1.0 PURPOSE AND INTENT:

1.1 To provide a process for routinely screening neonates for various high risk illnesses and conditions to facilitate appropriate treatment and follow-up.

Note: All recommendations are approximate guidelines only and practitioners must take into account individual patient characteristics and situation. Concerns regarding appropriate treatment must be discussed with the attending neonatologist.

2.0 PRACTICE OUTCOME:

2.1 To identify infants who require further follow up or treatment for: potential visual impairments related to retinopathy of prematurity, developmental and cognitive impairment resulting from intraventricular hemorrhage, hearing loss resulting from sequelae of their condition or treatments, or various issues related to metabolic diseases.

3.0 DEFINITIONS:

3.1 Gestational Age (GA) (completed weeks, not rounded up): Time elapsed between the first day of the last menstrual period and the day of delivery. If pregnancy was achieved using assisted reproductive technology, gestational age is calculated by adding 2 weeks to the conceptual age.

3.2 Chronological Age (days, weeks, months, or years): Time elapsed since birth.

3.3 Postmenstrual Age (PMA): Gestational Age plus chronological age. This is the preferred term to use during the perinatal neonatal hospital stay.

3.4 Corrected Age (weeks or months): Chronological Age reduced by the number of weeks born before 40 weeks gestation. This is the preferred term to use after the perinatal period. The term should be used only for children up to 3 years of age who were born prematurely.

4.0 GUIDELINES:

4.1 Provide multiples (twins, triplets, etc) with the same screening tests even if they do not each qualify by their weight.

Retinopathy of Prematurity

4.2 Schedule an initial ophthalmology exam for all infants less than 1250 gram birth weight and/or born at less than 31 weeks 0 days gestational age according to the schedule in Appendix A. Neonatology staff should also flag infants for screening who do not meet these automatic inclusion criteria, but who have an unstable clinical course (e.g. prolonged ventilation, hemodynamic instability or severe sepsis) and who are believed to be at high risk for retinopathy of prematurity. See Appendix B for the process for infants transferred to Brandon General Hospital.

4.3 Consult the Pediatric Ophthalmologist for an initial ophthalmology exam for all infants of any GA who have received greater than 49 days of continuous oxygen therapy before discharge.
4.4 Schedule subsequent exams weekly or bi-weekly until retinal maturation, as recommended on consult form by the Ophthalmologist.

**Intraventricular Hemorrhage**

4.5 Book cranial ultrasound for all infants less than 32 weeks PMA. The physician writes an order for cranial ultrasound and completes the requisition. The first exam is done between 10 and 14 days of age (sooner only if clinical situation warrants). Indicate on the requisition for all studies “please include ventricular index measurement”.

4.6 Book subsequent exams dependent on findings at 1st exam:
- Normal, Grade I or Grade II IVH – repeat between 4-6 weeks of age and at term equivalent.
- Grade III or IV IVH – consider repeat exams every 2 weeks until 4 weeks then assess further need.

**Hearing Loss**

4.7 Hearing screening A health care professional who attends the birth of an infant must ensure that the parent or legal guardian of the infant is offered the opportunity to have the infant screened for hearing loss in accordance with the [Manitoba Universal Newborn Hearing Screening Act](https://www.gov.mb.ca/health/probscreening.html).

4.8 In mother / baby units, the NHS offers newborn hearing screening to the parent / guardian. Acceptance of this offer implies consent for the newborn hearing screening and documentation of the results. Refusal of newborn hearing screening is documented by the screener. Parental signature is not required. For known apprehensions (prior to birth), Child and Family Services (CFS) obtains consent from the parent beforehand and provides the information to the birthing facility. For babies apprehended after birth and the parents are unavailable the hearing screener conducts the screening before the baby is discharged.

4.9 For inpatients in the NICU the hearing screener conducts an Automated Auditory Brainstem Response (AABR) as a standing order, prior to the baby reaching 1 month corrected age if possible, as described in the Provincial Universal Newborn Hearing Screening (UNHS) Program protocol.

4.10 The unit staff will indicate any high risk factors for hearing loss or late onset/progressive hearing loss, so that appropriate surveillance, when required, can be completed in accordance with the Provincial guidelines.

4.11 The hearing screener will complete the hearing screening at the infant's bedside when the infant's condition is stable enough to tolerate the test. The first screen will occur no sooner than 34 weeks Post-Menstrual Age

4.12 If the hearing screening results in a “refer” result- a re-screen will occur no sooner than 1 week following the initial screen. This should ideally be performed prior to discharge whenever possible.

4.13 The UNHS program will contact the family of any infant who has not been screened prior to discharge, or who requires a second screening and has been discharged, to schedule outpatient screening.

**Metabolic Diseases**

4.14 Collect a blood sample on Manitoba Newborn Screening Card (MG-8017) for all full-term healthy infants at time of hospital discharge ensuring that the infant is at least 24 hours old. For infants receiving Parenteral Nutrition containing amino acids, stop the amino acid solution and run a dextrose solution in its place for 3 hours prior to drawing the sample.

4.15 Collect a blood sample on Manitoba Newborn Screening Card (MG-8017) for all infants admitted to neonatal units at 24-48 hours of age. For infants <33 weeks PMA or <1500 grams birthweight, and all same sex twins, collect a second specimen at 10 days of age. For infants ≥ 33 weeks PMA or ≥ 1500 grams collect a second sample only upon request by Cadham Lab.
4.16 For babies whose families are from South Indian Lake or Nelson House, place a pink sticker indicating this on an additional Manitoba Newborn Screening Card and collect extra blood from the baby to fill two spots on the card and send it to Cadham Lab along with the routine newborn screen. Provide the family with the fact sheet found in Appendix C.

4.17 Provide Cadham Lab with additional samples to follow-up on abnormal results upon request. They will indicate how many circles of blood they require. These will be in addition to the routine samples.

5.0 **PRINCIPAL AUTHORS**

5.1 Dr. Cheryl Greenberg, (Metabolic Diseases)
5.2 Diana Dinon, Audiology (Hearing Loss)
5.3 Dr. Paul Shuckett, Dr. Ian Clark (Retinopathy of Prematurity)
5.4 Dr. John Baier (Intraventricular Hemorrhage)

6.0 **REFERENCES:**


# APPENDIX A

Timing of First Eye Examination Based on Gestational Age at Birth

<table>
<thead>
<tr>
<th>Gestational Age at birth (wk)</th>
<th>Age at Initial Examination (wk)</th>
<th>Postmenstrual</th>
<th>Chronologic</th>
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<tbody>
<tr>
<td>22&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td>31</td>
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<td>23&lt;sup&gt;a&lt;/sup&gt;</td>
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</tr>
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<td>32&lt;sup&gt;b&lt;/sup&gt;</td>
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<td>36</td>
<td>4</td>
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</tbody>
</table>

Shown is a schedule for detecting pre-threshold ROP with 99% confidence, usually well before any required treatment.

<sup>a</sup> This guideline should be considered tentative rather than evidence-based for infants with a gestational age of 22 to 23 weeks because of the small number of survivors in these gestational-age categories.

<sup>b</sup> If necessary.
APPENDIX B

ROP Screening for Infants Transferred to Brandon General Hospital (BGH)

PROCEDURE

1. *Physician* receives written or verbal confirmation from Ophthalmologist that the infant may be followed by Dr. Rocha in Brandon

2. **Physician** writes consult to Dr. Rocha – the consult must include the date assessment is required based on ROP Screening criteria or Ophthalmologist recommendation

3. **Nursing Assistant or Unit Clerk:**
   - Send consult *and* Ophthalmologist’s last report (if he has already seen the infant) to
     1. Dr. Rocha at fax # 204-728-5248
     2. Newborn Follow-Up Program fax #787-1138
     3. Infant’s Winnipeg pediatrician
     4. Infant’s Brandon pediatrician
     5. Brandon General Hospital when the baby is transferred

DOCUMENTATION

1. **Physician** documents:
   - Confirmation of approval from Ophthalmologist for Dr. Rocha to continue follow-up written in the Progress Notes

2. **Nurse/Nursing Assistant/Unit Clerk** documents:
   - ROP transfer checklist (kept with Ophthalmology consult forms)

*Physician refers to HSC House Staff (resident, fellow, house officer).

ROP Screening Checklist for Infants transferred to Brandon General Hospital

- Conformation received from HSC Ophthalmologist to transfer ROP screening to BGH
- Consult to Dr. Rocha written by Physician including date of next ROP assessment required
- Discharge summary completed and included in transfer
- Documented in hospital chart Progress Notes

Copies of consult and latest ROP assessment to:
- Dr. Rocha (204-728-5248)
- BGH-NICU (to be included with transfer papers with infant)
- Pediatrician in Winnipeg
- Pediatrician in Brandon
- Newborn Follow-up Program (fax # 787-1138)
APPENDIX C

Fact Sheet About SCID

What does SCID stand for?
It stands for Severe Combined Immunodeficiency.

What is SCID

SCID refers to a condition that is inherited and in which there are severe problems of the immune system. The immune system is part of our bodies and helps to fight against infections. When the immune system does not work properly, it can be difficult or impossible for it to battle germs. This includes viruses, bacteria, fungi - anything that can cause infections.

When babies are born, they are protected from infections by special proteins called antibodies that are part of the immune system. The baby gets these antibodies from his/her mother. When the baby is still inside the mother, the antibodies are transferred to the baby through the placenta. After the baby is born antibodies are transferred to the baby through breast milk. The level of antibodies from the mother will slowly decrease over the first few months of the baby's life. At the same time, the baby's own body, as it gets older, starts to produce its own antibodies and these are used as part of his/her immune system to fight infections.

Sometimes, a baby's immune system does not work properly. It lacks the tools to fight diseases and infections. The immune system is called deficient. Babies with immune deficiencies cannot fight off routine infections on their own. The symptoms of immune deficiencies depend on what part of the immune system is affected. Severe combined immunodeficiency (SCID) is a rare kind of immune deficiency that can be treated if diagnosed early. If not, the baby will become very sick and will die, usually before the age of two years.

We have identified a new test that will help us to make the diagnosis at birth. The test will be performed on blood collected routinely at birth on Guthrie cards. This test will be discussed with you by the nurse at the nursing station during your prenatal visits. We are giving you a copy, for your information, of a brochure entitled "Newborn Screening in Manitoba" which every mother receives in hospital prior to the baby’s discharge.

When the screen test is positive for the type of SCID seen in your community, a referral will be made to a doctor in Winnipeg who is a specialist in treating immune deficiencies. A positive screen test may not mean that the baby has the disorder, but the test should be repeated to confirm the findings. Additional tests may also be required, specifically to look at immune function and could include levels of antibodies, for example. These might require a blood sample from the arm. The tests that will be ordered depend on the results from the screen test. If your baby is diagnosed with SCID, the treatment of choice is a bone marrow transplant which would give your baby a chance for a cure.

Please note: you can refuse to have the test for SCID done on your baby. Please let your health care provider know this before the test is done.

For further information contact Dr. Marlis Schroeder, Dr. Cheryl Rockman-Greenberg or Jessica Hartley, Genetic Counsellor during work hours at 204-787-4681 or leave a message and someone will return your call.