neuronal Nuclear Antibodies (Hu, Ri, Yo, Tr/DNER) IgG by Immunoblot will be performed. Additional charges apply. If DPPX CSF antibody IgG by IFA is positive, then titer will be added. Additional charges apply. If GABA-BR CSF antibody IgG is positive, then titer will be added. Additional charges apply. If AQP4/NMO CSF antibody IgG by IFA is positive, then titer will be added. Additional charges apply. If mGluR1 CSF antibody IgG by IFA is positive, then titer will be added. Additional charges apply.
CPT Codes:	86341; 86052; 84182 x2; 86255 x5; if reflexed add 84182 x4; 86256 per titer
New York DOH Approval Status:	This test is New York DOH approved.
Interpretive Data:	
Refer to report	
Reference Interval:	

Test Number	Components	Reference Interval
	Amphiphysin Antibody, CSF	Negative
	CV2 Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	DPPX Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	GABA-BR Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	Glutamic Acid Decarboxylase Antibody CSF	0.0-5.0 IU/mL
	mGluR1 Ab IgG CBA IFA Screen, CSF	Less than 1:1
	NMO/AQP4 Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	Paraneoplastic Abs (PCCA/ANNA) IgG, CSF	None Detected
	SOX1 Antibody, IgG by Immunoblot, CSF	Negative

TEST CHANGE

Autoimmune Pediatric CNS Disorders, CSF

3006211, AIPEDC

Specimen Requirements:	
Patient Preparation:	N/A
Collect:	CSF
Specimen Preparation:	Transfer 4~~three 1~~ mL ~~CSF aliquots~~ to ARUP standard transport tube~~s~~. (Min: 2~~0.5~~ mL~~/aliquot~~)
Transport Temperature:	Frozen
Unacceptable Conditions:	Fluid other than CSF. Grossly hemolyzed specimens.
Remarks:	
Stability:	Ambient: 24 hours; Refrigerated: 1 week; Frozen: 30 days (avoid repeated freeze/thaw cycles)
Methodology:	Semi-Quantitative Cell-Based Indirect Fluorescent Antibody / Semi-Quantitative Indirect Fluorescent Antibody (IFA) / Semi-Quantitative Enzyme-Linked Immunosorbent Assay (ELISA)
Note:	If NMDA CSF antibody IgG is positive, then titer will be performed. Additional charges apply. PCCA/ANNA antibody IgG is screened by IFA. If the IFA screen is indeterminate, then a Neuronal Nuclear Antibodies (Hu and Tr/DNER) IgG by Immunoblot will be performed. If the IFA screen is positive at 1:10 or greater, then a PCCA/ANNA antibodies titer and Neuronal Nuclear Antibodies (Hu and Tr/DNER) IgG by Immunoblot will be performed. Additional charges apply. If LGI1 CSF antibody IgG is positive, then titer will be added. Additional charges apply. If CASPR2 CSF antibody IgG is positive, then titer will be added. Additional charges apply. If AQP4/NMO CSF antibody IgG by IFA is positive, then titer will be added. Additional charges apply. If GABA-BR CSF antibody IgG by IFA is positive, then titer will be added. Additional charges apply. If DPPX CSF antibody IgG by IFA is positive, then titer will be added. Additional charges apply. If mGluR1 CSF antibody IgG by IFA is positive, then titer will be added. Additional charges apply.

	If GABA-AR CSF antibody IgG by IFA is positive, then titer will be added. Additional charges apply. If AMPA CSF antibody IgG by IFA is positive, then titer will be added. Additional charges apply.
CPT Codes:	86341; 86052; 86255 x9; if reflexed add 84182 x2; 86256 per titer
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

Refer to report.

Reference Interval:

Test Number	Components	Reference Interval
	AMPA Receptor Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	CASPR2 Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	DPPX Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	GABA-AR Ab IgG CBA IFA Screen, CSF	Less than 1:1
	GABA-BR Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	Glutamic Acid Decarboxylase Antibody CSF	0.0-5.0 IU/mL
	LGI1 Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	mGluR1 Ab IgG CBA IFA Screen, CSF	Less than 1:1
	NMDA Receptor Ab IgG CBA-IFA, CSF	Less than 1:1
	NMO/AQP4 Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	Paraneoplastic Abs (PCCA/ANNA) IgG, CSF	None Detected

TEST CHANGE

Autoimmune Stiff-Person Disorders, CSF

3006235, AISPSC

Specimen Requirements:	
Patient Preparation:	N/A
Collect:	CSF
Specimen Preparation:	Transfer 4~~three 1~~ mL ~~CSF aliquots~~ to ARUP standard transport tube~~s~~. (Min: 2~~0.5~~ mL~~/aliquot~~)
Transport Temperature:	Frozen
Unacceptable Conditions:	Fluid other than CSF. Grossly hemolyzed specimens
Remarks:	
Stability:	After separation from cells: Ambient: 24 hours; Refrigerated: 1 week; Frozen: 30 days (avoid repeated freeze/thaw cycles)
Methodology:	Semi-Quantitative Cell-Based Indirect Fluorescent Antibody / Qualitative Immunoblot / Semi-Quantitative Enzyme-Linked Immunosorbent Assay (ELISA)
Note:	If DPPX CSF Antibody IgG by IFA is positive, then titer will be added. Additional charges apply
CPT Codes:	86341; 84182; 86255; if reflexed, add 86256
New York DOH Approval Status:	This test is New York DOH approved.
Interpretive Data:	
Refer to report.	

Reference Interval:

Test Number	Components	Reference Interval
	Amphiphysin Antibody, CSF	Negative
	DPPX Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	Glutamic Acid Decarboxylase Antibody CSF	0.0-5.0 IU/mL

TEST CHANGE

Exome Sequencing

3016583, EXOME PRO

Specimen Requirements:	
Patient Preparation:	
Collect:	Whole blood in lavender or pink (EDTA) or yellow (ACD solution A or B). ~~Lavender or pink (EDTA) or yellow (ACD solution A or B). Peripheral blood required. Contact ARUP's genetic counselor at 800-242-2787 ext. 2141 prior to test submission. Refer to EXOME FRPT (ARUP test code 3016589) for parental specimen requirements. Two parental controls are recommended for EXOME PRO. Controls should be ordered using EXOME FRPT (ARUP test code 3016589) and submitted within 7 days of the proband's sample.~~ New York State Clients: ARUP cannot facilitate testing for New York patients. Please work directly with a New York-approved laboratory.
Specimen Preparation:	Transport 2mL whole blood (Min 1.0mL).~~)~~ ~~Refer to EXOME FRPT (ARUP test code 3016589) for parental specimen requirements.~~
Transport Temperature:	Refrigerated.~~Refrigerated.~~ ~~Refer to EXOME FRPT (ARUP test code 3016589) for parental specimen requirements.~~
Unacceptable Conditions:	
Remarks:	Refer to Exome Sequencing, Familial Control (ARUP test code 3016589) for comparator specimen requirements. Parental comparator samples are recommended for optimal exome sequencing analysis. Comparator samples must be submitted within 7 days of the proband's sample. Secondary findings are reported for the proband and comparators unless "opt out" is selected on the proband's Genome Sequencing Intake Form.
Stability:	Ambient: 72 hours; Refrigerated: 1 week; Frozen: Unacceptable
Methodology:	Massively Parallel Sequencing
Note:	The ability to identify causative variant(s) for the patient's presentation is strongly influenced by the quality of the clinical information provided. Contact ARUP's genetic counselors at 800-242-2787 ext. 2141 with questions about test submission.
CPT Codes:	81415: per familial comparator, 81416 is added

New York DOH Approval Status:	Specimens from New York clients will be sent out to a New York DOH approved laboratory, if possible.

Interpretive Data:

Refer to report.

Reference Interval:

Refer to report~~N/A~~

TEST CHANGE

Exome Sequencing, Familial Control

3016589, EXOME FRPT

Specimen Requirements:	
Patient Preparation:	
Collect:	Whole blood in lavender~~Lavender~~ or pink (EDTA) or yellow (ACD solution A or B). ~~Peripheral blood required. Contact ARUP's genetic counselor at 800-242-2787 ext. 2141 prior to test submission~~ New York State Clients: ARUP cannot facilitate testing for New York patients. Please work directly with a New York-approved laboratory.
Specimen Preparation:	Transport 2 mL whole blood. (Min: 1.0 mL)
Transport Temperature:	Refrigerated
Unacceptable Conditions:	
Remarks:	Refer to Exome Sequencing (ARUP test code 3016583) for proband specimen requirements. This test is used for parental or other familial comparator~~control~~ samples associated with a proband sample submitted for Exome Sequencing (ARUP test code 3016583). Comparator samples must be submitted ~~EXOME PRO. Submit comparator samples~~ within 7 days of the proband's sample. Please list the name/DOB of submitted familial comparators~~If a report for a parental control sample is desired, indicate opt-in status for ACMG secondary findings~~ on the proband's Exome Sequencing Intake Form.~~exome sequencing intake form (additional charges apply).~~
Stability:	Ambient: 72 hours; Refrigerated: 1 week; Frozen: Unacceptable
Methodology:	Massively Parallel Sequencing
Note:	Parental or other familial comparator samples are used to aid in interpretation of the proband's exome sequencing data. Contact ARUP's genetic counselors at 800-242-2787 ext. 2141 with questions about test submission~~Please indicate on the exome sequencing intake form if a report of American College of Medical Genetics and Genomics (ACMG) secondary findings is desired for submitted parental controls (additional charges apply). Please list the name/DOB for parental controls on the exome sequencing intake form~~.
CPT Codes:	NA
New York DOH Approval Status:	Specimens from New York clients will be sent out to a New York DOH approved laboratory, if possible.
Interpretive Data:	
Refer to report.	
Reference Interval:	

Refer to report~~N/A~~

NEW TEST

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Cytogenomic SNP Microarray - RAPID

3016596, CMA RAPID

Specimen Requirements:	
Patient Preparation:	IF Buccal swab: Patient should not eat, drink, smoke or chew gum for 30 minutes before collecting oral sample.
Collect:	Peripheral blood or cord blood collected in lavender (K2EDTA). OR Buccal swab: collect one buccal swab using the ORAcollect Collection Kit (ARUP supply #49295). Available online through eSupply using ARUP Connect or contact ARUP Client Services at 800-522-2787
Specimen Preparation:	Whole Blood: Transport 3 mL. (Min: 0.5 mL) Buccal Swab: ensure the sponge tip does not come in contact with any surface prior to collection. Transport buccal swab in ORAcollect Collection Kit.
Transport Temperature:	Preferred transport temp: Room temperature.
Unacceptable Conditions:	Frozen or clotted specimens
Remarks:	
Stability:	Whole blood: Room temperature: 2 days; Refrigerated: 3 days; Frozen: Unacceptable Buccal swab: Room temperature: 1 week; Refrigerated: 1 week; Frozen: Unacceptable
Methodology:	Genomic Microarray (Oligo-SNP Array)
Note:	
CPT Codes:	81229
New York DOH Approval Status:	Specimens from New York clients will be sent out to a New York DOH approved laboratory, if possible.
Interpretive Data:	
Refer to report.	
Reference Interval:	

HOTLINE NOTE: Refer to the Hotline Test Mix for interface build information.

TEST CHANGE

Hemoglobin S Evaluation with Reflex to RBC Solubility

3016616, SCKLHB

Specimen Requirements:	
Patient Preparation:	
Collect:	Lavender (EDTA) or pink (K2EDTA).
Specimen Preparation:	Transport 5 mL whole blood in original tube. ~~.~~ (Min: 0.2 mL) Also acceptable: whole blood in an ARUP standard transport tube.
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Frozen or room temperature specimens.
Remarks:	
Stability:	Ambient: Unacceptable; Refrigerated: 1 week; Frozen: Unacceptable
Methodology:	High Performance Liquid Chromatography (HPLC) / RBC Solubility
Note:	If HPLC detects a peak which suggests Hgb S, then RBC s~~S~~olubility will be added for confirmation. Additional charges apply.
CPT Codes:	83021; if reflexed, add 85660
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

Negative: Negative for h~~H~~emoglobin S by HPLC. Solubility testing not performed.
Positive: Positive for h~~H~~emoglobin S by HPLC and confirmed by solubility testing. Additional charges apply.
Conf Previous: Positive for h~~H~~emoglobin S by HPLC. Solubility testing performed previously and not repeated with this submission.

This test does not differentiate hemoglobin S trait from homozygous sickle cell disease or other possible combinations such as: S/C, S/D, S/G, S/E, S/thalassemia, S/O-Arab, S/New York and C-Georgetown trait (Hb C-Harlem). For further clarification, Hemoglobin Evaluation with Reflex to Electrophoresis and/or RBC Solubility (ARUP test code 3017101) is recommended.

Reference Interval:

~~Negative~~

Test Number	Components	Reference Interval
	Hemoglobin S Evaluation	Negative

TEST CHANGE

Myelin Oligodendrocyte Glycoprotein (MOG) Antibody, IgG by CBA-IFA With Reflex to Titer, CSF

3016853, MOG CSF

Specimen Requirements:	
Patient Preparation:	
Collect:	CSF
Specimen Preparation:	Transfer 1~~0.5~~ mL CSF to an ARUP standard transport tube. (Min: 0.3~~15~~ mL)
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Hemolyzed, contaminated specimens, or severely lipemic specimens.
Remarks:	
Stability:	Ambient: 48 hours; Refrigerated: 2 weeks; Frozen: 1 month
Methodology:	Semi-Quantitative Cell-Based Indirect Fluorescent Antibody
Note:	If Myelin Oligodendrocyte Glycoprotein (MOG) Antibody, IgG by IFA with Reflex to Titer, CSF is positive, then a Myelin Oligodendrocyte Glycoprotein (MOG) Antibody Titer, IgG is performed. Additional charges apply.
CPT Codes:	86362; if reflexed, add 86256
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

Myelin oligodendrocyte glycoprotein (MOG) antibody is found in a subset of patients with neuromyelitis optica spectrum disorders, including optic neuritis and transverse myelitis, brainstem encephalitis, and acute disseminated encephalomyelitis. Persistence of antibody positivity may be associated with a relapsing course; decreasing antibody levels may be associated with therapeutic response. A negative test result does not rule out a diagnosis of CNS demyelinating disease. Low antibody titers have a lower positive predictive value of disease, and should be carefully interpreted in the context of the patient's clinical history, neurologic exam, imaging, and other laboratory findings. Serum is the preferred specimen type, but in some cases patients with MOG-associated disease may be positive only in CSF; CSF positivity may be associated with more severe clinical outcomes.

This indirect fluorescent antibody assay utilizes full-length MOG transfected cell lines for the detection and semiquantification of MOG IgG antibody.

Reference Interval:

Test Number	Components	Reference Interval
	MOG Ab IgG CBA-IFA Screen, CSF	Less than 1:1

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Effective Date: April 20, 2026

TEST CHANGE

CV2 Antibody, IgG by CBA-IFA With Reflex to Titer, CSF

3017001, CV2 CSF

Specimen Requirements:	
Patient Preparation:	
Collect:	CSF.
Specimen Preparation:	Transfer 10~~.5~~ mL CSF to an ARUP standard transport tube. (Min: 0.3~~1.5~~ mL)
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Hemolyzed, contaminated, or severely lipemic specimens.
Remarks:	
Stability:	Ambient: 48 hours; Refrigerated: 2 weeks; Frozen: 1 month
Methodology:	Semi-Quantitative Cell-Based Indirect Fluorescent Antibody
Note:	If CV2 Antibody IgG Screen by IFA, CSF is positive, then CV2 Antibody IgG Titer, CSF will be added. Additional charges apply.
CPT Codes:	86255; if reflexed, add 86256
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

CV2 antibodies aid in discriminating between chronic paraneoplastic neurological disorder (PND) and other inflammatory disorders of the nervous system. Anti-CV2 is associated with small-cell lung cancer and thymoma. A negative test result does not rule out a diagnosis of autoimmune neurologic disease. Results should be interpreted in correlation with the patient's clinical history and other laboratory findings.

This indirect fluorescent antibody assay utilizes CV2 transfected cell lines for the detection and semiquantification of the CV2 IgG antibody.

Reference Interval:

Test Number	Components	Reference Interval
	CV2 Ab IgG CBA-IFA Screen, CSF	Less than 1:1

Inserted Cells

TEST CHANGE

Hemoglobin Evaluation by HPLC With Reflex to Electrophoresis and/or RBC Solubility

3017101, HGBEL RFX

Specimen Requirements:	
Patient Preparation:	
Collect:	Lavender (EDTA) or pink (K2EDTA).
Specimen Preparation:	Transport 5 mL whole blood in original tube.~~.~~ (Min: 0.5 mL) Also acceptable: whole blood in an ARUP standard transport tube.
Transport Temperature:	Refrigerated
Unacceptable Conditions:	Frozen or room temperature specimens.
Remarks:	
Stability:	Ambient: Unacceptable; Refrigerated: 1 week; Frozen: Unacceptable
Methodology:	High Performance Liquid Chromatography (HPLC) / Capillary Electrophoresis / RBC Solubility
Note:	If abnormal peaks suggestive of a hemoglobin variant are detected, then RBC s~~S~~olubility and/or capillary electrophoresis~~Capillary Electrophoresis~~ will be performed to aid in confirmation and identification of the variant. Additional charges apply. If a hemoglobin variant cannot be quantitated by HPLC, results from capillary electrophoresis will be reported. Quantitation of hemoglobin is recommended for a definitive diagnosis in infants 1 year and older.
CPT Codes:	83021; if reflexed, add 83020; 85660
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

Sickle Cell Solubility Reflex:

Not Performed: Solubility testing for h~~H~~emoglobin S not indicated.
Positive: Positive for h~~H~~emoglobin S by HPLC and confirmed by solubility testing. Additional charges apply.
Conf Previous: Positive for h~~H~~emoglobin S by HPLC. Solubility testing performed previously and not repeated with this submission.

Hgb Capillary Electrophoresis Reflex:

Not Performed: Confirmation by capillary electrophoresis~~Capillary Electrophoresis~~ not indicated.
Performed: Results confirmed by capillary electrophoresis.~~Capillary Electrophoresis.~~ Additional

charges apply.
Conf Previous: Capillary eElectrophoresis confirmation performed as part of a previous submission. Confirmation not repeated with this submission.

Reference Interval:

<table>
<tr><th>Test Number</th><th>Components</th><th>Reference Interval</th></tr>
<tr><td></td><td>Hemoglobin A</td><td></td></tr>
<tr><td></td><td></td><td>
<table>
<tr><th>Age</th><th>Reference Intervals (%)</th></tr>
<tr><td>0-1 months</td><td>7.6-54.8</td></tr>
<tr><td>2 months</td><td>14.7-70.1</td></tr>
<tr><td>3 months</td><td>26.6-81.8</td></tr>
<tr><td>4 months</td><td>43.0-89.5</td></tr>
<tr><td>5 months</td><td>60.8-94.0</td></tr>
<tr><td>6-8 months</td><td>78.2-96.6</td></tr>
<tr><td>9-12 months</td><td>86.1-97.2</td></tr>
<tr><td>13-23 months</td><td>85.1-97.7</td></tr>
<tr><td>2 years and older</td><td>95.0-97.9</td></tr>
</table>
</td></tr>
<tr><td></td><td>Hemoglobin A2</td><td></td></tr>
<tr><td></td><td></td><td>
<table>
<tr><th>Age</th><th>Reference Intervals (%)</th></tr>
<tr><td>0-1 months</td><td>0.0-1.4</td></tr>
<tr><td>2 months</td><td>0.0-2.0</td></tr>
<tr><td>3 months</td><td>0.1-2.6</td></tr>
<tr><td>4 months</td><td>0.8-3.0</td></tr>
<tr><td>5 months</td><td>1.5-3.3</td></tr>
<tr><td>6-8 months</td><td>1.8-3.5</td></tr>
<tr><td>9-23 months</td><td>1.9-3.5</td></tr>
<tr><td>2 years and older</td><td>2.0-3.5</td></tr>
</table>
</td></tr>
<tr><td></td><td>Hemoglobin C</td><td>0.0</td></tr>
<tr><td></td><td>Hemoglobin E</td><td>0.0</td></tr>
<tr><td></td><td>Hemoglobin F</td><td></td></tr>
<tr><td></td><td></td><td>
<table>
<tr><th>Age</th><th>Reference Intervals (%)</th></tr>
<tr><td>0-1 months</td><td>45.8-91.7</td></tr>
<tr><td>2 months</td><td>32.7-85.2</td></tr>
<tr><td>3 months</td><td>14.5-73.7</td></tr>
<tr><td>4 months</td><td>4.2-56.9</td></tr>
<tr><td>5 months</td><td>1.0-38.1</td></tr>
<tr><td>6-8 months</td><td>0.9-19.4</td></tr>
<tr><td>9-12 months</td><td>0.6-11.6</td></tr>
<tr><td>13-23 months</td><td>0.0-8.5</td></tr>
</table>
</td></tr>
</table>

		2 years and older	0.0-2.1
	Hemoglobin Other	0.0	
	Hemoglobin S	0.0	
	Sickle Cell Solubility	Not Performed	

TEST CHANGE

Thrombotic Risk Reflex Panel

3017156, THROMRISK

Specimen Requirements:	
Patient Preparation:	Fasting preferred. Refer to Specimen Handling at aruplab.com for hemostasis/thrombosis specimen handling guidelines.
Collect:	Four light blue (sodium citrate) AND two lavender (EDTA) AND one~~two~~ serum separator tube (SST). ~~tubes (SSTs). Also acceptable in place of one of the serum separator tubes (SSTs): green (lithium heparin) or EDTA (K2 or K3).~~
Specimen Preparation:	Separate~~One~~ serum from cells ASAP~~separator tube (SST), green (lithium heparin),~~ or ~~EDTA (K2 or K3) must be centrifuged and serum or plasma separated~~ within 2 hours~~1 hour~~ of collection. Transfer 1 mL ~~centrifuged~~ serum into 1~~or plasma to~~ ARUP standard transport tube ~~and label centrifuged tube for homocysteine testing. (Min: 0.5 mL) AND Transfer 2 mL serum into 2 ARUP standard transport tubes~~, label as serum. (Min: 0.6~~5~~ mL/tube) AND Transfer 7.5 mL platelet poor plasma prepared from the sodium citrate tubes to 5 ARUP standard transport tubes, label as sodium citrate. (Min: 1 mL/tube) AND Transfer 3 mL lavender whole blood to 2 ARUP standard transport tubes. (Min: 1 mL/tube)
Transport Temperature:	Light blue (sodium citrate): CRITICAL FROZEN. Separate specimens must be submitted when multiple tests are ordered. Lavender whole blood and serum~~, green (lithium heparin), or EDTA (K2 or K3):~~ Frozen.
Unacceptable Conditions:	Specimens collected in any tube type not listed above.
Remarks:	
Stability:	Light blue (sodium citrate): Ambient: Unacceptable; Refrigerated: Unacceptable; Frozen: 2 weeks Lavender whole blood: Ambient: 7 days; Refrigerated: 1 week; Frozen: 1 month Serum: After separation from cells: Ambient: 48~~2~~ hours; Refrigerated: 2 weeks~~1 week~~; Frozen: 1 year (avoid repeated freeze/thaw cycles)~~2 weeks~~ ~~Green (lithium heparin) or EDTA (K2 or K3): Ambient: 4 days; Refrigerated: 1 month; Frozen: 10 months~~
Methodology:	Electromagnetic Mechanical Clot Detection / Chromogenic ~~Assay / Quantitative Enzymatic~~ Assay / Semi-Quantitative Enzyme-Linked Immunosorbent Assay (ELISA) / Polymerase Chain Reaction (PCR) / Fluorescence Monitoring / Microlatex Particle-Mediated Immunoassay

Note:	Testing will include Antithrombin, Enzymatic (Activity) (0030010); Protein S Free, Antigen (0098894); Protein C, Functional (0030113); Beta-2 Glycoprotein 1 Antibodies, IgG and IgM (0050321); Cardiolipin Antibodies, IgG and IgM (0099344); Lupus Anticoagulant Reflex Panel (3017009); Prothrombin (F2) c.*97G>A (G20210A) Pathogenic Variant (0056060); and APC Resistance Profile with Reflex to Factor V Leiden (0030192~~); and Homocysteine, Total (0099869~~). If APC resistance is low, or if a valid result cannot be obtained for the APC portion of the profile, then Factor V Leiden by PCR will be added. Additional charges apply. For the Lupus Anticoagulant Reflex Panel (3017009) portion of the panel, if PTT-LA Ratio and dRVVT Screen Ratio are normal, then no further clot-based testing is performed. If either the PTT-LA Ratio or dRVVT Screen Ratio are elevated, then Anti-Xa Qualitative Interpretation is added. If PTT-LA Ratio is elevated, then Thrombin Time is also added. If Anti-Xa Qualitative Interpretation is Present and Thrombin Time is greater than 30 seconds, then Hepzyme treatment is added. If PTT-LA Ratio is normal and Anti-Xa Qualitative Interpretation is Present, or Thrombin Time is greater than 30 seconds, and Anti-Xa Qualitative Interpretation is Not Present, or Thrombin Time is less than 30 seconds, and Anti-Xa Qualitative Interpretation is Present, then DOAC-Stop treatment is added. If either Hepzyme or DOAC-Stop treatment is added, then Neutralized PTT-LA Ratio and/or Neutralized dRVVT Screen Ratio are added. If dRVVT Screen Ratio is elevated in the absence of Hepzyme or DOAC-Stop, or if Neutralized dRVVT Screen Ratio is elevated, then dRVVT 1:1 Mix Ratio and dRVVT Confirmation Ratio are added. If PTT-LA Ratio is elevated in the absence of Hepzyme or DOAC-Stop treatment, or if Neutralized PTT-LA Ratio is elevated, then Hexagonal Phospholipid Confirmation is added. Additional charges apply. ~~False elevations of plasma or serum homocysteine may occur if the plasma or serum is not promptly separated from the cells at the time of collection.~~
CPT Codes:	81240~~; 83090~~; 85300; 85303; 85306; 85307; 85610; 85613; 85730; 86147x2; 86146x2; if reflexed, additional CPT codes may apply: 81241; 85520; 85525; 85598; 85613; 85670; 85730.
New York DOH Approval Status:	This test is New York DOH approved.
Interpretive Data: Refer to individual components.	
Reference Interval: Refer to report~~individual components.~~	

HOTLINE NOTE: There is a reflexive pattern change associated with this test. One or more orderable or component has been added or removed to the reflexive pattern. Refer to the Hotline Test Mix for interface build information.

TEST CHANGE

Ma2/Ta Antibody, IgG by Immunoblot, CSF

3017440, MA2/TA CSF

Specimen Requirements:	
Patient Preparation:	
Collect:	CSF
Specimen Preparation:	Transfer 21 mL ~~CSF~~ to ~~an~~ ARUP standard transport tube. (Min: 10~~.60~~ mL)
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Urine, plasma. Contaminated, heat-inactivated, hemolyzed, or lipemic specimens.
Remarks:	
Stability:	Ambient: 48 hours; Refrigerated: 2 weeks; Frozen: 1 month
Methodology:	Qualitative Immunoblot
Note:	
CPT Codes:	84182
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

IgG antibodies to Ma2/Ta are associated with paraneoplastic neurologic syndromes with phenotypes most often including a combination of limbic encephalitis, diencephalic encephalitis, and brainstem encephalitis. Patients with anti-Ma2/Ta paraneoplastic neurologic syndromes should be thoroughly evaluated for cancer, including testicular cancer and adenocarcinoma, as neurologic symptoms often precede cancer diagnosis. Use of immune checkpoint inhibitors has also been associated with an increased risk of anti-Ma2 paraneoplastic neurologic disease. Consider sending testing in serum as well as CSF to improve diagnostic yield. Results (positive or negative) should be interpreted in the context of the patient's complete clinical picture, as false positives may occur and a negative result does not exclude the diagnosis of paraneoplastic neurologic disease.

Reference Interval:

Test Number	Components	Reference Interval
	Ma2/Ta Antibody, IgG by Immunoblot, CSF	Negative

TEST CHANGE

Encephalitis Panel With Reflex to Herpes Simplex Virus Types 1 and 2 Glycoprotein G-Specific Antibodies, IgG, CSF

3017752, ENCEPH-CSF

Specimen Requirements:	
Patient Preparation:	
Collect:	CSF.
Specimen Preparation:	Transfer 5.0mL CSF to an ARUP standard transport tube. (Min: 2.5mL)
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Serum or plasma. Contaminated, heat-inactivated, or hemolyzed specimens.
Remarks:	
Stability:	Ambient: 8 hours; Refrigerated: 2 weeks; Frozen: 1 month
Methodology:	Semi-Quantitative Enzyme-Linked Immunosorbent Assay (ELISA) / Semi-Quantitative Chemiluminescent Immunoassay (CLIA) / Semi-Quantitative Indirect Fluorescent Antibody (IFA)
Note:	If HSV 1 and/or 2 IgG, CSF is 1.10 IV or greater, then HSV 1 G-specific IgG, CSF and HSV 2 G-specific IgG, CSF will be added. Additional charges apply.
CPT Codes:	86765 x2; 86735 x2; 86787 x2; 86789; 86788; 86694; if reflexed, add 86695; 86696
New York DOH Approval Status:	Specimens from New York clients will be sent out to a New York DOH approved laboratory, if possible.

Interpretive Data:

~~Component~~	~~Interpretation~~
~~Measles (Rubeola) Antibody, IgG, CSF~~	~~13.4 AU/mL or less: Negative. No significant level of IgG antibody to measles (rubeola) virus detected. 13.5-16.4 AU/mL: Equivocal. Repeat testing in 10-14 days may be helpful. 16.5 AU/mL or greater: Positive. IgG antibody to measles (rubeola) detected, which may indicate a current or past measles (rubeola) infection.~~
~~Measles~~	~~Less than 1:2:~~

Deleted Cells

Deleted Cells

~~(Rubeola) Antibody, IgM, CSF by IFA~~	~~Negative. No evidence of recent infection. False-negative results are possible if the specimen was collected too soon after exposure. 1:2 or greater: Positive. Indicative of recent primary measles infection.~~
~~Mumps Virus Antibody IgG, CSF~~	~~8.9 AU/mL or less: Negative. No significant level of detectable IgG mumps virus antibody. 9.0-10.9 AU/mL: Equivocal. Repeat testing in 10-14 days may be helpful. 11.0 AU/mL or greater: Positive. IgG antibody to mumps virus detected, which may indicate a current or past mumps virus infection.~~
~~Mumps Virus Antibody IgM, CSF~~	~~0.79 IV or less: Negative. No significant level of detectable IgM antibody to mumps virus. 0.80-1.20 IV: Equivocal. Borderline levels of IgM antibody to mumps virus. Repeat testing in 10-14 days may be helpful. 1.21 IV or greater: Positive. Presence of IgM antibody to mumps virus detected, which may indicate a current or recent infection. However, low levels of IgM~~

	antibody may occasionally persist for more than 12 months post infection or immunization.
Varicella-Zoster Virus Antibody, IgG, CSF	Less than or equal to 0.99 S/CO: Negative: No significant level of IgG antibody to varicella-zoster virus detected. Greater than or equal to 1.00 S/CO: Positive: IgG antibody to varicella-zoster virus detected, which may indicate a current or past varicella-zoster infection.
Varicella-Zoster Virus Antibody, IgM by ELISA (CSF)	0.90 ISR or less: Negative. No significant level of IgM antibody to varicella-zoster virus detected. 0.91-1.09 ISR: Equivocal. Repeat testing in 10-14 days may be helpful. 1.10 ISR or greater: Positive. Significant level of IgM antibody to varicella-zoster virus detected, which may indicate current or recent infection. However, low levels of IgM antibodies may occasionally persist for more than 12 months post infection.
Herpes Simplex Virus Type 1 and/or 2 Antibodies, IgG, CSF	0.89 IV or less: Negative. No significant level of detectable HSV IgG antibody. 0.90-1.09 IV: Equivocal. Questionable

	~~presence of IgG antibodies. Repeat testing in 10-14 days may be helpful. 1.10 IV or greater: Positive. IgG antibody to HSV detected which may indicate a current or past HSV infection.~~
~~West Nile Virus Antibody, IgG by ELISA, CSF~~	~~1.29 IV or less: Negative. No significant level of West Nile virus IgG antibody detected. 1.30-1.49 IV: Equivocal. Questionable presence of West Nile virus IgG antibody detected. Repeat testing in 10-14 days may be helpful. 1.50 IV or greater: Positive. Presence of IgG antibody to West Nile virus detected, suggestive of current or past infection.~~
~~West Nile Virus Antibody, IgM by ELISA, CSF~~	~~0.89 IV or less: Negative. No significant level of West Nile virus IgM antibody detected. 0.90-1.10 IV: Equivocal. Questionable presence of West Nile virus IgM antibody detected. Repeat testing in 10-14 days may be helpful. 1.11 IV or greater: Positive. Presence of IgM antibody to West Nile virus detected, suggestive of current or recent infection.~~

Reference Interval:

Test Number	Components	Reference Interval
	HSV 1/2 Antibody Screen IgG, CSF	0.89 IV or less
	Measles, Rubeola, Antibody IgG CSF	Less than or equal to 13.4 AU/mL
	Measles, Rubeola, Antibody IgM CSF	Less than 1:2
	Mumps Virus Antibody IgG CSF	Less than or equal to 8.9 AU/mL
	Mumps Virus Antibody IgM CSF	0.79 IV or less
	VZV Antibody IgG CSF	0.99 S/CO or less
	VZV Antibody IgM CSF	0.90 ISR or less
	West Nile Virus Antibody IgG CSF	1.29 IV or less
	West Nile Virus Antibody IgM CSF	0.89 IV or less

TEST CHANGE

Kelch-Like Protein 11 Antibody, IgG by CBA-IFA, With Reflex to Titer, CSF

3018508, KLHL11 CSF

Specimen Requirements:	
Patient Preparation:	
Collect:	Separate CSF.
Specimen Preparation:	Transfer 1~~0.5~~ mL CSF to an ARUP standard transport tube. (Min: 0.3~~15~~ mL)
Transport Temperature:	Refrigerated
Unacceptable Conditions:	Grossly hemolyzed or contaminated specimens.
Remarks:	
Stability:	Ambient: 48 hours; Refrigerated: 2 weeks; Frozen: 1 month (three freeze/thaw cycles are acceptable)
Methodology:	Semi-Quantitative Cell-Based Indirect Fluorescent Antibody
Note:	If KLHL11 antibody IgG is positive, then KLHL11 antibody IgG titer will be added. Additional charges apply.
CPT Codes:	86255; if reflexed, add 86256
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

IgG antibodies to KLHL11 are associated with paraneoplastic neurologic syndromes with phenotypes most often including a combination of brainstem and cerebellar encephalitis as well as sensorineural hearing loss. Patients with anti-KLHL11 syndromes should be thoroughly evaluated for cancer, including testicular cancer, as neurologic symptoms often precede cancer diagnosis. Consider sending testing in serum as well as CSF to improve diagnostic yield. Coexisting and clinically relevant antineural antibodies have been reported; consider ordering a phenotype-specific panel to assess for these. Results (positive or negative) should be interpreted in the context of the patient's complete clinical picture, as false positives may occur, and a negative result does not exclude the diagnosis of immune-mediated neurologic disease.

Reference Interval:

Test Number	Components	Reference Interval
	KLHL11 Ab IgG CBA-IFA Screen, CSF	Less than 1:1

TEST CHANGE

Autoimmune Movement Disorder Panel, CSF

3018966, AIMDC 2

Specimen Requirements:	
Patient Preparation:	
Collect:	CSF
Specimen Preparation:	Transfer 4~~three 1~~ mL ~~CSF aliquots~~ to ARUP standard transport tube~~s~~. (Min: 2~~0.5~~ mL~~/aliquot~~)
Transport Temperature:	Frozen
Unacceptable Conditions:	Fluid other than CSF. Grossly hemolyzed specimens
Remarks:	
Stability:	Ambient: 24 hours; Refrigerated: 1 week; Frozen: 1 month (avoid repeated freeze/thaw cycles)
Methodology:	Semi-Quantitative Cell-Based Indirect Fluorescent Antibody / Semi-Quantitative Indirect Fluorescent Antibody (IFA) / Qualitative Immunoblot / Semi-Quantitative Enzyme-Linked Immunosorbent Assay (ELISA)
Note:	If NMDA CSF antibody IgG is positive, then titer will be performed. Additional charges apply. If CV2 CSF antibody IgG is positive, then titer will be added. Additional charges apply. PCCA/ANNA CSF antibody IgG is screened by IFA. If the IFA screen is indeterminate, then a Neuronal Nuclear Antibodies (Hu, Ri, Yo, and Tr/DNER) IgG by Immunoblot will be performed. If the IFA screen is positive at 1:10 or greater, then a PCCA/ANNA antibodies titer and Neuronal Nuclear Antibodies (Hu, Ri, Yo, Tr/DNER) IgG by Immunoblot will be performed. Additional charges apply. If PCCA is detected ITPR1 antibody IgG will be added and if positive, then titer will be added. Additional charges apply. If LGI1 CSF antibody IgG is positive, then titer will be added. Additional charges apply. If CASPR2 CSF antibody IgG is positive, then titer will be added. Additional charges apply. If DPPX CSF antibody IgG by IFA is positive, then titer will be added. Additional charges apply. If AMPA CSF antibody IgG is positive, then titer will be added. Additional charges apply. If GABA-BR CSF antibody IgG is positive, then titer will be added. Additional charges apply. If GABA-AR CSF antibody IgG by IFA is positive, then titer will be added. Additional charges apply. If mGluR1 CSF antibody IgG by IFA is positive, then titer will be added. Additional charges apply.

	If IgLON5 CSF antibody IgG by IFA is positive, then titer will be added. Additional charges apply. If KLHL11 antibody IgG by IFA is positive, then titer will be added. Additional charges apply.
CPT Codes:	86341; 84182 x3; 86255 x12; if reflexed add 84182 x4; 86255; 86256 per titer
New York DOH Approval Status:	This test is New York DOH approved.
Interpretive Data:	
Refer to report	

Reference Interval:

Test Number	Components	Reference Interval
	AMPA Receptor Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	Amphiphysin Antibody, CSF	Negative
	CASPR2 Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	CV2 Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	DPPX Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	GABA-AR Ab IgG CBA IFA Screen, CSF	Less than 1:1
	GABA-BR Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	Glutamic Acid Decarboxylase Antibody CSF	0.0-5.0 IU/mL
	IgLON5 Ab IgG CBA IFA Screen, CSF	Less than 1:1
	KLHL11 Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	LGI1 Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	Ma2/Ta Antibody, IgG by Immunoblot, CSF	Negative
	mGluR1 Ab IgG CBA IFA Screen, CSF	Less than 1:1
	NMDA Receptor Ab IgG CBA-IFA, CSF	Less than 1:1
	Paraneoplastic Abs (PCCA/ANNA) IgG, CSF	None Detected
	SOX1 Antibody, IgG by Immunoblot, CSF	Negative

TEST CHANGE

Autoimmune Neurologic Disease Panel With Reflex, CSF

3018967, NEURORCSF3

Specimen Requirements:	
Patient Preparation:	
Collect:	CSF
Specimen Preparation:	Transfer 4~~four 1~~ mL ~~CSF aliquots~~ to ARUP standard transport tube~~s~~. (Min: 2~~.8~~ mL)
Transport Temperature:	Frozen
Unacceptable Conditions:	Fluid other than CSF. Grossly hemolyzed specimens.
Remarks:	
Stability:	Ambient: 24 hours; Refrigerated: 1 week; Frozen: 1 month (Three freeze/thaw cycles are acceptable.)
Methodology:	Semi-Quantitative Cell-Based Indirect Fluorescent Antibody / Qualitative Immunoblot / Quantitative Radioimmunoassay (RIA) / Semi-Quantitative Enzyme-Linked Immunosorbent Assay (ELISA) / Semi-Quantitative Indirect Fluorescent Antibody (IFA)
Note:	If NMDA CSF antibody IgG is positive, then titer will be added. Additional charges apply. If AMPA CSF antibody IgG is positive, then titer will be added. Additional charges apply. If GABA-BR CSF antibody IgG is positive, then titer will be added. Additional charges apply. If CASPR2 CSF antibody IgG is positive, then titer will be added. Additional charges apply. PCCA/ANNA CSF antibodies are screened by IFA. If the IFA screen is indeterminate, then the Immunoblot will be added. If the IFA screen is positive at 1:1, then a specific titer (PCCA or ANNA) and Immunoblot will be added. Additional charges apply. If PCCA is detected ITPR1 antibody IgG will be added and if positive, then titer will be added. Additional charges apply. If LGI1 CSF antibody IgG is positive, then titer will be added. Additional charges apply. If CV2 CSF antibody IgG is positive, then titer will be added. Additional charges apply. If DPPX CSF antibody IgG is positive, then titer will be added. Additional charges apply. If IgLON5 CSF antibody IgG is positive, then titer will be added. Additional charges apply. If GABA-AR CSF antibody IgG is positive, then titer will be added. Additional charges apply. If mGLUR1 antibody IgG is positive, then titer will be added.

	Additional charges apply. If KLHL11 antibody IgG by IFA is positive, then titer will be added. Additional charges apply.
CPT Codes:	86255 x12; 83519; 86341; 84182 x3; if reflexed, add 84182 x4; 86255; 86256 per titer
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

Refer to Report

Component	Interpretive Data
Voltage-Gated Potassium Channel Ab, CSF	0.0-1.1 pmol/L: Negative 1.2 pmol/L or greater: Positive

Reference Interval:

Test Number	Components	Reference Interval
	AMPA Receptor Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	Amphiphysin Antibody, CSF	Negative
	CASPR2 Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	CV2 Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	DPPX Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	GABA-AR Ab IgG CBA IFA Screen, CSF	Less than 1:1
	GABA-BR Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	Glutamic Acid Decarboxylase Antibody CSF	0.0-5.0 IU/mL
	IgLON5 Ab IgG CBA IFA Screen, CSF	Less than 1:1
	KLHL11 Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	LGI1 Ab IgG CBA-IFA Screen, CSF	Less than 1:1
	Ma2/Ta Antibody, IgG by Immunoblot, CSF	Negative
	mGluR1 Ab IgG CBA IFA Screen, CSF	Less than 1:1
	NMDA Receptor Ab IgG CBA-IFA, CSF	Less than 1:1
	Paraneoplastic Abs (PCCA/ANNA) IgG, CSF	None Detected
	SOX1 Antibody, IgG by Immunoblot, CSF	Negative
	Voltage-Gated Potassium Channel Ab, CSF	1.1 pmol/L or less

TEST CHANGE

Influenza A (H5) Virus by Qualitative NAAT

3018970, H5 PCR

Specimen Requirements:	
Patient Preparation:	
Collect:	Respiratory swab or conjunctival swab.
Specimen Preparation:	Place swab in viral transport media (ARUP supply #12884) available online through eSupply using ARUP Connect{~~{~~TM}~~}~~ or contact ARUP Client Services at 800-522-2787.
Transport Temperature:	Frozen
Unacceptable Conditions:	Specimens not in viral transport media.
Remarks:	
Stability:	Ambient: 2 days Refrigerated: 5 days Frozen: 28~~14~~ days
Methodology:	Qualitative Nucleic Acid Amplification Test (NAAT)
Note:	
CPT Codes:	87502
New York DOH Approval Status:	Specimens from New York clients will be sent out to a New York DOH approved laboratory, if possible.

Interpretive Data:

A negative result does not rule out the presence of PCR inhibitors in the patient specimen or assay-specific nucleic acid in concentrations below the level of detection by this assay.

Reference Interval:

Test Number	Components	Reference Interval
	Influenza A by NAAT	Not Detected
	Influenza H5 by NAAT	Not Detected

TEST CHANGE

11Q Aberrations by FISH

3019126, 11Q FISH

Specimen Requirements:	
Patient Preparation:	
Collect:	Tumor tissue.
Specimen Preparation:	Formalin fix (10 percent neutral buffered formalin) and paraffin-embed specimen. Protect paraffin block from excessive heat. Transport tissue block or 6 unstained (3-micron thick sections) positively charged slides in a tissue transport kit (ARUP supply #47808) available online through eSupply using ARUP Connect(TM) or contact ARUP Client Services at 800-522-2787 (kit is recommended but not necessary). (Min: 3 slides)
Transport Temperature:	Room temperature or refrigerated. Ship in cooled container during summer months.
Unacceptable Conditions:	Specimens fixed or processed in alternative fixatives (alcohol, Prefer) or heavy metal fixatives (B-4 or B-5). No tumor in tissue. Decalcified specimens.
Remarks:	Include surgical pathology report. If multiple specimens (blocks or slides) are sent to ARUP, they must be accompanied by one of the following: an order comment indicating that the ARUP pathologist should choose the specimen most appropriate for testing (e.g., "Choose best block"), or individual orders for each sample submitted. A Pathologist Block Selection Fee (ARUP test code 3002076) will be added to orders that utilize the first option. If multiple specimens are sent to ARUP without a request for pathologist block/slide selection or individual orders, they will be held until clarification is provided.
Stability:	Ambient: Indefinitely; Refrigerated: Indefinitely; Frozen: Unacceptable
Methodology:	Fluorescence in situ Hybridization (FISH)
Note:	
CPT Codes:	88377
New York DOH Approval Status:	This test is New York DOH approved.
Interpretive Data:	
Refer to report.	
Reference Interval:	
Refer to report	

HOTLINE NOTE: There is a component change associated with this test. One or more components

have been added or removed. Refer to the Hotline Test Mix for interface build information.

TEST CHANGE

UPD Glucuronosyltransferase 1A1 (UGT1A1) and Dihydropyrimidine Dehydrogenase (DPYD) Genotyping

3019841, UGT1A1DPYD

Specimen Requirements:	
Patient Preparation:	
Collect:	Two tubes of lavender (EDTA), pink (K2EDTA).
Specimen Preparation:	Transport 3 mL whole blood in each tube. (Min: 1 mL in each tube)
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Heparinized specimens. Frozen specimens in glass collection tubes.
Remarks:	
Stability:	Ambient: 72 hours; Refrigerated: 1 week
Methodology:	Fragment Analysis / Polymerase Chain Reaction (PCR) / Fluorescence Monitoring
Note:	
CPT Codes:	81232; 81350
New York DOH Approval Status:	This test is New York DOH approved.
Interpretive Data:	
Refer to report.	
Reference Interval:	

HOTLINE NOTE: There is a component change associated with this test. One or more components have been added or removed. Refer to the Hotline Test Mix for interface build information.

NEW TEST

Click for Pricing

Beta Globin (HBB) Deletion/Duplication by MLPA

3019876, BG DELDUP

Specimen Requirements:	
Patient Preparation:	Transport 2 mL whole blood. (Min: 1 mL)
Collect:	Lavender (EDTA), pink (K2EDTA), or yellow (ACD solution A or B)
Specimen Preparation:	Transport 2 mL whole blood. (Min: 1 mL)
Transport Temperature:	Refrigerated. Also acceptable: Ambient.
Unacceptable Conditions:	Saliva, buccal swab, FFPE tissue, fresh/frozen tissue.
Remarks:	
Stability:	Room Temperature: 1 week; Refrigerated: 1 month; Frozen: Unacceptable
Methodology:	Multiplex Ligation-Dependent Probe Amplification (MLPA) / Capillary Electrophoresis
Note:	
CPT Codes:	81363
New York DOH Approval Status:	This test is New York DOH approved.
Interpretive Data:	
Refer to report.	
Reference Interval:	

HOTLINE NOTE: Refer to the Hotline Test Mix for interface build information.

TEST CHANGE

Genome Sequencing

3019943, WGS PRO

Specimen Requirements:	
Patient Preparation:	
Collect:	Preferred: Whole blood in lavender (EDTA) or pink (EDTA) Acceptable: Oragene(TM) saliva collection kit, or equivalent saliva collection device, collected in accordance with manufacturer instructions. Saliva in collection device suitable for human DNA extraction. New York State Clients: ARUP cannot facilitate testing for New York patients. Please work directly with a New York-approved laboratory.
Specimen Preparation:	Transport 2 mL whole blood (Min: 0.5 mL) or 2 mL saliva.
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	
Remarks:	Refer to Genome Sequencing, Familial Comparator (ARUP test code 3019951) for comparator specimen requirements. Parental comparator samples are recommended for optimal whole genome analysis. Comparator samples must be submitted within 7 days of the proband's sample. Secondary findings are reported for the proband and comparators unless "opt out" is selected on the proband's Genome Sequencing Intake Form.
Stability:	Ambient: 72 hours; Refrigerated: 1 week; Frozen: Unacceptable
Methodology:	Qualitative Massively Parallel Sequencing
Note:	The ability to identify causative variant(s) for the patient's presentation is strongly influenced by the quality of the clinical information provided. Contact ARUP's genetic counselors at 800-242-2787 ext. 2141 with questions about test submission.
CPT Codes:	81425; 81460; add 81426; 81460 per familial comparator
New York DOH Approval Status:	Specimens from New York clients will be sent out to a New York DOH approved laboratory, if possible.
Interpretive Data:	
Refer to report	

Reference Interval:

TEST CHANGE

Rapid Genome Sequencing

3019947, RWGS PRO

Specimen Requirements:	
Patient Preparation:	
Collect:	Preferred: Whole blood in lavender (EDTA) or pink (EDTA) Acceptable: Oragene(TM) saliva collection kit, or equivalent saliva collection device, collected in accordance with manufacturer instructions. Saliva in collection device suitable for human DNA extraction. New York State Clients: ARUP cannot facilitate testing for New York patients. Please work directly with a New York-approved laboratory.
Specimen Preparation:	Transport 2 mL whole blood (Min: 0.5 mL) or 2 mL saliva.
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	
Remarks:	Refer to Rapid Genome Sequencing, Familial Comparator (ARUP test code 3019953) for comparator specimen requirements. Parental comparator samples are required for optimal whole genome analysis. Comparator samples must be submitted within 7 days of the proband's sample. Secondary findings are reported for the proband and comparators unless "opt out" is selected on the proband's Genome Sequencing Intake Form.
Stability:	Ambient: 72 hours; Refrigerated: 1 week; Frozen: Unacceptable
Methodology:	Qualitative Massively Parallel Sequencing
Note:	The ability to identify causative variant(s) for the patient's presentation is strongly influenced by the quality of the clinical information required. Contact ARUP's genetic counselors at 800-242-2787 ext. 2141 with questions about test submission.
CPT Codes:	81425; 81460; add 81426; 81460 per familial comparator
New York DOH Approval Status:	Specimens from New York clients will be sent out to a New York DOH approved laboratory, if possible.
Interpretive Data:	

Refer to report

Reference Interval:

TEST CHANGE

Genome Sequencing, Familial Comparator

3019951, WGS FM

Specimen Requirements:	
Patient Preparation:	
Collect:	Preferred: Whole blood in lavender (EDTA) or pink (EDTA) Acceptable: Oragene(TM) saliva collection kit, or equivalent saliva collection device, collected in accordance with manufacturer instructions. Saliva in collection device suitable for human DNA extraction. New York State Clients: ARUP cannot facilitate testing for New York patients. Please work directly with a New York-approved laboratory.
Specimen Preparation:	Transport 2 mL whole blood (Min: 0.5 mL) or 2 mL saliva.
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	
Remarks:	Refer to Genome Sequencing (ARUP test code 3019943) for proband specimen requirements. This test is used for parental or other familial comparator samples associated with a proband sample submitted for Genome Sequencing (ARUP test code 3019943). Comparator samples must be submitted within 7 days of the proband's sample. Please list the name/DOB of submitted familial comparators on the proband's Genome Sequencing Intake Form. ~~If reporting of secondary findings is desired for comparator individual(s), indicate opt-in status on the proband's Genome Sequencing Intake Form (additional charges apply).~~
Stability:	Ambient: 72 hours; Refrigerated: 1 week; Frozen: Unacceptable
Methodology:	Qualitative Massively Parallel Sequencing
Note:	Parental or other familial comparator samples are used to aid interpretation of the proband's genome sequencing data. Contact ARUP's genetic counselors at 800-242-2787 ext. 2141 with questions about test submission.
CPT Codes:	NA

New York DOH Approval Status:	Specimens from New York clients will be sent out to a New York DOH approved laboratory, if possible.

Interpretive Data:

Refer to report.

Reference Interval:

TEST CHANGE

Rapid Genome Sequencing, Familial Comparator

3019953, RWGS FM

Specimen Requirements:	
Patient Preparation:	
Collect:	Preferred: Whole blood in lavender (EDTA) or pink (EDTA) Acceptable: Oragene(TM) saliva collection kit, or equivalent saliva collection device, collected in accordance with manufacturer instructions. Saliva in collection device suitable for human DNA extraction. New York State Clients: ARUP cannot facilitate testing for New York patients. Please work directly with a New York-approved laboratory.
Specimen Preparation:	Transport 2 mL whole blood (Min: 0.5 mL) or 2 mL saliva.
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	
Remarks:	Refer to Rapid Genome Sequencing (ARUP test code 3019947) for proband specimen requirements. This test is used for parental or other familial comparator samples associated with a proband sample submitted for Rapid Genome Sequencing (ARUP test code 3019947). Comparator samples must be submitted within 7 days of the proband's sample. Please list the name/DOB of submitted familial comparators on the proband's Genome Sequencing Intake Form. ~~If reporting of secondary findings is desired for comparator individual(s), indicate opt-in status on the proband's Genome Sequencing Intake Form (additional charges apply).~~
Stability:	Ambient: 72 hours; Refrigerated: 1 week; Frozen: Unacceptable
Methodology:	Qualitative Massively Parallel Sequencing
Note:	Parental or other familial comparator samples are used to aid interpretation of the proband's genome sequencing data. Contact ARUP's genetic counselors at 800-242-2787 ext. 2141 with questions about test submission.
CPT Codes:	NA
New York DOH Approval Status:	Specimens from New York clients will be sent out to a New York DOH approved laboratory, if possible.

Interpretive Data:

Refer to report.

Reference Interval:

NEW TEST – Available Now

Click for Pricing

SF-1 Non-GYN by Immunohistochemistry

3020201, SF1 IHC

Specimen Requirements:	
Patient Preparation:	
Collect:	Tissue or cells.
Specimen Preparation:	Formalin fix (10 percent neutral buffered formalin) and paraffin embed specimen (cells must be prepared into a cellblock). Protect paraffin block and/or slides from excessive heat. Transport tissue block or 5 unstained (3- to 5-micron thick sections), positively charged slides in a tissue transport kit (ARUP supply #47808). Available online through eSupply using ARUP Connect(TM) or contact ARUP Client Services at 800-522-2787. (Min: 2 slides). If sending precut slides, do not oven bake.
Transport Temperature:	Room temperature or refrigerated. Ship in cooled container during summer months.
Unacceptable Conditions:	Specimens submitted with nonrepresentative tissue type. Depleted specimens.
Remarks:	IMMUNOHISTOCHEMISTRY ORDERING AND SUBMISSION DETAILS : Submit electronic request. If you do not have electronic ordering capability, use an ARUP Immunohistochemistry Stain Form (#32978) with an ARUP client number. For additional technical details, contact ARUP Client Services at 800-522-2787.
Stability:	Ambient: Indefinitely; Refrigerated: Indefinitely; Frozen: Unacceptable
Methodology:	Immunohistochemistry (IHC)
Note:	This test is performed as a stain and return (technical) service only. This orderable is validated on non-gynecology specimens only. Please refer to 3020700 for SF1 GYN IHC.
CPT Codes:	88342
New York DOH Approval Status:	This test is New York DOH approved.
Interpretive Data:	
Reference Interval:	

HOTLINE NOTE: Refer to the Hotline Test Mix for interface build information.

NEW TEST – Available Now

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Prosthetic Joint Infection Panel by PCR

3020347, PJIPCR

Specimen Requirements:	
Patient Preparation:	N/A
Collect:	Synovial Fluid (SF)
Specimen Preparation:	Transfer 0.5 mL synovial fluid to a sterile ARUP standard transport tube (ARUP supply #43115) available online through eSupply using ARUP Connect or contact ARUP Client Services at 800-522-2787. (Min: 0.25 mL) Do not centrifuge.
Transport Temperature:	Refrigerated or frozen
Unacceptable Conditions:	Specimens that have been pre-processed or placed into transport media or treated with anticoagulants before testing.
Remarks:	
Stability:	Ambient: 8 hours Refrigerated: 7 days Frozen: 7 days
Methodology:	Qualitative Polymerase Chain Reaction (PCR)
Note:	This assay detects Anaerococcus prevotii/vaginalis, Finegoldia magna, Streptococcus spp., Clostridium perfringens, Parvimonas micra, Streptococcus agalactiae, Cutibacterium avidum/granulosum, Peptoniphilus, Streptococcus pneumoniae, Enterococcus faecalis, Peptostreptococcus anaerobius, Streptococcus pyogenes, Enterococcus faecium, Staphylococcus aureus, Staphylococcus lugdunensis, Bacteroides fragilis, Kingella kingae, Proteus spp., Citrobacter, Klebsiella aerogenes, Pseudomonas aeruginosa, Enterobacter cloacae complex, Klebsiella pneumoniae group, Salmonella spp., Escherichia coli, Morganella morganii, Serratia marcescens, Haemophilus influenzae, Neisseria gonorrhoeae, Candida spp., and Candida albicans. This panel contains assays for the detection of genetic determinants associated with S. aureus resistance to methicillin (mecA/C in conjunction with the SCCmec right extremity junction (MREJ)), enterococcal resistance to vancomycin (vanA and vanB) and some mechanisms of gram-negative bacterial resistance to beta-lactams including penicillins, cephalosporins, monobactams, and carbapenems (blaCTX-M, blaIMP, blaKPC, blaNDM, blaOXA-48-like,

	blaVIM). Negative results for these select antimicrobial resistance gene assays do not indicate susceptibility, as multiple mechanisms of resistance to methicillin, vancomycin, and beta-lactams exist.
CPT Codes:	87999
New York DOH Approval Status:	This test is New York DOH approved.
Interpretive Data:	
Negative results may be due to infection with pathogens that are not detected by this test, pathogens present below the limit of detection of the assay, or infection that may not be detected in a synovial fluid specimen. Positive results do not rule out co-infection with other organisms.	
Reference Interval:	

HOTLINE NOTE: Refer to the Hotline Test Mix for interface build information.

NEW TEST

Click for Pricing

ThinPrep PAP Test With Reflex to HPV if Abnormal

3020444, TD REQUEST

Specimen Requirements:	
Patient Preparation:	
Collect:	Cervical specimen in a ThinPrep Pap Test Collection Vial, PK/25 (ARUP Supply #51325). Cytology collection devices available: Rover Combi Brush - PK/25 (ARUP Supply #64001) , Broom - PK/100 (ARUP Supply #22218) , Combi Brush/Spatula - PK/25 (ARUP Supply #51326) , Endocervical Brush - Each (ARUP Supply #11440). Available online through eSupply using ARUP Connect(TM) or contact ARUP Client Services at 800-522-2787. For specific instructions refer to Specimen Collection and Handling.
Specimen Preparation:	Transport cervical specimen in the original collection kit.
Transport Temperature:	Ambient
Unacceptable Conditions:	Specimens not collected in a ThinPrep Pap Test collection vial. Specimens submitted in an expired collection vial.
Remarks:	
Stability:	Ambient: 3 weeks; Refrigerated: 3 weeks; Frozen: Unacceptable
Methodology:	Qualitative Microscopy / Qualitative Computer Assisted Analysis
Note:	If the ThinPrep Pap test is interpreted as atypical squamous of undetermined significance (ASCUS), then Human Papillomavirus (HPV), High Risk Screen by Transcription-Mediated Amplification (TMA), with Reflex to Genotypes 16 and 18/45 (ARUP test code 3016945) will be performed and reported under a separate accession. Additional charges apply. The Pap test is a screening test for cervical cancer and its precursors with an inherent false-negative rate. Store collection vials without cytologic samples at room temperature (15C to 30C). Do not use solution beyond expiration date marked on the vial.
CPT Codes:	88175 (88142 if manual); If reviewed by pathologist add 88141; if reflexed, add 87624; 87625
New York DOH Approval Status:	Specimens from New York clients will be sent out to a New York DOH approved laboratory, if possible.
Interpretive Data:	

Refer to report.
Reference Interval:
Refer to report

HOTLINE NOTE: Refer to the Hotline Test Mix for interface build information.

NEW TEST

Click for Pricing

Laminin 332 and p200 Antibodies, IgG by IIF

3020664, IGGLM332B4

Specimen Requirements:	
Patient Preparation:	
Collect:	Plain red or serum separator tube (SST).
Specimen Preparation:	Transfer 2 mL serum to an ARUP standard transport tube. (Min: 0.5 mL)
Transport Temperature:	Refrigerated/ambient
Unacceptable Conditions:	Hemolyzed or lipemic specimens. Plasma.
Remarks:	As a general rule, serum specimens should be shipped to the laboratory as soon as possible. Store refrigerated unless shipping promptly (within 2 hours). Transport at ambient temperature to arrive within 7 days. If 7-14 days until received in laboratory, store and ship refrigerated. If greater than 14 days, serum specimens must be stored and shipped frozen.
Stability:	Ambient: 1 week; Refrigerated: 2 weeks; Frozen: Indefinitely
Methodology:	Qualitative Indirect Immunofluorescence (IIF)
Note:	The methodology is indirect immunofluorescence (IIF) of serum with substrates consisting of transfected cells expressing whole-length recombinant three-chain laminin 332 and transfected cells expressing the laminin beta4 chain that are grown and fixed as individual substrates on cover glass called “biochips”. Of important note, patients with anti-laminin 332 pemphigoid who develop antibodies to any of the three laminin 332 subunit chains are at risk for having an associated malignancy or developing one. Laminin 332 previously was known as laminin 5, epiligrin, nicein, ladsin, and kalinin. Patients with anti-p200 pemphigoid and antibodies to laminin beta4 also commonly have antibodies to laminin gamma1; ant-p200 pemphigoid was referred to previously as anti-laminin gamma1 pemphigoid. Reports are qualitative, positive or negative (no antibody

	titers). For specimens less than 0.5 mL, call the Immunodermatology Laboratory at 801-581-7139.
CPT Codes:	88346; 88350
New York DOH Approval Status:	Specimens from New York clients will be sent out to a New York DOH approved laboratory, if possible.
Interpretive Data: Refer to report.	
Reference Interval:	

HOTLINE NOTE: Refer to the Hotline Test Mix for interface build information.

NEW TEST

Click for Pricing

HLA-B*58:01 Genotyping, Allopurinol Hypersensitivity

3020683, HLA-B5801

Specimen Requirements:	
Patient Preparation:	
Collect:	Lavendar (EDTA), pink (K2EDTA), or yellow (ACD solution A or B).
Specimen Preparation:	Transport 5 mL whole blood. (Min: 3 mL)
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Specimens collected in green (sodium or lithium heparin).
Remarks:	
Stability:	Ambient: 72 hours; Refrigerated: 1 week; Frozen: Unacceptable
Methodology:	Polymerase Chain Reaction (PCR) / Sequence-Specific Oligonucleotide Probe Hybridization / Massively Parallel Sequencing
Note:	
CPT Codes:	81381
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

Characteristics: Allopurinol is the most commonly used drug for the treatment of hyperuricemia and gout. It inhibits xanthine oxidase, a key enzyme involved in uric acid formation. However, allopurinol is one of the most common causes of life-threatening severe cutaneous adverse reactions (SCAR), which include drug hypersensitivity syndrome, Stevens-Johnson syndrome (SJS), and toxic epidermal necrolysis (TEN). The presence of HLA-B*58:01 allele shows strong association with allopurinol-induced SCAR, including TEN and SJS. Although allopurinol-induced SCAR is rare, with an estimated risk of 0.1-0.4 percent in allopurinol users, the severity can be high, with a mortality rate of up to 25 percent. Symptoms include rash, combined with eosinophilia, leukocytosis, fever, hepatitis, and progressive kidney failure. Due to the severity of adverse reactions, it is recommended to test for the HLA-B*58:01 allele prior to initiation of the drug.
Incidence: HLA-B*58:01 allele frequency varies by ethnicity. In the U.S. population, the highest incidence at 5.3 percent is found in Asians, 3.8 percent in African Americans, 1.45 percent in Native Hawaiians or Pacific Islanders, 1.35 percent in Hispanics, 1.19 percent in American Indians or Alaska Natives, and 0.8 percent in Caucasians. Frequencies may be higher in other countries, up to 20 percent in Singapore, Taiwan, and among Han Chinese, 15.4 percent in India, 14.2 percent in Hong Kong, 12 percent in China and Korea, 11 percent in Indonesia.
Cause: Allopurinol-induced SCAR, including SJS and TEN, is strongly associated with the presence of one or two copies of HLA-B*58:01 allele. The mechanism is immune mediated and involves direct interactions between the allopurine metabolite oxypurinol, and HLA-B*58:01, which may result in drug-induced changes in peptide presentation, allowing activation of self-reactive T lymphocytes.

Alleles tested: HLA-B*58:01 allele.
Clinical Sensitivity and Specificity: 71 percent sensitivity and 92 percent specificity, overall mean values from pooled populations (Yu KH et al, Int J Rheum Dis 2017). Higher in populations with increased HLA-B*58:01 allele frequency.
Methodology: PCR followed by sequence-specific oligonucleotide probe hybridization of HLA-B locus.
Analytical Sensitivity and Specificity: Greater than 99 percent.
Limitations: Other genetic and non-genetic factors that influence allopurinol hypersensitivity are not evaluated. Other rare, or novel alleles may occur which may lead to false positive or false negative results.

Test systems were developed and their performance characteristics determined by the H&I laboratory at the University of Utah Health, under the accreditation guidelines from the American Society for Histocompatibility and Immunogenetics (ASHI).

Reference Interval:

Refer to report

HOTLINE NOTE: Refer to the Hotline Test Mix for interface build information.

NEW TEST

Click for Pricing

HLA-B*15:02 Genotyping, Carbamazepine Hypersensitivity

3020687, HLA-B1502

Specimen Requirements:	
Patient Preparation:	
Collect:	Lavender (EDTA), pink (K2EDTA), or yellow (ACD solution A or B).
Specimen Preparation:	Transport 5 mL whole blood. (Min: 3 mL)
Transport Temperature:	Refrigerated.
Unacceptable Conditions:	Specimens collected in green (sodium or lithium heparin).
Remarks:	
Stability:	Ambient: 72 hours; Refrigerated: 1 week; Frozen: Unacceptable
Methodology:	Polymerase Chain Reaction (PCR) / Sequence-Specific Oligonucleotide Probe Hybridization / Massively Parallel Sequencing
Note:	
CPT Codes:	81381
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

Background Information for HLA-B*1502 Genotype, Carbamazepine Hypersensitivity:
Characteristics: Carbamazepine (CBZ) is an aromatic antiepileptic drug, approved for the treatment of epilepsy and trigeminal neuralgia. Rarely, CBZ can induce severe life-threatening reactions such as Stevens-Johnson syndrome (SJS) or toxic epidermal necrolysis (TEN). Symptoms usually appear within the first months of treatment, and include skin rash, hives, sores in the mouth, blistering or peeling of the skin, and erosion of the mucous membranes in the respiratory and gastrointestinal tract. The presence of HLA-B*15:02 increases risk for CBZ-induced SJS/TEN in individuals of Asian ancestry. The incidence of CBZ-induced life-threatening reactions such SJS, TEN, or hypersensitivity syndrome (HSS) is 1-10 per 10,000, which can be higher in some Asian countries.
Incidence: HLA-B*15:02 allele frequency varies by ethnicity, with highest incidence in Asians: 10.2 percent in Han Chinese, 10 percent in Taiwanese (18 percent in indigenous Puyuma), greater than 5 percent in the populations of Hong Kong, Thailand, Malaysia, Vietnam, Philippines, India (Khandesh and West Bhil), and Indonesia. Frequency is low in African Americans (0.1-1 percent) and less than 0.1 percent in Caucasians.
Cause: In patient of Asian descent, CBZ-induced SJS/TEN is strongly associated with the presence of HLA-B*15:02 allele. The mechanism is immune mediated and involves drug-induced changes in peptide presentation by HLA-B*15:02, which allows for the activation of self-reactive T lymphocytes. Activated immune cells contribute to the cellular death of keratinocytes in the skin, which causes the epidermal destruction and detachment of the skin seen in SJS/TEN.
Alleles tested: HLA-B*15:02 allele. Other members of the HLA B75 serogroup detected by this

assay can also be associated with carbamazepine-induced SJS/TEN.
Clinical Sensitivity and Specificity: 80-97 percent and 99 percent, respectively in populations where the HLA-B*15:02 allele is common.
Methodology: PCR followed by sequence-specific oligonucleotide probe hybridization of HLA-B locus.
Analytical Sensitivity and Specificity: Greater than 99 percent.
Limitations: Other genetic and non-genetic factors that influence carbamazepine hypersensitivity are not evaluated. Other rare, or novel alleles may occur which may lead to false positive or false negative results.

Test systems were developed and their performance characteristics determined by the H&I laboratory at the University of Utah Health, under the accreditation guidelines from the American Society for Histocompatibility and Immunogenetics (ASHI).

Reference Interval:

Refer to report

HOTLINE NOTE: Refer to the Hotline Test Mix for interface build information.

NEW TEST

Click for Pricing

DNA Extract and Hold for Whole Blood and Bone Marrow

3020699, WBBMDNAEXT

Specimen Requirements:	
Patient Preparation:	
Collect:	Whole blood or bone marrow in lavender (K3EDTA or K2EDTA) or pink (K2EDTA). Also Acceptable: Whole blood or bone marrow in green (sodium heparin) or yellow (ACD).
Specimen Preparation:	Do not freeze. Transport 1 mL whole blood or bone marrow.
Transport Temperature:	Preferred transport temp: Refrigerated
Unacceptable Conditions:	Unacceptable specimens types: Plasma, serum, FFPE tissue blocks/slides, or fresh or frozen tissue, bone core, white cell pellet, other body fluids. Unacceptable collected device: Any anticoagulants other than EDTA, sodium heparin, or yellow. Unacceptable specimen conditions: Clotted or grossly hemolyzed specimens.
Remarks:	
Stability:	Room Temperature: 3 days; Refrigerated: 30 days; Frozen: Unacceptable
Methodology:	DNA Extraction
Note:	Yield of 50 microliters. DNA will be held for 3 months for possible add-on testing. Additional charges will apply if extracted DNA is sent to an outside laboratory.
CPT Codes:	NA
New York DOH Approval Status:	This test is New York DOH approved.
Interpretive Data:	
Reference Interval:	

HOTLINE NOTE: Refer to the Hotline Test Mix for interface build information.

NEW TEST – Available Now

Click for Pricing

Toxigenic *Clostridioides difficile* GDH Antigen and Toxin by EIA, Stool

3020774, CDIFF EIA

Specimen Requirements:	
Patient Preparation:	
Collect:	Liquid or soft stool.
Specimen Preparation:	Transfer 1.0 mL stool to a clean, unpreserved transport vial (ARUP Supply# 40910). Available online through eSupply using ARUP Connect(TM) or contact ARUP Client Services at 800-522-2787. (Min: 0.5 mL).
Transport Temperature:	Refrigerated. Also acceptable: Frozen.
Unacceptable Conditions:	Specimens preserved in Cary Blair/C&S media, formalin-based fixative (eg, formalin, SAF) or alcohol-based fixative (e.g., PVA, Totalfix, Alcorfix, etc). Formed stool.
Remarks:	
Stability:	Ambient 2 hours; Refrigerated 72 hours; Frozen 1 week
Methodology:	Qualitative Enzyme Immunoassay (EIA)
Note:	
CPT Codes:	87324; 87899
New York DOH Approval Status:	This test is New York DOH approved.

Interpretive Data:

This test is intended for symptomatic patients with greater or equal to 3 unformed stools in 24 hours. Testing of formed stool, asymptomatic patients, or for test of cure is not recommended. Results should always be interpreted in conjunction with clinical findings.

Reference Interval:

Test Number	Components	Reference Interval
	Toxigenic C. difficile Interpretation	Not Detected

HOTLINE NOTE: Refer to the Hotline Test Mix for interface build information.

ARUP LABORATORIES

A nonprofit enterprise of the University of Utah and its Department of Pathology

Inactivations

The following will be discontinued from ARUP's test menu on April 20, 2026
Replacement test options are indicated when applicable.

Test Number	Test Name	Refer to Replacement Test
0020799	Hepatitis Delta Virus Antibody	Hepatitis Delta Virus Antibody by ELISA With Reflex to Hepatitis Delta Virus by Quantitative PCR (3006379)
2001956	Hearing Loss, Nonsyndromic, Connexin 30 (GJB6) 2 Deletions	
2006352	X-Chromosome Inactivation Analysis	
2012049	HLA-B*15:02 Genotyping, Carbamazepine Hypersensitivity	HLA-B*15:02 Genotyping, Carbamazepine Hypersensitivity (3020687)
3001393	HLA-B*58:01 Genotyping, Allopurinol Hypersensitivity	HLA-B*58:01 Genotyping, Allopurinol Hypersensitivity (3020683)