Title 15: Mississippi State Department of Health Part 4: Office of Health Services Subpart 1: Bureau of Genetics

Chapter 1. NEWBORN SCREENING AND BIRTH DEFECTS REGISTRY

Subchapter 1. AUTHORITY

Rule 1.1.1. **Statutory Authority**

1. Sections 41-21-201 and 41-21-203 of the Mississippi Code of 1972, Annotated, authorizes the State Department of Health to adopt rules and regulations to carry out the Newborn Screening and Follow-up Program for hypothyroidism, phenylketonuria (PKU), hemoglobinopathy, congenital adrenal hyperplasia (CAH), galactosemia, and other such conditions listed on the Recommended Uniform Screening Panel (RUSP) and as specified by the State Board of Health as stated herein below in Rule 1.1.2.

2. Section 41-24-1 of the Mississippi Code of 1972, Annotated, authorizes the State Department of Health to adopt rules and regulations to establish a program of testing to determine the presence of sickle cell trait or sickle cell anemia.

SOURCE: Miss. Code Ann. § 41-21-201

Rule 1.1.2. **Legal Requirements**

1. Under the statutory authority, conditions listed on the RUSP will be included in the comprehensive newborn screening program within three (3) years after being added to the RUSP and adopt any rules and regulations necessary to accomplish the program.

    a. If any RUSP-listed conditions are not added to the comprehensive newborn screening program within three (3) years, a report on the status and reasons for the delay will be submitted to the House and Senate Public Health Committees once a year after the three-year period.

2. Under the statutory authority, a list of each of the conditions included in the comprehensive newborn screening program and made available to physicians and other health care providers who are required to provide for newborn screening testing under Section 41-21-203.

3. Under the statutory authority, informational materials about newborn screening tests will be available for use by physicians and other health care providers to inform pregnant women and parents.

4. Under statutory authority, ongoing epidemiological surveillance of the comprehensive newborn screening program will be used to determine the efficacy and cost effectiveness of screening newborn infants.

5. Under statutory authority, the physician attending to a newborn child, or the persons attending a newborn child who was not attended by a physician, is held responsible for ensuring that the child is tested for the newborn screening tests as described in these rules and regulations. State law exempts from these tests any child whose parents object thereto on the grounds that such tests conflict with their religious practices or tenets.

6. Under the statutory authority, screening for congenital hypothyroidism (TSH), phenylketonuria (PKU), hemoglobinopathies (Hgb), congenital adrenal hyperplasia (CAH), and galactosemia (GAL) will be conducted statewide. Screening for the following conditions, as determined and specified by the State Board of Health, will also be conducted:

   a. 2-Methylbutyryl-CoA Dehydrogenase Deficiency

   b. 3-Hydroxy-3-Methylglutaryl-CoA Lyase Deficiency (HMG)

   c. 3-Methylcrotonyl-CoA Carboxylase Deficiency (3MCC Def)

   d. 3-Methylglutaconyl-CoA Hydratase Deficiency

   e. 5-Oxoprolinuria (Pyroglutamic aciduria)

   f. Argininemia

   g. Argininosuccinic Aciduria (ASA Lyase Deficiency)

   h. Biotinidase Deficiency

   i. Carbamoylphosphate Synthetase Deficiency (CPS Deficiency)

   j. Carnitine Palmitoyltransferase I Deficiency (CPT I)

   k. Carnitine Palmitoyltransferase II Deficiency (CPT II)

   l. Carnitine/Acylcarnitine Translocase Deficiency (Translocase)

   m. Citrullinemia (ASA Synthetase Deficiency)

   n. Critical Congenital Heart Defects (CCHD) - Under the statutory authority, all licensed hospitals and other state licensed birthing facilities must test every newborn for CCHD statewide. All CCHD screenings must be performed prior to discharge and in accordance with current standards of care.

Screening results must be reported to the Mississippi State Department of Health Newborn Screening Program. (Point of care testing which does not require blood)

o. Cystic Fibrosis (CF)

p. Glutaric Aciduria Type I (GA I)

q. Homocystinuria

r. Hyperammoninemia,Hyperornithinemia, Homocitrullinemia Syndrome (HHH)

s. Hypermethioninemia

t. Isobutyryl-CoA Dehydrogenase Deficiency

u. Isovaleric Acidemia (IVA)

v. Long-Chain 3-hydroxyacyl-CoA Dehydrogenase Deficiency (LCHAD)

w. Malonic Aciduria

x. Maple Syrup Urine Disease (MSUD)

y. Medium-Chain Acyl-CoA Dehydrogenase Deficiency (MCAD)

z. Methylmalonic Acidemia (MMA)

aa. Mitochondrial Acetoacetyl-CoA Thiolase Deficiency

bb. Mucopolysaccharidosis I (MPS1)

cc. Multiple Acyl-CoA Dehydrogenase Deficiency (MADD or GA II)

dd. Multiple CoA Carboxylase Deficiency

ee. Pompe

ff. Propionic Acidemia (PPA)

gg. Severe Combined Immunodeficiency (SCID)

hh. Short-Chain Acyl-CoA Dehydrogenase Deficiency (SCAD)

ii. Short-Chain Hydroxy Acyl-CoA Dehydrogenase Deficiency (SCHAD)

jj. Spinal Muscular Atrophy (SMA)

kk. Trifunctional Protein Deficiency (TFP Deficiency)

ll. Tyrosinemia Type I (TYR I)

mm. Tyrosinemia Type II (TYR II)

nn. Very Long-Chain Acyl-CoA Dehydrogenase Deficiency (VLCAD)

oo. X-linked adrenoleukodystrophy (X-ALD) (starts July 1, 2023)

pp. Cystic Fibrosis (338)

qq. Guanidinoacetate Methyltransferase Deficiency (GAMT)

rr. Infantile Globoid Cell Leukodystrophy

ss. Mucopolysaccharidosis Type I + Fuller

tt. Mucopolysaccharidosis Type II+ Fuller.

SOURCE: Miss. Code Ann. § 41-21-201

Subchapter 2. SPECIMEN COLLECTION

Rule 1.2.1. **Specimen Collection Requirements**

1. The specimen must be dried blood spots for screening and whole blood for confirmatory testing. Specimen should be collected according to the instructions issued by the Newborn Screening Program and as specified in the Child Health and Public Health Nursing Manuals.

2. Newborn screening should be performed prior to hospital discharge. Any specimen collected prior to 24 hours of age will require repeat specimen collection.

3. Newborn screening collection for Hgb is accepted for testing under the assumption that the infant has not been transfused. This statement is noted on Mississippi's newborn screening collection card. The most recent transfusion date must be appropriately documented on the collection card.

4. The performing laboratory must receive the specimen within five working days of the date of collection. All specimens requiring repeat testing will be monitored by the Newborn Screening Program as follows:

a. Specimen repeated due to lack of information will be the responsibility of the originating hospital.

b. All other repeated specimen will be followed by the patient's local county health department unless there is a special circumstance.

5. A Mississippi State Department of Health newborn screening collection card must be completed in full and accompany the specimen. It is critical that the data on the collection card be accurate; the information entered must be compatible with that recorded on the infant's birth certificate. The collection card must be completed according to the instructions issued by the Newborn Screening Program.

SOURCE: Miss. Code Ann. § 41-21-201

Subchapter 3. CCHD Reporting Rule

1.3.1 **Reporting Requirements**

1. All infants will receive a CCHD screening after 24 hours of age or before discharge.

    a. All infants should be in the room-air for at least 24 hours and asymptomatic, including those in the NICU.

    b. Neonatal intensive care unit (NICU) infants who are stable and preparing for discharge.

    c. Infants with a prenatal diagnosis of a cardiac defect or infants who have already had a complete postnatal echocardiogram performed should be excluded.

    d. CCHD results must be entered on the collection card for all screens done.

        i. If the CCHD screening results are not available and the bloodspot is ready to be shipped. Ship the bloodspot specimen once it is dried.

SOURCE: Miss. Code Ann. § 41-21-201

Rule 1.3.2. **Fees**

1. A charge will be assessed for every infant screened.

SOURCE: Miss. Code Ann. § 41-21-201

Subchapter 4. FOLLOW-UP

Rule 1.4.1. **Documentation of Screening Outcomes**

1. The Newborn Screening Program will be responsible for assuring that all infants have a CCHD screening outcome documented.

    a. Each healthcare facility is responsible for providing additional information on all infants that failed the CCHD Screening or did not have a "passed" result documented on the Newborn Screening Collection Card.

        i. Except in the case where the card is marked as expired.

Rule 1.4.2. **Follow-up for Positive Results, Questionable Results, and Repeat Screening**

1. The Newborn Screening Program will be responsible for assuring that all infants with positive, questionable, and repeat screening tests are appropriately followed. Follow-up on infants who have a primary care provider will be coordinated with the provider. The local health department will provide repeat follow-up on all specimens that have been collected too early or improperly.

Rule 1.4.3. **Repeat Screening Outside of the Health Department**

1. Special cases where the infant may have a repeat completed outside of the health department are: (1) Infant has not been discharged from the birthing facility or (2) parent/guardian request to return to birthing facility due to parent preference, location, or health department scheduling conflict.

SOURCE: Miss. Code Ann. § 41-21-201

Rule 1.4.4. **Repeat Screening Due to Incomplete Collection Card**

1. If the newborn screening tests must be repeated due to lack of information on the collection card, the hospital will be charged with finding the newborn and repeating the newborn screening tests.

SOURCE: Miss. Code Ann. § 41-21-201

Subchapter 5. LABORATORY REQUIREMENTS

Rule 1.5.1. **Compliance with Standards**

1. Any laboratory which offers this testing must meet the standards outlined in this section and, if requested, provide the

agency with a written statement that they will comply with these standards. All specimens must be tested in an approved laboratory located in the United States.

2. The results of hemoglobinopathies, galactosemia, and congenital adrenal hyperplasia screening are not always clear cut and this type of screening requires extensive input from a recognized reference laboratory. Screening by tandem mass spectrometry requires extensive expertise and experience in this testing methodology.

3. A single control laboratory is required for screening. The laboratory should be proficient in all required testing methodologies.

SOURCE: Miss. Code Ann. § 41-21-201

Rule 1.5.2. **Specimen Requirements:**

1. Specimen acceptable for analysis includes only dried blood spots for newborn screening, and whole blood or serum for confirmatory testing.

SOURCE: Miss. Code Ann. § 41-21-201

Rule 1.5.3. **Method for Specimen Analysis**

1. **Argininemia**: Method: fluorometric assay or by tandem mass spectrometry analysis

2. **Biotinidase Deficiency**: Method: continuous flow enzyme assay

3. **Congenital Hypothyroidism**: Method: Enzyme Immunoassay (EIA)

4. **Cystic Fibrosis (CF)**: Immunoreactive Trypsinogen (IRT) Method: Immunoassay

5. **Congenital Adrenal Hyperplasia (CAH)**: Method: Enzyme Immunoassay (EIA)

6. **Galactosemia**: Method: continuous flow chemistry analysis for Galactose- 1-Phospahte Uridyltransferase deficiency

7. **Hemoglobinopathies**: Method: isoelectric focusing

8. **Phenylketonuria (PKU)**: Method: continuous flow chemistry analysis or tandem mass spectrometry analysis

9. **Other Disorders**: Method: tandem mass spectrometry analysis, or biochemical and other established technologies.

SOURCE: Miss. Code Ann. § 41-21-201

Rule 1.5.4. **Quality Control**

1. The laboratory must be successfully participating in an acceptable proficiency testing program that will monitor the performance of all testing methodologies. Acceptable testing programs include the following:

    a. College of American Pathologists (CAP)

    b. American Association of Clinical Chemists (AACC)

    c. Centers for Disease Control (CDC)

2. Test methods used by the laboratory must be FDA cleared/approved and must be used according to the manufacturers' directions. Documentation must be provided upon request for any appropriate and necessary test used by the laboratory that is not FDA cleared/approved.

3. The laboratorian must examine the quality and integrity of blood spots and must have a written procedure for rejection of those specimens judged to be unacceptable.

4. The laboratory must test a minimum of 40,000 specimens per year for each disorder.

5. Standard curves must be done with each assay of TSH and CAH.

6. Since interpretation of 17-OHP levels for CAH is weight dependent, a birth weight and current weight in grams must be documented for all specimen submitted for CAH testing.

7. Laboratories must be Medicare approved.

8. Hemoglobinopathies

    a. Control(s) containing AFSC must be included in each assay.

    b. All samples that are not normal (not FA or AF) must be sent to a recognized reference laboratory as liquid blood unless a diagnosis has been determined by DNA analysis or other valid means.

    c. If transfused, a repeat blood spot specimen or a liquid blood sample will be collected and tested between two and twelve weeks post last transfusion.

SOURCE: Miss. Code Ann. § 41-21-201

Rule 1.5.5. **Disorders being Screened by Biochemical and Other Technologies**

1. **Biotinidase Deficiency:** Biotinidase Deficiency is caused by the complete or partial lack of enzyme biotinides. This condition can lead to seizures, developmental delay, eczema, and hearing loss.

2. **Congenital Adrenal Hyperplasia:** Congenital Adrenal Hyperplasia (CAH) is a genetic endocrine disorder caused primarily by a deficiency of enzymes needed for the adrenal glands to make the hormones cortisol and aldosterone. It can result in masculinization of female genitalia as well as adrenal crisis and early infant death.

3. **Cystic Fibrosis:** Cystic Fibrosis (CF) is an inherited condition that affects the glands that produce mucus, tears, sweat, saliva, and digestive juices. It causes severe lung damage and nutritional deficiencies. Respiratory failure is the most dangerous consequence.

4. **Congenital Hypothyroidism:** Hypothyroidism is a disorder in which there is a decrease in the production of thyroid hormone, possibly resulting in brain damage and mental retardation in the absence of prompt treatment.

5. **Galactosemia:** Galactosemia is an inborn error of metabolism, inherited as an autosomal-recessive trait, in which the hepatic enzyme galactose-1- phosphate uridyl transferase is absent, preventing the conversion of the milk sugar galactose to glucose. If untreated death can occur in the first month of life.

6. **Hemoglobinopathies:** Hemoglobinopathy, which includes sickle cell diseases, thalassemia, and other variants are blood disorders resulting from change in the structure of hemoglobin. Sickle Cell Disease, the most common hemoglobinopathy in Mississippi, is an inherited disease found primarily in African Americans and people of Mediterranean descent. Although there is no cure for sickle cell disease, early detection is important for effective treatment and prevention of complications. Infection due to Streptococcus pneumonia is a significant cause of death during the first few years of life for patients with sickle cell disease.

SOURCE: Miss. Code Ann. § 41-21-201

Rule 1.5.6. **Disorders Screened by Tandem Mass Spectrometry**

1. A tandem mass spectrometer is an analytical instrument consisting of two mass spectrometers in series connected by a reaction chamber or collision cell. It can identify a compound by its mass and determine how much of the compound is present. Through tandem mass spectrometry analysis, many genetic disorders can be detected from one blood specimen.

2. **Medium Chain Acyl-CoA Dehydrogenase Deficiency:** Medium Chain Acyl-CoA Dehydrogenase Deficiency (MCAD) is a hereditary condition that is caused by a lack of an enzyme required to convert fat to energy. For individuals with this condition, prolonged fasting can lead to hypoglycemia, vomiting, lethargy, seizures, coma, apnea, cardiac arrest, or sudden unexplained death.

3. **Phenylketonuria:** Phenylketonuria (PKU) is a genetic disorder inherited as an autosomal-recessive trait caused by the absence of an enzyme that is necessary for metabolism of the essential amino acid phenylalanine. If untreated, neurologic deterioration, seizures, and severe mental retardation will occur.

4. **Other Disorders:** Other less prevalent conditions are detectable by tandem mass spectrometry. They are grouped into amino acid disorders, organic acid disorders, and fatty acid disorders (See Attachment A). Many of these conditions can be life threatening if appropriate and timely interventions are not initiated.

SOURCE: Miss. Code Ann. § 41-21-201

Rule 1.5.7. **Record Retention**

1. Records of standardization, quality control, and patient values must be kept for at least two years. It is advisable for laboratories to retain these records until the statute of limitations regarding medical malpractice actions expires as stipulated by Mississippi state law.

SOURCE: Miss. Code Ann. § 41-21-201

Rule 1.5.8. **Specimen Retention**

1. Specimen must be retained for at least 365 days. Under no circumstances will the retained specimen be used for research or purposes other than confirmation of previous test results.

SOURCE: Miss. Code Ann. § 41-21-201

Chapter 2. BIRTH DEFECTS REGISTRY

Subchapter 1. Authority

Rule 2.1.1. **Statutory Authority**

1. Section 41-21-205 of the Mississippi Code of 1972, Annotated, authorizes the State Department of Health (the department) to adopt rules and regulations to govern the operation of the Birth Defects Registry.

SOURCE: Miss. Code Ann. § 41-21-201

Rule 2.1.2. **Legal Requirements**

Under statutory authority, the Board of Health (the board) shall:

1. Establish in the department a birth defects surveillance program to:

    a. identify and investigate birth defects, and

    b. maintain a central registry of cases of birth defects

2. Design a birth defects data system that will:

    a. provide information to identify risk factors and causes of birth defects, provide information on other possible causes of birth defects,

    b. provide for the development of strategies to prevent birth defects,

    c. provide for interview studies about the causes of birth defects, and

    d. provide for the collection of birth defect information

3. Adopt rules, regulations and procedures to govern the operation of the registry program and to carry out the intent of this action

4. Specify the types of information to be provided to the birth defects registry and the persons and entities who are required to provide such information to the birth defects registry

5. Prescribe the way records and other information are made available to the department

6. Obtain records and/or test results of individuals with birth defects not previously reported or observed for inclusion in the central registry.

7. Collect, analyze and place data in the central registry to facilitate epidemiological studies/ reviews and to maintain security

8. Use the registry to:

    a. investigate the causes of birth defects and other health conditions as authorized by statute,

    b. design and evaluate measures to prevent the occurrence of birth defects, and other conditions, and

c. refer and track children with special health care needs

d. conduct other investigations and activities necessary for the board and the department to fulfill their obligation to protect the public health

SOURCE: Miss. Code Ann. § 41-21-205

Rule 2.1.3. **The Genetics Advisory Committee**

1. The State Health Officer may appoint or delegate his authority for the purposes of this section to an advisory committee, not to exceed (13) persons, to assist in the design and implementation of this central registry with representation from relevant groups including, but not limited to, hospitals, two (2) pediatricians, board-certified clinical geneticists, personnel of the department, personnel of other appropriate state agencies, and one (1) consumer representative from a family that has experience with a newborn infant with an abnormal screening test. . If a central registry advisory committee is created by the State Health Officer, the board shall consult and be advised by the committee on the promulgation of rules, regulations and procedures for the purposes of this section.

SOURCE: Miss. Code Ann. § 41-21-205

Chapter 3. Identifying Reportable Cases

Rule 3.1.1. **Definition of Birth Defect**

1. **Birth Defect:** A birth defect is an abnormality of structure, function or metabolism, whether genetically determined or a result of environmental influences during embryonic or fetal life. A birth defect may present from the time of conception through one year after birth, or later in life.

    a. From birth to one year of age certain principal birth defects shall be reported.

    b. Other birth defects found later in life may be reported at any time up to age twenty-one.

2. **Reportable Birth Defects:** Live Births and Reportable Fetal Deaths with birth defects (fetal death of 20 completed weeks of gestation or more, or a weight of 350 grams or more) shall be reported. Birth Defects of the following categories must be reported:

Craniofacial GI/GU

Neural Tube	Teratogen
Cardiac	Skeletal
Genetic Disorders	Skin
Congenital Tumors	Central Nervous System

3. **Persons and Entities Required to Provide Information to the Registry**

   a. The physician must report every birth defect case the first time the patient is seen, for individuals born on or after January 1, 2000. A reporting form or its equivalent as determined by the Mississippi State Department of Health is required when reporting a suspected or diagnosed birth defect. If the patient is seen for another birth defect on another occasion, that defect shall also be reported.

   b. Appropriate birth certificate data will be reported.

   c. Appropriate data from other department registries such as the Cancer Registry and Newborn Hearing Registry will be reported.

   d. The state (s) tertiary care center and other hospitals will report data through newborn discharge summaries or by completing and submitting individual reporting forms.

   e. Appropriate data on specified disorders detected through newborn screening will be reported.

4. **Criteria for Inclusion as a Case**

   a. The infant/fetus must have a reportable structural defect, newborn screening disorder, functional or metabolic disorder, genetically determined or a defect resulting from an environmental influence during embryonic or fetal life.

   b. The defect optimally should be diagnosed or its signs and symptoms recognized within the first year of life, but defects can be recognized and included up to twenty-one years of age.

   c. An infant must have been born alive, or a fetus must have gestational age of at least 20 weeks or a birth weight of at least 350 grams to be included in the Birth Defects Registry.

5. **Process for Making Records and Other Information Available to The Birth Defects Registry**

a. Hospitals, physicians, and other health care professionals may submit records and birth defect information electronically or by completing and submitting individual reporting forms.

b. The following people who act in compliance with this section are not civilly or criminally liable for furnishing the information required under this section:

i. A hospital, clinical laboratory, genetic treatment center or other health care facility.

ii. An administrator, officer or employee of a hospital, clinical laboratory, genetic treatment center or other health care facility; and

iii. A physician or employee of a physician.

c. The department field staff will visit health care facilities to gather medical and other required information of children with birth defects. This information will be recorded on registry data report forms. The department may obtain records and/or test results of individuals with known or potential birth defects not previously reported.

6. **Confidentiality and Security**

a. Information collected and analyzed by the department under this section shall be placed in the central registry to facilitate epidemiological studies/ reviews and to maintain security.

i. Data obtained under this section directly from the medical records of a patient is for the confidential use of the department and the persons or public or private entities that the department determines are necessary to carry out the intent of this section. The data is privileged and may not be divulged or made public in a manner that discloses the identity of an individual whose medical records have been used for obtaining data under this section.

ii. Information that may identify an individual whose medical records have been used for obtaining data under this section is not available for public inspection under the Mississippi Public Records Act of 1993.

iii. Statistical information collected under this section is public information.

b. Misuse of the Registry Data: Any person or entity who misuses the information provided to the registry shall be subject to a civil penalty of Five Hundred Dollars ($500.00) for each such failure or misuse. Such penalties shall be assessed and levied by the board after a hearing, and all such penalties collected shall be deposited into the State General Fund.

7. **Policies and Procedures**

The department will maintain written policies and procedures to guide the operations of the Birth Defects Registry.

SOURCE: Miss. Code Ann. §41-21-205

Approved by the Mississippi State Board of Health, October 2025