



**Pathology and Clinical Laboratory
Duluth, MN**

To: Medical Staff
From: Dr. Steven Eastep
Date: January 1, 2018
Re: Reflexive Testing at St. Luke's Hospital Lab

It is the responsibility of the laboratory to inform its medical staff of reflexive testing done in the lab. Reflexive testing is described as: Test done if the initial test is positive or if the initial results fit defined criteria; the follow-up test will be ordered and the appropriate charges initiated. The following list includes the reflexive testing done at St. Luke's Hospital Laboratory:

1. A CBC with an automated differential will require a manual differential if found to be abnormal under predefined laboratory parameters.
2. Hematology differentials (first time encounter or new diagnosis) that fit the following criteria will be referred to a hematopathologist. They will decide whether a written report should follow:
 - Markedly abnormal RBC morphology—many target cells, spherocytes, schistocytes, etc.
 - Nucleated RBC's (excluding newborns) if hemoglobin is greater than 8 g/dL
 - If the WBC is less than 1,000/mm³ or greater than 30,000/mm³.
 - If immature WBC's are present: promyelocytes or blasts or if Auer rods are present.
 - If the number of lymphocytes is greater than 7,500/mm³ for adults, or >10,500/mm³ for children greater than one year of age.
 - If lymphocytes appear suspicious for lymphoblasts or lymphoma cells.
 - If the number of platelets is less than 20,000/mm³ or greater than 750,000/mm³
 - If the hemoglobin is less than 7 gms or greater than 19 gms.
 - Presence of organisms (i.e. Anaplasmosis, Babesia etc.)
3. If a semen analysis reveals no sperm, a semen Fructose will be ordered and sent to Mayo Medical Laboratories.
4. If the CKMB is greater than 5 ng/mL, a total CK will be analyzed and the percent CKMB will be calculated.
5. Iron Binding capacity includes a total Iron and a calculated Transferrin Saturation.
6. Electrophoresis, Protein, serum. If a discrete electrophoretic band is identified, the laboratory will evaluate the serum protein electrophoresis and perform immunofixation and interpretation at an additional charge.
7. If a TSH reflexive test is ordered, a TSH will be done. If the TSH is abnormal a Free T3 and/or a Free T4 will be ordered and charged.
8. If the triglyceride is >400 mg/dl, a calculated LDL cannot be done. SLH will reflex the Lipid Panel to include a direct LDL.
9. When HgBA1C testing cannot be performed "in house" due to variant interference, testing will be forwarded to Mayo Reference Laboratory.
10. If requested, a quantitative serum hCG will be reflexively added to a positive qualitative serum hCG.
11. If a Streptozyme is ordered and the Streptozyme Screen is positive, the sample will be titered.

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12. If an ASO is ordered, a Streptozyme Screen will be run. If results are positive the sample will be referred to a reference lab for an ASO titer and Anti-Dnase B titer.
13. If the Lyme Disease Antibody is positive, a sample will be sent to a reference lab for Western Blot Confirmation.
14. Treponema antibody tests that are positive will reflex to an RPR Titer. The specimen will be referred to MDH if the RPR Titer is negative.
15. All reactive samples for HCV will be reflexed to a HCV, RNA-PCR regardless of the s/co ratio.
16. Reactive samples for Hepatitis B Surface Antigen are confirmed with a neutralization procedure.
17. Reactive samples for Human Immunodeficiency Virus will be sent to Mayo for HIV-1 and HIV-2 Antibody Differentiation. Based on the results of the test, Mayo may add on additional testing.
18. If requested, an Epstein Barr panel will be reflexively added to a negative Monospot.
19. ANA testing ordered as ANA with Reflex that are positive will reflex to a dsDNA, ENA Screen and Ribosome. The Ribosome will be sent to Mayo.
20. ANA testing that is part of the Connective Tissue Disease Cascade that are positive will reflex to a dsDNA, ENA Screen, Centromere and Ribosome. The Centromere and Ribosome will be sent to Mayo. If the ENA Screen is also positive an ENA will be sent to Mayo for differentiation.
21. dsDNA samples that are equivocal or positive will reflex to a send-out dsDNA by Crithidia methodology.
22. ENA Screen samples that are positive will reflex to an ENA and will be referred to Mayo for differentiation.
23. Celiac Disease Cascade begins with a total IgA. Based on the results of the initial IgA, Tissue Transglutaminase IgA/IgG, Endomysial and Gliadin testing may or may not be performed.
24. If the white blood cell count on Body Fluids is >10 nucleated cells; a differential will be done.
25. If a UA is ordered; the microscopic will be done if the protein, nitrate and/or leukocyte esterase is positive; if the blood is greater than trace or if the glucose is greater than 1 g/dL. If the nitrate is positive and/or the leukocyte esterase is moderate to large, a urine culture will be ordered (except in the Emergency Department or Urgent Care unless the patient is admitted from ED/UC within 5 hours). The urine culture will be ordered on catheterized urines from children under the age of 10, regardless of urine chemistry results or location.
26. When a Streptococcus B PCR test is reported as indeterminate, a Strep B culture will be done.
27. Gram stains will be done on the following cultures:
 - Bronchial Brushings or Bronchial Washing
 - Body Fluid
 - CSF Fluid
 - Ear/Eye Cultures
 - Sputum Culture
 - Tissue Culture
 - Wound Culture
 - Fungus Culture: KOH
 - AFB Cultures: If the culture is from an inpatient, the AFB direct stain will be read at SLH.
28. Culture Identification: Organisms identified in bacterial and fungal cultures will be identified at an additional charge
29. Antibiotic Sensitivity. Sensitivities will be done on all significant isolates as determined by SLH Microbiology Department. If additional sensitivities are needed, please call ext. 5319.
30. If a Strep Screen is positive, no further testing is done. If a Strep Screen is negative, a throat culture for Strep A is completed and charged unless the physician specifically requested to only do the antigen testing. A throat culture for Strep A is not reflexively added if the patient is seen in ED or St. Luke's Urgent Care.
31. Ova and Parasite Screen has replaced the traditional Ova and Parasite microscopic examination. This EIA assay will detect Giardia and Cryptosporidium antigens. Positive Cryptosporidium specimens

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- will be forwarded to the Minnesota Department of Health. Stool specimens will be held for two weeks in preservative following the Giardia and Cryptosporidium EIA results to allow conversion to a conventional microscopic examination. This O&P Screen will automatically replace orders for stool O&P microscopic examinations unless overridden by the ordering physician stating Complete O & P.
32. When an Antibody screen (indirect coombs) is resulted as positive, an antibody identification and antigen typing will be performed as indicated.
 33. Antibodies detected in a type and screen, crossmatch, or antibody screen will be identified to include a direct Coombs test when indicated.
 34. If a clinically significant antibody is detected, two units of antigen negative red blood cells will be crossmatched in addition to the number of units initially requested. Exception: Patients with antibodies which required rare red blood cell units (i.e. <5% of all red blood cell units are compatible.)
 35. When antibody identification cannot be completed at St. Luke's, MBC Specialty Testing will be ordered, sent to Memorial Blood Centers for testing, resulted and charged accordingly.
 36. When a cord blood Rh Immune Globulin evaluation workup determines the mother to be Rh negative:
An Rh newborn will be ordered on the baby and tested on the cord blood sample.
 - If the baby's Rh status is determined to be Rh positive, a Fetal Screen will be reflexively ordered and collected on the mother.
 - When a Fetal Screen is resulted as negative, one vial of Rh Immune Globulin will be ordered, dispensed, and administered.
 - When a Fetal Screen is resulted as positive, a Quantitative Hemoglobin F by Flow Cytometry will be performed and the corresponding dose of Rh Immune Globulin will be ordered, dispensed, and administered. (MINIMUM Rh Immune Globulin dose is one vial, even with a negative result).
 37. When Rh Immune Globulin is ordered for antenatal administration, an Rh type and antibody screen will be reflexively added and performed.
 38. When antigen typing is ordered on the partner of a pregnant female with antibody(s) and the patient tests positive for the antigen in question and that antigen has an antithetical partner, the partner antigen will also be tested to determine if the patient is homozygous or heterozygous for the antigen in question.
 39. When a transfusion reaction workup produces significant results (i.e. clerical error, visible hemolysis or icterus, positive DAT), an extended transfusion reaction workup will be reflexively ordered and completed.
 40. We provide the option to order HPV HR (High Risk) testing reflexively based on PAP smear results.

Mayo Medical Laboratories (MML) serves as the primary reference laboratory for St. Luke's Laboratory. Most tests will be forwarded to MML if not performed on site. Tests that are sent to Mayo Medical Laboratories will be subject to MML's reflexive policies. The following are tests that are commonly sent to MML and have reflexive testing performed:

- Flow cytometry for Leukemia/Lymphoma done at MML will reflex to the appropriate panel based on reference lab findings.
- Coagulation Consultations are performed by MML and include screening tests of coagulation. If the screening tests are abnormal, appropriate diagnostic coagulation tests will be added and interpreted.