

Direct Telephone: (207)287-5351; Fax: (207)287-4743

Maine CDC Newborn Bloodspot Screening Program

ACTION SHEET For Primary Care Provider

**YOUR PATIENT HAS A POSITIVE SCREENING RESULT FOR
SEVERE COMBINED IMMUNODEFICIENCY (SCID)**

INTERPRETATION OF NEWBORN SCREENING REPORT:

Your patient has a positive (Out of Range) result from SCID screening. This means that the infant **MAY BE** at increased risk for SCID.

Result:

Reference Range (TREC/ul):

TREC < 252 copies/ul

TREC ≥ 252 copies/ul

We are requesting a **new filter paper specimen be collected within 2 days**. This will help determine if the finding reflects a transient immunologic status or prompts further evaluation.

RECOMMENDED NEXT STEPS FOR PRIMARY CARE PROVIDER

- Contact family. Assess infant's status. Discuss positive newborn screening result with family (increased risk for immune deficiency).
 - Well infants may stay at home safely during preliminary diagnostic testing as they have some protection from maternal antibodies.
 - ***If your clinical assessment is that the baby is not well, call the NBS program immediately (287-5351) to arrange a different follow-up plan including consultation with Pediatric Immunology.***
- Obtain a repeat State newborn bloodspot screening specimen (filter paper) within 2 days. Specimen can be obtained at any birthing facility.
- If you have any questions, please contact the Maine CDC Newborn Bloodspot Screening Program at 207-287-5351.

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Basic Facts about Severe Combined Immunodeficiency (SCID) for Primary Care Provider

SCID is the name of a spectrum of Primary Immunodeficiencies. These immunodeficiencies are characterized by severe defects in cellular and humoral immunity and comprise > 15 independent genetic conditions.

Natural history, treatments and outcomes

- If untreated, SCID results in near uniform mortality by age 1.
 - The most common presenting symptoms are recurrent severe infections, chronic diarrhea, and failure to thrive.
 - Infants with SCID are particularly susceptible to complications from routine infant vaccinations with live virus vaccines.
 - Without Newborn Bloodspot Screening (NBS), the average age at diagnosis is 6 months.
 - Without NBS, infants with SCID are likely to miss the opportunity for early diagnosis and early treatment.
- SCID *can be cured* by Hematopoietic Stem Cell Transplantation (HSCT).
 - Transplant prior to the onset of severe infections yields the most promising outcomes.
 - Infants diagnosed with SCID immediately after birth have the best chance of survival and fewer medical complications after transplant compared to those diagnosed after clinical presentation.

Incidence and risk factors

- The true incidence of SCID is unknown; a conservative estimate is 1/50,000-1/100,000 births.
- SCID can occur in all ethnic groups.
- Infants with a family history of SCID are at high risk; family history is not required for an infant to have SCID.

Genetics and Immunology

- The most common form of SCID is X-linked, but there are also multiple autosomal recessive forms.
- Infants with SCID universally have extremely low or absent T cells.
- Infants with SCID may or may not have B cells; if present B cells are non-functioning.
- Infants with SCID may or may not have Natural Killer (NK) cells.

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Components of the SCID Newborn Screen

for Primary Care Provider

SCID Newborn Screening includes the following components: 1. screening tests 2. preliminary diagnostic tests 3. diagnostic evaluation 4. treatment and 5. program evaluation. All infants with Out of Range Newborn Screening results need to have a repeat newborn screen. Only some infants will need the additional workups outlined in steps 2, 3, and 4.

1. Screening Tests performed on the dried blood spot:

The principal test is quantification of a marker that indicates presence of autologous T cells, the “T cell Receptor Excision Circle” (TREC). This is a molecular marker detectable by quantitative PCR. Low or absent quantities of TRECs observed in the screen indicate a possible severe defect in the ability to generate T lymphocytes.

- As with other screening tests, some values will prompt a request for a repeat specimen.
- As with other screening tests, some values will prompt a preliminary diagnostic test directly.

2. Preliminary Diagnostic test performed on specially-collected whole blood:

- The principal test is a Flow Cytometry test to measure specific T cell markers.
- Boston Children’s Hospital is the referral laboratory to perform these measurements.
- Measurements indicating low to absent T cell markers on a SCID Flow Cytometry test confirm a T-cell lymphocytopenia that requires a diagnostic evaluation by a specialist.

Note: The presence of T lymphocytes alone does not rule out SCID; specialized testing to detect newly generated T lymphocytes must be performed.

3. Diagnostic Evaluation:

The diagnostic evaluation requires a specialty referral inclusive of physical exam and specialized immune function tests. Infants whose evaluation yields a diagnosis of SCID will require immediate treatment. In many cases this will be Hematopoietic Stem Cell Transplantation (HSCT). Infants may be found to have other immune deficiencies, such as DiGeorge syndrome, which requires different treatment (thymic transplant), other primary immune deficiencies requiring a spectrum of preventative treatments or may also be found to be well.

4. Treatment:

SCID infants may be enrolled for HSCT at a pediatric FACT (Foundation for the Accreditation of Cellular Therapy)-accredited center. Boston Children’s Hospital is the closest accredited center.

5. Program Evaluation:

Predictive values of the screening algorithm, yields of SCID and other Primary Immunodeficiency Diagnoses, compliance with recommendations, and short and long-term treatment outcomes will be analyzed for quality assurance and quality improvement of the program.