



**Panels Offered at Spectrum Health**

Approved by MEC December

**Laboratory Approved Panels**

Approved March 2021

**AMA Approved Panels**

Panel Name	Tests Included in Panel
Acute Hepatitis Panel	Hepatitis B surface antigen, Hepatitis B core antibody-IgM, Hepatitis A antibody-IgM, Hepatitis C antibody
Basic Metabolic Panel	Sodium, Potassium, Chloride, Bicarbonate, Creatinine, Urea Nitrogen (BUN), Glucose, Calcium (Total)
Comprehensive Metabolic Panel	Sodium, Potassium, Chloride, Bicarbonate, Creatinine, Urea Nitrogen (BUN), Glucose, Calcium (Total), Total Protein, Albumin, Aspartate Aminotransferase (AST), Alanine Aminotransferase (ALT), Alkaline Phosphatase, Total Bilirubin
Electrolyte Panel	Sodium, Potassium, Chloride, Bicarbonate
Hepatic Function Panel	Albumin, Alkaline Phosphatase, Alanine Aminotransferase (ALT), Aspartate Aminotransferase (AST), Total Bilirubin, Direct Bilirubin, Total Protein
Lipid Panel	Cholesterol, HDL Cholesterol, Triglycerides, Calculated LDL Cholesterol, Non HDL Cholesterol
Renal Panel	Sodium, Potassium, Chloride, Bicarbonate, Creatinine, Urea Nitrogen (BUN), Glucose, Calcium (Total), Albumin, Phosphorus (PO4)

**Additional Panels Offered at Spectrum Health**

Panel Name	Tests Included in Panel
Acid Fast bacilli Culture with Smear	Acid Fast bacilli Culture, Acid Fast Stain, and additional charges as indicated
Adulteration Panel	specific gravity, pH, creatinine
Alpha-Globin Gene Analysis	DNA Extract-Purify, Enzyme Digest, Separation by Gel Electrophoresis, [Amplification, target, multiplex, first 2 nucleic acid sequences (x2)], Separation and identification by high-resolution technique, Interpretation and Report, Mutation identification by enzymatic ligation or primer extension (x15)
APTT Heparin Neutralization	APTT, Heparin Neutralized PTT
Antiphospholipid Antibody Syndrome panel	Cardiolipin IgG and IgM, Beta 2 Glycoprotein IgG and IgM, Lupus anticoagulant
Bronchial Alveolar Lavage	Acid Fast bacilli Culture with smear, Fungal Culture – Respiratory, Fungal Smear, Gram Stain, Legionella culture, Legionella Direct Fluorescent Antibody, Quant Respiratory Culture, and additional studies as indicated.
Benzodiazepines Urine Level Panel	Alprazolam metabolite, Lorazepam, Oxazepam, Clonazepam metabolite, Nordiazepam, Temazepam

Panel Name	Tests Included in Panel
Body Fluid Microbiology Labs	Bacterial culture (anaerobic) [Test Code: 8885], Body Fluid Cult w/ gram stain [Test Code: 166], Fungal culture w/ Fungal Smear [Test Code: 8898]
Bordetella Pertussis IgG Ab	B. Pertussis PT IgG and B. Pertussis FHA IgG (Performed at reference laboratory)
Colon Mutation Analysis Panel	KRAS mutation, NRAS mutation, and BRAF mutation
Comprehensive Drug Screen (Blood, Urine, or Gastric) (#4, 6, 200)	Alkaline Drug screen by GCMS, Acid Drug Screen by GCMS, Volatile screen
Cryptococcus CSF Panel	Cryptococcus Ag, Fungal Culture (performed whenever "Cryptococcus Ag" is ordered on a CSF per CAP guidelines)
CSF Microbiology Labs	Gram Stain [Test Code: 8880]
<b>Urine Drug Screen with Confirmation (23 Targets)</b> LAB1230496	Amphetamines (2), Amphetamine, Methamphetamine, Benzodiazepines (6), Oxazepam, Alprazolam Metabolite, Clonazepam Metabolite, Lorazepam, Nordiazepam, Temazepam, Cannabinoids (1), THC Metabolite, Cocaine (1), Cocaine Metabolite, Methadone (2), Methadone, Methadone Metabolite, Opiates (7), Codeine, Morphine, 6MAM Heroin Metabolite, Hydrocodone, Hydromorphone, Oxycodone, Oxymorphone, Tramadol (2), Tramadol, Tramadol Metabolite, Fentanyl (2), Fentanyl, Fentanyl Metabolite
<b>Urine Drug Screen with Confirmation (32 Targets)</b> LAB1230497	Amphetamines (2), Amphetamine, Methamphetamine, Benzodiazepines (6), Oxazepam, Alprazolam Metabolite, Clonazepam Metabolite, Lorazepam, Nordiazepam, Temazepam, Cannabinoids (1), THC Metabolite, Cocaine (1), Cocaine Metabolite, Methadone (2), Methadone, Methadone Metabolite, Opiates (7), Codeine, Morphine, 6MAM Heroin Metabolite, Hydrocodone, Hydromorphone, Oxycodone, Oxymorphone, Tramadol (2), Tramadol, Tramadol Metabolite, Fentanyl (2), Fentanyl, Fentanyl Metabolite, Methylphenidate (2), Methylphenidate, Methylphenidate Metabolite, Methylenedioxyamphetamines (2), MDMA, MDA, Buprenorphine (2), Buprenorphine, Buprenorphine Metabolite, Gabapentin (1), Gabapentin, Pregabalin (1), Pregabalin, Ethanol (1), Ethanol
Drug of Abuse Screen LAB3227 (If confirmation ordered, reflex will occur as indicated in parenthesis)	Amphetamines screen (confirmation: Amphetamine, Methamphetamine, MDMA, MDA), Barbiturates screen (confirmation: Butalbital, Secobarbital, Pentobarbital, Phenobarbital), Benzodiazepines screen (confirmation: Benzodiazepines Urine Level Panel ), Cannabinoids screen (confirmation: Cannabinoids), Cocaine Metabolites screen (confirmation: Cocaine metabolites), Ethanol screen (confirmation: Ethanol), Methadone Metabolites screen (confirmation: Methadone, EDDP), Opiate screen (confirmation: Expanded Opiate Confirmation Panel ), Oxycodone screen (confirmation: Expanded Opiate Confirmation Panel), Adulteration Panel

Panel Name	Tests Included in Panel
Drug Screen-Pain Management Panel LAB3382 (If confirmation ordered, reflex will occur as indicated in parenthesis)	Amphetamines screen (confirmation: Amphetamine, Methamphetamine, MDMA, MDA), Barbiturates screen (confirmation: Butalbital, Secobarbital, Pentobarbital, Phenobarbital), Benzodiazepines screen (confirmation: Benzodiazepines Urine Level Panel ), Cannabinoids screen (confirmation: Cannabinoids), Cocaine Metabolites screen (confirmation: Cocaine metabolites), Ethanol screen (confirmation: Ethanol), Methadone Metabolites screen (confirmation: Methadone, EDDP), Expanded Opiates Confirmation Panel, Adulteration Panel
Drug Screen, Meconium	Cannabinoids, Opiates (morphine, codeine, hydrocodone, hydromorphone, oxycodone, oxymorphone), amphetamines/methamphetamine, methadone, methadone metabolite.
Dialysis Hepatitis Panel	Hepatitis B surface antigen, Hepatitis B core antibody-IgM, Hepatitis B surface antibody, Hepatitis A antibody-IgM, Hepatitis C antibody
Enteric Pathogen Panel	Campylobacter Group, Salmonella spp, Shigella spp, Vibrio Group (V. Cholerae and V. parahaemolyticus) Yersinia enterocolitica, Norovirus, Rotavirus, Shiga Toxin 1, Shiga Toxin 2
Expanded amphetamines confirmation panel	MDMA, MDA
Expanded opiates confirmation panel	Codeine, Morphine, Hydrocodone, Hydromorphone, Oxycodone, Oxymorphone, 6-MAM
Film Array Group Respiratory Panel	Adenovirus PCR FmAr, Coronavirus 229E PCR FmAr, Coronavirus HKU1 PCR FmAr, Coronavirus NL63 PCR FmAr, Coronavirus OC43 PCR FmAr, Influenza A PCR FmAr, Influenza A H3 PCR FmAr, Influenza A H1 PCR FmAr, Influenza A 2009 H1 PCR FmAr, Influenza B PCR FmAr, Metapneumovirus PCR FmAr, Parainfluenza 1 PCR FmAr, Parainfluenza 2 PCR FmAr, Parainfluenza 3 PCR FmAr, Parainfluenza 4 PCR FmAr, RSV PCR FmAr, Rhinovirus-Enterovirus PCR FmAr, Bordetella PCR FmAr, Chlamydomphila pneumoniae PCR FmAr, Mycoplasma pneumoniae PCR FmAr
Film Array Mycoplasma pneumoniae/Chlamydomphila pneumoniae PCR panel	Mycoplasma pneumoniae PCR FmAr, Chlamydomphila pneumoniae PCR FmAr
Fungus Culture	Fungal Smear and Fungus Culture (all fungus cultures except the fungus blood cultures will have a Fungus Smear)
General Health Panel	Complete Metabolic Panel, CBC w/ Auto Diff, TSH
Gliadin Antibodies	Gliadin Antibody(IgA), Gliadin Antibody (IgG)
Hemoglobin Electrophoresis Cascade	Agar Electrophoresis Confirms, Hemoglobin Electrophoresis B, Hemoglobin A2 and F, Hemoglobin S, Screen, B

Panel Name	Tests Included in Panel
Herpes Simplex IgG Antibody	Herpes Simplex Type 1 (IgG) Antibody, Herpes Simplex Type 2 (IgG) Antibody
Food Allergy Basic Panel	Egg White (f1), Milk (Cow) (f2), Peanut (f13), Soybean (f14), Wheat (f4)
Food Allergy Comprehensive Panel	Almond (f20), Cashew (f202), Cod (f3), Egg White (f1), Hazelnut (f17), Milk (Cow) (f2), Peanut (f13), Salmon (f41), Scallop (f338), Sesame Seed (f10), Shrimp (f24), Soybean (f14), Tuna (f40), Walnut (f256), Wheat (f4)
Food Allergy Nut Panel	Almond, Brazil Nut, Cashew, Hazelnut, Macadamia Nut, Peanut, Pecan, Pistachio, Walnut
Food Allergy Fish and Seafood Panel	Cod, Crab, Lobster, Salmon, Scollop, Shrimp, Tilapia and Tuna
Adult Respiratory/Environmental Allergy Panel	Cat epithelium/dander (e1), Dog dander (e5), Mouse epithelium/serum/urine (e88), Cockroach (i6), <i>D. farinae</i> (d2), <i>D. pteronyssinus</i> (d1), <i>Alternaria alternata</i> (m6), <i>Aspergillus fumigatus</i> , Cladosporium herbarum (m2), Penicillium chrysogenum (m1), Mugwort, Ragweed (common/short), Timothy grass, Birch, Cottonwood/Poplar, Elm, Maple ,Oak
Child Respiratory/Environmental Allergy Panel	Cat epithelium/dander (e1), Dog dander (e5), Mouse epithelium/serum/urine (e88), Cockroach (i6), <i>D. farinae</i> (d2), <i>D. pteronyssinus</i> (d1), <i>Alternaria alternata</i> (m6), <i>Aspergillus fumigatus</i> , Ragweed (common/short), Timothy grass, Birch, Oak
Leukemia/Lymphoma Immunophenotyping Panel	CD1, CD2, CD3, CD4, CD5, CD7, CD8, CD10, CD13, CD14, CD19, CD20, CD30, CD33, CD34, CD38, CD45, CD56, CD61, CD117, kappa, lambda, HLA-DR, Glycophorin A
Molecular Lung Cancer Panel	EGFR mutation; KRAS mutation; BRAF mutation; ERBB2 mutation; ALK rearrangement; ROS1 rearrangement; RET rearrangement; MET amplification
MPN Panel	CALR exon 9, JAK2 exon 12 and MPL exon 10, which, in addition to BCR-ABL gene fusion and JAK2 V617F mutation testing
Natural Killer Cell/Complete Panel	CD3, CD4, CD8, CD16/CD56, CD19
Neuroblastoma Panel	GD2, CD56, CD81, CD9, CD34, CD45
Novel H1N1 RT-PCR	Novel H1N1 RT-PCR and Influenza A RT-PCR (available only during Flu season typically January through March)
Obstetric Panel	ABO & Rh Blood Typing, Antibody Screen, Syphilis IgG antibody, Rubella antibody, Complete Blood Count (CBC) w/diff, Hepatitis B surface antigen
Opioid Confirmation Panel – 2 <sup>nd</sup> Tier	Methadone/EDDP LC/MS Confirmation, Tapentadol LC/MS Confirmation, Tramadol LC/MS Confirmation
Ova and Parasite Screen	Cryptosporidium screen, Giardia screen

Panel Name	Tests Included in Panel
Ova and Parasites, Stool complete	Ova and parasites (direct and concentrated exam), Ova & Parasite Screen Giardia, Ova Parasite Cryptosporidium, Trichrome Stain
RSV PCR	RSV type A and B
Sarcoidosis Panel	CD3, CD4, CD8, CD16/CD56, CD19
Serum Immunoglobulin Panel	Serum IgG, IgA, and IgM
STD Panel	Chlamydia trachomatis by PCR, Gonococcus by PCR
Sweat Chloride Test	two arm reporting; testing will be done on each arm and each order will consist of 2 times the analysis and 2 times the collection
Thrombophilia Panel	PT/INR, APTT, Antithrombin III Activity, Protein C Activity, Protein S Activity, Prothrombin G20210A, Factor V Leiden (DNA), Lupus Screen, Cardiolipin IgG and IgM Ab, Homocysteine, Total, Plasma Lvl, D-Dimer, Fibrinogen, Thrombin Time
Toxic Alcohol Screen Panel	Volatile Screen, Ethylene Glycol
Type and Screen	ABO/Rh Blood Type and Antibody Screen
Urinalysis with Culture	Urinalysis with urine culture performed regardless of urinalysis results (only available in <i>PEDs ED powerplans</i> )
Virus Culture	Viral shell vial culture with stain and additional testing as indicated, Viral ID
Von Willibrand Profile	Factor VIII Activity, Von Willebrand Factor Antigen, Von Willibrand Ristocetin Cofactor
Volatile Screen panel	Acetone, Ethanol, Isopropanol, Methanol

## **Cytogenetic Laboratory FISH Probe Panels\***

### **\*Notes:**

- Each probe in a panel can be ordered individually.
- When tracking residual disease, an appropriate subset of the panel will be determined at the laboratory's discretion.

### **AML Panel**

FISH probes to detect: EVI1 rearrangement t(3q26;var), deletion 5q/monosomy 5, deletion 7q/monosomy 7, MLL rearrangement t(11q23;var), deletion 13q/monosomy 13, t(15;17) PML/RARA, CBFβ rearrangement t(16q22;var), deletion 20q, t(8;21) AML1/ETO (and trisomy 8), t(9;22) BCR/ABL1, t(16;16) CBFβ/MYH11, NUP98 rearrangement t(11p15.4;var)

### **AneuVysion Panel**

FISH probes to detect gender and aneuploidy of chromosomes 13, 18 and 21.

### **B-ALL Panel**

FISH probes to detect: TCF3 (E2A) rearrangement t(19p13.3;var), aneuploidy of chromosomes 4, and 10, deletion p16 (9p21), MLL rearrangement t(11q23;var), t(9;22) BCR/ABL1, t(12;21) ETV6/RUNX1, CRLF2 (Xp22.33/Y11.23) rearrangement, PBX/TCF3 t(1;19), ABL1, ABL2, and PDGFRB.

### **Burkitt's Lymphoma Panel**

FISH probes to detect: MYC rearrangement t(8q24;var) and t(8;14) IGH@/MYC/CEP 8

### **CLL Panel**

FISH probes to detect: Deletion 11q, Trisomy 12, Deletion 13q/Monosomy 13, t(11;14) IGH@/CCND1, Deletion TP53 (17p13.3).

### **Diffuse Large B-cell Lymphoma (DLBCL) Panel**

FISH probes to detect: MYC rearrangement t(8q24;var), BCL2 rearrangement t(18q21;var) and BCL6 rearrangement t(3q27;var).

**Reflex Testing:** If POSITIVE for MYC rearrangement ONLY, add t(8;14) IGH@/MYC/CEP 8

### **Eosinophilia (EOS) Panel**

FISH probes to detect: PDGFRA (4q12) deletion/rearrangement, PDGFRB rearrangement (5q32;var) and FGFR1 rearrangement t(8p11;var) BCR/ABL1 (t 9;22) dual fusion.

### **Follicular Lymphoma Panel**

FISH probes to detect: BCL2 rearrangement t(18q21;var) and t(14;18)IGH@/BCL2

**MDS Panel**

FISH probes to detect: EVI1 rearrangement t(3q26;var), deletion 5q/monosomy 5, deletion 7q/monosomy 7, trisomy 8, deletion 13q/monosomy 13, deletion 20q.

**Medulloblastoma Panel**

FISH probes to detect: N-MYC amplification and IGH/MYC/CEP8 (CMYC amplification).

**Multiple Myeloma Panel**

FISH probes to detect: Aneuploidy of chromosomes 5, 9 and 15, MYC rearrangement t(8q24;var), Deletion 13q/Monosomy 13, IGH@ rearrangement t(14q32;var), Deletion TP53 (17p13.3).

**Reflex Testing:** If POSITIVE for IGH@ rearrangement, add t(11;14) IGH@/CCND1, t(4;14) IGH@/FGFR3 and t(14;16) IGH@/MAF.

**Myxoid Liposarcoma**

FISH probes to detect DDIT3 (CHOP) rearrangement and FUS rearrangement.

**POC Common Trisomies Panel**

FISH probes to detect gender and aneuploidy of chromosomes 13, 16, 18 and 21.

**T-ALL Panel**

FISH probes to detect: TLX3 rearrangement t(5q35;var), TCRB rearrangement (7q34;var), deletion CDKN2A (9p21), MLL rearrangement t(11q23;var), TCRAD rearrangement (14q11.2;var) and t(9;22) BCR/ABL1.

**Reflex parental testing to Microarray**

If a child with microarray results that are of unclear clinical significance, reflex microarray testing or FISH testing (if applicable) will be offered on the parents (if not performed previously).

**Array Comparative Genomic Hybridization (aCGH), Prenatal:**

Chromosomal microarray (array comparative genomic hybridization, aCGH) analysis is useful for detecting clinically significant copy number abnormalities in patients with phenotypic features suggestive of a congenital chromosome rearrangement. Microarray testing permits a whole genome survey at very high resolution and is currently recommended by the American College of Medical Genetics as a first-tier test for certain patients.

**Reflex:** If fetus is female, the extracted DNA will be tested for maternal cell contamination by the Molecular Diagnostics Department.

## **MANDATORY REFLEX TESTING**

### **Additional Cells Counted**

An additional 10 cells are counted (for a total of 30 cells) for all chromosome studies with an indication of Turner Syndrome, Short Stature, or any indication with possible mosaicism. The completion of a 30 cell study rules out 10% mosaicism with 95% confidence.

### **Additional Karyotype(s)**

An additional karyotype will be created to represent each additional cell line identified in the chromosome study.

### **45,X Karyotype**

Chromosome studies which identify a nonmosaic 45,X karyotype will be followed by reflex FISH testing utilizing the X and Y centromeric regions to exclude occult Y chromosome mosaicism. This supplemental testing is consistent with recent American College of Medical Genetics (ACMG) Standards and Guidelines (Wolff D, et al. Genet Med 12:52-5, 2010) and is intended to identify those Turner syndrome patients with Y chromosome material that have an increased risk for gonadoblastoma.

### **Abnormal or ambiguous microarray results**

Abnormal or ambiguous microarray results will be confirmed by cytogenetic chromosome analysis OR fluorescence in situ hybridization (FISH) analysis as appropriate, based on specific abnormality, size and location of region identified. This supplemental testing is consistent with American College of Medical Genetics (ACMG) Standards and Guidelines (Shaffer L, et al. Genetics in Medicine 9:654-662, 2007).

### **Newborn fluorescence in situ hybridization (FISH) studies**

Cytogenetic chromosome analysis will be completed as appropriate on newborn patients (age  $\leq$  6 weeks) with abnormal results on interphase fluorescence in situ hybridization (FISH) testing in order to fully characterize the chromosomal abnormality identified.

### **Monitor previously identified chromosome abnormalities by FISH**

If FISH testing is requested to monitor abnormalities previously identified by chromosome analysis, testing of the earlier diagnostic specimen will also be performed to confirm the FISH abnormality/pattern (if not performed previously).

## Reference Lab Panels

Quad Screen-Mayo QUAD	4-marker screen includes alpha-fetoprotein (AFP), estriol (uE3), human chorionic gonadotropin (total beta-hCG: ThCG), and inhibin A.																																
Electrolyte and Osmolality Panel (Stool) –Mayo EFPO	<p><b>Profile Information</b> <a href="#">[OBI]</a></p> <table border="1"> <thead> <tr> <th>Test ID</th> <th>Reporting Name</th> <th>Available Separately</th> <th>Always Performed</th> </tr> </thead> <tbody> <tr> <td>NA_F</td> <td>Sodium, F</td> <td>No</td> <td>Yes</td> </tr> <tr> <td>K_F</td> <td>Potassium, F</td> <td>No</td> <td>Yes</td> </tr> <tr> <td>CL_F</td> <td>Chloride, F</td> <td>No</td> <td>Yes</td> </tr> <tr> <td>OSMOF</td> <td>Osmolality, F</td> <td>No</td> <td>Yes</td> </tr> <tr> <td>MG_F</td> <td>Magnesium, F</td> <td>No</td> <td>Yes</td> </tr> <tr> <td>OG_F</td> <td>Osmotic Gap, F</td> <td>No</td> <td>Yes</td> </tr> <tr> <td>POU_F</td> <td>Phosphorus, F</td> <td>No</td> <td>Yes</td> </tr> </tbody> </table>	Test ID	Reporting Name	Available Separately	Always Performed	NA_F	Sodium, F	No	Yes	K_F	Potassium, F	No	Yes	CL_F	Chloride, F	No	Yes	OSMOF	Osmolality, F	No	Yes	MG_F	Magnesium, F	No	Yes	OG_F	Osmotic Gap, F	No	Yes	POU_F	Phosphorus, F	No	Yes
Test ID	Reporting Name	Available Separately	Always Performed																														
NA_F	Sodium, F	No	Yes																														
K_F	Potassium, F	No	Yes																														
CL_F	Chloride, F	No	Yes																														
OSMOF	Osmolality, F	No	Yes																														
MG_F	Magnesium, F	No	Yes																														
OG_F	Osmotic Gap, F	No	Yes																														
POU_F	Phosphorus, F	No	Yes																														