

# BC Early Hearing Program Information Update

For Physicians, Nurses and Midwives

Fall 2009

## What is the BC Early Hearing Program?

The BC Early Hearing Program (BCEHP) is a province-wide program for early hearing screening and intervention. The BCEHP is a service of BC Children's Hospital and the Provincial Health Services Authority (PHSA) in partnership with the regional health authorities and the Ministry of Children and Family Development and their funded agencies.

BCEHP, which was announced in March 2005 by the provincial government, is the first province-wide screening program to check the hearing of newborns in British Columbia.

Hearing is screened shortly after birth, either in hospital or at community sites. Infants who do not exhibit a clear "pass" result on their screenings are referred for comprehensive diagnostic testing. If a child is found to have hearing loss, the BCEHP provides the first set of hearing aids, as well as intervention and communication support services. The BCEHP serves children from birth to five years.

## What is the incidence of hearing loss among infants?

About **one to three of every 1,000 newborns have hearing loss** at birth that can be detected by universal newborn hearing screening programs. This number increases to approximately one in every 50 for babies who require special care at birth. Hearing loss is one of the most common congenital disorders.

## What are the benefits of the program?

Prior to the introduction of the BCEHP, the average age of identification of hearing loss in children was approximately two and a half years. Without hearing screening, age of identification is very variable and is dependent on the degree of hearing loss, whether there is a known risk factor, and whether there is parental concern. Typically, the more severe the hearing loss, the earlier the diagnosis occurred.

With the introduction of newborn hearing screening, diagnosis of hearing loss occurs in the majority of healthy babies by three months of age. Hearing devices are fitted within one month of the confirmed diagnosis. Extended stays in the Neonatal Intensive Care Unit (NICU) may lengthen the timeframes.

Other means of identifying hearing loss are much less effective. The High Priority Hearing Registry, which

monitored children with risk factors, missed at least half of children with hearing loss, as less than 50 percent of children with hearing loss have an identified risk factor.

With the BCEHP, babies with hearing loss are identified earlier and have intervention and supports in place by the age of six months. In many cases, this is happening at much earlier ages. Studies show that in the absence of other complicating factors, **early intervention and support can help children with hearing loss have skills similar to their hearing peers by the time they start kindergarten.**

## Screening implementation

Screening was available in all NICU sites by February 2007. The rollout in well-baby started in October 2007. By early 2009, implementation of screening in both birthing hospitals and community sites was complete in all health authorities with the exception of Northern Health. Community-based screening is available at all public health audiology clinics. Rural and remote communities may have other screening access arranged for smaller birthing hospitals.

The following is a summary of some of the sites offering on-site screening (not a complete list):

Health Authority	Screening Sites: Hospital and Health Centre
Fraser Health Authority	Surrey Memorial, Peace Arch, Matsqui Sumas Abbotsford, Royal Columbian, Burnaby, Chilliwack General, Langley General, Ridge Meadows
Vancouver Coastal Health Authority	St. Paul's, Richmond Hospital, Squamish General, Lion's Gate, <i>Squamish public health unit, Powell River and Gibsons public health units</i>
Vancouver Island Health Authority	Victoria General, Nanaimo Regional, Saltspring Island, Campbell River & District General, St. Joseph's General, <i>Port Hardy and Port McNeill public health units, Cormorant Island health centre, Tofino General, Cowichan General, West Coast General</i>
Interior Health Authority	Royal Inland, Cariboo Memorial, 100 Mile District General, East Kootenay Regional, Kelowna General, Penticton Regional, Vernon Jubilee, Golden & District, Kootenay Lake District, Kootenay Boundary Regional
Northern Health Authority	Prince George Regional; <i>Vanderhoof, Burns Lake, Quesnel, Smithers, Houston, and Hazelton public health units</i>
Provincial Health Services Authority	BC Children's Hospital

**Progress to date (as of March 31, 2009)**

Since inception, 49,050 babies had been screened by March 31, 2009.

The refer rate from screening was 2 percent for 08/09, well within acceptable rates for established programs.

To date, the program has identified 112 babies (2.28/1,000) with hearing loss as a result of screening. BCEHP intervention services were first made available in October 2007. Since then, 83 babies have been referred to intervention services and have been connected to local service providers.

Number of babies screened by March 31, 2009	49,050
Number of babies identified with permanent hearing loss by March 31, 2009	112
Number of babies referred to early intervention services by March 15, 2009	83
Number of children fitted with BCEHP hearing equipment by March 31, 2009	271

**How is screening done?**

Most screenings are done before the baby leaves hospital. For those babies who do not have screening completed by the time of discharge, the family will be offered a follow-up appointment, usually at the local public health audiology clinic. Screening may be offered at other community sites in each health authority.

Screening is completed by BCEHP-trained personnel using standardized equipment and following provincial protocols. Two safe and effective screening methods are used:

- **Automated Otoacoustic Emissions (AOAE):**  
A probe is placed in the infant’s ear that presents a soft clicking sound. Sound waves (emissions) generated by the outer hair cells of the cochlea in response to the stimulus are measured by the probe. Response detection is automated.
- **Automated Auditory Brainstem Response (AABR):**  
Electrodes are placed on the forehead and nape of neck, and soft clicks are presented by earphones. The electrodes measure the neural responses to the clicks from the auditory nerve and brainstem. Response detection is automated.

Screening is a two-stage process:

- For those babies who have a clear response (pass) on the first screening test, no further screening is needed. A “pass” screening result means it is very unlikely that a baby has a hearing loss. The accuracy of hearing screening is estimated to be between 90 percent and 95 percent.
- About 25 percent of babies need to have a second screening test because the first screening did not show a clear response from one or both ears.

The risk for hearing loss increases tenfold for babies who do not pass the second-stage screening. Babies who do not pass screening (in one or both ears) have a 1-in-10 to 1-in-20 chance of hearing loss. These babies are at a greatly increased risk of having hearing loss.

It is important that families understand the increased likelihood of hearing loss once a refer result has occurred on screening. When families are (inappropriately) reassured that their baby’s hearing is likely fine, they may not follow through on the diagnostic assessment process. This will delay the age of identification.

**For babies who do not pass second-stage screening**

If the second screening test *does not* show a clear response from both ears (a refer result), the family will be referred to the nearest public health audiology clinic that provides infant diagnostic Auditory Brainstem Response (ABR) assessments.

The refer rate from screening is between 2 and 3 percent. **Even if a baby had a “refer” result in one ear only, it is important for the family to follow through with diagnostic testing.** Babies with hearing loss in one ear are at risk for delays in learning, language and speech. There are also some indications that babies with hearing loss in one ear may develop a hearing loss in their other ear later on.

**What does the ABR assessment entail?**

The diagnostic ABR appointment is an in-depth assessment of hearing performed by a BCEHP-trained audiologist. Like the AABR, electrodes are placed on the forehead and behind the ears, and soft clicks are presented by earphones. The electrodes measure the neural responses to the clicks from the auditory nerve and brainstem. Interpretation of data is done by the audiologist. Appointments are usually between two and three hours in length, although actual test time is usually less. The infant must be asleep, as myogenic activity interferes with interpretation of waveforms.

It is not uncommon to require several appointments to obtain complete results, as infants do not always sleep long enough for complete results in one appointment. Needing several appointments may reduce parents’ confidence in the testing or their willingness to see testing through to completion. **As a physician, midwife, or nurse, your confidence and support of the screening and assessment process can help to ensure that families follow through with the necessary appointments.**

The public health audiology clinics listed in the chart to the right provide diagnostic ABR assessments.

Health Authority	Clinic
Fraser Health Authority	Chilliwack
	Burnaby
	North Delta
	Surrey Memorial Hospital
Interior Health Authority	Cranbrook
	Trail
	Kelowna
	Kamloops
Northern Health Authority	Fort St. John
	Prince George
	Prince Rupert
	Terrace
Vancouver Coastal Health Authority	Richmond
	North Shore
	Vancouver
Vancouver Island Health Authority	Nanaimo
	Victoria
	West Shore
Provincial Health Services Authority	BC Children’s Hospital

**If a diagnosis of hearing loss is confirmed**

**Medical assessment**

Babies with confirmed hearing loss require a detailed medical assessment by an otolaryngologist. The BC Otolaryngology Society has worked with BCEHP to ensure that there are no delays in fitting of amplification and that medical assessment is initiated within three months of diagnosis. The BCEHP has designated otolaryngologists

who will ensure infants have the necessary approvals in place quickly. These otolaryngologists are familiar with the program’s medical assessment guidelines for young children with sensorineural hearing loss and will accept referrals for medical assessment of children identified with permanent hearing loss within the BCEHP.

Health Authority	Otolaryngologist	Contact Information	Location
FHA	Dr. Johann Steinberg	604-792-6921	Chilliwack
FHA	Dr. Sanjay Morzaria	604-957-2239	Surrey
IHA	Dr. David Kramer	250-374-1488	Kamloops
IHA	Dr. Tim Kramer	250-861-5578	Kelowna
IHA	Dr. Ryan Cain	250-489-3323	Cranbrook
NHA	Dr. Sergei Filatov	250-562-3733	Prince George
NHA	Dr. Lodewyk De Jager	250-615-5070	Terrace
VCHA	Dr. Fred Kozak	604-875-2113	Vancouver
VIHA	Dr. Gerry Martin	250-753-2142	Nanaimo and North Vancouver Island
VIHA	Dr. Kevin Clarke	250-595-7564	South Vancouver Island

**Hearing devices**

The BCEHP provides the first set of hearing aids for babies identified with permanent hearing loss through newborn screening at no cost to families. More detailed eligibility requirements are available through the BCEHP. Earmolds and batteries are also provided for the first three years of hearing aid use or until the child reaches five years of age, whichever comes first. Medical clearance from an otolaryngologist is required prior to fitting any hearing device. The audiologist who prescribes and fits the hearing aid will send a request for medical approval and authorization to one of the otolaryngologists above, who will return the signed form within three business days. The specialist does not need to see the child prior to signing the form, as this would cause unnecessary and potentially harmful delay in the fitting of amplification. Medical assessment will be initiated by the otolaryngologist who signed the medical clearance.

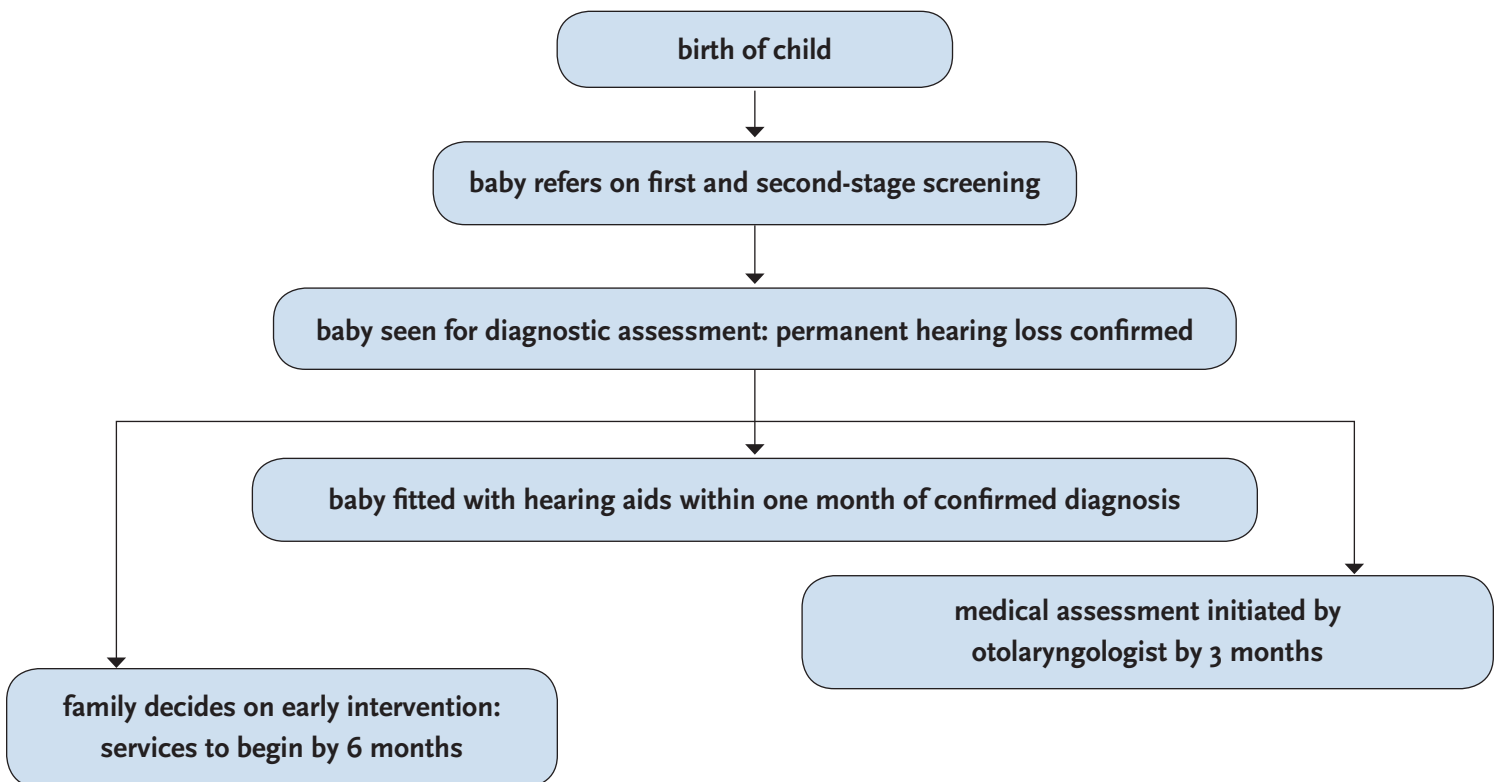
**Early intervention**

One of the goals of the BCEHP is to **have early intervention services in place for each infant with hearing loss by the time they are six months old**. Early interventionists are qualified professionals with experience working with babies newly identified with hearing loss. They provide families with the information they need to

help their baby develop early communication (including listening, language and speech). The BCEHP Early Intervention Coordinator will contact the family within one week of confirmation of permanent hearing loss. Families are provided with information and are encouraged to make a decision about which of the various programs and approaches to communication they feel is right for their family and child. For more information about these early intervention programs, visit the “*For Families/your baby has hearing loss: next steps*” portion of the BCEHP website ([www.phsa.ca/earlyhearing](http://www.phsa.ca/earlyhearing)). For more information about BCEHP early intervention services, contact Susan Lane or Lori Bell at 250-519-5725.

The **Guide By Your Side** (GBYS) program is also available for any family of a child newly diagnosed with hearing loss in B.C. The Provincial Intervention Coordinator refers families to the GBYS Parent Coordinator at the time of diagnosis. The Parent Coordinator will then match the family with a parent guide, who will contact the family within a week or two. The Parent Guides are trained to provide unbiased support and information to families. Parents often find it helpful to speak with another parent who has been through a similar experience. For more information about *Guide By Your Side*, please contact Teresa Kazemir at [tkazemir@cw.bc.ca](mailto:tkazemir@cw.bc.ca) or 604-612-9193, or visit the “*For Professionals*” portion of the BCEHP website ([www.phsa.ca/earlyhearing](http://www.phsa.ca/earlyhearing)).

**Timeline for a typical child identified with permanent hearing loss: first six months.**



## Later-onset hearing loss

Newborns may pass hearing screening but still be at risk for developing a hearing loss in early childhood. At the time of screening, babies are checked for factors that place them at greater risk of having hearing loss later in childhood. Babies found to have one or more of these late-onset risk factors will be reassessed in early childhood. All babies with a risk factor will receive at least one hearing assessment before age three to assess their hearing status. Risk factors include:

- A. An obvious craniofacial anomaly (not pits or tags), e.g., cleft palate (not cleft lip in isolation), microtia/atresia.
- B. Close relative (parent, sibling, uncle, aunt, cousin, grandparent) who had permanent hearing loss before 12 years of age, regardless of degree of hearing loss.
- C. Syndrome associated with progressive/late-onset hearing loss (e.g., Pendred, Branchio-Oto-Renal, Alport, Usher, LVA, neurofibromatosis, osteopetrosis, Down Syndrome).
- D. Birthweight less than 1,200 grams.
- E. Breathing problems:
  - i. Five-minute APGAR score less than or equal to 3
  - ii. Hypoxic-Ischemic Encephalopathy (HIE) moderate/severe (Sarnat II or III)
  - iii. Congenital Diaphragmatic Hernia (CDH)
  - iv. Extra-Corporeal Membrane Oxygenation (ECMO) or inhaled Nitrous Oxide (iNO) or High-Frequency Oscillatory (HFO) or Jet (HFJ) ventilation
- F. Brain dysfunction:
  - i. Intra-ventricular Hemorrhage (IVH), Grade III or IV (IV are seen by neonatal follow-up)
  - ii. Peri-ventricular Leukomalacia (PVL)
- G. Hyperbilirubinemia > 400  $\mu\text{mol}$  OR meeting any standard criteria for exchange.
- H. Lab-proven infection:
  - i. Perinatal (in the baby) TORCHS infection (toxoplasmosis, rubella, Cytomegalovirus [CMV], herpes, syphilis)
  - ii. Meningitis, irrespective of the pathogen
- I. Accidental overdose of Gentamycin or other aminoglycosides, fivefold or greater.

Risk factors may not always be identified at the time of screening, such as certain syndromes or perinatal infections (e.g., TORCHS). Other risk factors may develop later, such as meningitis. If you become aware of a risk factor that was not present or known at the time of screening, a referral for hearing assessment is appropriate, even if the child passed newborn hearing screening.

## Key points to remember

- Reassure families that hearing screening and diagnostic hearing assessments are effective and safe.
- Getting through the second-screening and diagnostic appointments can be difficult for parents. Parents often observe that their baby seems to hear, and therefore they may not see the importance of having the screening or diagnostic assessments completed. However, most babies with hearing loss will usually react to some sounds. Remind them that even if their baby seems to be hearing, it is important to demonstrate clear responses at normal levels in both ears to a range of frequencies important for speech development.
- A baby who has not passed second-stage screening has a 1-in-10 to 1-in-20 chance of having hearing loss in one or both ears. Encourage families to follow through with hearing and screening appointments.
- Conductive involvement present during the diagnostic audiology process can contribute to a delayed diagnosis of hearing loss. Prompt medical treatment may be indicated.
- The presence of risk factors for late-onset or progressive hearing loss puts a child at risk for developing hearing loss later in early childhood, even if the newborn screening results indicated a “pass.”
- Some children who develop late-onset hearing loss will not have any known risk factors. If a child has delayed speech and language or there is parental concern about hearing, a referral for a hearing assessment is appropriate, even if the child passed newborn hearing screening.
- The critical age for starting early intervention, including the fitting of hearing devices, is prior to six months of age. Encourage families to enrol in an early intervention program.

## Goals of the program

- Hearing screening completed before one month of age.
- Diagnostic hearing assessment completed before three months of age.
- Medical assessment commenced by three months of age.
- Early intervention and communication supports commenced before six months of age.

## Resources available

The BCEHP has several resources to assist professionals and families in understanding BCEHP services and eligibility:

- BCEHP website: [www.phsa.ca/earlyhearing](http://www.phsa.ca/earlyhearing)
- BCEHP posters and information brochures. Many BCEHP materials are also available in Traditional Chinese, Simplified Chinese, Punjabi, Farsi, Arabic, Korean, Spanish, French, Vietnamese and Russian. Please contact the BCEHP provincial office for free copies.

For more information,  
visit the BCEHP website at  
**[www.phsa.ca/earlyhearing](http://www.phsa.ca/earlyhearing)**

To contact the provincial office of  
the BC Early Hearing Program:

**Tel:** 250-519-5725

**Toll-free:** 1-866-612-2347 (1-866-61-BCEHP)

**Fax:** 250-519-2015

**Email:** [bcehp@phsa.ca](mailto:bcehp@phsa.ca)

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*Health authority contact information*

## BC Early Hearing Program

A service of BC Children's Hospital  
and the Provincial Health Services Authority

