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**Lab Dept:** Hematology

**Test Name:** HEMOGLOBIN ELECTROPHORESIS CASCADE REFLEX

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**General Information**

**Lab Order Codes:** MELP

**Synonyms:** Hemoglobin Electrophoresis Blood; Isoelectric Focusing

**CPT Codes:** 83020 – Hemoglobin fractionation and quantitation; electrophoresis  
83021 – Hemoglobin fractionation and quantitation; chromatography  
82664 – Electrophoresis, agar (if appropriate)  
82664 x2 – Electrophoresis not elsewhere specified (if appropriate)  
83068 - Unstable hemoglobin (if appropriate)  
83789 – Hemoglobin variant by mass spectrophotometry (if appropriate)  
88184 - Hemoglobin F, RBC distribution (if appropriate)  
85660 – Sickling of red blood cells, reduction (if appropriate)  
81257 – HBA1/HBA2, gene analysis for common deletions or variant (if appropriate)  
81401 – HBB, common variants (if appropriate)  
81403 – HBB, deletion/duplication analysis (if appropriate)

**Testing includes:** Level 1 Testing - Includes: Hemoglobin A2 and F and Hemoglobin electrophoresis.

**Reflex Testing** – Hemoglobin electrophoresis reflex testing performed at an additional charge, may include any or all of the following as indicated to identify rare hemoglobin variant(s) present: Hgb S Screen, Unstable Hgb, IEF confirms, Hgb variant by mass spec, Hgb F red cell distribution, beta-globin gene, large del/dup, alpha-globin gene sequencing, and beta-globin gene sequencing.

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**Logistics**

**Test Indications:** Diagnose hemoglobinopathies; evaluate hemolytic anemia; diagnose thalassemia; evaluate sickling hemoglobins, hemoglobin C; with other specialized techniques; evaluate unstable, low affinity hemoglobinopathies. Evaluation of unexplained microcytosis.

**Lab Testing Sections:** Hematology - Sendouts

**Referred to:** Mayo Medical Laboratories (MML Test: HBELC)

**Phone Numbers:** MIN Lab: 612-813-6280

STP Lab: 651-220-6550

**Test Availability:** Daily, 24 hours

**Turnaround Time:** 1 – 25 days (longer if structural studies are required), performed Monday – Saturday

**Special Instructions:** A Thalassemia/Hemoglobinopathy Information Sheet (available from lab) may be completed and forwarded with the specimen. Include recent transfusion history.

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***Specimen***

**Specimen Type:** Whole blood

**Container:** Lavender (EDTA) top tube

**Draw Volume:** 10 mL (Minimum: 1 mL) blood

**Processed Volume:** Same as Draw Volume.

**Collection:** Routine venipuncture

**Special Processing:** Lab Staff: **Do Not** centrifuge. Specimen should remain in original collection container. **Do not** freeze. Send refrigerated.

**Patient Preparation:** None

**Sample Rejection:** Testing cannot be performed on clotted samples; frozen specimens; mislabeled or unlabeled specimens

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***Interpretive***

**Reference Range:**

<b>LEVEL 1</b>	<b>Hgb A</b>	1 - 30 days:	5.9 – 77.2%
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		1 – 2 months:	7.9 – 92.4%
		3 – 5 months:	54.7 – 97.1%
		6 – 8 months:	80.0 – 98.0%
		9 – 12 months:	86.2 – 98.0%
		13 – 17 months:	88.8 – 98.0%
		18 – 23 months:	90.4 – 98.0%
		> or = 24 months:	95.8 – 98.0%
	<b>Hgb A<sub>2</sub></b>	1 - 30 days:	0.0 – 2.1%
		1 – 2 months:	0.0 – 2.6%
		3 – 5 months:	1.3 – 3.1%
		> or = 6 months:	2.0 – 3.3%
	<b>Hgb F</b>	1 – 30 days:	22.8 – 92.0%
		1 – 2 months:	7.6 – 89.8%
		3 – 5 months:	1.6 – 42.2%
		6 – 8 months:	0.0 – 16.7%
		9 – 12 months:	0.0 – 10.5%
		13 – 17 months:	0.0 – 7.9%
		18 – 23 months:	0.0 – 6.3%
		>or = 24 months:	0.0 – 0.9%
	<b>Variants</b>	No abnormal variants	
<b>Reflexes:</b>	<b>Hemoglobin F, Red Cell Distribution</b>	Reported as heterogeneous or homogenous	
	<b>IEF Confirmation</b>	Noted when performed	

	<b>Hemoglobin, Unstable</b>	Normal (reported as normal [stable] or abnormal [unstable])
	<b>Hemoglobin Variant by Mass Spec</b>	Noted when performed
	<b>Hemoglobin S, Scrn</b>	Negative
	<b>Hemoglobin ELP, Molecular</b>	Noted when performed. May include Alpha Globin Gene Sequence, Beta Globin Gene Sequence, Beta Globin Del/Dup

**Critical Values:** N/A

**Limitations:** Blood transfusion prior to hemoglobin electrophoresis may make interpretations inconsistent.

Alpha-thalassemias with only 1 or 2 alpha-globin gene deletions are not recognized by this testing protocol. Alpha-globin gene analysis is required to identify 1 or 2 globin genes deleted.

**Methodology:** Hemoglobin A2 and F: Cation Exchange/HPLC  
Hemoglobin Electrophoresis: Capillary Electrophoresis  
Hemoglobin S: Hemoglobin S Solubility  
Unstable Hemoglobin: Isopropanol Stability  
Hgb F, Red Cell Distribution: Flow Cytometry  
Hgb Variant by Mass Spec: Mass Spectrophotometry (MS)  
Hgb ELP, Molecular: Polymerase Chain Reaction (PCR)  
Analysis/Multiplex Ligation-Dependent Probe Amplification (MLPA),  
Polymerase Chain Reaction (PCR)/DNA Sequencing  
IEF Confirms: Isoelectric Focusing

**References:** [Mayo Medical Laboratories Lab Web Page](#) August 2015

**Updates:** 1/11/2007: CPT 2007 updates  
4/21/2009: Addition of Level 3 testing, additional charging/CPT's  
1/25/2011: Level 2 testing now direct reflex per test. Updated reference ranges for pediatrics.  
2/12/2013: CPT update