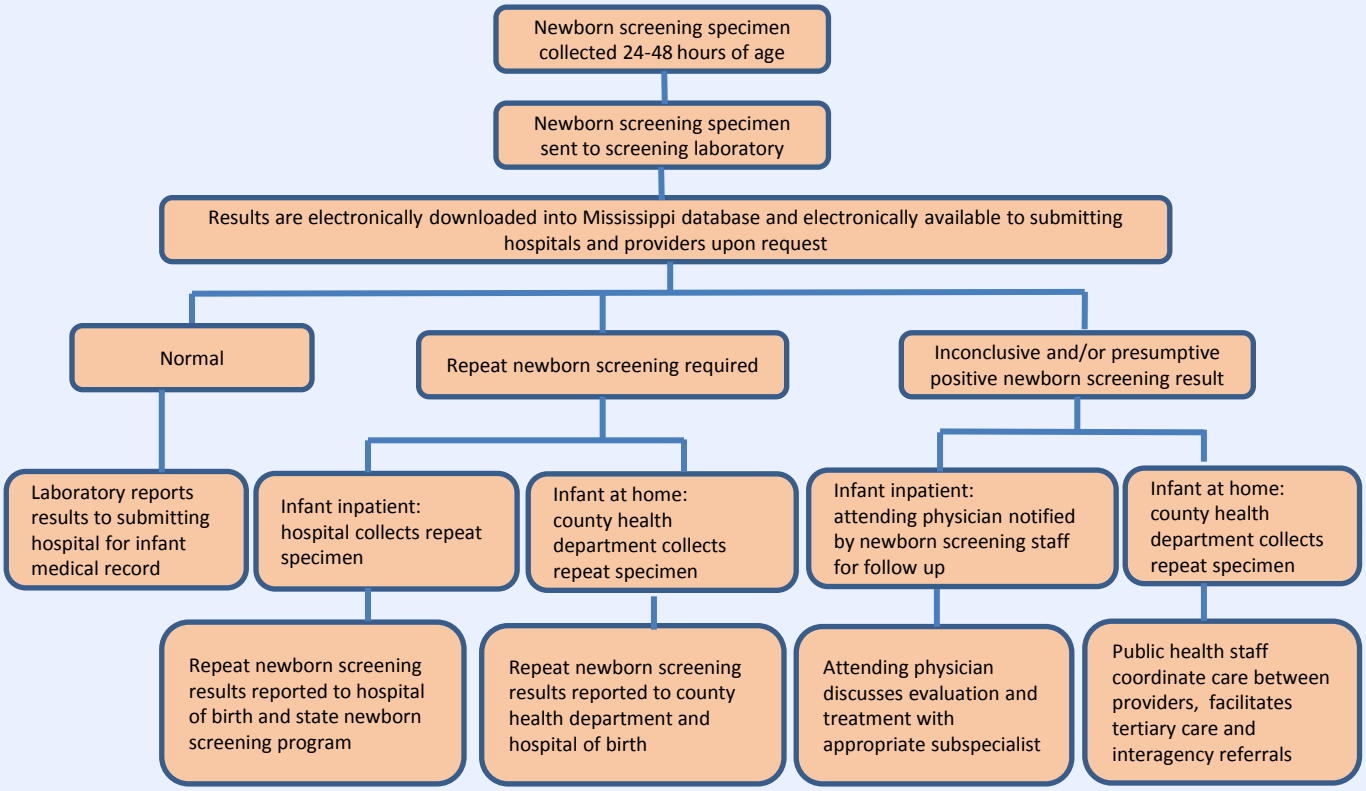
Mississippi Newborn Screening Report 2010-2015

Introduction

The primary goal of the Newborn Screening Program is to screen every infant born in the state and refer infants with abnormal results to appropriate centers for medical evaluation, confirmatory testing, and initiation of medical and/or nutritional treatment if indicated. The newborn screening system includes birthing hospitals, screening laboratory, public health staff, and tertiary care centers. The program is housed in the MSDH Health Services' Office of Child and Adolescent Health in the Bureau of Genetic Services. It screens a wide range of genetic disorders including:

- Amino Acid Disorders
- Organic Acid Disorders
- Fatty Acid Oxidation Disorders
- Biotinidase Deficiency
- Hypothyroidism
- Congenital Adrenal Hypoplasia
- Cystic Fibrosis
- Galactosemia
- Hemoglobinopathies
- SCID

Newborn Screening Program Flow Chart



Number and Percentage of Newborns Screened, 2010-2015

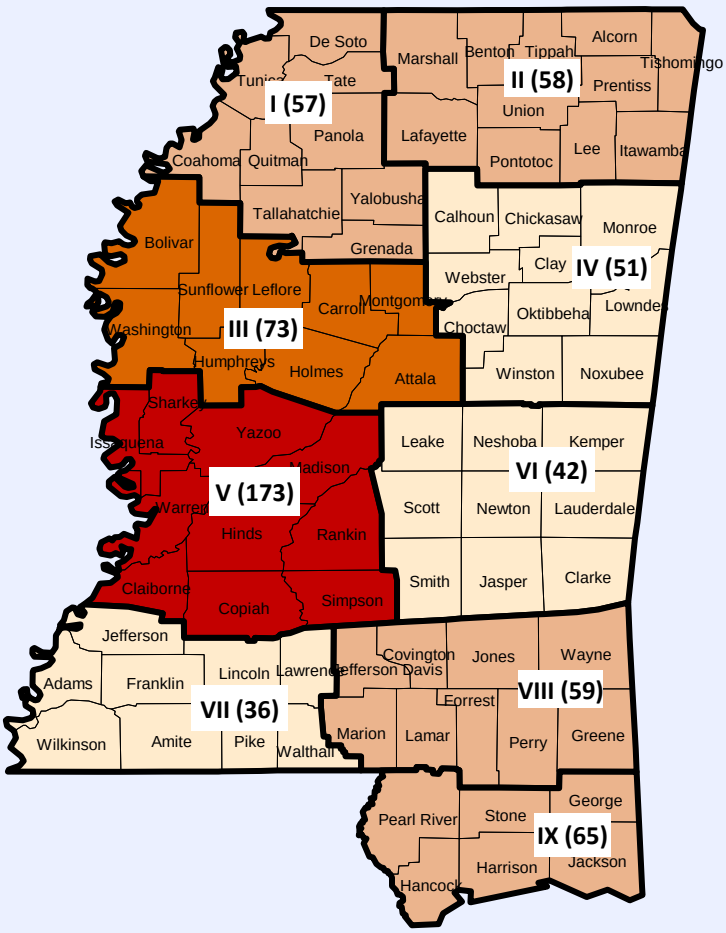
Through the collaboration of all stakeholders in the newborn screening process, almost all infants born in Mississippi are screened each year. Newborns may not have been screened due to transferring out of state for a higher level of care shortly after birth, death prior to specimen collection or other exception.

	2010	2011	2012	2013	2014	2015
Mississippi Births	39,177	38,939	37,787	37,648	37,956	37,618
Number of Newborns Screened	38,158	37,979	36,759	36.607	36,961	36,495
Percentage of Newborns Screened	97.4%	97.5%	97.3%	97.2%	97.4%	97.0%

Newborns with Confirmed Genetic Disorders/Diseases by Public Health District, 2010-2015

The map displays the number of infants with confirmed disorders or diseases over a six-year period (2010-2015) according to their residence within the nine public health districts.

Between 2010 – 2015, 614* newborns were identified with genetic disorders or diseases. The districts with higher numbers of newborns with confirmed genetic disorders or diseases were Districts V and III. District V has the highest population concentration in the state, and it may explain its higher number of disorders/ diseases. District III has an overall lower population, however, it has the largest percentage of African Americans, who are at greater risk of Hemoglobinopathy disorders (HGBD), the largest group of disorders in the state.



*** The total number (614) of newborns screened with confirmed disorders/diseases does not include non-Mississippi residents**

Data Source: Mississippi Newborn Screening Program Database

Confirmed Disorders/Diseases, 2010 – 2015*

Over the six-year period, 99.7% of the newborns screened had normal results. A total of 62 newborns with disorders/diseases were confirmed. Among them, 391 or 63% were hemoglobinopathy disorders.

Amino Acid Disorders	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Total**
Hypermethioninemia	3	0	0	0	0	0	3
Maple Syrup Urine Disease	0	0	0	0	0	0	0
Phenylketonuria	1	2	1	1	2	4	11
Tyrosinemia	0	0	0	0	0	0	0
Total	**4**	**2**	**1**	**1**	**2**	**4**	**14**
Organic Acid Disorders	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Total**
3-methylcrotonyl-Coa Carboxylase Deficiency	2	0	0	1	1	0	4
Glutaric Aciduria Type I	1	0	0	1	0	0	2
Isovaleric Acidemia	0	1	0	0	0	0	1
Propionic Acidemia	2	0	0	0	0	1	3
Total	**5**	**1**	**0**	**2**	**1**	**1**	**10**
Fatty Acid Oxidation Disorders	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Total**
Carnitine Palmitoryltransferase II	0	1	0	0	0	0	1
Long-chain L-3 hydroxyacyl-CoA dehyrogenase deficiency	0	0	1	0	0	0	1
Medium-Chain Acyl-CoA Dehydrogenase Deficiency	5	2	1	2	0	0	10
Short-Chain Acyl-CoA Dehydrogenase Deficiency	3	1	0	3	0	1	8
Very Long-Chain Acyl-CoA Dehydrogenase Deficiency	0	0	0	0	1	1	2
Total	**8**	**4**	**2**	**5**	**1**	**2**	**22**
General Disorders	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Total**
Biotinidase Deficiency	4	3	1	5	1	5	19
Hypothyroidism	14	23	12	15	12	9	85
Congenital Adrenal Hypoplasia (Included CAH-SW)	2	2	5	3	3	3	18
Cystic Fibrosis	9	7	9	6	8	4	43
Galactosemia	3	1	3	1	3	2	12
Hemoglobinopathies (HGBD)	60	71	60	65	74	61	391
Total	**92**	**107**	**90**	**95**	**101**	**84**	**569**
Severe Combined Immunodeficiency (SCID) / Others	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Total**
SCID	0	0	0	1	2	0	3
Congenital Hypoparathyroidism & DiGeorge Syndrome	0	0	0	1	0	0	1
DiGeorge Syndrome	0	0	0	1	3	0	4
DiGeorge Velocardiofocial Syndrome	0	0	1	0	0	0	1
Partial Di-George Syndrome	0	0	0	0	1	0	1
Total	**0**	**0**	**1**	**3**	**6**	**0**	**10**
Grand Total	**109**	**114**	**94**	**106**	**111**	**91**	**625****

- **This does not include hemoglobinopathy traits**

**** The total number (625) of newborns screened with confirmed disorders/diseases includes non-Mississippi residents**

Hemoglobinopathy Disorders (HGBD) Identified through Newborn Screening 2010-2015

HGBD is a group of blood disorders or diseases that affect red blood cells. These disorders include both sickle cell disease and thalassemia.

During the six-year period (2010-2015) in Mississippi, 391 HGBD cases were confirmed , which represented the largest group of genetic disorders or diseases identified through newborn screening. Among them, 99% were African Americans and 1% were whites. The incidence of HGBD for African American newborns screened in Mississippi was 3.9 per 1,000.

Disorders	2010	2011	2012	2013	2014	2015	Total
Hemoglobin Sickle Cell Anemia	31	36	30	37	34	29	197
Hemoglobin FS + Barts	0	1	4	2	6	1	14
Hemoglobin Sickle "C " Disease	1	0	1	0	0	1	3
Hemoglobin S/ Beta + Thalassemia	4	6	1	3	5	2	21
Hemoglobin S/Beta o Thalessemia	4	1	2	0	0	0	7
Hemoglobin Sickle C Disease (FSC)	15	19	17	18	22	17	108
Hemoglobin Sickle "C" Disease+Barts	0	0	0	0	0	1	1
Hemoglobin C/ Beta + Thalassemia	0	0	0	1	1	2	4
Hemoglobin C/Beta o Thalassemia	0	0	0	0	0	1	1
Hemoglobin B/Thal	0	0	0	0	0	1	1
Hemoglobin ASF + Other Hemoglobin	0	1	0	0	0	0	1
Hemoglobin Beta Thalassemia Intermedia	0	0	0	0	0	0	0
Hemoglobin C Disease	4	3	4	2	3	1	17
Hemoglobin E Disease + Barts	0	0	0	0	0	0	0
Hemoglobin F only/disease	0	0	1	0	0	0	1
Hemoglobin FCA	0	1	0	0	0	0	1
Hemoglobin FSA	0	0	0	1	3	3	7
Hemoglobin SC Disease + Barts	0	3	0	0	0	1	4
Hemoglobin S/HPFH	1	0	0	0	0	0	1
Hemoglobin SD Disease	0	0	0	1	0	0	1
Hemoglobin SE Disease	0	0	0	0	0	1	1
Total	**60**	**71**	**60**	**65**	**74**	**61**	**391**

Hemoglobinopathy Traits (HGBT) detected through Newborn Screening 2010-2015

HGBT is commonly known as sickle cell trait, hemoglobinopathy trait results when a baby receives a gene for hemoglobin A from one parent and a gene for a different hemoglobin type (S, C, or D) from the other parent.

During the six-year period (2010-2015) in Mississippi, 11,044 HGBT cases were found. The incidence of HGBT was 49.5 per 1,000 newborns screened overall. Out of the overall incidence rate of HGBT, 101 per 1,000 screened were African American newborns and 5 per 1,000 screened white newborns.

Trait	2010	2011	2012	2013	2014	2015	Total
Hemoglobin S Trait	1,326	1,358	1,324	1,237	1,246	1,293	7,784
Hemoglobin FAS Trait+BART	87	87	79	80	61	75	469
Hemoglobin FAS + Fast	0	0	0	1	0	0	1
Hemoglobin FAVBAR	0	0	1	1	0	1	3
Hemoglobin AS Trait+ Variant	1	0	0	0	0	0	1
Hemoglobin C Trait	401	432	392	366	379	405	2,375
Hemoglobin FAC Trait+BART	40	23	21	19	23	20	146
Hemoglobin D Trait	14	7	16	20	19	11	87
Hemoglobin D Los Angeles Trait	0	6	2	0	0	0	8
Hemoglobin D or G Trait	0	0	0	0	0	0	0
Hemoglobin AD or AG Trait	15	7	10	7	4	4	47
Hemoglobin AD or AG w/some F	0	2	0	0	0	0	2
Hemoglobin ADF or Hb AGF Tra	1	11	6	5	1	5	29
Hemoglobin AG or AD T+ Fast	0	0	0	0	0	0	0
A + Fast Hemoglobin	0	0	1	0	0	0	1
AF + Fast Hemo + Pos	0	0	1	0	0	0	1
AF Hemoglobin + Fast	0	0	1	3	5	4	13
AF Hgb/Poss other va	0	0	1	0	0	0	1
Hemoglobin AFD or AFG Trait	1	1	2	0	0	0	4
Hemoglobin ASF	1	1	2	0	2	2	8
Hemoglobin E Trait	6	7	14	6	12	5	50
Hemoglobin AE with some F	0	0	1	0	0	0	1
Hemoglobin FAE Trait+BART	0	0	0	0	3	0	3
Hemoglobin ACF	0	0	0	1	0	0	1
Hemoglobin O Ar Trait	3	0	0	3	1	2	9
Grand Total	**1,896**	**1,942**	**1,874**	**1,749**	**1,756**	**1,827**	**11,044**

For questions regarding this report contact the MSDH Newborn Screening Program / Health Data Research Office at 601-576-7619.