

### MEDICARE COVERAGE OF LABORATORY TESTING

Please remember when ordering laboratory tests that are billed to Medicare/Medicaid or other federally funded programs, the following requirements apply:

1. Only tests that are medically necessary for the diagnosis or treatment of the patient should be ordered. Medicare does not pay for screening tests except for certain specifically approved procedures and may not pay for non-FDA approved tests or those tests considered experimental.
2. If there is reason to believe that Medicare will not pay for a test, the patient should be informed. The patient should then sign an Advance Beneficiary Notice (ABN) to indicate that he or she is responsible for the cost of the test if Medicare denies payment.
3. The ordering physician must provide an ICD-10 diagnosis code or narrative description, if required by the fiscal intermediary or carrier.
4. Organ- or disease-related panels should be billed only when all components of the panel are medically necessary.
5. Both ARUP- and client-customized panels should be billed to Medicare only when every component of the customized panel is medically necessary.
6. Medicare National Limitation Amounts for CPT codes are available through the Centers for Medicare & Medicaid Services (CMS) or its intermediaries. Medicaid reimbursement will be equal to or less than the amount of Medicare reimbursement.

The CPT Code(s) for test(s) profiled in this bulletin are for informational purposes only. The codes reflect our interpretation of CPT coding requirements, based upon AMA guidelines published annually. CPT codes are provided only as guidance to assist you in billing. ARUP strongly recommends that clients reconfirm CPT code information with their local intermediary or carrier. CPT coding is the sole responsibility of the billing party.

The regulations described above are only guidelines. Additional procedures may be required by your fiscal intermediary or carrier.

Hotline Page #	Test Number	Summary of Changes by Test Name	Name Change	Methodology	Performed/Reported Schedule	Specimen Requirements	Reference Interval	Interpretive Data	Note	CPT Code	Component Change	Other Interface Change	New Test	Inactive
6	<a href="#">2014521</a>	Acetaminophen Quantitative, Urine											x	
7	<a href="#">0090005</a>	Acetone, Quantitative			x	x								
7	<a href="#">0090131</a>	Alcohols			x	x								
7	<a href="#">0070016</a>	Aldosterone 30 Minute				x			x					
7	<a href="#">0070017</a>	Aldosterone 60 Minute				x			x					
8	<a href="#">2002582</a>	Aldosterone and Renin, Direct with Ratio				x			x					
8	<a href="#">0070015</a>	Aldosterone, Serum				x			x					
8	<a href="#">0070073</a>	Aldosterone/Renin Activity Ratio				x			x					

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8	<a href="#">2008601</a>	Allergen, Fungi and Molds, <i>Aspergillus fumigatus</i> IgG				x								
9	<a href="#">2014513</a>	Alpha/Beta Double-Negative T-Cells for Autoimmune Lymphoproliferative Syndrome											x	
10	<a href="#">2014507</a>	Alpha Fetoprotein, Body Fluid											x	
10	<a href="#">2013034</a>	Alpha Subunit, Free, Pituitary Glycoprotein Hormones (PGH)	x											
10	<a href="#">0050005</a>	Alpha-2-Macroglobulin				x								
39	<a href="#">0080276</a>	Amniotic Bilirubin Scan												x
10	<a href="#">0050392</a>	Ankylosing Spondylitis (HLA-B27) Genotyping			x	x								
11	<a href="#">2014277</a>	Antimicrobial Susceptibility – Carbapenemase Gene Detection by PCR											x	
12	<a href="#">2014499</a>	ATRX by Immunohistochemistry											x	
39	<a href="#">0095505</a>	Autoimmune Lymphoproliferative Profile												x
12	<a href="#">2008665</a>	<i>Babesia</i> Species by PCR								x				
12	<a href="#">2008420</a>	<i>BCR-ABL1</i> Mutation Analysis for Tyrosine Kinase Inhibitor Resistance by Next Generation Sequencing								x				
12	<a href="#">0065080</a>	<i>Bordetella pertussis/parapertussis</i> by PCR								x				
13	<a href="#">2014493</a>	Bupivacaine Quantitative, Serum or Plasma											x	
13	<a href="#">0095200</a>	<i>Candida albicans</i> Antibodies IgA, IgG, and IgM by ELISA					x							
13	<a href="#">0051769</a>	<i>Candida albicans</i> IgA Antibody by ELISA					x							
13	<a href="#">0051770</a>	<i>Candida albicans</i> IgG Antibody by ELISA					x							
14	<a href="#">0051771</a>	<i>Candida albicans</i> IgM Antibody by ELISA					x							
14	<a href="#">2013798</a>	<i>Candida</i> Species by PCR								x				
14	<a href="#">2013784</a>	<i>Candida</i> Species by PCR with Reflex to <i>FKS</i> Drug Resistance by Sequencing								x				
14	<a href="#">2010179</a>	CD4+ T-Cell Recent Thymic Emigrants (RTEs)				x								
14	<a href="#">2012151</a>	Charcot-Marie-Tooth (CMT) and Related Hereditary Neuropathies Panel Sequencing								x				
15	<a href="#">2014505</a>	Chromium, RBC											x	
15	<a href="#">2011157</a>	Cobalamin/Propionate/Homocysteine Metabolism Related Disorders Panel, Sequencing (25 Genes) and Deletion/Duplication (24 Genes)								x				
15	<a href="#">0025032</a>	Cobalt, Urine					x							
39	<a href="#">0051232</a>	Cytochrome P450 2D6 (CYP2D6) 14 Variants and Gene Duplication												x
16	<a href="#">2014547</a>	Cytochrome P450 2D6 (CYP2D6) 15 Variants and Gene Duplication											x	

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18	<a href="#">2013098</a>	Cytochrome P450 Genotype Panel						x						
19	<a href="#">2013294</a>	Dengue Virus (1-4) Subtype by PCR								x				
19	<a href="#">2011153</a>	Duchenne/Becker Muscular Dystrophy (DMD) Sequencing								x				
19	<a href="#">2007862</a>	<i>Ehrlichia</i> and <i>Anaplasma</i> Species by Real-Time PCR								x				
20	<a href="#">0090120</a>	Ethanol, Serum or Plasma - Medical			x	x								
20	<a href="#">2008803</a>	Expanded Hearing Loss Panel, Sequencing (56 Genes) and Deletion/Duplication (53 Genes)								x				
39	<a href="#">0020149</a>	Gastric Analysis												x
20	<a href="#">2013449</a>	Gastrointestinal Hereditary Cancer Panel, Sequencing and Deletion/Duplication, 16 Genes								x				
20	<a href="#">2011660</a>	Gastrointestinal Parasite and Microsporidia by PCR								x				
20	<a href="#">2014459</a>	Gaucher Disease (GBA), Enzyme Activity in Leukocytes											x	
21	<a href="#">2014285</a>	Hepatitis B Virus (HBV) Perinatal Exposure Follow-up by CIA, Panel											x	
21	<a href="#">0020090</a>	Hepatitis B Virus Surface Antibody						x						
22	<a href="#">2014598</a>	Hepatitis C Virus (HCV) Genotype with Reflex to HCV NS5A Drug Resistance by Sequencing											x	
22	<a href="#">2010784</a>	Hepatitis C Virus Antibody by CIA with Reflex to HCV by Quantitative PCR			x									
22	<a href="#">2012052</a>	Hereditary Hemolytic Anemia Sequencing, 28 Genes								x				
22	<a href="#">2009337</a>	Hereditary Hemorrhagic Telangiectasia (HHT) Panel, Sequencing and Deletion/Duplication, 5 Genes								x				
22	<a href="#">2011148</a>	Herpes Simplex Virus (HSV) by PCR with Reflex to HSV (HSV-1/HSV-2) Subtype by PCR								x				
22	<a href="#">2010095</a>	Herpes Simplex Virus (HSV-1/HSV-2) Subtype by PCR								x				
23	<a href="#">2008125</a>	Hexosaminidase A Percent and Total Hexosaminidase in Leukocytes			x									
23	<a href="#">2008121</a>	Hexosaminidase A Percent and Total Hexosaminidase, Plasma or Serum			x									
23	<a href="#">2007578</a>	High Molecular Weight Kininogen (HMWK), Activity	x											
23	<a href="#">2008848</a>	Holoprosencephaly Panel, Nonsyndromic, Sequencing and Deletion/Duplication, 11 Genes								x				
39	<a href="#">0080413</a>	Homocystine Quantitative, Urine												x
39	<a href="#">2012175</a>	<i>HRAS</i> Mutation Detection by Pyrosequencing												x

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39	<a href="#">0065999</a>	Human Papillomavirus (HPV), High Risk by Hybrid Capture, Cervical Brush												x
39	<a href="#">2008404</a>	Human Papillomavirus (HPV), High Risk by Hybrid Capture, ThinPrep												x
23	<a href="#">0040227</a>	IGHV Mutation Analysis by Sequencing (Pricing Change Only)												
39	<a href="#">0080403</a>	Indicans, Urine Qualitative												x
23	<a href="#">0070022</a>	Insulin, Other				x								
23	<a href="#">2013599</a>	Insulin-Like Growth Factor 2 (IGF-2)	x											
23	<a href="#">0098843</a>	Insulin-Like Growth Factor Binding Protein 1 (IGFBP-1)	x	x										
23	<a href="#">0098842</a>	Insulin-Like Growth Factor Binding Protein 2 (IGFBP-2)	x	x										
23	<a href="#">0070060</a>	Insulin-Like Growth Factor Binding Protein 3 (IGFBP-3)	x											
24	<a href="#">0090144</a>	Isopropanol (Includes Acetone)			x	x								
39	<a href="#">0080301</a>	Leucine Aminopeptidase (LAP), Serum												x
39	<a href="#">0080467</a>	Lipid Associated Sialic Acid												x
24	<a href="#">2013716</a>	LipoFit by NMR											x	
25	<a href="#">2013715</a>	LipoFit by NMR, Particle Count Only											x	
39	<a href="#">2012186</a>	LipoProfile by Nuclear Magnetic Resonance (NMR)												x
39	<a href="#">2012200</a>	LipoProfile by Nuclear Magnetic Resonance (NMR), Particle Analysis Only												x
25	<a href="#">0030181</a>	Lupus Anticoagulant Reflexive Panel					x							
25	<a href="#">2004963</a>	Malaria Detection and Speciation, Qualitative by Real-Time PCR								x				
26	<a href="#">0025070</a>	Manganese, Urine					x	x				x		
26	<a href="#">0050375</a>	Measles (Rubeola) Antibodies, IgG and IgM				x								
39	<a href="#">0020226</a>	Melanin, Urine												x
26	<a href="#">0090165</a>	Methanol			x	x								
26	<a href="#">2011626</a>	Microsporidia by PCR								x				
27	<a href="#">2014510</a>	Molybdenum Quantitative, Urine											x	
27	<a href="#">2012182</a>	Myeloid Malignancies Somatic Mutation and Copy Number Analysis Panel								x				
27	<a href="#">0055506</a>	Neutrophil-Associated Antibodies				x		x	x					
28	<a href="#">0025045</a>	Nickel, Urine					x	x				x		
28	<a href="#">2007537</a>	Non-Invasive Prenatal Testing for Fetal Aneuploidy								x				

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28	<a href="#">2010232</a>	Non-Invasive Prenatal Testing for Fetal Aneuploidy (Panorama) with Microdeletions								X				
28	<a href="#">2013142</a>	Non-Invasive Prenatal Testing for Fetal Aneuploidy with 22q11.2 Microdeletion (Panorama)								X				
39	<a href="#">0051281</a>	Norovirus Group 1 and 2 by PCR												X
29	<a href="#">2014546</a>	Norovirus, Groups 1 and 2 by PCR											X	
29	<a href="#">0049250</a>	p53 with Interpretation by Immunohistochemistry									X			
30	<a href="#">2007479</a>	Pain Management Drug Panel by High-Resolution Time-of-Flight or Tandem Mass Spectrometry and Enzyme Immunoassay, Urine	X	X			X	X						
31	<a href="#">2009288</a>	Pain Management Drug Screen with Interpretation by High-Resolution Time-of-Flight or Tandem Mass Spectrometry and Enzyme Immunoassay, Urine	X	X			X	X						
39	<a href="#">2012603</a>	PAX8-PPARG Translocations Detection by PCR												X
31	<a href="#">2007370</a>	Periodic Fever Syndromes Panel, Sequencing (7 Genes) and Deletion/Duplication, (6 Genes)								X				
39	<a href="#">2004510</a>	PIK3CA Mutation												X
39	<a href="#">2008103</a>	Pipecolic Acid, CSF												X
39	<a href="#">0051718</a>	Platelet Antibodies, Indirect with Reflex to Identification												X
32	<a href="#">2014463</a>	Pompe Disease (GAA), Enzyme Activity in Leukocytes											X	
32	<a href="#">2011156</a>	Primary Antibody Deficiency Panel, Sequencing (35 Genes) and Deletion/Duplication (26 Genes)								X				
33	<a href="#">2014318</a>	Prolonged Clot Time Reflex Panel											X	
35	<a href="#">0056060</a>	Prothrombin (F2) c.*97G>A (G20210A) Pathogenic Variant	X				X	X						
35	<a href="#">2009345</a>	Pulmonary Arterial Hypertension (PAH) Panel, Sequencing and Deletion/Duplication, Multigene								X				
36	<a href="#">2014523</a>	Purines and Pyrimidines Panel, Urine											X	
36	<a href="#">2014351</a>	Rabies Antibody Screen (RFFIT)											X	
36	<a href="#">0070105</a>	Renin Activity				X			X					
37	<a href="#">2001575</a>	Renin, Direct				X			X					
39	<a href="#">2012605</a>	RET-CCDC6 and RET-NCOA4 (RET-PTC1 and RET-PTC3) Translocations Detection by PCR												X
39	<a href="#">0050698</a>	Reticulin Antibody, IgA with Reflex to Titer												X
37	<a href="#">0040131</a>	RNA Extraction and Storage											X	
37	<a href="#">0025067</a>	Selenium, Urine					X							

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37	<a href="#">2012015</a>	Skeletal Dysplasia Panel, Sequencing (39 Genes) and Deletion/Duplication (36 Genes)								X				
38	<a href="#">2012010</a>	Skeletal Dysplasia Panel, Sequencing (39 Genes) and Deletion/Duplication (36 Genes), Fetal								X				
38	<a href="#">0070130</a>	Testosterone, Adult Male				X								
39	<a href="#">0070132</a>	Testosterone, Pooled Adult Male												X
38	<a href="#">0025019</a>	Thallium, Urine					X							
38	<a href="#">0099610</a>	Thallium, Whole Blood				X			X					
39	<a href="#">2012755</a>	Thyroid Translocation and Mutation Panel												X
38	<a href="#">2008670</a>	Tick-Borne Disease Panel by PCR, Blood								X				
38	<a href="#">2011172</a>	Urogenital Ureaplasma and Mycoplasma Species by PCR								X				
39	<a href="#">2007384</a>	Vascular Malformations Panel, Sequencing and Deletion/Duplication, 14 Genes								X				
39	<a href="#">2007136</a>	von Willebrand Factor Collagen Binding								X				
39	<a href="#">2013701</a>	Vulvovaginal <i>Candida</i> Species by PCR								X				
39	<a href="#">0020609</a>	Xylose Absorption Test (Adult - 25g dose)												X
39	<a href="#">0020615</a>	Xylose Absorption Test (Adult - 5g dose)												X
39	<a href="#">0020612</a>	Xylose Absorption Test (Child)												X

**New Test**     [2014521](#)     **Acetaminophen Quantitative, Urine**     **ACETA U**  
 Available Now

**Methodology:** Quantitative High Performance Liquid Chromatography  
**Performed:** Varies  
**Reported:** 3-10 days

**Specimen Required:** Collect: Random urine.  
 Specimen Preparation: Transfer 1 mL urine to an ARUP Standard Transport Tube. (Min: 0.24 mL)  
 Storage/Transport Temperature: Refrigerated. Also acceptable: Room temperature or frozen.  
 Stability (collection to initiation of testing): Ambient: 2 weeks; Refrigerated: 1 month; Frozen: 1 month

**Reference Interval:** By report

**CPT Code(s):** 80329 (Alt code: G0480)

New York DOH Approved.

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

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**0090005 Acetone, Quantitative AC**

**Performed:** Sun-Sat  
**Reported:** 1-3 days

**Specimen Required:** Patient Prep: For medical purposes only. Timing of specimen collection: Dependent on time of exposure, test upon presentation to hospital.  
Collect: Plain Red. Also acceptable: Lavender (EDTA), Pink (K<sub>2</sub>EDTA), Green (Sodium or Lithium Heparin), or Gray (Potassium Oxalate/Sodium Fluoride).  
Specimen Preparation: Separate from cells ASAP or within 2 hours of collection. Transfer 0.5 mL serum or plasma to an ARUP Standard Transport Tube. (Min: 0.2 mL) **Cap tube tightly to minimize alcohol loss.**  
Storage/Transport Temperature: Refrigerated.  
Unacceptable Conditions: Whole blood. Plasma Separator Tubes (PST), Serum Separator Tubes (SST).  
Stability (collection to initiation of testing): After separation from cells: Ambient: 5 days; Refrigerated: 1 week; Frozen: 1 month

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**0090131 Alcohols ALCT**

**Performed:** Sun-Sat  
**Reported:** 1-3 days

**Specimen Required:** Patient Prep: For medical purposes only. Timing of specimen collection: Dependent on time of exposure, test upon presentation to hospital.  
Collect: Plain Red. Also acceptable: Lavender (EDTA), Pink (K<sub>2</sub>EDTA), or Gray (Potassium Oxalate/Sodium Fluoride).  
Specimen Preparation: Separate from cells ASAP or within 2 hours of collection. Transfer 2 mL serum or plasma to an ARUP Standard Transport Tube. (Min: 0.3 mL) **Cap tube tightly to minimize alcohol loss.**  
Storage/Transport Temperature: Refrigerated.  
Unacceptable Conditions: Whole blood, Plasma Separator Tubes (PST), Serum Separator Tubes (SST).  
Stability (collection to initiation of testing): After separation from cells: Ambient: 1 week; Refrigerated: 2 weeks; Frozen: 1 month.

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**0070016 Aldosterone 30 Minute ALDO 30**

**Specimen Required:** Patient Prep: 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 (SST) or Plain Red.  
Specimen Preparation: Separate from cells ASAP or within 2 hours of collection. Transfer 1 mL serum to an ARUP Standard Transport Tube. (Min: 0.5 mL)  
Storage/Transport Temperature: Frozen.  
Unacceptable Conditions: EDTA plasma.  
Stability (collection to initiation of testing): After separation from cells: Ambient: 8 hours; Refrigerated: 5 days; Frozen: 1 month

**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.

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**0070017 Aldosterone 60 Minute ALDO 60**

**Specimen Required:** Patient Prep: 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 (SST) or Plain Red  
Specimen Preparation: Separate from cells ASAP or within 2 hours of collection. Transfer 1 mL serum to an ARUP Standard Transport Tube. (Min: 0.5 mL)  
Storage/Transport Temperature: Frozen.  
Unacceptable Conditions: EDTA plasma.  
Stability (collection to initiation of testing): After separation from cells: Ambient: 8 hours; Refrigerated: 5 days; Frozen: 1 month

**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.



**2002582**

**Aldosterone and Renin, Direct with Ratio**

**A/DR**

**Specimen Required:** Patient Prep: 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 (SST) AND Lavender (EDTA) or Pink (K<sub>2</sub>EDTA). Do not collect in refrigerated tubes.  
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/Transport Temperature: Both specimens should be submitted together for testing.  
Serum: Frozen. Also acceptable: Refrigerated.  
Plasma: **CRITICAL FROZEN. Separate specimens must be submitted when additional tests are ordered.**  
Unacceptable Conditions: Plasma collected in citrate, heparin, or oxalate. Hemolyzed specimens.  
Stability (collection to initiation of testing): **Serum:** Ambient: 8 hours; Refrigerated: 5 days; Frozen: 1 month  
**Plasma:** Ambient: 4 hours; Refrigerated: Unacceptable; Frozen: 1 month

**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.

**0070015**

**Aldosterone, Serum**

**ALDOST**

**Specimen Required:** Patient Prep: 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 (SST) or Plain Red.  
Specimen Preparation: Separate from cells ASAP or within 2 hours of collection. Transfer 1 mL serum to an ARUP Standard Transport Tube. (Min: 0.5 mL)  
Storage/Transport Temperature: Frozen.  
Unacceptable Conditions: EDTA plasma.  
Stability (collection to initiation of testing): After separation from cells: Ambient: 8 hours; Refrigerated: 5 days; Frozen: 1 month

**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.

**0070073**

**Aldosterone/Renin Activity Ratio**

**A/RA**

**Specimen Required:** Patient Prep: 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 (SST) AND Lavender (EDTA) or Pink (K<sub>2</sub>EDTA). Do not collect in refrigerated tubes.  
Specimen Preparation: Separate from cells ASAP or within 2 hours of collection.  
Serum: Transfer 1 mL serum to an ARUP Standard Transport Tube. (Min: 0.5 mL)  
**AND**  
Plasma: Transfer 2 mL EDTA plasma to an ARUP Standard Transport Tube and freeze immediately. (Min: 1.2 mL)  
Storage/Transport Temperature: Both specimens should be submitted together for testing.  
Serum: Frozen. Also acceptable: Refrigerated.  
Plasma: **CRITICAL FROZEN. Separate specimens must be submitted when additional tests are ordered.**  
Unacceptable Conditions: Plasma collected in citrate, heparin, or oxalate. Hemolyzed specimens.  
Stability (collection to initiation of testing): **Serum:** Ambient: 8 hours; Refrigerated: 5 days; Frozen: 1 month  
**Plasma:** Ambient: 6 hours; Refrigerated: Unacceptable; Frozen: 1 month

**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.

**2008601**

**Allergen, Fungi and Molds, *Aspergillus fumigatus* IgG**

**ASPER FUM**

**Specimen Required:** Collect: Plain Red or Serum Separator Tube (SST).  
Specimen Preparation: Separate from cells ASAP or within 2 hours of collection. Transfer 0.5 mL serum **plus** 0.1 mL for each additional allergen ordered to an ARUP Standard Transport Tube. (Min: 0.34 mL **plus** 0.04 mL for each allergen ordered)  
Storage/Transport Temperature: Room temperature. Also acceptable: Refrigerated or frozen.  
Unacceptable Conditions: Hemolyzed, icteric, or lipemic specimens.  
Stability (collection to initiation of testing): Ambient: 1 week; Refrigerated: 1 month; Frozen: 1 year



**New Test**

**2014513**

**Alpha/Beta Double-Negative T-Cells for Autoimmune Lymphoproliferative Syndrome**

**ALPS ABDNT**



Time Sensitive

**Methodology:** Quantitative Flow Cytometry  
**Performed:** Sun-Sat  
**Reported:** 1-3 days

**Specimen Required:** Collect: Green (Sodium or Lithium Heparin), Lavender (EDTA), or Pink (K<sub>2</sub>EDTA).  
Specimen Preparation: Transport 5 mL whole blood. (Min: 0.5 mL)  
Storage/Transport Temperature: **CRITICAL ROOM TEMPERATURE.**  
Remarks: Specimens must be analyzed within 48 hours of collection.  
Unacceptable Conditions: Clotted or hemolyzed specimens.  
Stability (collection to initiation of testing): Ambient: 48 hours; Refrigerated: Unacceptable; Frozen: Unacceptable

**Reference Interval:** Reports include age appropriate reference intervals and interpretation.

Test Number	Components	Age: 2-18 years old	Age: 18-69 years old
	Absolute alpha/beta TCR+ DNT	0-46 (cells/uL)	0-32 (cells/uL)
	Absolute alpha/beta TCR+ DNT B220+	0-5 (cells/uL)	0-6 (cells/uL)
	% alpha/beta TCR+ DNT	0-3 (%CD3+)	0-2 (%CD3+)
	% alpha/beta TCR+ DNT B220+	0-0.3 (%CD3+)	0-0.4 (%CD3+)

**Interpretive Data:** The hallmark for a diagnosis of Autoimmune Lymphoproliferative Syndrome (ALPS) is an increased concentration of CD3+ T-cells negative for CD4 and CD8 (double-negative T-cells [DNT]) and positive for the alpha/beta T-cell receptor (TCR). B220 expression on alpha/beta TCR+DNT cells is a sensitive and specific marker for ALPS and is associated with mutations in the *FAS* gene.

Abnormal results should be correlated with clinical history and confirmed by additional testing for defective in vitro lymphocyte apoptosis and for mutations in the *FAS* gene.

See Compliance Statement A: [www.aruplab.com/CS](http://www.aruplab.com/CS)

**CPT Code(s):** 86356 x4

New York DOH approval pending. Call for status update.

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

**New Test**     [2014507](#)     **Alpha Fetoprotein, Body Fluid**     **AFP FL**

**Methodology:** Quantitative Chemiluminescent Immunoassay  
**Performed:** Sun-Sat  
**Reported:** Within 24 hours

**Specimen Required:** Collect: Pericardial, Peritoneal, or Pleural fluid.  
Specimen Preparation: Centrifuge to remove cellular material. Transfer 1 mL body fluid to an ARUP Standard Transport Tube. (Min: 0.5 mL)  
Storage/Transport Temperature: Refrigerated.  
Remarks: Specimen source required.  
Unacceptable Conditions: Specimen types other than those listed. Specimens too viscous to be aspirated by instrument.  
Stability (collection to initiation of testing): Ambient: 24 hours; Refrigerated: 1 week; Frozen: 1 year

**Interpretive Data:** This assay uses the Beckman Coulter Access Dxi AFP methodology. Results obtained with different assay methods or kits cannot be used interchangeably. The AFP assay value, regardless of level, should not be interpreted as evidence for the presence or absence of malignant disease.

For information on body fluid reference ranges and/or interpretive guidance visit <http://aruplab.com/bodyfluids/>

See Compliance Statement B: [www.aruplab.com/CS](http://www.aruplab.com/CS)

**Note:** For cerebral spinal fluid, refer to Alpha Fetoprotein, CSF (ARUP test code 0020729).

**CPT Code(s):** 86316

New York DOH approval pending. Call for status update.

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

[2013034](#)     **Alpha Subunit, Free, Pituitary Glycoprotein Hormones (PGH)**     **A SUB PGH**

**HOTLINE NOTE:** Name change only.

[0050005](#)     **Alpha-2-Macroglobulin**     **A2M**

**Specimen Required:** Collect: Serum Separator Tube (SST).  
Specimen Preparation: Separate from cells ASAP or within 2 hours of collection. Transfer 1 mL serum to an ARUP Standard Transport Tube. (Min: 0.4 mL)  
Storage/Transport Temperature: Refrigerated.  
Unacceptable Conditions: CSF. Hemolyzed specimens.  
Stability (collection to initiation of testing): After separation from cells: Ambient: 8 hours; Refrigerated: 8 days; Frozen: 1 year (if frozen within 24 hours, avoid repeated freeze/thaw cycles)

[0050392](#)     **Ankylosing Spondylitis (HLA-B27) Genotyping**     **HLAB27 PCR**

**Performed:** Sun-Sat  
**Reported:** 3-7 days

**Specimen Required:** Collect: Lavender (EDTA), Pink (K<sub>2</sub>EDTA), or Yellow (ACD Solution A or B).  
Specimen Preparation: Do not freeze. Transport 3 mL whole blood. (Min: 1 mL)  
Storage/Transport Temperature: Refrigerated.  
Unacceptable Conditions: Plasma or serum; collection of specimen in sodium heparin tubes.  
Stability (collection to initiation of testing): Ambient: 72 hours; Refrigerated: 1 week; Frozen: Unacceptable

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**New Test**     [2014277](#)     **Antimicrobial Susceptibility – Carbapenemase Gene Detection by PCR**     **CARBAR PCR**

Available Now

**Methodology:** Qualitative Polymerase Chain Reaction  
**Performed:** Sun-Sat  
**Reported:** 1-4 days

**Specimen Required:** Collect: Actively growing Enterobacteriaceae, *Pseudomonas aeruginosa*, or *Acinetobacter baumannii* in pure culture.  
Specimen Preparation: Transport sealed container with pure culture on agar slant/bacterial transport media. Place each specimen in an individually sealed bag.  
Storage/Transport Temperature: Room temperature.  
Remarks: Isolate identification (for cultures) and specimen source required.  
Unacceptable Conditions: Mixed cultures or non-viable organisms.  
Stability (collection to initiation of testing): Ambient: 1 week; Refrigerated: 1 week; Frozen: Unacceptable

**Reference Interval:** Not Detected

**Interpretive Data:** This assay detects five carbapenemase gene families (*blaKPC*, *blaNDM*, *blaOXA-48*, *blaVIM*, *blaIMP*) encoding enzymes that may confer resistance to carbapenem and other beta-lactam antibiotics. This assay is intended for use as an aid to infection control in the detection of carbapenem-resistant bacteria and is not intended to guide or monitor treatment of infection. A negative result does not exclude the presence of other resistance mechanisms or assay-specific nucleic acid in concentrations below the level of detection.

**Note:** An additional processing fee will be billed for all isolates not submitted in pure culture, as indicated in the specimen requirements.

If species identification is not provided, identification will be performed at ARUP. Additional charges apply.

This assay will generate a negative IMP result when testing samples containing IMP-7, IMP-13 or IMP-14 gene sequences, and may detect IMP-4 at reduced sensitivity. False negative results may be encountered in rectal specimens with *Pseudomonas aeruginosa* containing the *blaVIM* gene and with *Acinetobacter baumannii* containing *blaIMP* gene.

**CPT Code(s):** 87150

New York DOH approval pending. Call for status update.

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

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**New Test**      [2014499](#)      **ATRX by Immunohistochemistry**      **ATRX IHC**  
**Available Now**

**Methodology:** Immunohistochemistry  
**Performed:** Mon-Fri  
**Reported:** 1-3 days

**Specimen Required:** Collect: Tissue.

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 (recommended but not required), (ARUP supply #47808) available online through eSupply using ARUP Connect or contact ARUP Client Services at (800) 522-2787. (Min: 2 slides) If sending precut slides, do not oven bake.

Storage/Transport Temperature: Room temperature. Also acceptable: Refrigerated. Ship in cooled container during summer months.

Unacceptable Conditions: Specimens submitted with non-representative tissue type. Depleted specimens.

Stability (collection to initiation of testing): Ambient: Indefinitely, Refrigerated: Indefinitely, Frozen: Unacceptable

**Interpretive Data:** See Compliance Statement B: [www.aruplab.com/CS](http://www.aruplab.com/CS)

**Note:** All stains will be handled as "Stain and Return" unless a consultation is requested. To request a consultation, submit the pathology report, all associated case materials (clinical history, blocks, slides, etc.), and the Anatomic Pathology requisition form (#32960) in place of the Immunohistochemistry Stain Form.

**CPT Code(s):** 88342

New York DOH approval pending. Call for status update.

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

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[2008665](#)      **Babesia Species by PCR**      **BABPCR**

**CPT Code(s):** 87798

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[2008420](#)      **BCR-ABL1 Mutation Analysis for Tyrosine Kinase Inhibitor Resistance by Next Generation Sequencing**      **BCRABL NGS**

**CPT Code(s):** 81479

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[0065080](#)      **Bordetella pertussis/parapertussis by PCR**      **BORD PCR**

**CPT Code(s):** 87798

Quarterly HOTLINE: Effective August 21, 2017

**New Test**      [2014493](#)      **Bupivacaine Quantitative, Serum or Plasma**      **BUPIVAC SP**  
**Available Now**

**Methodology:**      Quantitative Gas Chromatography  
**Performed:**      Varies  
**Reported:**      3-10 days

**Specimen Required:** Collect: Plain Red, Lavender (EDTA), or Pink (K<sub>2</sub>EDTA).  
Specimen Preparation: Transfer 1 mL serum or plasma to an ARUP Standard Transport Tube and freeze immediately. (Min: 0.4 mL)  
Storage/Transport Temperature: Frozen.  
Unacceptable Conditions: Separator tubes.  
Stability (collection to initiation of testing): Ambient: Undefined; Refrigerated: Undefined; Frozen: 6 months

**Reference Interval:**      By report

**CPT Code(s):**      80375 (Alt code: G0480)

New York DOH Approved.

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

[0095200](#)      **Candida albicans Antibodies IgA, IgG, and IgM by ELISA**      **CANDIDA AB**

**Reference Interval:**  
 Effective August 21, 2017

Test Number	Components	Reference Interval	
0051770	Candida albicans IgG Antibody by ELISA	0.88 EV or less	Negative - No significant level of detectable <i>Candida albicans</i> antibody.
		0.89-0.99 EV	Equivocal - Questionable presence of antibodies. Repeat testing in 10-14 days may be helpful.
		1.00 EV or greater	Positive - Antibody to <i>Candida albicans</i> detected, which may indicate a current or past infection.
0051771	Candida albicans IgM Antibody by ELISA	0.88 EV or less	Negative - No significant level of detectable <i>Candida albicans</i> antibody.
		0.89-0.99 EV	Equivocal - Questionable presence of antibodies. Repeat testing in 10-14 days may be helpful.
		1.00 EV or greater	Positive - Antibody to <i>Candida albicans</i> detected, which may indicate a current or past infection.
0051769	Candida albicans IgA Antibody by ELISA	0.88 EV or less	Negative - No significant level of detectable <i>Candida albicans</i> antibody.
		0.89-0.99 EV	Equivocal - Questionable presence of antibodies. Repeat testing in 10-14 days may be helpful.
		1.00 EV or greater	Positive - Antibody to <i>Candida albicans</i> detected, which may indicate a current or past infection.

[0051769](#)      **Candida albicans IgA Antibody by ELISA**      **CANDI IGA**

**Reference Interval:**  
 Effective August 21, 2017

0.88 EV or less	Negative - No significant level of detectable <i>Candida albicans</i> antibody.
0.89-0.99 EV	Equivocal - Questionable presence of antibodies. Repeat testing in 10-14 days may be helpful.
1.00 EV or greater	Positive - Antibody to <i>Candida albicans</i> detected, which may indicate a current or past infection.

[0051770](#)      **Candida albicans IgG Antibody by ELISA**      **CANDI IGG**

**Reference Interval:**  
 Effective August 21, 2017

0.88 EV or less	Negative - No significant level of detectable <i>Candida albicans</i> antibody.
0.89-0.99 EV	Equivocal - Questionable presence of antibodies. Repeat testing in 10-14 days may be helpful.
1.00 EV or greater	Positive - Antibody to <i>Candida albicans</i> detected, which may indicate a current or past infection.

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**0051771**      ***Candida albicans* IgM Antibody by ELISA**      **CANDI IGM**

**Reference Interval:**

Effective August 21, 2017

0.88 EV or less	Negative - No significant level of detectable <i>Candida albicans</i> antibody.
0.89-0.99 EV	Equivocal - Questionable presence of antibodies. Repeat testing in 10-14 days may be helpful.
1.00 EV or greater	Positive - Antibody to <i>Candida albicans</i> detected, which may indicate a current or past infection.

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**2013798**      ***Candida* Species by PCR**      **CANDPCR**

CPT Code(s):      87481

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**2013784**      ***Candida* Species by PCR with Reflex to *FKS* Drug Resistance by Sequencing**      **CAND RFX**

CPT Code(s):      87481 ; if reflexed, add 87900

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**2010179**      **CD4+ T-Cell Recent Thymic Emigrants (RTEs)**      **CD4 RTE**

**Specimen Required:** Collect: Lavender (EDTA) or Green (Sodium or Lithium Heparin).

**New York State Clients:** Lavender (EDTA).

**Specimen Preparation:** Transport 4 mL whole blood. (Min: 0.5 mL)

**New York State Clients:** Transport 3 mL whole blood in the original collection tube. (Min: 1.5 mL) Do not send to ARUP Laboratories. Specimen must be received at performing laboratory within 48 hours of collection. For specimen requirements and direct submission instructions please contact ARUP Referral Testing at (800) 242-2787, ext. 5145.

**Storage/Transport Temperature:** Refrigerated. Also acceptable: Room temperature.

**New York State Clients:** Room temperature.

**Remarks:** Specimens must be analyzed within 72 hours of collection.

**New York State Clients:** Specimens must be analyzed within 48 hours of collection.

**Unacceptable Conditions:** Cord blood. Specimens older than 72 hours. Clotted or hemolyzed specimens.

**Stability (collection to initiation of testing):** Ambient: 72 hours; Refrigerated: 72 hours; Frozen: Unacceptable

**New York State Clients:** Ambient: 48 hours; Refrigerated: Unacceptable; Frozen: Unacceptable

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**2012151**      **Charcot-Marie-Tooth (CMT) and Related Hereditary Neuropathies Panel Sequencing**      **CMT SEQ**

CPT Code(s):      81479

Quarterly HOTLINE: Effective August 21, 2017

**New Test**  
Available Now

**2014505**

**Chromium, RBC**

**CR RBC**

**Methodology:** Inductively Coupled Plasma-Mass Spectrometry  
**Performed:** Varies  
**Reported:** 3-10 days

**Specimen Required:** Collect: Royal Blue (K<sub>2</sub>EDTA).  
Specimen Preparation: Separate from cells ASAP or within 2 hours of collection. Transport 1 mL RBCs in the original collection tube. (Min: 0.4 mL)  
Storage/Transport Temperature: Refrigerated. Also acceptable: Room temperature.  
Stability (collection to initiation of testing): Ambient: 1 month; Refrigerated: 1 month; Frozen: Unacceptable

**Reference Interval:** By report

**CPT Code(s):** 82495

New York DOH Approved.

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

**2011157**

**Cobalamin/Propionate/Homocysteine Metabolism Related Disorders Panel, Sequencing (25 Genes) and Deletion/Duplication (24 Genes)**

**VB12 PANEL**

**CPT Code(s):** 81479

**0025032**

**Cobalt, Urine**

**COBALT U**

**Reference Interval:**

Test Number	Components	Reference Interval		
	Cobalt, Urine - per volume	Effective August 21, 2017 0.0-1.2 µg/L		
	Cobalt, Urine - per 24h	Effective August 21, 2017 0.0-4.4 µg/d		
0020473	Creatinine, 24-Hour Urine	<b>Age</b>	<b>Male</b>	<b>Female</b>
		3-8 years	140-700 mg/d	140-700 mg/d
		9-12 years	300-1300 mg/d	300-1300 mg/d
		13-17 years	500-2300 mg/d	400-1600 mg/d
		18-50 years	1000-2500 mg/d	700-1600 mg/d
		51-80 years	800-2100 mg/d	500-1400 mg/d
		81 years and older	600-2000 mg/d	400-1300 mg/d
	Cobalt, Urine - ratio to CRT	Effective August 21, 2017 0.0-4.2 (µg/g CRT)		



**New Test**     [2014547](#)     **Cytochrome P450 2D6 (CYP2D6) 15 Variants and Gene Duplication**     **CYP2D6**



Additional Technical Information



Supplemental Resources

**Methodology:** Polymerase Chain Reaction/Fluorescence Monitoring  
**Performed:** Varies  
**Reported:** 5-10 days

**Specimen Required:** Collect: **Whole Blood:** Lavender (EDTA), Pink (K<sub>2</sub>EDTA), or Yellow (ACD Solution A or B).  
**Saliva:** Collection Device by Spectrum Solutions, LLC (SS-SAL-1, ARUP Supply #52535) available online through eSupply using ARUP Connect™ or by contacting ARUP Client Services at (800) 522-2787.  
Specimen Preparation: Transport 3 mL whole blood. (Min: 1 mL) OR Saliva Collection Device.  
Storage/Transport Temperature: **Whole Blood:** Refrigerated.  
**Saliva:** Room temperature.  
Unacceptable Conditions: Plasma or serum. Specimens collected in sodium heparin or lithium heparin.  
Stability (collection to initiation of testing): **Whole Blood:** Ambient: 72 hours; Refrigerated: 2 weeks; Frozen: 1 month  
**Saliva:** Ambient: 2 weeks; Refrigerated: Unacceptable; Frozen: Unacceptable

**Reference Interval:** By report

**Interpretive Data:**

**Background Information for Cytochrome P450 2D6 (CYP2D6) 15 Variants and Gene Duplication:**

**Characteristics:** The cytochrome P450 (CYP) isozyme 2D6 is involved in the metabolism of many drugs, such as antiestrogens (tamoxifen), alpha-blockers, analgesics, anticonvulsives, antidepressants, antidiabetics, antihypertensives, antipsychotics, antitussives, beta blockers, cardioactives, norepinephrine reuptake inhibitors, and stimulants. Variants of *CYP2D6* will influence pharmacokinetics of CYP2D6 substrates, and may predict non-standard dose requirements.

**Inheritance:** Autosomal co-dominant.

**Cause:** *CYP2D6* gene variants and copy number result in increased, decreased or complete deficiency in enzyme activity.

**Variants Tested:** (Variants are numbered according to M33388 sequence.)

**Functional:** \*2 (2850C>T), \*2A (-1584C>G; 2850C>T).

**Decreased function:** \*9 (2613-5delAGA), \*10 (100C>T), \*17 (1023C>T; 2850C>T), \*29 (1659G>A; 2850C>T) \*41 (2988G>A; 2850C>T).

**Non-functional:** \*3 (2549delA), \*4 (100C>T; 1846G>A), \*5 (gene deletion), \*6 (1707delT), \*7 (2935A>C), \*8 (1758G>T; 2850C>T), \*12 (124G>A; 2850C>T), \*14 (1758G>A; 2850C>T), \*36 (a \*10 carrying a CYP2D7-derived exon 9 conversion).

**Increased function:** Duplicated functional alleles.

**Negative:** No variants detected is predictive of \*1 functional alleles and normal enzymatic activity.

**Allele frequencies:**

*CYP2D6*\*2 or *CYP2D6*\*2A: African-17.6 percent, Asian-21.2 percent, Caucasian-27.6 percent, Middle Eastern-21.7 percent, Oceanian-1.2 percent  
*CYP2D6*\*3: African-0.2 percent, Asian-0 percent, Caucasian-1.3 percent, Middle Eastern-0.1 percent, Oceanian-0.2 percent  
*CYP2D6*\*4: African-4.9 percent, Asian-4.6 percent, Caucasian-18.2 percent, Middle Eastern-7.8 percent, Oceanian-2.5 percent  
*CYP2D6*\*5: African-6.3 percent, Asian-4.3 percent, Caucasian-2.8 percent, Middle Eastern-2.3 percent, Oceanian-4.3 percent  
*CYP2D6*\*6: African-0.1 percent, Asian-0 percent, Caucasian-1.0 percent, Middle Eastern-0.6 percent, Oceanian-0 percent  
*CYP2D6*\*7: African-0 percent, Asian-0 percent, Caucasian-0.1 percent, Middle Eastern-0 percent, Oceanian-0 percent  
*CYP2D6*\*8: African-0 percent, Asian-0 percent, Caucasian-0 percent, Middle Eastern-0 percent, Oceanian-0 percent  
*CYP2D6*\*9: African-0.3 percent, Asian-0.5 percent, Caucasian-2.1 percent, Middle Eastern-0 percent, Oceanian-0 percent  
*CYP2D6*\*10: African-5.3 percent, Asian-30.2 percent, Caucasian-3.0 percent, Middle Eastern-3.5 percent, Oceanian- 2.5 percent  
*CYP2D6*\*12: African-0 percent, Asian-0 percent, Caucasian-0 percent, Middle Eastern-0 percent, Oceanian-0 percent  
*CYP2D6*\*14: African-0.1 percent, Asian-0.4 percent, Caucasian-0 percent, Middle Eastern-0.2 percent, Oceanian-0 percent  
*CYP2D6*\*17: African-19.0 percent, Asian-0.1 percent, Caucasian-0.4 percent, Middle Eastern-1.6 percent, Oceanian-0.1 percent  
*CYP2D6*\*29: African-7.7 percent, Asian-0 percent, Caucasian-0.1 percent, Middle Eastern-0.8 percent, Oceanian-0 percent  
*CYP2D6*\*36: African-0.3 percent, Asian-0.7 percent, Caucasian-0 percent, Middle Eastern-0 percent, Oceanian-0 percent  
*CYP2D6*\*41: African-9.2 percent, Asian-4.9 percent, Caucasian-7.9 percent, Middle Eastern-19.9 percent, Oceanian-0.9 percent  
*CYP2D6*xN (gene duplication): African-4.7 percent, Asian-1.6 percent, Caucasian-2.6 percent, Middle Eastern-7.1 percent, Oceanian-11.8

**Clinical Sensitivity:** Drug-dependent.

**Methodology:** Polymerase chain reaction (PCR) and fluorescence monitoring.

**Analytical Sensitivity and Specificity:** Greater than 99 percent.

**Limitations:** Only the targeted *CYP2D6* variants will be detected by this panel. Diagnostic errors can occur due to rare sequence variations. Risk of therapeutic failure or adverse reactions with CYP2D6 substrates may be affected by genetic and non-genetic factors that are not detected by this test. This result does not replace the need for therapeutic drug or clinical monitoring.

See Compliance Statement C: [www.aruplab.com/CS](http://www.aruplab.com/CS)

**CPT Code(s):** 81226



Quarterly HOTLINE: Effective **August 21, 2017**

New York DOH approval pending. Call for status update.

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

**Interpretive Data:**

**Background Information for Cytochrome P450 2D6 (CYP2D6) 15 Variants and Gene Duplication:**

**Characteristics:** The cytochrome P450 (CYP) isozyme 2D6 is involved in the metabolism of many drugs, such as antiestrogens (tamoxifen), alpha-blockers, analgesics, anticonvulsives, antidepressants, antidiabetics, antihypertensives, antipsychotics, antitussives, beta blockers, cardioactives, norepinephrine reuptake inhibitors, and stimulants. Variants of *CYP2D6* will influence pharmacokinetics of *CYP2D6* substrates, and may predict non-standard dose requirements.

**Inheritance:** Autosomal co-dominant.

**Cause:** *CYP2D6* gene variants and copy number result in increased, decreased or complete deficiency in enzyme activity.

**Variants Tested:** (Variants are numbered according to M33388 sequence.)

**Functional:** \*2 (2850C>T), \*2A (-1584C>G; 2850C>T).

**Decreased function:** \*9 (2613-5delAGA), \*10 (100C>T), \*17 (1023C>T; 2850C>T), \*29 (1659G>A; 2850C>T) \*41 (2988G>A; 2850C>T).

**Non-functional:** \*3 (2549delA), \*4 (100C>T; 1846G>A), \*5 (gene deletion), \*6 (1707delT), \*7 (2935A>C), \*8 (1758G>T; 2850C>T), \*12 (124G>A; 2850C>T), \*14 (1758G>A; 2850C>T), \*36 (a \*10 carrying a *CYP2D7*-derived exon 9 conversion).

**Increased function:** Duplicated functional alleles.

**Negative:** No variants detected is predictive of \*1 functional alleles and normal enzymatic activity.

**Allele frequencies:**

*CYP2D6*\*2 or *CYP2D6*\*2A: African-17.6 percent, Asian-21.2 percent, Caucasian-27.6 percent, Middle Eastern-21.7 percent, Oceanian-1.2 percent

*CYP2D6*\*3: African-0.2 percent, Asian-0 percent, Caucasian-1.3 percent, Middle Eastern-0.1 percent, Oceanian-0.2 percent

*CYP2D6*\*4: African-4.9 percent, Asian-4.6 percent, Caucasian-18.2 percent, Middle Eastern-7.8 percent, Oceanian-2.5 percent

*CYP2D6*\*5: African-6.3 percent, Asian-4.3 percent, Caucasian-2.8 percent, Middle Eastern-2.3 percent, Oceanian-4.3 percent

*CYP2D6*\*6: African-0.1 percent, Asian-0 percent, Caucasian-1.0 percent, Middle Eastern-0.6 percent, Oceanian-0 percent

*CYP2D6*\*7: African-0 percent, Asian-0 percent, Caucasian-0.1 percent, Middle Eastern-0 percent, Oceanian-0 percent

*CYP2D6*\*8: African-0 percent, Asian-0 percent, Caucasian-0 percent, Middle Eastern-0 percent, Oceanian-0 percent

*CYP2D6*\*9: African-0.3 percent, Asian-0.5 percent, Caucasian-2.1 percent, Middle Eastern-0 percent, Oceanian-0 percent

*CYP2D6*\*10: African-5.3 percent, Asian-30.2 percent, Caucasian-3.0 percent, Middle Eastern-3.5 percent, Oceanian-2.5 percent

*CYP2D6*\*12: African-0.3 percent, Asian-0 percent, Caucasian-0 percent, Middle Eastern-0 percent, Oceanian-0 percent

*CYP2D6*\*14: African-0.1 percent, Asian-0.4 percent, Caucasian-0 percent, Middle Eastern-0.2 percent, Oceanian-0 percent

*CYP2D6*\*17: African-19.0 percent, Asian-0.1 percent, Caucasian-0.4 percent, Middle Eastern-1.6 percent, Oceanian-0.1 percent

*CYP2D6*\*29: African-7.7 percent, Asian-0 percent, Caucasian-0.1 percent, Middle Eastern-0.8 percent, Oceanian-0 percent

*CYP2D6*\*36: African-0.3 percent, Asian-0.7 percent, Caucasian-0 percent, Middle Eastern-0 percent, Oceanian-0 percent

*CYP2D6*\*41: African-9.2 percent, Asian-4.9 percent, Caucasian-7.9 percent, Middle Eastern-19.9 percent, Oceanian-0.9 percent

*CYP2D6*:N (gene duplication): African-4.7 percent, Asian-1.6 percent, Caucasian-2.6 percent, Middle Eastern-7.1 percent, Oceanian-11.8

**Clinical Sensitivity:** Drug-dependent.

**Methodology:** Polymerase chain reaction (PCR) and fluorescence monitoring.

**Analytical Sensitivity and Specificity:** Greater than 99 percent.

**Limitations:** Only the targeted *CYP2D6* variants will be detected by this panel. Diagnostic errors can occur due to rare sequence variations. Risk of therapeutic failure or adverse reactions with *CYP2D6* substrates may be affected by genetic and non-genetic factors that are not detected by this test. This result does not replace the need for therapeutic drug or clinical monitoring.

**Background Information for Cytochrome P450 2C9, CYP2C9, 2 Variants:**

**Characteristics:** The cytochrome P450 (CYP) isozyme 2C9 is involved in the metabolism of many drugs such as warfarin, phenytoin, tolbutamide, glipizide, ibuprofen, and phenobarbital. Variants of *CYP2C9* will influence pharmacokinetics of *CYP2C9* substrates, and may predict non-standard dose requirements.

**Inheritance:** Autosomal co-dominant.

**Cause:** *CYP2C9* gene variants result in decreased or complete deficiency in enzyme activity.

**Variants Tested:** (Variants are numbered according to NM\_000771 transcript)

**Decreased function:** \*2 (rs1799853, c.430C>T).

**Non-functional:** \*3 (rs1057910, c.1075A>C).

**Negative:** No variants detected is predictive of \*1 functional alleles and normal enzymatic activity.

**Allele Frequencies:**

*CYP2C9* \*2: Caucasians - 13 percent, Asians - less than 1 percent, African Americans - 3 percent.

*CYP2C9* \*3: Caucasians - 7 percent, Asians - 4 percent, African Americans - 2 percent.

**Clinical Sensitivity:** Drug-dependent.

**Methodology:** Polymerase chain reaction (PCR) and fluorescence monitoring.

**Analytical Sensitivity and Specificity:** Greater than 99 percent.

**Limitations:** Only the targeted *CYP2C9* variants will be detected by this panel. Diagnostic errors can occur due to rare sequence variations. Risk of therapeutic failure or adverse reactions with *CYP2C9* substrates may be affected by genetic and non-genetic factors that are not detected by this test. This result does not replace the need for therapeutic drug or clinical monitoring.

**Background Information for Cytochrome P450 2C19, CYP2C19, 9 Variants:**

**Characteristics:** The cytochrome P450 (CYP) isozyme 2C19 is involved in the metabolism of many drugs such as clopidogrel, phenytoin, diazepam, R-warfarin, tamoxifen, some antidepressants, proton pump inhibitors, and antimalarials. Variants of *CYP2C19* will influence pharmacokinetics of *CYP2C19* substrates, and may predict non-standard dose requirements.

**Inheritance:** Autosomal co-dominant.

**Cause:** *CYP2C19* gene variants result in increased, decreased, or complete deficiency in enzyme activity.

**Variants Tested:** (Variants are numbered according to NM\_000769 transcript).

**Decreased function:** \*9 (rs17884712, c.431G>A); \*10 (rs6413438, c.680C>T).

Quarterly HOTLINE: Effective **August 21, 2017**

**Non-functional:** \*2 (rs4244285, c.681G>A), \*3 (rs4986893, c.636G>A), \*4 (rs28399504, c.1A>G), \*6 (rs72552267, c.395G>A), \*7 (rs72558186, c.819+2T>A), \*8 (rs41291556, c.358T>C).

**Increased function:** \*17 (rs12248560, c.-806C>T).

**Negative:** No variants detected is predictive of \*1 functional alleles and normal enzymatic activity.

**Allele frequencies:**

*CYP2C19*\*2: African American - 18.3 percent, Caucasian - 14.6 percent, Middle Eastern - 13.2 percent, Oceanian - 54.9 percent, South Asian - 34.4 percent.

*CYP2C19*\*3: African American - 0.3 percent, Caucasian - 0.6 percent, Middle Eastern - 2.6 percent, Oceanian - 13.9 percent, East Asian - 8.5 percent.

*CYP2C19*\*17: African American - 19.4 percent, Caucasian - 21.5 percent, Oceanian - 2.5 percent, South Asian - 16.5 percent.

Other alleles are rare, with allele frequencies of less than 1 percent in all populations studied.

**Clinical Sensitivity:** Drug-dependent.

**Methodology:** Polymerase chain reaction (PCR) and fluorescence monitoring.

**Analytical Sensitivity and Specificity:** Greater than 99 percent.

**Limitations:** Only the targeted *CYP2C19* variants will be detected by this panel. Diagnostic errors can occur due to rare sequence variations. Risk of therapeutic failure or adverse reactions with *CYP2C19* substrates may be affected by genetic and non-genetic factors that are not detected by this test. This result does not replace the need for therapeutic drug or clinical monitoring.

**Background Information for Cytochrome P450 3A5 Genotyping, *CYP3A5*, 2 Variants:**

**Characteristics:** The cytochrome P450 (CYP) 3A subfamily of enzymes is involved in metabolism of many drugs such as immunosuppressants, antibiotics, antivirals, benzodiazepines, and steroids. Nonfunctional variants of *CYP3A5* are common in some populations, preventing expression and function of the *CYP3A5* enzyme, which will influence pharmacokinetics of *CYP3A5* substrates, and may predict non-standard dose requirements.

**Inheritance:** Autosomal co-dominant.

**Cause:** *CYP3A5* gene variants result in enzyme deficiency.

**Variants Tested:** *CYP3A5* non-functional alleles: \*3 (rs776746, c.6986A>G), \*6 (rs10264272, c.14690G>A).

**Negative:** No variants detected is predictive of \*1 functional alleles and normal *CYP3A5* enzyme activity. (Variants are numbered according to NG\_007938.1 transcript)

**Allele Frequencies:**

*CYP3A5*\*3: African - 29.8 percent, Asian - 74.2 percent, Caucasian - 92.1 percent, Latin American - 76.5 percent, Middle Eastern - 88.1 percent.

*CYP3A5*\*6: African - 17.2 percent, Asian - 0.1 percent, Caucasian - 0.1 percent, Latin American - 3.7 percent, Middle Eastern - 1.9 percent.

*CYP3A5*\*7: African - 7.7 percent, Asian - 0 percent, Caucasian - 0 percent, Latin American - 2.5 percent, Middle Eastern - 0.2 percent.

**Clinical Sensitivity:** drug-dependent

**Methodology:** Polymerase chain reaction (PCR) and fluorescence monitoring.

**Analytical Sensitivity and Specificity:** Greater than 99 percent.

**Limitations:** Only the targeted *CYP3A5* variants will be detected by this panel. Diagnostic errors can occur due to rare sequence variations. Many *CYP3A* substrates are also metabolized by *CYP3A4*, for which clinically relevant genetic variation is not recognized to be common. Risk of therapeutic failure or adverse reactions with *CYP3A5* substrates may be affected by genetic and non-genetic factors that are not detected by this test. This result does not replace the need for therapeutic drug or clinical monitoring.

See Compliance Statement C: [www.aruplab.com/CS](http://www.aruplab.com/CS)

<a href="#"><u>2013294</u></a>	<b>Dengue Virus (1-4) Subtype by PCR</b>	<b>DENGUEPCR</b>
CPT Code(s):	87798	
<a href="#"><u>2011153</u></a>	<b>Duchenne/Becker Muscular Dystrophy (DMD) Sequencing</b>	<b>DMD SEQ</b>
CPT Code(s):	81479	
<a href="#"><u>2007862</u></a>	<b>Ehrlichia and Anaplasma Species by Real-Time PCR</b>	<b>EHR ANAPCR</b>
CPT Code(s):	87798	

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**0090120      Ethanol, Serum or Plasma - Medical      ETOH**

**Performed:** Sun-Sat  
**Reported:** 1-3 days

**Specimen Required:** Patient Prep: For medical purposes only. Timing of specimen collection: Dependent on time of exposure, test upon presentation to hospital.  
Collect: Plain Red or Gray (Potassium Oxalate/Sodium Fluoride). Also acceptable: Lavender (EDTA) or Green (Sodium or Lithium Heparin).  
Specimen Preparation: **Separate** from cells ASAP or within 2 hours of collection. **Transfer** 2 mL serum or plasma to an ARUP Standard Transport **Tube**. (Min: 0.5 mL) **Cap tube tightly to minimize alcohol loss.**  
Storage/Transport Temperature: Refrigerated.  
Unacceptable Conditions: Whole blood. Plasma Separator Tubes (PST), Serum Separator Tubes (SST).  
Stability (collection to initiation of testing): After separation from cells: Ambient: 4 **hours**; Refrigerated: 1 **week**; Frozen: 6 months

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**2008803      Expanded Hearing Loss Panel, Sequencing (56 Genes) and Deletion/Duplication (53 Genes)      EHL PANEL**

**CPT Code(s):** 81479

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**2013449      Gastrointestinal Hereditary Cancer Panel, Sequencing and Deletion/Duplication, 16 Genes      GICAN PAN**

**CPT Code(s):** 81435; 81436

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**2011660      Gastrointestinal Parasite and Microsporidia by PCR      PARAMICPCR**

**CPT Code(s):** 87505; **87798**

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**New Test Available Now      2014459      Gaucher Disease (GBA), Enzyme Activity in Leukocytes      GBA ENZYME**

**Methodology:** Quantitative Fluorometry  
**Performed:** Varies  
**Reported:** 3-10 days

**Specimen Required:** Collect: Yellow (ACD), Lavender (K<sub>2</sub>EDTA), Lavender (K<sub>3</sub>EDTA), or Green (Sodium Heparin).  
Specimen Preparation: Transport 3 mL whole blood. (Min: 1 mL)  
Storage/Transport Temperature: Refrigerated  
Remarks: Additional information is required: Clinical Indication for testing.  
Unacceptable Conditions: Grossly hemolyzed specimens.  
Stability (collection to initiation of testing): Ambient: Unacceptable; Refrigerated: 3 days; Frozen: Unacceptable

**Reference Interval:** 4.6 – 12.0 nmol hydrolyzed/hr/mg protein

**Interpretive Data:** Refer to report.

**CPT Code(s):** 82657

New York DOH approval pending. Call for status update.

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

Quarterly HOTLINE: Effective August 21, 2017

**New Test**     [2014285](#)     **Hepatitis B Virus (HBV) Perinatal Exposure Follow-up by CIA, Panel**     **HBV PAN PN**

Available Now

**Methodology:** Qualitative Chemiluminescent Immunoassay/Quantitative Chemiluminescent Immunoassay  
**Performed:** Sun-Sat  
**Reported:** Within 24 hours

**Specimen Required:** Collect: Serum Separator Tube (SST). Also acceptable: Lavender (EDTA) or Pink (K<sub>2</sub>EDTA).  
Specimen Preparation: Separate from cells ASAP or within 2 hours of collection. Transfer 3 mL serum or plasma to an ARUP Standard Transport Tube. (Min: 1.5 mL)  
Storage/Transport Temperature: Refrigerated.  
Unacceptable Conditions: Heparinized plasma. Specimens containing particulate material. Heat-inactivated, severely hemolyzed or lipemic specimens.  
Stability (collection to initiation of testing): After separation from cells: Ambient: Unacceptable; Refrigerated: 1 week; Frozen: Indefinitely (avoid repeated freeze/thaw cycles)

**Reference Interval:**

Test Number	Components	Reference Interval		
0020090	Hepatitis B Virus Surface Antibody	Less than 10.00 IU/L	Negative	
		Greater than or equal to 10.00 IU/L	Positive	
0020089	Hepatitis B Virus Surface Antigen with Reflex to Confirmation	Test Number	Components	Reference Interval
			Hepatitis B Virus Surface Antigen	Negative
		0020128	Hepatitis B Virus Surface Antigen, Confirmation	Refer to report

**Interpretive Data:** This panel of assays should not be used for blood donor screening, associated re-entry protocols, or for screening Human Cell, Tissues and Cellular and Tissue-Based Products (HCT/P).

**Note:** Performed and Reported times indicated are for screening of Hepatitis B Surface Ag w/ Reflex to Conf and Hepatitis B Virus Surface Antibody. If results for Hepatitis B Surface Ag w/ Reflex to Conf screen is repeatedly reactive with an index value between 1.00 and 50.00, then Hepatitis B Virus Surface Ag, Confirm will be added. Additional charges apply.

**CPT Code(s):** 86317; 87340; if reflexed, add 87341

New York DOH Approved.

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

[0020090](#)     **Hepatitis B Virus Surface Antibody**     **HBSAB**

**Interpretive Data:**  
This assay should not be used for blood donor screening, associated re-entry protocols, or for screening Human Cell, Tissues and Cellular and Tissue-Based Products (HCT/P).

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**New Test**     [2014598](#)     **Hepatitis C Virus (HCV) Genotype with Reflex to HCV NS5A Drug Resistance by Sequencing**     **HCV RFX 5A**

Available Now

**Methodology:** Polymerase Chain Reaction/Sequencing  
**Performed:** Sun-Sat  
**Reported:** 13-19 days

**Specimen Required:** Collect: Lavender (EDTA), Pink (K<sub>2</sub>EDTA), Plasma Preparation Tube (PPT), or Serum Separator Tube (SST).  
Specimen Preparation: Separate from cells ASAP or within 2 hours of collection. Transfer 2 mL serum or plasma to an ARUP Standard Transport Tube. (Min: 1.5 mL)  
Storage/Transport Temperature: Frozen.  
Unacceptable Conditions: Heparinized specimens.  
Stability (collection to initiation of testing): Ambient: Unacceptable; Refrigerated: 72 hours; Frozen: 4 months

**Reference Interval:** By report

**Interpretive Data:** Refer to report.

See Compliance Statement B: [www.aruplab.com/CS](http://www.aruplab.com/CS)

**Note:** This test may be unsuccessful if the HCV RNA viral load is less than log 3.6 or 4000 IU/mL. If initial result is Type “1a or 1b”, then HCV NS5A Drug Resistance by Sequencing will be added. Additional charges apply.

**CPT Code(s):** 87902; if reflexed, add 87902

New York DOH approval pending. Call for status update.

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

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[2010784](#)     **Hepatitis C Virus Antibody by CIA with Reflex to HCV by Quantitative PCR**     **HCV AB QR**

**Performed:** Sun-Sat  
**Reported:** Within 48 hours

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[2012052](#)     **Hereditary Hemolytic Anemia Sequencing, 28 Genes**     **HHA SEQ**

**CPT Code(s):** 81479

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[2009337](#)     **Hereditary Hemorrhagic Telangiectasia (HHT) Panel, Sequencing and Deletion/Duplication, 5 Genes**     **HHT PANEL**

**CPT Code(s):** 81479

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[2011148](#)     **Herpes Simplex Virus (HSV) by PCR with Reflex to HSV (HSV-1/HSV-2) Subtype by PCR**     **HSVPCR RFX**

**CPT Code(s):** 87529; if reflexed, add 87529

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[2010095](#)     **Herpes Simplex Virus (HSV-1/HSV-2) Subtype by PCR**     **HSVTYPEPCR**

**CPT Code(s):** 87529



Quarterly HOTLINE: Effective August 21, 2017

<a href="#"><u>2008125</u></a>	<b>Hexosaminidase A Percent and Total Hexosaminidase in Leukocytes</b>	<b>HEXOA LEUK</b>
<b>Performed:</b>	Mon	
<b>Reported:</b>	2-9 days	
<a href="#"><u>2008121</u></a>	<b>Hexosaminidase A Percent and Total Hexosaminidase, Plasma or Serum</b>	<b>HEXOS A P/S</b>
<b>Performed:</b>	Mon	
<b>Reported:</b>	2-9 days	
<a href="#"><u>2007578</u></a>	<b>High Molecular Weight Kininogen (HMWK), Activity</b>	<b>HIGH MOLE</b>
<b>HOT LINE NOTE:</b> Name change only.		
<a href="#"><u>2008848</u></a>	<b>Holoprosencephaly Panel, Nonsyndromic, Sequencing and Deletion/Duplication, 11 Genes</b>	<b>HPE PAN</b>
<b>CPT Code(s):</b>	81479	
<a href="#"><u>0040227</u></a>	<b>IGHV Mutation Analysis by Sequencing</b>	<b>IGHV MUT</b>
<b>HOTLINE NOTE:</b> There is a price change associated with this test. Please contact ARUP Client Services at (800) 522-2787 for additional information.		
<a href="#"><u>0070022</u></a>	<b>Insulin, Other</b>	<b>INSULINOTH</b>
<b>Specimen Required:</b> Collect: Serum Separator Tube (SST). Also acceptable: Lavender (EDTA). <b>Specimen Preparation:</b> Allow sample to clot completely at room temperature. Separate from cells ASAP or within 2 hours of collection. Transfer 1 mL serum or plasma to an ARUP Standard Transport Tube. (Min: 0.4 mL) <b>Storage/Transport Temperature:</b> Frozen. <b>Unacceptable Conditions:</b> Vitreous fluid. Gray (sodium fluoride/potassium oxalate) or heparinized plasma. Hemolyzed specimens. <b>Stability (collection to initiation of testing):</b> After separation from cells: Ambient: 8 hours; Refrigerated: 1 week; Frozen: 1 month		
<a href="#"><u>2013599</u></a>	<b>Insulin-Like Growth Factor 2 (IGF-2)</b>	<b>IGF-2</b>
<b>HOTLINE NOTE:</b> Name change only.		
<a href="#"><u>0098843</u></a>	<b>Insulin-Like Growth Factor Binding Protein 1 (IGFBP-1)</b>	<b>IGFBP-1</b>
<b>Performed:</b>	Varies	
<b>Reported:</b>	3-16 days	
<a href="#"><u>0098842</u></a>	<b>Insulin-Like Growth Factor Binding Protein 2 (IGFBP-2)</b>	<b>IGFBP-2</b>
<b>Performed:</b>	Varies	
<b>Reported:</b>	4-11 days	
<a href="#"><u>0070060</u></a>	<b>Insulin-Like Growth Factor Binding Protein 3 (IGFBP-3)</b>	<b>IGFBP-3</b>
<b>HOTLINE NOTE:</b> Name change only.		

**0090144**

**Isopropanol (Includes Acetone)**

**ISOP**

**Performed:** Sun-Sat  
**Reported:** 1-3 days

**Specimen Required:** Patient Prep: For medical purposes only. Timing of specimen collection: Dependent on time of exposure, test upon presentation to hospital.  
Collect: Plain Red or Gray (Potassium Oxalate/Sodium Fluoride).  
Specimen Preparation: **Separate** from cells ASAP or within 2 hours. Transfer 3 mL serum or plasma to an ARUP Standard Transport Tube. (Min: 0.5 mL) **Cap tube tightly to minimize alcohol loss.**  
Storage/Transport Temperature: Refrigerated.  
Unacceptable Conditions: Whole blood. Plasma Separator Tubes (PST), Serum Separator Tubes (SST).  
Stability (collection to initiation of testing): After separation from cells: Ambient: 1 **week**; Refrigerated: 2 **weeks**; Frozen: 1 month.

**New Test**

**2013716**

**LipoFit by NMR**

**NMRLIPFIT**

Available Now

**Methodology:** Quantitative Nuclear Magnetic Resonance Spectroscopy/ Quantitative Enzymatic/ Detergent Solubilization  
**Performed:** Sun-Sat  
**Reported:** 3-6 days

**Specimen Required:** Patient Prep: 12 hour fasting is preferred, but not required.  
Collect: Greiner Bio-One Clot Activator Tube (ARUP supply #53483) available online through eSupply using ARUP Connect™ or by contacting ARUP Client Services at (800) 522-2787. Also acceptable: Plain Red.  
Specimen Preparation: Gently invert tube to mix contents; allow to clot at room temperature. Separate from cells within 8 hours. Transfer 4 mL serum to an ARUP Standard Transport Tube. (Min: 2 mL)  
Storage/Transport Temperature: Refrigerated.  
Unacceptable Conditions: Plasma. Serum separator tubes other than Greiner Bio-One.  
Stability (collection to initiation of testing): Ambient: 24 hours; Refrigerated: 1 week; Frozen: Unacceptable

**Reference Interval:** By report

**Interpretive Data:** See Compliance Statement B: [www.aruplab.com/CS](http://www.aruplab.com/CS)

**CPT Code(s):** 83704; 80061

New York DOH approval pending. Call for status update.

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

**New Test**     [2013715](#)  
Available Now

**LipoFit by NMR, Particle Count Only**

**NMRLIPFITP**

**Methodology:** Quantitative Nuclear Magnetic Resonance Spectroscopy  
**Performed:** Sun-Sat  
**Reported:** 3-6 days

**Specimen Required:** Patient Prep: 12 hour fast is preferred but not required.  
Collect: Greiner Bio-One Clot Activator Tube (ARUP supply #53483). Available online through eSupply using ARUP Connect™ or by contacting ARUP Client Services at (800) 522-2787. Also acceptable: Plain red.  
Specimen Preparation: Gently invert tube to mix contents and allow to clot at room temperature. Separate serum from cells within 8 hours. Transfer 2 mL serum to an ARUP Standard Transport Tube. (Min: 1 mL)  
Storage/Transport Temperature: Refrigerated.  
Unacceptable Conditions: Plasma. Serum separator tubes other than Greiner Bio-One.  
Stability (collection to initiation of testing): Ambient: 2 days; Refrigerated: 1 month; Frozen: Unacceptable

**Reference Interval:** By Report

**Interpretive Data:** See Compliance Statement B: www.aruplab.com/CS

**CPT Code(s):** 83704

New York DOH approval pending. Call for status update.

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

[0030181](#)

**Lupus Anticoagulant Reflexive Panel**

**LUPUS R**

**Reference Interval:**  
Effective August 21, 2017

Test Number	Components	Reference Interval
	Dilute Russell Viper Venom Time (dRVVT)	33-44 seconds
	Dilute Russell Viper Venom (dRVVT) 1:1 Mix (performed if dRVVT > 44 seconds)	33-44 seconds
	Dilute Russell Viper Venom Time (dRVVT) Confirmation Test (performed if dRVVT 1:1 Mix > 44 seconds)	Negative
	<b>Prothrombin Time</b>	<b>12.0-15.5 seconds</b>
	Partial Thromboplastin Time	32-48 seconds
	Thrombin Time	14.7-19.5 seconds
	Reptilase Time	Less than 22.0 seconds
	PTT Heparin Neutralized	32-48 seconds
	Partial Thromboplastin Time 1:1 Mix (performed if PTT > 48 seconds)	32-48 seconds
	Platelet Neutralization Procedure (performed if PTT 1:1 Mix > 48 seconds)	Negative
	Hexagonal Phospholipid Neutralization	Negative

[2004963](#)

**Malaria Detection and Speciation, Qualitative by Real-Time PCR**

**MALARIAPCR**

**CPT Code(s):** 87798

**0025070**

**Manganese, Urine**

**MANG U**

**Reference Interval:**

Effective August 21, 2017

Test Number	Components	Reference Interval	
	Manganese, Urine - <b>per volume</b>	0.0-0.9 µg/L	
	Manganese, Urine - <b>per 24h</b>	0.0-2.4 µg/d	
	Manganese, Urine - <b>ratio to CRT</b>	0.0-0.9 µg/g CRT	
	Creatinine, Urine - per 24h	<b>Age</b>	
		<b>Male</b>	
		<b>Female</b>	
		3-8 years	140-700 mg/d
		9-12 years	300-1300 mg/d
		13-17 years	500-2300 mg/d
		18-50 years	1000-2500 mg/d
	51-80 years	800-2100 mg/d	
	81 years and older	600-2000 mg/d	

**Interpretive Data:** This assay provides limited utility in determining manganese exposure. Whole blood measurements are recommended for determining recent or active exposure.

See Compliance Statement B: [www.aruplab.com/CS](http://www.aruplab.com/CS)

**HOTLINE NOTE:** There is a clinically significant charting name change associated with this test.

Change the charting name of component 0025043 from Manganese, Urine - ug/gCRT to **Manganese, Urine - ratio to CRT**

Change the charting name of component 0025071 from Manganese, Urine - ug/L to **Manganese, Urine - per volume**

Change the charting name of component 0025072 from Manganese, Urine - ug/day to **Manganese, Urine - per 24h**

**0050375**

**Measles (Rubeola) Antibodies, IgG and IgM**

**MEASLE PAN**

**Specimen Required:** Collect: Serum Separator Tube (SST).

Specimen Preparation: Separate 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 specimens. **Mark specimens plainly as "acute" or "convalescent."**

Storage/Transport Temperature: Refrigerated.

Unacceptable Conditions: Refer to individual components.

Stability (collection to initiation of testing): After separation from cells: Ambient: 48 hours; Refrigerated: 2 weeks; Frozen: 1 year (avoid repeated freeze/thaw cycles)

**0090165**

**Methanol**

**METHANOL**

**Performed:** Sun-Sat

**Reported:** 1-3 days

**Specimen Required:** Patient Prep: For medical purposes only. Timing of specimen collection: Dependent on time of exposure, test upon presentation to hospital.

Collect: Plain Red. Also acceptable: Lavender (EDTA), Pink (K<sub>2</sub>EDTA), Green (Sodium or Lithium Heparin), Gray (Potassium Oxalate/Sodium Fluoride).

Specimen Preparation: **Separate** from cells ASAP or within 2 hours of collection. Transfer 3 mL serum or plasma to an ARUP Standard Transport Tube. (Min: 0.5 mL) **Cap tube tightly to minimize alcohol loss.**

Storage/Transport Temperature: Refrigerated.

Unacceptable Conditions: Whole blood. Plasma Separator Tubes (PST), Serum Separator Tubes (SST).

Stability (collection to initiation of testing): After separation from cells: Ambient: **1 week**; Refrigerated: **2 weeks**; Frozen: 1 month.

**2011626**

**Microsporidia by PCR**

**MICROSPCR**

**CPT Code(s):** 87798

**New Test**     [2014510](#)     **Molybdenum Quantitative, Urine**     **MOLYBDENUR**  
 Available Now

**Methodology:** Quantitative Colorimetry/Inductively Coupled Plasma-Mass Spectrometry  
**Performed:** Varies  
**Reported:** 3-6 days

**Specimen Required:** Collect: Urine.  
Specimen Preparation: Transfer 3 mL urine to an ARUP Standard Transport Tube. (Min: 1.3 mL)  
Storage/Transport Temperature: Refrigerated. Also acceptable: Frozen.  
Stability (collection to initiation of testing): Ambient: 5 days; Refrigerated: 1 month; Frozen: 3 months

**Reference Interval:** By report

**CPT Code(s):** 82570; 83018

New York DOH Approved.

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

[2012182](#)     **Myeloid Malignancies Somatic Mutation and Copy Number Analysis Panel**     **MYE CMANGS**

**CPT Code(s):** 81455

[0055506](#)     **Neutrophil-Associated Antibodies**     **ANTI-NEU**

**Specimen Required:** Collect: Plain Red or Serum Separator Tube (SST).  
Specimen Preparation: **Separate from** cells ASAP or within 2 hours of collection. Transfer 3 mL serum to an ARUP Standard Transport Tube and freeze. (Min: 0.5 mL)  
Storage/Transport Temperature: **CRITICAL FROZEN. Separate specimens must be submitted when multiple tests are ordered.**  
Stability (collection to initiation of testing): After separation from cells: Ambient: Unacceptable; Refrigerated: Unacceptable; Frozen: 1 month

**Interpretive Data:** Neutrophil-associated antibodies may cause neutropenia in various autoimmune disorders including Felty syndrome, SLE and drug-induced neutropenia. Febrile transfusion reactions and isoimmune neonatal neutropenia may also be caused by antibodies to neutrophil-specific antigens or HLA antigens.

A positive **result is** not definitive for specific anti-neutrophil **antibodies**. **Anti**-HLA antibodies and immune complexes may also cause a positive result. The results of this test should be correlated to clinical history and other data.

See Compliance Statement B: [www.aruplab.com/CS](http://www.aruplab.com/CS)

**Note:** Circulating antibodies in patient's serum are measured by flow cytometry after incubation with normal neutrophils. Values greater than 2 standard deviations of a normal control population are interpreted as "weakly positive" and greater than 3 standard deviations as "positive".

This test should not be confused with Anti-Neutrophil Cytoplasmic Antibody, IgG (**ARUP test code 0050811**).

**0025045**

**Nickel, Urine**

**NICKEL U**

**Reference Interval:**

Effective August 21, 2017

Test Number	Components	Reference Interval	
	Nickel, Urine - per volume	0.0-10.4 µg/L	
	Nickel, Urine - per24h	0.0-14.9 µg/d	
	Nickel, Urine - ratio to CRT	0.0-9.9 µg/g CRT	
	Creatinine, Urine - per 24h	<b>Age</b>	
		<b>Male</b>	
		<b>Female</b>	
		3-8 years	140-700 mg/d
		9-12 years	300-1300 mg/d
		13-17 years	500-2300 mg/d
		18-50 years	1000-2500 mg/d
	51-80 years	800-2100 mg/d	
	81 years and older	600-2000 mg/d	

**Interpretive Data:** Measurement of nickel is not recommended in asymptomatic individuals or in individuals with a low likelihood of exposure. Elevations in nickel urine should be interpreted with caution in individuals with no exposure risks, and may indicate contamination of the specimen.

See Compliance Statement B: [www.aruplab.com/CS](http://www.aruplab.com/CS)

**HOTLINE NOTE:** There is a clinically significant charting name change associated with this test.

Change the charting name of component 0025044 from Nickel, Urine - ug/gCRT to Nickel, Urine - ratio to CRT

Change the charting name of component 0025046 from Nickel, Urine - ug/L to Nickel, Urine - per volume

Change the charting name of component 0025047 from Nickel, Urine - ug/day to Nickel, Urine - per 24h

**2007537**

**Non-Invasive Prenatal Testing for Fetal Aneuploidy**

**NIPT ANEU**

CPT Code(s): 81420

**2010232**

**Non-Invasive Prenatal Testing for Fetal Aneuploidy (Panorama) with Microdeletions**

**NIPTANEUMD**

CPT Code(s): 81420; 81422

**2013142**

**Non-Invasive Prenatal Testing for Fetal Aneuploidy with 22q11.2 Microdeletion (Panorama)**

**NIPTANEU22**

CPT Code(s): 81420; 81422

Quarterly HOTLINE: Effective August 21, 2017

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**New Test**     [2014546](#)     **Norovirus, Groups 1 and 2 by PCR**     **NOROPCR**

**Methodology:** Qualitative Reverse Transcription Polymerase Chain Reaction  
**Performed:** Mon, Wed, Fri  
**Reported:** 1-5 days

**Specimen Required:** Collect: Stool.  
Specimen Preparation: Transfer 1 mL stool to an unpreserved stool transport vial (ARUP Supply #40910) available online through eSupply using ARUP Connect™ or contact ARUP Client Services at (800) 522-2787. (Min: 0.5 mL)  
Storage/Transport Temperature: Frozen.  
Stability (collection to initiation of testing): Ambient: 8 hours; Refrigerated: 72 hours; Frozen: 1 month

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

See Compliance Statement B: [www.aruplab.com/CS](http://www.aruplab.com/CS)

**CPT Code(s):** 87798

New York DOH Approved.

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

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[0049250](#)     **p53 with Interpretation by Immunohistochemistry**     **P53 IP**

**HOTLINE NOTE:** There is a component change associated with this test.  
Remove component 0049251, p53 Result.



2007479

**Pain Management Drug Panel by High-Resolution Time-of-Flight or Tandem Mass Spectrometry and Enzyme Immunoassay, Urine**

**PAIN HYB U**

**Methodology:** Qualitative Liquid Chromatography/Time of Flight Mass Spectrometry or Tandem Mass Spectrometry/Enzyme Immunoassay/Quantitative Spectrophotometry

**Reference Interval:** Effective November 17, 2014

**Drugs covered and range of cutoff concentrations.**

**Note: Some drugs are identified based on the presence of unique drug metabolites not listed below.**

Drugs/Drug Classes	Range of Cutoff Concentrations
<b>Barbiturates</b>	200 ng/mL
<b>Benzodiazepine-like:</b> alprazolam, clonazepam, diazepam, lorazepam, midazolam, nordiazepam, oxazepam, temazepam, zolpidem	20 - 60 ng/mL
<b>Cannabinoids (11-nor-9-carboxy-THC)</b>	20 ng/mL
<b>Ethyl Glucuronide</b>	500 ng/mL
<b>Muscle Relaxant(s):</b> carisoprodol, meprobamate	100 ng/mL
<b>Opiates/Opioids:</b> buprenorphine, codeine, fentanyl, heroin, hydrocodone, hydromorphone, meperidine, methadone, morphine, oxycodone, oxymorphone, propoxyphene, tapentadol, tramadol	2-300 ng/mL
<b>Phencyclidine (PCP)</b>	25 ng/mL
<b>Stimulants:</b> amphetamine, cocaine, methamphetamine, methylphenidate, MDMA (Ecstasy), MDEA (Eve), MDA, phentermine	100-400 ng/mL

**Interpretive Data:**

Methodology: Qualitative Enzyme Immunoassay and Qualitative Liquid Chromatography-Time-of-Flight-Mass Spectrometry or Tandem Mass Spectrometry, Quantitative Spectrophotometry

The absence of expected drug(s) and/or drug metabolite(s) may indicate non-compliance, inappropriate timing of specimen collection relative to drug administration, poor drug absorption, diluted/adulterated urine, or limitations of testing. The concentration must be greater than or equal to the cutoff concentration to be reported as present. If specific drug concentrations are required, contact the laboratory within two weeks of specimen collection to request confirmation and quantification by a second analytical technique. Interpretive questions should be directed to the laboratory.

Results based on immunoassay detection that do not match clinical expectations should be interpreted with caution. Confirmatory testing by mass spectrometry for immunoassay-based results is available, if ordered within two weeks of specimen collection. Additional charges apply.

For medical purposes only; not valid for forensic use.

**2009288**

**Pain Management Drug Screen with Interpretation by High-Resolution Time-of-Flight or Tandem Mass Spectrometry and Enzyme Immunoassay, Urine**

**PAIN HYB 2**

**Methodology:** Qualitative Liquid Chromatography/Time of Flight Mass Spectrometry or Tandem Mass Spectrometry/Enzyme Immunoassay/Quantitative Spectrophotometry

**Reference Interval:** Effective November 17, 2014

**Drugs covered and range of cutoff concentrations.**

**Note: Some drugs are identified based on the presence of unique drug metabolites not listed below.**

Drugs/Drug Classes	Range of Cutoff Concentrations
Barbiturates	200 ng/mL
<b>Benzodiazepine-like:</b> alprazolam, clonazepam, diazepam, lorazepam, midazolam, nordiazepam, oxazepam, temazepam, zolpidem	20 - 60 ng/mL
<b>Cannabinoids (11-nor-9-carboxy-THC)</b>	20 ng/mL
<b>Ethyl Glucuronide</b>	500 ng/mL
<b>Muscle Relaxant(s):</b> carisoprodol, meprobamate	100 ng/mL
<b>Opiates/Opioids:</b> buprenorphine, codeine, fentanyl, heroin, hydrocodone, hydromorphone, meperidine, methadone, morphine, oxycodone, oxymorphone, propoxyphene, tapentadol, tramadol	2-300 ng/mL
<b>Phencyclidine (PCP)</b>	25 ng/mL
<b>Stimulants:</b> amphetamine, cocaine, methamphetamine, methylphenidate, MDMA (Ecstasy), MDEA (Eve), MDA, phentermine	100-400 ng/mL

**Interpretive Data:**

Methodology: Qualitative Enzyme Immunoassay and Qualitative Liquid Chromatography-Time-of-Flight-Mass Spectrometry or Tandem Mass Spectrometry, Quantitative Spectrophotometry

The absence of expected drug(s) and/or drug metabolite(s) may indicate non-compliance, inappropriate timing of specimen collection relative to drug administration, poor drug absorption, diluted/adulterated urine, or limitations of testing. The concentration must be greater than or equal to the cutoff concentration to be reported as present. If specific drug concentrations are required, contact the laboratory within two weeks of specimen collection to request confirmation and quantification by a second analytical technique. Interpretive questions should be directed to the laboratory.

Results based on immunoassay detection that do not match clinical expectations should be interpreted with caution. Confirmatory testing by mass spectrometry for immunoassay-based results is available if ordered within two weeks of specimen collection. Additional charges apply.

For medical purposes only; not valid for forensic use.

**2007370**

**Periodic Fever Syndromes Panel, Sequencing (7 Genes) and Deletion/Duplication, (6 Genes)**

**PRFEVERPAN**

**CPT Code(s):** 81479

Quarterly HOTLINE: Effective August 21, 2017

**New Test**      [2014463](#)      **Pompe Disease (GAA), Enzyme Activity in Leukocytes**      **GAA ENZYME**  
 Available Now

**Methodology:**      Quantitative Fluorometry  
**Performed:**      Varies  
**Reported:**      3-10 days

**Specimen Required:** Collect: Yellow (ACD), Lavender (K<sub>2</sub>EDTA), Lavender (K<sub>3</sub>EDTA), or Green (Sodium Heparin).  
Specimen Preparation: Transport 3 mL whole blood. (Min: 1 mL)  
Storage/Transport Temperature: Refrigerated  
Remarks: Additional information is required: Clinical Indication for testing.  
Unacceptable Conditions: Grossly hemolyzed specimens.  
Stability (collection to initiation of testing): Ambient: 3 days; Refrigerated: 3 days; Frozen: Unacceptable

**Reference Interval:** 5.5 – 25.0 nmol hydrolyzed/hr/mg protein

**Interpretive Data:** Refer to report.

**CPT Code(s):**      82657

New York DOH approval pending. Call for status update.

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

[2011156](#)      **Primary Antibody Deficiency Panel, Sequencing (35 Genes) and Deletion/Duplication (26 Genes)**      **PAD PANEL**

**CPT Code(s):**      81479

**New Test**     **2014318**  
Available Now

**Prolonged Clot Time Reflex Panel**

**CLOT REF R**



Patient History Form for Prolonged Clot Reflex Panel

**Methodology:** Electromagnetic Mechanical Clot Detection/Qualitative Hemagglutination/Platelet Agglutination/Microlatex Particle-Mediated Immunoassay

**Performed:** Mon-Sun

**Reported:** 1-8 days

**Specimen Required:** Collect: At least five (5) Light Blue (Sodium Citrate) tubes. Refer to Specimen Handling at aruplab.com for hemostasis/thrombosis specimen handling guidelines.

Specimen Preparation: Transfer five 1 mL aliquots of platelet-poor plasma to five ARUP Standard Transport Tubes, label as sodium citrate. (Min: 1 mL/aliquot and 5 mL total)

Storage/Transport Temperature: **CRITICAL FROZEN. Separate specimens must be submitted when additional test codes are ordered.**

Remarks: Submit the Patient History Form for Prolonged Clot Reflex Panel.

Unacceptable Conditions: Serum or EDTA plasma. Specimens containing anticoagulant medications. Clotted or hemolyzed specimens.

Stability (collection to initiation of testing): Ambient: Unacceptable; Refrigerated: Unacceptable; Frozen: at -20°C: 3 months; Frozen at -70°C: 6 months

**Reference Interval:**

Test Number	Components	Reference Interval			
0030130	Fibrinogen	150-430 mg/dL			
0030057	D-Dimer	0.0-0.4 µg/mL			
0030181	Lupus Anticoagulant reflexive panel	<b>Test Number</b>	<b>Components</b>	<b>Reference Interval</b>	
			Dilute Russell Viper Venom Time (dRVVT)	33-44 seconds	
			Dilute Russell Viper Venom (dRVVT) 1:1 Mix (performed if dRVVT > 44 seconds)	33-44 seconds	
			Dilute Russell Viper Venom Time (dRVVT) Confirmation Test (performed if dRVVT 1:1 Mix > 44 seconds)	Negative	
			Prothrombin Time	12.0-15.5 seconds	
			Partial Thromboplastin Time	32-48 seconds	
			Thrombin Time	14.7-19.5 seconds	
			Reptilase Time	Less than 22.0 seconds	
			PTT Heparin Neutralized	32-48 seconds	
			Partial Thromboplastin Time 1:1 Mix (performed if PTT > 48 seconds)	32-48 seconds	
			Platelet Neutralization Procedure (performed if PTT 1:1 Mix > 48 seconds)	Negative	
	Hexagonal Phospholipid Neutralization	Negative			
	PT, Inhibitor Screen, 1:1 Mix	12.0-15.5 seconds			
0030126	Soluble Fibrin Monomer	Negative			
0030007	Factor II, Activity (Prothrombin)	<b>Age</b>	<b>Reference Interval</b>	<b>Age</b>	<b>Reference Interval</b>
		1-4 days	26-70%	7-9 years	78-125%
		5-29 days	33-93%	10-11 years	78-120%
		30-89 day	34-102%	12-13 years	72-123%
		90-179 days	45-105%	14-15 years	75-135%
		180-364 days	60-116%	16-17 years	77-130%
		1-5 years	71-116%	18 years and older	86-150%
		6 years	67-107%		
0030075	Factor V, Activity	<b>Age</b>	<b>Reference Interval</b>	<b>Age</b>	<b>Reference Interval</b>
		1-4 days	36-108%	7-9 years	69-132%
		5-29 days	45-145%	10-11 years	66-136%
		30-89 days	62-134%	12-13 years	66-135%
		90-179 days	48-132%	14-15 years	61-129%
		180-364 days	55-127%	16-17 years	65-131%
		1-5 years	79-127%	18 years and older	62-140%
		6 years	63-116%		
0030080	Factor VII, Activity	<b>Age</b>	<b>Reference Interval</b>	<b>Age</b>	<b>Reference Interval</b>
		1-4 days	28-104%	7-9 years	67-145%
		5-29 days	35-143%	10-11 years	71-163%
		30-89 days	42-138%	12-13 years	78-160%
		90-179 days	39-143%	14-15 years	74-180%

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		180-364 days	47-127%	16-17 years	63-163%		
		1-5 years	55-116%	18 years and older	80-181%		
		6 years	52-120%				
0030026	Factor VIII Activity with Reflex to Bethesda Quantitative, Factor VIII	<b>Test Number</b>	<b>Components</b>	<b>Reference Interval</b>			
		0030095	Factor VIII, Activity	<b>Age</b>		<b>Reference Interval</b>	
				0-6 years		56-191%	
				7-9 years		76-199%	
				10-11 years		80-209%	
				12-13 years		72-198%	
				14-15 years		69-237%	
				16-17 years		63-221%	
				18 years and older		56-191%	
			Bethesda Quantitative, Factor VIII	Effective May 19, 2014		0.5 BU or less	
0030032	Factor IX Activity with Reflex to Bethesda Quantitative, Factor IX	<b>Test Number</b>	<b>Components</b>	<b>Reference Interval</b>			
		0030100	Factor IX, Activity	<b>Age</b>	<b>Reference Interval</b>	<b>Age</b>	<b>Reference Interval</b>
				1-4 days	15-91%	7-9 years	70-133%
				5-29 days	15-91%	10-11 years	72-149%
				30-89 days	21-81%	12-13 years	73-152%
				90-179 days	21-113%	14-15 years	80-161%
				180-364 days	36-136%	16-17 years	86-176%
				1-5 years	47-104%	18 years and older	78-184%
				6 years	63-89%		
			Bethesda Quantitative, Factor IX	Effective May 19, 2014		0.4 BU or less	
0030105	Factor X, Activity	<b>Age</b>	<b>Reference Interval</b>	<b>Age</b>	<b>Reference Interval</b>		
		1-4 days	12-68%	7-9 years	74-130%		
		5-29 days	19-79%	10-11 years	70-134%		
		30-89 days	31-87%	12-13 years	69-133%		
		90-179 days	35-107%	14-15 years	63-146%		
		180-364 days	38-118%	16-17 years	74-146%		
		1-5 years	58-116%	18 years and older	81-157%		
		6 years	55-101%				
0030110	Factor XI, Activity	<b>Age</b>	<b>Reference Interval</b>	<b>Age</b>	<b>Reference Interval</b>		
		1-4 days	10-66%	7-9 years	70-138%		
		5-29 days	23-87%	10-11 years	66-137%		
		30-89 days	27-79%	12-13 years	68-138%		
		90-179 days	41-97%	14-15 years	57-129%		
		180-364 days	38-134%	16-17 years	65-159%		
		1-5 years	56-150%	18 years and older	56-153%		
		6 years	52-120%				
0030115	Factor XII, Activity	58-166%					
0030285	Von Willebrand Factor Antigen	<b>Age</b>	<b>Reference Interval</b>				
		0-6 years	52-214%				
		7-9 years	62-180%				
		10-11 years	63-189%				
		12-13 years	60-189%				
		14-15 years	57-199%				
		16-17 years	50-205%				
		18 years and older	52-214%				
0030250	Von Willebrand Factor Activity (Ristocetin Cofactor)	<b>Age</b>	<b>Reference Interval</b>				
		0-6 years	51-215%				
		7-9 years	52-176%				
		10-11 years	60-195%				
		12-13 years	50-184%				
		14-15 years	50-203%				
		16-17 years	49-204%				
		18 years and older	51-215%				

**Interpretive Data:** Refer to report.

**Note:** Submission of a completed Patient History Form with test order will allow for optimal panel interpretation. The Patient History Form for Prolonged Clot Reflex Panel is available on the ARUP web site or by contacting ARUP Client Services at (800) 522-2787.

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If D-Dimer is abnormal, Soluble Fibrin Monomer is added. If PT is abnormal PT, Inhibitor Screen, 1:1 Mix is added. If PTT is abnormal, Thrombin Time is added. If Thrombin Time is normal, PTT 1:1 mix is added. If Thrombin time is abnormal, Reptilase Time and PTT Heparin Neutralization is added. If PTT Heparin Neutralization is abnormal, PTT 1:1 mix is added. If PTT 1:1 mix is abnormal, Platelet Neutralization procedure is added. If dRVVT is abnormal, dRVVT 1:1 mix is added. If dRVVT 1:1 mix is abnormal, dRVVT confirmation is added. If Platelet Neutralization procedure and dRVVT confirmation are normal or if one is normal and the other not done, Hexagonal Phospholipid Neutralization is added. Depending on findings, one or more reflexive tests may be required in order to provide a clinical interpretation. Additional charges apply.

**CPT Code(s):** 85384, 85379, 85610, 85730, 85613; if reflexed, additional CPT codes may apply: 85670, 85635, 85730, 85525, 85732, 85597, 85613, 85598, 85611, 85366, 85210, 85220, 85230, 85240, 85335, 85250, 85260, 85270, 85280, 85246, 85245

New York DOH Approved.

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

**0056060**

**Prothrombin (F2) c.\*97G>A (G20210A) Pathogenic Variant**

**PT PCR**

**Interpretive Data:**

**Background Information for Prothrombin (F2) c.\*97G>A (G20210A) Pathogenic Variant:**

**Characteristics:** The Factor II, c.\*97G>A (G20210A) pathogenic variant is a common genetic risk factor for venous thrombosis associated with elevated prothrombin levels leading to increased rates of thrombin generation and excessive growth of fibrin clots. The expression of Factor II thrombophilia is impacted by coexisting genetic thrombophilic disorders, acquired thrombophilic disorders (eg, malignancy, hyperhomocysteinemia, high factor VIII levels), and circumstances including: pregnancy, oral contraceptive use, hormone replacement therapy, selective estrogen receptor modulators, travel, central venous catheters, surgery, and organ transplantation.

**Incidence:** Approximately 2 percent of Caucasians and 0.3 percent of African Americans are heterozygous; homozygosity occurs in 1 in 10,000 individuals.

**Inheritance:** Incomplete autosomal dominant.

**Penetrance:** The risk of thrombosis is increased 2-4 fold for heterozygotes and further increased for homozygotes.

**Cause:** Homozygosity or heterozygosity for F2 c.\*97G>A (G20210A).

**Pathogenic Variant Tested:** F2 c.\*97G>A (G20210A).

**Clinical Sensitivity for Venous Thrombosis:** Approximately 10 percent.

**Methodology:** Polymerase chain reaction and fluorescence monitoring.

**Analytical Sensitivity and Specificity:** 99 percent.

**Limitations:** Diagnostic errors can occur due to rare sequence variations. F2 gene variants, other than c.\*97G>A (G20210A), will not be detected.

See Compliance Statement C: [www.aruplab.com/CS](http://www.aruplab.com/CS)

**HOTLINE NOTE:** Remove information found in the Reference Interval field.

**2009345**

**Pulmonary Arterial Hypertension (PAH) Panel, Sequencing and Deletion/Duplication, Multigene**

**PAH PANEL**

**CPT Code(s):** 81479

**New Test**     [2014523](#)     **Purines and Pyrimidines Panel, Urine**     **PUPY URN**  
 Available Now

**Methodology:** Quantitative Liquid Chromatography/Tandem Mass Spectrometry  
**Performed:** Varies  
**Reported:** 3-16 days

**Specimen Required:** Collect: Urine.  
Specimen Preparation: Transfer 3 mL urine to an ARUP Standard Transport Tube. (Min: 2 mL)  
Storage/Transport Temperature: **CRITICAL FROZEN. Separate specimens must be submitted when multiple tests are ordered.**  
Stability (collection to initiation of testing): Ambient: Unacceptable; Refrigerated: Unacceptable; Frozen: 3 months

**Reference Interval:** By Report

**CPT Code(s):** 82542

New York DOH Approved.

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

**New Test**     [2014351](#)     **Rabies Antibody Screen (RFFIT)**     **RABIES AB**  
 Available Now

**Methodology:** Rapid Fluorescent Focus Inhibition  
**Performed:** Varies  
**Reported:** 21-31 days

**Specimen Required:** Collect: Plain Red, Serum Separator Tube (SST), or CSF.  
Specimen Preparation: Transfer 2 mL serum or CSF to an ARUP Standard Transport Tube. (Min: 0.25 mL)  
Storage/Transport Temperature: Refrigerated. Also acceptable: Room temperature or frozen.  
Stability (collection to initiation of testing): Ambient: 1 week; Refrigerated: 2 weeks; Frozen: 1 month

**Reference Interval:** By report

**CPT Code(s):** 86382

New York DOH Approved.

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

[0070105](#)     **Renin Activity**     **RENIN**

**Specimen Required:** Patient Prep: 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 (K<sub>2</sub>EDTA). **Do not collect in refrigerated tubes.**  
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/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.  
Stability (collection to initiation of testing): Ambient: 6 hours; Refrigerated: Unacceptable; Frozen: 1 month

**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.



**2001575**

**Renin, Direct**

**RENIND**

**Specimen Required:** Patient Prep: 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 (K<sub>2</sub>EDTA). Do not collect in refrigerated tubes.  
 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 mL)  
 Storage/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.  
 Stability (collection to initiation of testing): Ambient: 4 hours; Refrigerated: Unacceptable; Frozen: 4 weeks

**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.

**New Test**

**0040131**

**RNA Extraction and Storage**

**RNA EXT**

Available Now

**Methodology:** RNA Extraction  
**Performed:** Sun-Sat  
**Reported:** 1-7 days

**Specimen Required:** Collect: Lavender (EDTA), or bone marrow (EDTA).  
 Specimen Preparation: Do not freeze. Transport 5 mL whole blood. (Min: 1 mL) **OR** Transport 3 mL bone marrow. (Min: 1 mL)  
 Storage/Transport Temperature: Refrigerated.  
 Remarks: Specimens must be received within 48 hours of collection due to lability of RNA.  
 Stability (collection to initiation of testing): Ambient: 4 hours; Refrigerated: 72 hours; Frozen: Unacceptable

**Note:** RNA will be held for 6 months for possible add-on testing.

**CPT Code(s):** 81479

New York DOH approval pending. Call for status update.

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

**0025067**

**Selenium, Urine**

**SE-U**

**Reference Interval:**  
 Effective August 21, 2017

Test Number	Components	Reference Interval	
	Selenium, Urine - per volume	12.0-40.0 µg/L	
	Selenium, Urine - per 24h	12.0-52.6 µg/d	
	Selenium Urine - ratio to CRT	10.0-35.0 µg/g CRT	
	Creatinine, Urine - per 24h	<b>Age</b>	
		<b>Male</b>	
		<b>Female</b>	
		3-8 years	140-700 mg/d
		9-12 years	300-1300 mg/d
		13-17 years	500-2300 mg/d
	18-50 years	1000-2500 mg/d	
	51-80 years	800-2100 mg/d	
	81 years and older	600-2000 mg/d	

**2012015**

**Skeletal Dysplasia Panel, Sequencing (39 Genes) and Deletion/Duplication (36 Genes)**

**SKEL PANEL**

**CPT Code(s):** 81479

**2012010**      **Skeletal Dysplasia Panel, Sequencing (39 Genes) and Deletion/Duplication (36 Genes), Fetal**      **SKEL FE**

CPT Code(s):      81479

**0070130**      **Testosterone, Adult Male**      **TESTOS**

**Specimen Required:** Patient Prep: Collect specimen between 6-10 a.m.  
Collect: Serum Separator Tube (SST) or Green (Lithium Heparin). Also acceptable: Lavender (K<sub>2</sub> EDTA) or Lavender (K<sub>3</sub> EDTA).  
**Pooled Specimens:** Collect three samples, 20 minutes apart.  
Specimen Preparation: Transport 1 mL serum or plasma to an ARUP Standard Transport Tube. (Min: 0.5 mL)  
**Pooled Specimens:** Spin and pool equal amounts of serum or plasma. Transfer 1 mL of pooled specimen into an ARUP Standard Transport Tube. (Min: 0.5 mL)  
Storage/Transport Temperature: Refrigerated. Also acceptable: Frozen.  
Stability (collection to initiation of testing): After separation from cells: Ambient: 5 days; Refrigerated: 2 weeks; Frozen: 6 months

**0025019**      **Thallium, Urine**      **THALU**

**Reference Interval:**  
 Effective August 21, 2017

Test Number	Components	Reference Interval		
	Thallium, Urine - per volume	0.0-0.4 µg/L		
	Thallium, Urine - per 24h	0.0-0.4 µg/d		
	Thallium, Urine - ratio to CRT	0.0-0.4 µg/g CRT		
	Creatinine, Urine - per 24h	<b>Age</b> <b>Male</b> <b>Female</b>		
		3-8 years	140-700 mg/d	140-700 mg/d
		9-12 years	300-1300 mg/d	300-1300 mg/d
		13-17 years	500-2300 mg/d	400-1600 mg/d
		18-50 years	1000-2500 mg/d	700-1600 mg/d
		51-80 years	800-2100 mg/d	500-1400 mg/d
		81 years and older	600-2000 mg/d	400-1300 mg/d

**0099610**      **Thallium, Whole Blood**      **THALB**

**Specimen Required:** Patient Prep: Diet, medication, and nutritional supplements may introduce interfering substances. Patients should be encouraged to discontinue nutritional supplements, vitamins, minerals, and non-essential over-the-counter medications (upon the advice of their physician).  
Collect: Royal Blue (K<sub>2</sub>EDTA or Na<sub>2</sub>EDTA).  
Specimen Preparation: Transport 7 mL whole blood in the original collection tube. (Min: 0.5 mL)  
Storage/Transport Temperature: Room temperature. Also acceptable: Refrigerated.  
Unacceptable Conditions: Heparin anticoagulant. Hemolyzed specimens.  
Stability (collection to initiation of testing): Ambient: Indefinitely; Refrigerated: Indefinitely; Frozen: Unacceptable

**Note:** Elevated results from noncertified trace element-free collection tubes may be due to contamination. Elevated concentrations of trace elements in blood should be confirmed with a second specimen collected in a tube designed for trace element determinations, such as a royal blue (K<sub>2</sub>EDTA) or (Na<sub>2</sub>EDTA) tube. If the specimen is drawn and stored in the appropriate container, the trace element values do not change with time.

**2008670**      **Tick-Borne Disease Panel by PCR, Blood**      **TICKPCR**

CPT Code(s):      87798 x2

**2011172**      **Urogenital Ureaplasma and Mycoplasma Species by PCR**      **UR MYCOPCR**

CPT Code(s):      87798

Quarterly HOTLINE: Effective August 21, 2017

<a href="#">2007384</a>	<b>Vascular Malformations Panel, Sequencing and Deletion/Duplication, 14 Genes</b>	<b>VASC PANEL</b>
CPT Code(s):	81479	
<a href="#">2007136</a>	<b>von Willebrand Factor Collagen Binding</b>	<b>VWF C BIND</b>
CPT Code(s):	85246	
<a href="#">2013701</a>	<b>Vulvovaginal <i>Candida</i> Species by PCR</b>	<b>VCANPCR</b>
CPT Code(s):	87481	

**The following will be discontinued from ARUP's test menu on August 21, 2017.  
Replacement test options are supplied if applicable.**

Test Number	Test Name	Refer To Replacement
<a href="#">0080276</a>	Amniotic Bilirubin Scan	
<a href="#">0095505</a>	Autoimmune Lymphoproliferative Profile	Alpha/Beta Double-Negative T-Cells for Autoimmune Lymphoproliferative Syndrome ( <a href="#">2014513</a> )
<a href="#">0051232</a>	Cytochrome P450 2D6 ( <i>CYP2D6</i> ) 14 Variants and Gene Duplication	Cytochrome P450 2D6 ( <i>CYP2D6</i> ) 15 Variants and Gene Duplication ( <a href="#">2014547</a> )
<a href="#">0020149</a>	Gastric Analysis	
<a href="#">0080413</a>	Homocystine Quantitative, Urine	Amino Acids Quantitative by LC-MS/MS, Plasma ( <a href="#">2009389</a> ) and Homocystine, Total ( <a href="#">0099869</a> )
<a href="#">2012175</a>	<i>HRAS</i> Mutation Detection by Pyrosequencing	
<a href="#">0065999</a>	Human Papillomavirus (HPV), High Risk by Hybrid Capture, Cervical Brush	
<a href="#">2008404</a>	Human Papillomavirus (HPV), High Risk by Hybrid Capture, ThinPrep	Human Papillomavirus (HPV), High Risk by Transcription-Mediated Amplification (TMA), ThinPrep ( <a href="#">2007893</a> ) or Human Papillomavirus (HPV), High Risk by PCR, ThinPrep ( <a href="#">2011947</a> )
<a href="#">0080403</a>	Indicans, Urine Qualitative	
<a href="#">0080301</a>	Leucine Aminopeptidase (LAP), Serum	Gamma Glutamyl Transferase, Serum or Plasma ( <a href="#">0020009</a> ) or 5'Nucleotidase ( <a href="#">0080235</a> )
<a href="#">0080467</a>	Lipid Associated Sialic Acid	
<a href="#">2012186</a>	LipoProfile by Nuclear Magnetic Resonance (NMR)	LipoFit by NMR ( <a href="#">2013716</a> )
<a href="#">2012200</a>	LipoProfile by Nuclear Magnetic Resonance (NMR), Particle Analysis Only	LipoFit by NMR, Particle Count Only ( <a href="#">2013715</a> )
<a href="#">0020226</a>	Melanin, Urine	
<a href="#">0051281</a>	Norovirus Group 1 and 2 by PCR	Norovirus, Groups 1 and 2 by PCR ( <a href="#">2014546</a> )
<a href="#">2012603</a>	<i>PAX8-PPARG</i> Translocations Detection by PCR	
<a href="#">2004510</a>	<i>PIK3CA</i> Mutation	Colon Cancer Gene Panel, Somatic ( <a href="#">2011616</a> )
<a href="#">2008103</a>	Pipecolic Acid, CSF	Pyridoxine-Dependent Epilepsy Panel, Serum or Plasma ( <a href="#">2013352</a> ) and Pyridoxine-Dependent Epilepsy Panel, Urine ( <a href="#">2013355</a> )
<a href="#">0051718</a>	Platelet Antibodies, Indirect with Reflex to Identification	Platelet Antibodies, Indirect ( <a href="#">0051050</a> )
<a href="#">2012605</a>	<i>RET-CCDC6</i> and <i>RET-NCOA4 (RET-PTC1)</i> and <i>RET-PTC3</i> Translocations Detection by PCR	
<a href="#">0050698</a>	Reticulin Antibody, IgA with Reflex to Titer	Endomysial Antibody, IgA by IFA ( <a href="#">0050736</a> )
<a href="#">0070132</a>	Testosterone, Pooled Adult Male	Testosterone, Adult Male ( <a href="#">0070130</a> )
<a href="#">2012755</a>	Thyroid Translocation and Mutation Panel	
<a href="#">0020609</a>	Xylose Absorption Test (Adult - 25g dose)	
<a href="#">0020615</a>	Xylose Absorption Test (Adult - 5g dose)	
<a href="#">0020612</a>	Xylose Absorption Test (Child)	