INFANT HEARING PROGRAM

NICU SCREENING TRAINING MANUAL

September 2001
HEARING SCREENING IN THE NEONATAL INTENSIVE CARE UNIT

INFANT HEARING PROGRAM: INTRODUCTION

The Infant Hearing Screening and Communication Development Program (Infant Hearing Program) was announced in the Ontario Government’s 2000 Budget. This new Program builds on the previously introduced government programs designed to give children a better start in life, including the Preschool Speech and Language Initiative and Healthy Babies/Healthy Children.

This manual has been developed to ensure consistency of information and training of those involved in the Infant Hearing Program across Ontario. A province wide standard will ensure that infants born deaf or hard of hearing or at risk of developing hearing loss in early childhood will be identified and that access to the necessary services and supports will be available to these babies and their families. When implemented this new program will integrate all service providers required to meet the vision and goals of the program.

CONTEXT

The importance of acquiring communication skills early in life is well understood. Research has shown that delay in language development can have significant impact on cognitive, emotional and psychosocial development and that language development is a prime indicator of future academic success. Children born with permanent hearing loss or who acquire permanent hearing loss during the early years of life are at risk for delay in language development, if the hearing loss is not identified early. Further, it is well understood that the earlier the hearing loss is identified, and supports and services for communication development are provided, the better the acquisition of language skills.

Screening of newborns to detect permanent hearing loss has been advocated for many years. In Ontario, screening of infants at high risk for hearing loss has been provided in some hospitals, but these services have reached only a small number of the 140,000 babies born in the province each year. The average age of identification of hearing loss in young children has remained about 2 ½ years of age in Ontario, while the recommended maximum age is 6 months.
VISION

Children who are born deaf or hard-of-hearing or at risk for developing hearing loss in early childhood will be identified and will receive the services and supports required for communication development, so that they will acquire the communication skills needed for performance of daily activities required for personal and social sufficiency at home and at school.

GOALS OF THE PROGRAM

The goals of this program are to provide an integrated system of services in all parts of Ontario that will:
1. identify infants born deaf or hard of hearing or at risk for developing hearing loss in early childhood and
2. provide child and family centered services to support communication development.

PRINCIPLES

1. There will be access to the services of this program across Ontario
2. Every aspect of this program will be provided based on fully informed parent/guardian choice and consent, and will comply with confidentiality requirements.
3. All services will be child and family centered taking into consideration the cultural and ethnic diversity of the people of Ontario.
4. A seamless system of services will be developed that integrates this program with other existing children’s programs and services.
5. The components of this program will be developed using the principles of evidence based practice.
6. The program will be monitored and evaluated on an ongoing basis.
7. The quality of the program will be continuously improved, based on the evaluations.

THE PROGRAM

The Infant Hearing Screening and Communication Development Program (Infant Hearing Program) will have three major components.

1. Universal Hearing Screening
2. Hearing Loss Confirmation and Audiologic Assessment
3. Follow up Support and Services

Each of these three components will encompass several aspects of service delivery and supports.

All equipment and procedures used for screening and assessment have been specified by the Provincial Infant Hearing Program. Detailed protocols have been developed and will be followed for delivery of all components of the Program. These protocols will be reviewed and changed as required to reflect current evidence based practice. As new changing evidence emerges, adjustments will be made as required to the program equipment as well as protocols.
Training will be provided for individuals who will be involved in the delivery of all aspects of the program. All information on the services provided through this program will be recorded on the Integrated Services for Children Database and reported on a regular basis to the Ministry of Health and Long-Term Care. The Program will be administered through the infrastructure of the Preschool Speech and Language Initiative (PSL) using 12 Coordinating PSL Systems to coordinate local service delivery.

PROGRAM COMPONENTS

1. UNIVERSAL HEARING SCREENING

In keeping with the most current evidence, the hearing screening component of this program will be a two-stage procedure. This is designed to achieve as low a false positive rate as possible, ideally less than 4%. Babies who receive a “Refer” result from a successful\(^1\) Stage 1 screening will be referred, with parental consent, for a Stage 2 screening, or, in the case of NICU graduates, directly to audiology assessment.

A. Stage 1 Screening

Three different methods of providing the first stage of the screening component are being developed in each region:

a) Screening of High Risk Babies: Hospital NICU Discharge Screening
b) Screening of Healthy Newborns: Healthy Babies, Healthy Children Postpartum Home Visit Screening
c) Community Screening

a) Screening of High Risk Babies: Hospital NICU Discharge Screening

Any infant who is admitted to a Level 3, Modified Level 3, Advanced Level 2 and in some regions Level 2 Neonatal Intensive Care Unit (NICU) and who meets the IHP risk criteria (see Page 6) is considered to be high risk for congenital hearing loss or for progressive or early-onset hearing loss. These babies will be screened at the time of discharge home from the hospital or at time of step-down from the NICU. The instrumentation used for this procedure will be an AABR (Automated Auditory Brainstem Response) screen. It will be determined locally who will carry out this procedure, (i.e. NICU staff, other hospital staff or community based staff hired by the Infant Hearing Program). Because babies who spend over 48 hours in the NICU are at risk for progressive or early-onset hearing loss, babies from this population, if they pass the Stage 1 screening procedure, will be followed through repeat Stage 1 ADPOAE (Automated Distortion Product Otoacoustic Emissions) screenings until they are 3 years of age. Further details on this high risk monitoring are described in a later section of this document.

\(^1\) Successful = A Pass or Refer result was obtained
b) Screening of Healthy Newborns: Healthy Babies Healthy Children Postpartum Home Visit Screening

In Ontario, all mothers of newborns are contacted, usually by telephone, within 48 hours of discharge from hospital, and offered a home visit by a Public Health Nurse (PHN) through Healthy Babies, Healthy Children (HBHC). One of the services that will be provided as part of this visit, to all babies that did not spend 48 hours in a NICU and do not meet the risk criteria, and whose parents consent, will be the Stage 1 hearing screening.

As Healthy Babies, Healthy Children is for all families in Ontario, the Infant Hearing Program, in partnership with First Nations communities and Aboriginal organizations, will develop an appropriate model for providing the Stage 1 screening on reserve that will meet the unique needs of First Nations communities.

The equipment used for the screening of babies through Healthy Babies Healthy Children will be an ADPOAE (Automated Distortion Product Otoacoustic Emissions). This technology has been selected mainly because it is noninvasive, very quick, straightforward and yields information about hearing sensitivity at specific frequencies of interest. In addition to the screening, the PHN will complete a short questionnaire during the home visit, designed to identify infants with congenital risk factors for progressive hearing loss, other than the NICU 48-hour stay and NICU risk list. Babies identified, as high risk through this process will also receive monitoring services as mentioned above.

c) Community Clinic Screening

Regularly scheduled screening clinics will be offered in community locations throughout each of the 12 regions to provide screening to babies who did not access Stage 1 screening or did not have a successful result from Stage 1 screening through the postpartum home visit screening.

This Stage 1 screening will be provided by screening personnel hired or funded through the Infant Hearing Program using either the ADPOAE or AABR equipment depending whether the baby is a healthy baby or NICU High Risk. It will be determined locally how and by whom the Community Stage 1 Screening will be made available.

B. Stage 2 Screening

All well babies with a “refer” result from Stage 1 screening will receive a Stage 2 screening. In most cases, this screening will take place in the community, at regularly scheduled clinics. These clinics are developed in conjunction with the Stage 1 Community Screening Clinics. Every effort must be made to provide a successful Stage 2 screening for each child who has a “refer” result from Stage 1. In some cases this may require a home visit, although home screening for Stage 2 should only be available for exceptional cases only. Stage 2 screening should be completed within 2-4 weeks, but preferably no later than 2 months of age.

The Stage 2 screening will be carried out by screening personnel hired or funded through the Infant Hearing Program using AABR (Automated Auditory Brainstem
Response) equipment. It will be determined locally how and by whom the Community Stage 2 Screening will be made available.

C. High Risk Monitoring

Babies at risk for progressive hearing loss will be monitored on an ongoing basis through regular access to Stage 1 rescreening until they reach 3 years of age. This screening will be conducted by appointment at the Community Screening Clinics using ADPOAE (Automated Distortion Product Otoacoustic Emissions) equipment. These children should be screened every 9 months, with the last screening taking place as close to their third birthday as possible.

The high risk monitoring screening will be carried out by screening personnel hired or funded through the Infant Hearing Program. It will be determined locally how and by whom this screening will be made available.

2. ASSESSMENT

A. Hearing loss confirmation and Audiologic Assessment

B. Medical Referral and Management

3. FOLLOW UP SUPPORT AND SERVICES

A. Family Support and Access to Information
   a) Hearing Aid Dispensing
   b) Other assistive technology

B. Communication Development

WHY NICU BABIES?

TARGET POPULATION

There is substantial evidence that the prevalence of significant, permanent bilateral hearing impairment is in the range 1-3% for NICU graduates. Therefore, all infants who graduate from an NICU after a stay of at least 48 hrs or who meet the risk criteria below are considered at risk for permanent hearing loss. These infants should be screened prior to discharge from the birth hospital admission, using Automated Auditory Brainstem Response (AABR) technology and then monitored through the community clinics until the age of 3 years.
RISK ASSESSMENT

NICU Newborn Hearing Screening Criteria
Babies with ANY of the following criteria should be screened using the ABAER equipment before discharge from Level III or Level II NICU:

- All Retrotransfers from Level III to Level II NICU
- All babies ≠ 34 weeks gestation
- All babies > 34 weeks gestation with a length of stay >48 hours, but EXCLUDING those with the following conditions:
  - Transient tachypnea of the newborn
  - Transient hypoglycemia
  - Feeding difficulties
  - Babies under observation for minor conditions
- All babies with craniofacial anomalies (including minor anomalies such as ear tags, malformed pinnae, etc)

Wherever possible, testing should be performed at a corrected age of 34-35 weeks gestation and prior to discharge from NICU or Special Care Nursery. Testing should NOT be done at < 34 weeks, and NOT within 48 hours of birth.

Time and Place of Screening
AABR screening is best carried out when the infant is medically stable and as much neurological development as possible has occurred. It is usually desirable to consider screening as a component of the NICU discharge protocol. Screening is feasible after about 34 weeks gestational age; before that time, the false-positive (failure) rate increases, due to neurologic immaturity or to fluid or debris in the ears. Testing within 48 hours of birth, even for a term well-baby, increases the false-positive rate.

The local situation will vary with respect to the proportion of transfers from Level III NICUs to Level II or Level I nurseries in the same facility or closer to home. The local protocol will specify which babies are scheduled for screening before Level III discharge or prior to discharge home from the step-down facility. All at risk infants discharged home directly from Level III should be screened in the Level III facility.

Screening Environment
A key requirement for successful AABR screening is that the baby should be asleep or at least drowsy and quiet. Screening will not be successful in a baby who is crying or restless, because electrical activity from head and neck musculature will obscure the EEG response to sound. The screening equipment can inform screening personnel that test conditions are not satisfactory.

Wherever possible, the time and place of testing should be chosen to maximize the likelihood of the baby being sleepy. The act of placing the EEG electrodes may wake up the baby, so testing after a long sleep is ill advised. Wherever feasible, swaddling or other maneuvers that promote relaxation and sleep may be helpful.
Other important factors include environmental noise, activity and lighting. Sudden noise can be distracting and alerting. Steady noise at a moderate level may actually mask the infant's perception of the stimulus. Low and steady noise levels should not be a problem. While quantitative limits to the noise levels that can be tolerated are not easy to specify, the quieter the test environment the better. Testing adjacent to a source of continuous noise such as a running tap or noisy instrument is inadvisable.

Normal activities of routine care or crisis response occurring in the vicinity of the baby to be screened can be distracting and alerting visually, as well as acoustically. Clearly, such activities are inevitable but in general, the less activity near the baby, the better. Also, bright light is not conducive to sleep. If it is feasible to move the baby to a quiet area, preferably only dimly lit, so much the better. Similarly, if it is possible to schedule testing at a relatively quiet or restful time, so much the better. There is no problem with testing the baby while attached to monitors or on low-flow oxygen.

Scheduling and Accessing Babies
The goal of the local process for screening is to maximize coverage of the target population without interfering with the normal standard of care in the NICU. Detailed solutions will depend on local variables. It is important that a practicable procedure of scheduling, notification and activity logging be developed. The procedure should promote efficient access to as large a proportion of babies about to be discharged or transferred as possible. This will involve collaboration and teamwork among the administrative, medical and nursing staff of the NICU, and the screening personnel.

Screening Personnel
The screening equipment is highly automated, so the actual performance of the screening test requires only a little training. However, the screening personnel MUST be familiar with NICU protocols and priorities, techniques for handling NICU babies, strategies for promoting the best test conditions, and the recognition of possible problems, both related and unrelated to the actual screening. For this reason, screening by designated NICU staff is likely to be a preferred option in many situations. If screening by other personnel is envisaged, the process to ensure appropriate knowledge and skills is a priority. If the screener is not perceived to be competent and sensitive to the NICU environment, the program is unlikely to be successful. Furthermore, the general level of endorsement and understanding of the importance of hearing screening in the NICU may contribute significantly to overall success. All screening personnel must attend one of the regional training sessions offered by the province. Appropriate education and information should be provided to all relevant personnel. This may be necessary on an ongoing basis, because of turnover. Dedicated personnel and active performance monitoring promote accountability.

Testing Procedure
Details of the test protocol for NICU AABR are provided elsewhere. The AABR equipment is usually mounted on a small, movable cart that is wheeled to the test location. Having ensured that the test environment is satisfactory and that the baby is at least drowsy, the electrodes are attached usually at the high forehead and behind each ear. The skin is cleaned beforehand using an alcohol swab and the self-adhesive electrode pads applied. The stimulus is delivered to each ear in turn, via an insert earphone with a disposable eartip.
If both ears give a 'pass' result, the screening is complete. If any ear gives a 'refer' result (i.e. fails the screen), the test should be repeated on that ear. If there is an obvious reason for the failure, such as an unsettled baby, waiting a short period before re-testing may allow the baby to settle and give a screening 'pass'. Both ears must pass for the baby as a whole to pass. If on any ear there is a repeated 'refer' result, the baby has failed the screen. If satisfactory conditions for screening (e.g. a quiet baby) cannot be achieved within reasonable time and effort, then the baby should be flagged for subsequent screening after transfer or discharge.

**Infection Control**

Hearing screening performed in the NICU should be carried out using hospital infection control protocols.

In the community, at a minimum, the following infection control procedures should be followed:

- Wash your hands before each screening or in between screenings.
- Use anti-bacterial hand-wash if there is no sink readily available.
- Wipe down all the equipment using disinfectant spray regularly.
- The probes should be cleaned using the probe cleaners provided, whenever debris is visible or at least every 50 screens.

Never re-use the disposable supplies on another baby. (Once used, the probe tips and other supplies can be disposed of in the regular garbage collection).

**The ABAER System**

The ABAER uses a laptop computer to perform the hearing screen. Although the ABAER has its own built-in database, this will not be used for the IH Program, as all information will be entered into the provincial database (ISCIS) using data entry forms (see Data Management and Completion of Forms). However, there are some mandatory fields in the ABAER software, which need to be populated in order to proceed with the screening:

- Child’s name (where the first name is unknown, enter “Baby”)
- Child’s date of birth
- Child’s gender
- Unique identifier for the ABAER database. In this field, enter the date of birth of the child again, but in the following format [YYYY, followed by month in 3 letters, followed by day in 2 digits, followed by the first 5 or 6 letters of the last name]. For example: 2001JAN12ROBINS. The maximum number of characters is 15. Do not use the child’s temporary or permanent health card number, as the IH Program is not permitted to collect this information provincially, nor is it consistently available. The unique identifier is not important for any other reason than to proceed with the screening test. A form is provided to capture all the important program information (see under Data Management and Completion of Forms).

**DATA MANAGEMENT AND COMPLETION OF FORMS**

Data for the Infant Hearing Program (IHP) is captured in the Preschool Speech and Language (PSL) version of ISCIS (Integrated Services for Children Information System).
Each IH Regional Co-ordinating Agency will enter the data for babies who reside in their region.

**Types of data being collected includes:**
- Demographic data (name, address, date of birth, etc. for the child and for the family).
  Note that the health card number is not required.
- Service delivery data
  - Dates of screenings/assessments/interventions
  - Service status (e.g., waiting, accessing service, etc.)
  - Whether the child is High Risk or not (of being born deaf or hard of hearing or of developing a hearing loss in early childhood)
  - Location where service was provided
  - Names of screening and other personnel
  - Results of screenings/assessments

**PURPOSE OF DATA COLLECTION**

1. **Service delivery**
   These data are being used to track babies and their families as they pass through the various stages of the IHP; to make sure no baby gets missed; to track wait times between service delivery points and to schedule appointments. Capturing these data is an essential part of service delivery. Parents should be encouraged to consent to sharing the above demographic and service delivery data within their regional IH System to enable services to be provided.

2. **Monitoring of the Program**
   The Ministry of Health and Long-Term Care will receive aggregate data (no individualized or personally identifiable data) on a quarterly and annual basis from each regional IHP agency. Individualized data will only be shared at the local level.

**CONSENT**

**Standard of Care**

The hearing screening is a quick, easy, non-invasive screening test, which does not involve the performance of any of the controlled acts under the *Regulated Health Professions Act, 1991*. However, provision of parental consent is required, unless hearing screening is performed as part of a hospital’s standard of care. Please refer to the section “Communicating with parents” for information on explaining the purpose and details of the hearing screening procedure to parents.

**Release of Information**

It is important that parents give consent to share information between specified agencies within the local/regional IHP System. As mentioned above, the IHP co-ordinating agency must have information on the babies who have received the screening (and any other services) in order to track that baby/family and make sure they receive appropriate follow-up care. The provision of this kind of consent is essential in order to provide service. It is understood that local procedures for authorization for release of information between one agency and another will be followed.
COMPLETING THE FORM

The form being used at time of training (September 2001) is in draft format and will be revised based on your feedback during the training sessions.

For the IHP System, the form represents the baby. Once the baby has been determined to be “High Risk” (see list of indicators), the demographic data on the baby should be entered on the form. All forms should be kept in a designated place (e.g. specific in-tray) within the NICU until they are completed.

Where to send the form

Discharged before screened: If the baby “steps down” from a higher to a lower level of care (e.g., L3 to L2) and the baby was not screened in L3 (if the baby was less than 34 weeks gestational age, for example), complete the following information on the form:
- Demographic data
- Check off “Did Not Test”
- Check off the risk indicators that apply
- Enter the transferred to and from information
- Check the consent acknowledgement

A copy of the form can be made for the attending physician, if required. Then send the original form to the step-down hospital. The step-down unit should complete the form received from the tertiary care centre, rather than generate a new form.

Screened pre-discharge: If the baby is successfully screened (a pass or refer result was obtained) in the NICU or step-down unit pre-discharge, complete all the information on the form and make 2 copies (the final version of the form will be in triplicate). The original must be sent to the regional IHP agency (see list in Appendix for your nearest agency); the other copies are for the family and the chart (the family can share the information with their primary care physician at their next regularly scheduled visit if they choose). Forms may be hand-delivered, faxed or mailed to the IHP agency; whichever method is quickest is preferred.

Out of region babies: For babies who are admitted to a NICU but who reside outside of that IHP region (e.g., Toronto hospital admissions), send the form to the regional IHP agency nearest to that hospital. That IHP agency will determine where the form should be sent. For example, if a baby from Timmins is admitted to Mount Sinai Hospital, is screened pre-discharge and is discharged home to Timmins, the form should be sent from Mount Sinai to Toronto Public Health. Toronto Public Health will then send the form to the Manitoulin-Sudbury IHP System.

Completing the form

Swipe the patient’s hospital card in the top right-hand corner of the form. Please make sure that the information is legible, particularly if the form is to be faxed. Please print clearly on the rest of the form. Please make sure the form is complete, leaving no relevant fields blank.
NICU

AABR

NO TEST OR NO RESULT

REFER'

PASS'

COMMUNICATING WITH PARENTS

Prior to the screening:
- Provide an explanation of the screening process. Include: why we screen, how many babies have hearing problems
- Provide information on how equipment works, what results mean, what happens next.

Discussion when the screening is complete:
- If outcome is Pass and High Risk, provide Pass handout, get consent to send the information to the IH centre and the need for surveillance appointment in 9 months.
- If outcome is Refer, provide and discuss the Refer pamphlet and stress the importance of the next appointment. Obtain consent to send the information to the IH centre.

GENERAL PRINCIPLES
- Provide consistent and accurate information
- Do not unnecessarily alarm parents, but do stress the importance of following through with subsequent appointments
- Offer appropriate written information, and a contact number for them to call
• Even if the baby passes the screening, stress the importance of monitoring speech and language development; if there are risk factors – the importance of the surveillance screens
• Most babies who do not pass the screen will turn out to have normal hearing, there are many possible causes of a refer result, other than hearing loss

SAMPLE QUESTIONS:

Before the screening: 1. Why are you screening my baby’s hearing?
2. What is an AABR screening test? How does it work?
3. What does it mean to “Pass” the screening?
4. What does a “Refer” result mean?
5. What can cause a “Refer” result?

After the screening: 6. If baby “Passes” the screening, there will be surveillance for progressive hearing loss.
7. If the result is “No Result” what does it mean?
8. If the result is ”Refer”, the next step is an Audiology Assessment.

SUGGESTED ANSWERS:

1. Why are you screening my baby’s hearing?

Serious hearing loss is found in six of every 1000 babies born in Canada. Some babies are born with hearing loss, and some babies develop hearing loss later in life from repeated ear infections, meningitis, head injury or other medical conditions. Sometimes babies lose their hearing and the reason is never known.
For babies in intensive care for a number of days after birth, 1 in 50 babies will have significant hearing loss. There is also a higher risk of late onset or progressive hearing loss for babies who graduate from NICU care.
Children born with permanent hearing loss or who acquire permanent hearing loss during the early years of life are at risk for delay in language development, if the hearing loss is not identified early. Research has shown that delay in language development can have significant impact on cognitive, emotional and psychosocial development and that language development is a prime indicator of future academic success.
Further, it is well understood that the earlier the hearing loss is identified, and supports and services for communication development are provided, the better the acquisition of language skills.
2. What is an AABR screening test? How does it work?

The Auditory Brainstem Response is the response of a part of the brain (the brainstem) to sound. The ABR is a type of EEG which can be measured very early after birth. Screening of hearing with Automated ABR equipment is usually quick, easy to do and reliable. It is completely objective. No behavioral response is needed from the baby, who ideally is tested asleep. Under good conditions, it takes less than ten minutes to screen a baby. AABR screening is performed using a machine called an ABAER which consists of an automatic screening unit installed on a cart or on a table and a portable computer. Disposable skin electrodes are placed on the head and neck and soft sounds are presented to the baby through earphones. The ABAER computer extracts and interprets the EEG response to sound automatically. Typically, the test takes a total of 10 minutes or less.

3. What does it mean to “Pass” the screening?

‘Pass’ means that the computer detected a response to sound for all test frequencies at normal levels for both ears. This means that the mechanisms in the ear were able to transmit their response to the sound through the hearing nerve to the brain. In order for this to happen, the ear must be functioning normally at the time of the screening test.

4. What does a “Refer” result mean?

‘Refer’ means that for any one of the test conditions (e.g. one frequency, one ear), a response by the brainstem could not be detected by the computer.

5. What can cause a “Refer” result?

The most likely reason for not getting a pass result is that the baby’s activity level was too high or the ambient room noise was too loud. The ABR is a subtle response and can be hard to detect. Another possibility is that there was wax or debris in the ear canal, blocking the probe. Or the baby might have a cold, which may cause a small hearing loss. There are many reasons not to get a pass result, so the parents can be reassured. However, it is certainly desirable, and in the baby’s best interests, that they attend for a follow-up check.

6. If baby “Passes” the screening, there will be surveillance for progressive hearing loss.

The results of the hearing screening indicate that the baby is able to hear normally in both ears at the time of the screen. Even if a baby passes the hearing screening, there may be factors that cause the baby to be at greater risk for developing hearing problems. Some of these factors are:

- The baby had to stay in the hospital for intensive care for a few days before coming home
- There is someone in the immediate family who had a hearing problem from early childhood
- The baby’s development is different than other babies, or has facial characteristics that are linked to the development of hearing loss.
Because the baby has one of these factors, the baby will be re-screened periodically until reaching the age of 3 years.

7. If the result is "No Result" what does it mean?

"No Result" means that the screening test could not be completed for some equipment related reason. If the baby was too active and the noise levels are too high, the computer will not be able to recognize a response. There could be a problem with the probe, or probe fit, or with the computer software, although that would be rare. Whatever the reason, a “No Result” means that the screening will have to be repeated in order to determine whether the true result for that baby is “Pass” or “Refer”.

8. If the result is "Refer", the next step is an Audiology Assessment.

If a baby doesn’t pass the screen, the parents should be informed in a low-key manner that there will be a follow-up contact for an audiology assessment within a few weeks, to be done at a time convenient to them and provided the general health of the baby is satisfactory. The parents should be reassured that the screening test result does NOT mean that the baby is deaf. There are many possible causes of screening failure, such as fluid in the middle ear that will resolve naturally in some cases or with medical management. Most infants who have a ‘refer’ result will turn out to have normal hearing. However, the ‘refer’ result does indicate increased risk and it should be indicated that a hearing check-up would be a good idea after the acute-care stage is passed.

The Next Step:
An audiology assessment is another step in checking the baby's hearing. It includes a number of tests to get a complete picture of how the baby hears. The assessment will be completed by an audiologist, a health care professional who specializes in hearing.

How is the Assessment Done?
While the baby is sleeping, special equipment is used to play soft sounds through earphones specially made for testing babies' hearing. The baby’s responses to sound are electronically recorded through the earpieces or through little wires attached by sticky pads on the head. Because more tests are done, an audiology assessment takes longer than the screening. It is possible for the assessment to take up to an hour or more, or may require a second visit.
APPENDIX A

INFANT HEARING PROGRAM CO-ORDINATING SYSTEMS

1. Essex Preschool Speech and Language (PSL) System (Includes Windsor-Essex and Kent-Chatham PSL Systems)
   Windsor Regional Hospital
   1453 Prince Road
   Windsor, Ontario, N9C 3Z4
   Tel: (519) 252-0636 (general number)
   Infant Hearing Program: 519-254-5577 Ext. 52595
   Co-ordinator: Rose Grant Rennie: rgrennie@wrh.on.ca
   Tel: (519) 257-5100 x76555

   C/O Middlesex-London Health Unit
   50 King Street
   London, Ontario, N6A 5L7
   Tel: (519) 663-5317 ext. 2224 (general number)
   Co-ordinator: Debbie Shugar: dshugar@mlhu.on.ca
   Tel: (519) 663-5317 x2430
   Web Page: www.tyketalk.com

3. Hamilton-Wentworth PSL System (Includes Hamilton-Wentworth, Niagara, Brant and Haldimand-Norfolk PSL Systems)
   Hamilton Health Sciences Corporation
   C/O Affiliated Services for Children and Youth
   1171 Upper James Street, Unit 8
   Hamilton, Ontario, L9C 3B2
   Co-ordinator: Sue Honeyman: honeyman@binatech.on.ca
   Tel: (905) 381-2828 x235

4. Peel PSL System (Includes Peel, Halton, Waterloo, and Wellington-Dufferin PSL Systems)
   Erinoak Serving Children with Physical Disabilities
   2277 South Millway
   Mississauga, ON, L5M 2M5
   (905) 820-7111 (general number)
   Project Manager: Lisa Chandler; Ichandler@erinoak.org
   Tel: (905) 820-7111 x2342
5. Toronto PSL System (Includes the City of Toronto only)
   Toronto Public Health Unit
   225 Duncan Mill Road, #201
   Toronto, Ontario, M3B 3K9
   Tel: (416) 338-8255 (general number) Fax: (416) 338-8511
   Co-ordinator: Steve Cohen: Tel: (416) 338-8362
   scohen@city.toronto.on.ca
   Web Page: www.tpsls.on.ca

6. Simcoe County PSL System (Includes Simcoe County and Muskoka-Parry Sound
   PSL Systems)
   Royal Victoria Hospital of Barrie
   201 Georgian Drive
   Barrie, Ontario, L4M 6M2
   Tel: 705-739-5696 or 1-800-675-1979 (PSL/Infant Hearing/Children’s
   Rehabilitation Services Intake)
   Co-ordinator: Mary Riggin Springstead: riginm@rvh.on.ca
   Tel: (705) 728-9090 x4736

7. York Region PSL System (Includes York Region, Durham, Haliburton, Kawartha,
   Pine-Ridge PSL System)
   Markham Stouffville Hospital
   381 Church Street
   Markham, Ontario, L3P 7P3
   Tel: 1-888-703-5437 (general number)
   Co-ordinator: Sara Koke; skoke@msh.on.ca Tel: (905) 472-7373 x6070
   Web Page: www.Beyond-Words.org

8. Early Expressions Speech and Language Preschool Services (Includes Kingston,
   Frontenac, Lennox and Addington, Leeds, Grenville and Lanark and Hastings
   Prince Edward PSL Systems)
   Kingston, Frontenac, Lennox & Addington Health Unit
   221 Portsmouth Avenue
   Kingston, Ontario, K7M 1V5
   Tel: (613) 546-3854 or 1-800-267-7875
   Co-ordinator: Sonya Bianchet: bianchet@mail1.moh.gov.on.ca
   Tel: (613) 549-1232 x204

9. Ottawa PSL System (Includes Ottawa, Renfrew County and District, and Eastern
   Ontario PSL Systems)
   Pinecrest-Queensway Health and Community Services
   1365 Richmond Road, 2nd Floor,
   Ottawa, Ontario, K2B 6R7
   Tel: (613) 724-4179 (parent information line)
   Co-ordinator: Suzanne Larocque: firstwords@pinecrest-queensway.com
   Tel: (613) 820-492

10. Manitoulin Sudbury PSL System (Includes Manitoulin-Sudbury, Algoma,
    Cochrane and Nipissing-Timiskaming PSL Systems)
Northeast Mental Health Centre
2041 Long Lake Road
Sudbury, Ontario, P3E 4M8
Tel: 1-877-522-6655 (general number)
Co-ordinator: Frank Demarco: fdemarco@networknorth.on.ca  Tel: (705) 522-6655 x32

11. Thunder Bay PSL System (Includes Thunder Bay PSL only)
   Thunder Bay District Health Unit
   999 Balmoral Street
   Thunder Bay, Ontario, P7B 6E7
   Tel: 1-888-294-6630 (general number)
   Co-ordinator: Janine Piovesana: pioves99@mail1.moh.gov.on.ca
   Tel: (807) 625-8806

12. Kenora Rainy River PSL System (Includes Kenora Rainy River only)
   Northwestern Health Unit
   396 Scott Street
   Fort Frances, Ontario, P9A 1G9
   Co-ordinator: Debby Cousineau: Tel: (807) 274-0709
dcousineau@nwhu.on.ca
   Toll–free: 1-877-553-7122
   Web Page: www.northwords.com
Infant Hearing Program Co-ordinating Centres

**North Region**
- 10 Sudbury-Manitoulin/ Cochrane/ Nipissing Timiskaming /Algoma
- 11 Thunder Bay
- 12 Kenora Rainy River

**Central West Region**
- 4 Peel/Halton/ Waterloo Region/ Wellington Dufferin

**Southwest Region**
- 1 - Essex/Kent
- 2 - Thames Valley/ Lambton / Grey Bruce /Huron Perth

**Central South Region**
- 3 Hamilton-Wentworth / Brant/ Niagara/ Haldimand Norfolk

**Central East Region**
- 6 - Simcoe/ Muskoka
- 7 York/Durham/ Parry Sound
- 8 York/Durham/ Wellington/ Haliburton, Kawartha
- 9 Ottawa/Renfrew/ Eastern Ontario
- 8 Kingston/ Lanark/Leeds/Grenville / Hastings Prince Edward

**E - Central East Region**
- 6 - Simcoe/ Muskoka
- 7 York/Durham/
- 9 Ottawa/Renfrew/ Eastern Ontario
- 8 Kingston/ Lanark/Leeds/Grenville / Hastings Prince Edward

**F - East Region**
- 9 Ottawa/Renfrew/ Eastern Ontario
- 8 Kingston/ Lanark/Leeds/Grenville / Hastings Prince Edward