

# Healthy Hearing Program



A Statewide Universal  
Neonatal Hearing Screening Program

### Introduction

The purpose of this paper is to inform professionals who work with children with a hearing loss in Queensland about the Queensland Health, Healthy Hearing Program which offers newborn hearing screening to all children born in public and private hospitals throughout Queensland. This paper provides details on:

- the implementation of the Healthy Hearing Program;
- how the hearing screen is performed;
- what services are currently available for babies who require diagnostic audiology assessment; and
- what services are in place for those who are subsequently diagnosed with a permanent hearing loss (PHL)

Queensland Health has appointed a Statewide Coordinator, two Project Officers and a Zonal Co-ordinator in each of the three Zones of Queensland Health, to manage the implementation of the Healthy Hearing Program throughout Queensland. If you would like any further information please do not hesitate to contact these officers:

**Ms Shirley Glennon**  
**Statewide Coordinator**  
Healthy Hearing Program  
Statewide Health and Community Services Branch  
Queensland Health

ph: 3131 6814  
e-mail: Shirley\_Glennon@health.qld.gov.au

**Ms Gretchen Young**  
**Senior Project Officer**  
Healthy Hearing Program  
Statewide Health and Community Services Branch  
Queensland Health

ph: 3131 6814  
e-mail: Gretchen\_Young@health.qld.gov.au

### Background

Over 50,000 babies are born in Queensland each year. Approximately 2 per 1000 babies born will have a bilateral moderate, severe or profound hearing loss<sup>1,2</sup>. Children with a significant hearing loss are at risk of poor language development in early childhood and lower educational achievement and employment opportunities later in life.

Prior to the commencement of newborn hearing screening in Queensland the average age of detection of permanent hearing loss (PHL) in children was approximately 30 months. International evidence suggests that detection of a hearing loss and commencement of early intervention through hearing aid provision and communication habilitation by the age of 6 months may be critical for speech and language development and can reduce the need for ongoing special education<sup>3</sup>.

In response to this evidence, Queensland Health commenced the implementation of a statewide universal newborn hearing screening program. The program is called 'Healthy Hearing'. The Healthy Hearing Program aims to detect PHL by providing free hearing screening to babies before they reach three months of age, as well as ensuring appropriate diagnosis and early intervention with those babies found to have a hearing loss.

To date the program has screened over 115,000 babies and from 2007 will aim to screen more than 95% of the babies born in Queensland each year (over 55,000). In fact, most hospitals are screening more than 98% of the eligible population.

### Statistics

Australian Hearing have collated statistics for Queensland detailing the proportion of children under the age of 17 years identified with a hearing loss. This chart represents a 3-frequency average hearing loss in the better ear grouped as <30dB, 31-60dB, 61-90dB and greater 90dB.

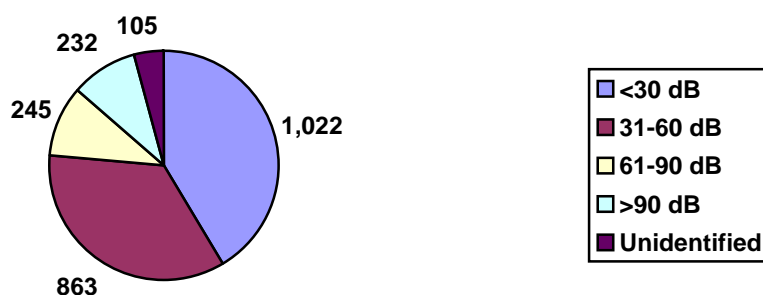


Figure 1: 3-Frequency average hearing level — Queensland.

Newborn hearing screening programs are aimed at detecting hearing loss above 35 dB in the 500 – 4000 Hz frequencies. These frequencies have been identified as being the most important for speech recognition<sup>4</sup>. Although this represents only a portion of the entire range of human hearing, most of the acoustic information necessary to comprehend spoken language is found within this range<sup>5</sup>. The 30 – 40dB range has historically been chosen for screening guidelines considering the known limitations of automated screening tools. Mild hearing loss can affect a child's development and therefore it is important that because screening procedures do not identify children with a hearing loss at this level that

the community is well-informed of the need for continual observation of a child's hearing status.

### Objectives

The objectives of the Healthy Hearing Program are to:

- Optimise early detection of PHL in neonates by providing newborn hearing screening before 3 months of age;
- Provide diagnostic audiology assessment to relevant neonates by 6 months of age;
- Ensure equitable access to the Healthy Hearing Program for all neonates irrespective of social, economic, cultural or geographic circumstances;
- Ensure the Healthy Hearing Program is standardised and provided using multidisciplinary, evidence based screening, diagnostic, treatment and habilitation protocols;
- Provide maintenance care for all children who have a cochlear implant at the time of the commencement of the Healthy Hearing Program;
- Provide an outreach hearing diagnostic and treatment service in the Cape York and Torres Strait region for children from an Aboriginal or Torres Strait Island background.

### Implementation

The Healthy Hearing Program reached its goal of rolling out newborn hearing screening in all Queensland public and private birthing hospitals by December 2006. Processes will be put in place in 2007 to ensure that parents of babies born outside of hospitals or unexpectedly at hospitals which do not usually offer birthing, will be offered hearing screening.

#### **Public Hospitals**

Since October 2004 the Healthy Hearing Program has been implemented in: 44 public hospitals, including:

- Royal Brisbane and Women's Hospital
- Townsville Hospital
- Mater Mother's Hospital
- Logan Hospital
- Cairns Hospital
- Nambour Hospital
- Ipswich Hospital
- Gold Coast Hospital
- Redcliffe Hospital
- Caboolture Hospital
- Mackay Hospital.
- Mt Isa Hospital
- Redlands Hospital
- Toowoomba Hospital
- Rockhampton Hospital
- Warwick Hospital
- Innisfail Hospital
- Tully Hospital
- Bundaberg Hospital
- Stanthorpe Hospital
- Biloela Hospital
- Theodore Hospital
- Ayr Hospital
- Longreach Hospital
- Charleville Hospital
- Charters Towers Hospital
- Hervey Bay Hospital
- Gladstone Hospital
- Gympie Hospital
- Proserpine Hospital
- Moranbah Hospital
- Dysart Hospital
- Chinchilla Hospital
- Dalby Hospital
- Roma Hospital
- St George Hospital
- Kingaroy Hospital
- Goondiwindi Hospital
- Stanthorpe Hospital
- Atherton Hospital
- Mareeba Hospital
- Ingham Hospital
- Thursday Island Hospital
- Cunnamulla Hospital

...And 17 private hospitals, including:

- Mater Private Hospital, South Brisbane
- Mater Private Hospital Townsville
- Wesley Private Hospital Townsville
- North West Private Hospital
- Wesley Private Hospital Brisbane
- Sunshine Coast Private Hospital
- St Andrews Private Hospital, Ipswich
- Cairns Private Hospital
- Mater Private Hospital Redland
- Mater Private Hospital Mackay
- Mater Private Hospital Gladstone
- Sunnybank Private Hospital
- Pindara Private Hospital
- John Flynn Private Hospital
- Nambour Selangor Private Hospital
- Mater Private Hospital Rockhampton
- St Vincent's Hospital Toowoomba

### Private Hospitals

All private birthing hospitals in Queensland were approached regarding the provision of newborn hearing screening and indicated a willingness to participate in the Healthy Hearing Program.

### Statistics for the Qld Program

The table below contains data from the program since the screening began in the three tertiary hospitals, to the end of June 2006. The first and second refer rates of 6.07% and 1.13% are well within international benchmarks for screening programs. The program target for the first screen refer rate was no more than 10% and the target for the second screen refer was no more than 4%. Caution needs to be exercised with these preliminary figures, however, as a full year's data for the whole population is not yet available. A full year's data for the whole of Queensland will not be available until the end of December 2007.

Similarly, the Queensland figure of 1.25 children per thousand diagnosed with a permanent sensorineural hearing loss includes unilateral and mild losses and most international reports do not. However, despite this, the rate per thousand is still within the generally accepted figure of 1-2 children per thousand.

<b><u>Implementation Progress in Queensland – % babies born who are now offered hearing screening - &gt;98%</u></b>	
<b>Healthy Hearing Screening and Audiology data to end June 2007</b>	
Number of Babies Screened since program began	102,000
1st Refer Rate	7.2%
2nd Refer Rate	1.11%
Targeted Surveillance Rate	3.17%
Number of babies directly referred to diagnostic audiology	1101
PHL detected - Rate per thousand for Bilateral hearing loss of 40dB or greater.	.84/1000*
PHL detected - Rate per thousand for all permanent hearing losses <i>including mild and unilateral</i>	1.37/1000*
Number of babies referred for targeted surveillance	3209

- Preliminary data only

### How is the screen performed?

In order to optimise 'capture rates', screening ideally takes place prior to the baby's discharge from hospital. Written consent is obtained from the parent/s prior to the screen being conducted. A brochure titled *"Your baby's free hearing test"* is provided to parents prior to screening. A nurse trained in hearing screening carries out the screen when the baby is quiet or asleep.

The screening process utilises Automated Auditory Brainstem Response (AABR) equipment. The hearing screen is non-invasive and easy to perform. The screening equipment used by Queensland Health is the Natus ALGO 3 (trolley mounted) and the ALGO 3i (hand held).

Several small sensor pads are placed on the baby's head and soft clicking sounds are played into the baby's ear through a soft earphone. The sensor pads record the baby's responses to the sounds. The baby must be more than 34 weeks gestation to be screened. The equipment is operated by the screener and requires no interpretation of results. The equipment automatically records whether the baby has passed the screen ('pass result') or whether a referral for further screening ('refer result') is required.

### Results

If a baby receives a 'refer result' on either or both ears a second screen of both ears is conducted at a later time to confirm the result. A 'refer result' does not necessarily mean that the baby has a hearing loss. Some common reasons for needing a second screen are:

- The baby was unsettled at the time of the first screen;
- There was background noise when the test was carried out;
- The baby had fluid or a temporary blockage in their ear after birth.

If the baby receives a 'refer result' on either or both ears on the second screen the baby is referred for diagnostic audiology assessment.

The results are recorded in the baby's medical chart and Personal Health Record. The data from the Natus (testing machine) is also entered into a statewide database for tracking and further analysis at a district or state level.

If a baby passes the screen but has risk factors for progressive or delayed onset hearing loss, the family is offered audiological testing at 6- 12 months of age. This is called targeted surveillance and aims to pick up this progressive loss as soon as possible.

Data from the Healthy Hearing Program indicates that at least 98% of babies born in hospitals that are providing universal screening have received screening. Of these 7.2% of babies have required a second screen and 1.11% have required referral to diagnostic audiology services.

It is also important for parents to know that a child's hearing may not remain the same over time. If a parent has any concerns about their baby's hearing, they should contact the baby's doctor or healthcare provider. Hearing can be tested at any age.

### Diagnostic Audiology Assessment and Services

For babies referred to a diagnostic audiology service, an appropriate diagnostic audiology protocol is followed. A further group of children who receive a 'pass result' on screening, but who have risk factors for progressive hearing loss or late-onset hearing loss, will be referred to diagnostic audiology for Targeted Surveillance which will involve diagnostic testing in the first year of life.

Queensland Health currently provides public neonatal diagnostic audiology services at:

- Royal Children's Hospital
- Mater Children's Hospital
- Logan Hospital
- Ipswich Hospital
- Nambour Hospital
- Toowoomba Hospital
- Gold Coast Hospital
- Townsville Hospital
- Cairns Hospital (through a private service provider)
- Rockhampton Hospital (through a private service provider)

Additional public audiology services are currently in development for other areas including:

- Mackay Hospital
- Mt Isa Hospital

Babies born in private hospitals who require referral for diagnostic audiology assessment may be referred to either private or public audiology services.

Overseas experience suggests that 50 - 60% of babies referred for diagnostic audiology will be confirmed to have either a transient conductive hearing loss or a permanent conductive or sensorineural hearing loss.

It is not expected that there will be more babies confirmed with a PHL, but that they will be referred at a younger age and seen by diagnostic and treatment services for longer. Early evidence from Australian Hearing, the hearing-aid fitting service, supports this.

### Referral to Australian Hearing

There are three Australian Hearing infant hearing aid fitting centres in Queensland. Australian Hearing is the Commonwealth funded national service which provides hearing aids. For children this service is free. Infant hearing aid fitting services are based in Brisbane City, Mt Gravatt and Townsville. These specialist services have been established to ensure children and families have access to services from professionals who have appropriate expertise and experience in working with infants.

Ideally children will access these centres until an optimal hearing aid fitting has been achieved. At this point their care can be transferred to a more local Australian Hearing centre if one is available. This process can take some months and a number of visits to the infant hearing aid fitting centre. Where families find the travel involved in this process too difficult, if the initial hearing aid fitting has occurred within a specialist fitting centre, the

staff from this centre will be better able to support the local Australian Hearing service to meet the needs of the child and family.

### Queensland Hearing Loss Family Support Facilitators

Families of children diagnosed with a PHL must make complex and difficult decisions regarding the best habilitation options for their child, and frequently need to access a wide range of different professionals and services. A statewide service with six full-time Family Support Facilitator roles has been established in Queensland. These roles offer support to all children diagnosed with a PHL from birth through to completion of Grade 1, although the decision to use this service will remain with the family. This includes children who access medical and habilitation services outside the public sector. Although these roles are based in Brisbane and Townsville they provide outreach services across the state.

The roles of the Family Support Facilitators are detailed below. For those roles that involve ensuring families have access to information, the responsibility will be to *facilitate access* to this information through a variety of means. The Family Support Facilitators will not be the sole person responsible for generating or communicating this information.

#### Family Support Facilitators Roles:

1. In collaboration with the family, establish the scope and nature of the case manager role, with the aim of maintaining a balance between promoting independence and providing support that is responsive to changing circumstances.
2. Provide family-centred counselling and support, as appropriate, through offering families:
  - A brief service in the diagnostic period following referral to audiology after a refer result on newborn hearing screening, and
  - A comprehensive service after diagnosis of a PHL through to completion of Grade 1.

The extent and timing of counselling and support will vary from family to family.

3. Co-ordinate the completion of post-diagnostic aetiological, health and developmental assessments and processes and ensure integration of information gained through this period for the benefit of families and professionals.
4. Work with families and professionals across a range of government and non-government organisations to create a team that is built around the unique needs of individual children and their families.
5. Ensure families have complete and accessible information about:
  - their child's hearing loss and its implications;
  - their child's other health and developmental needs;
  - the full range of habilitation options available to support their child's communication, development and health needs.
6. Facilitate a process to support family decision making regarding habilitation methods and services that is built on:
  - a philosophy of family-centred practice that promotes and enables family self-determination in defining and working towards goals;

- provision of complete, inclusive and accessible information regarding services, and habilitation and communication methods;
  - exploration of this information in the context of the known variables of the child, their family and the community they live in;
  - acceptance that individual families have the ability to make decisions that are in the best interests of their children and family;
  - acceptance of diversity in family goals and decisions; and
  - the knowledge that family decisions will be evolutionary and are open to review and development over time.
7. Ensure that all relevant services and professionals have access to appropriate information to support their involvement with the child and family, and reduce the requirement for families to relay information between professionals except in circumstances where this is the preference of the family.
  8. Support co-ordination and timing of services and processes to reduce family stress, minimise duplication and avoid communication gaps.
  9. Work with families and professionals to co-ordinate:
    - the development of family-centred, multidisciplinary, early intervention plans at the time of commencement of early intervention, at 6 months of age, 12 months of age and yearly until the completion of Grade 1
    - the completion of progress reviews and assessments at 6 months of age, 12 months of age and yearly until completion of Grade 1
    - modifications to the range of services a child and family accesses as their needs change over time.
  10. Participate in outreach services across the Zone to optimise provision of services to children and families within their local community contexts where possible.
  11. Contribute to the development and delivery of a parent mentor program, and a Deaf and hearing impaired adult mentor program.
  12. Identify and promote the needs of children with a PHL and their families and advocate on their behalf within relevant services and systems.

### Post-diagnostic Aetiological, Health and Developmental Assessment

For children diagnosed with a PHL, each of the three tertiary hospitals, Royal Children's Hospital, Mater Children's Hospital and Townsville Hospital, and possibly others will provide comprehensive assessment of the aetiology of the child's hearing loss, as well as their overall health and development. A subgroup of the Healthy Hearing Advisory Group is currently working on the clinical protocols for this service.

Once children and families have completed this initial phase of assessment, ongoing medical services may be accessed within local communities if these are available and appropriate to the needs of the individual child.

### Resource Development

An independent consultant recently completed a number of focus groups with parents of children who have a PHL. The qualitative information gained from this process has been analysed and a written report released to parents, service providers and other stakeholders. This information was used to inform both the development of relevant resources for families of children diagnosed with a PHL, as well as further decisions regarding the development of services for children and the support of families. Information from this report has already informed the introduction of the Family Support Facilitator role.

In addition, several information resources have been developed to inform parents about the hearing screening process, these include;

- 'Your baby's free hearing screen' brochure; which is provided to parents prior to the screen, and is used as part of the informed consent process.
- 'Your baby's audiology hearing test' brochure; given to parents whose baby is referred on to an Audiologist for further hearing tests.
- 'Translated Resources' for parents from a non English speaking background, which include;
  - translated versions of 'Your baby's free hearing screen' brochure
  - audio translated versions of 'Your baby's free hearing screen' brochure, and
  - translated consent form, for the hearing screen.
- 'How you go sabe if I listen you', a DVD produced in collaboration with the Torres Strait to promote hearing screening in the Torres Strait.

Other brochures will be developed to assist at various phases of the program – eg. a resource about targeted surveillance, audiology, otitis media.

### Working Groups

A number of different working groups were actively involved in the development and implementation of the Healthy Hearing Program. These include the Audiology Working Group and the group working on the Post-diagnostic Aetiological, Health and Developmental Assessment. Representatives of the key consultation groups - the Healthy Hearing Advisory Group, the Audiology Working Group and the Healthy Hearing Consultative Group are detailed below. Membership of the Post-Diagnostic Aetiological Health and Developmental Assessment group is open.

## Healthy Hearing Advisory Group

<b>Name</b>	<b>Organisation</b>	<b>Position</b>
Ms Sreedevi Aithal	Townsville Hospital	Paediatric Audiologist
Mr Venkatesh Aithal	Townsville Hospital	Senior Audiologist
Ms Angela Bertram	Health Advisory Unit, Queensland Health	Project Officer
Ms Hazel Brittain	Logan Hospital	Assistant Director Nursing
Dr David Cartwright	Royal Brisbane and Women's Hospital	Director Neonatology
Ms Noelle Cridland	Royal Brisbane and Women's Hospital	Director of Nursing
Ms Lorraine Girle	Logan Hospital	Southern Zone Co-ordinator, Healthy Hearing Program
Ms Shirley Glennon	Healthy Hearing Program Queensland Health	Statewide Co-ordinator
Dr Guan Koh	Townsville Hospital	Director Neonatology
Dr Anne Kynaston	Royal Children's Hospital	Paediatrician
Ms Helen Little	Statewide Health & Community Services Branch, Queensland Health	Director, Statewide Health Services Unit
Ms Jackie Moon	Mater Health Services	Senior Audiologist
Ms Kelly Nicholls	Royal Children's Hospital	Senior Audiologist
Dr Fiona Panizza	Mater Hospital, Private Practice	ENT
Ms Katrina Roberts	Townsville Hospital	Northern Zone Coordinator Healthy Hearing Program
Dr Alan Sive	Townsville Hospital	Paediatrician
Ms Delene Thomas	Royal Brisbane and Women's Hospital	Central Zone Co-ordinator Healthy Hearing Program
Julie Thompson	Healthy Hearing Program Queensland Health	Senior Project Officer
Prof David Tudehope	Mater Hospital	Director Neonatology
Dr Alison Van Haeringen	Mater Health Services	Paediatrician
Ms Gretchen Young	Healthy Hearing Program Queensland Health	Senior Project Officer

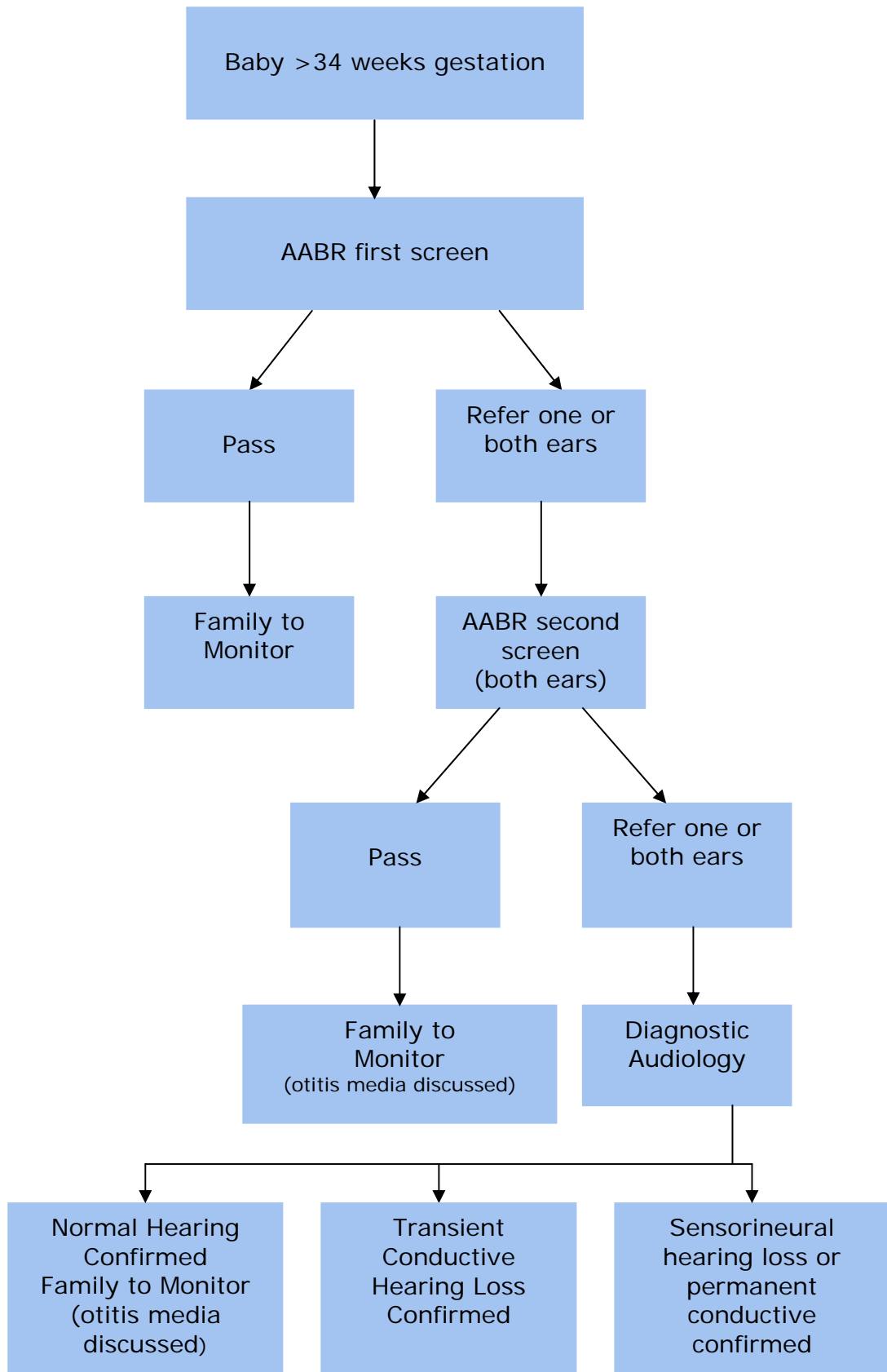
## Healthy Hearing Audiology Working Group

<b>Name</b>	<b>Organisation</b>	<b>Position</b>
Ms Sreedevi Aithal	Townsville Hospital	Paediatric Audiologist
Ms Jackie Moon	Mater Hospital	Director of Audiology
Ms Kelly Nicholls	Royal Childrens Hospital	Snr Audiologist
Mr Joseph Kei	University of Queensland	Snr Lecturer in Audiology
Ms Karen Lovelock/ Ms Madonna Crocker	Australian Hearing	Clinical Coordinator
Mr Ron Linning	Ipswich and Toowoomba Hospitals	Audiologist
Ms Tegan Keogh	Nambour General Hospital	Audiologist
Ms Suma Ajith	Logan and Gold Coast Hospitals	Snr Audiologist
Mr Geoff Lewis	North Qld Hearing Services	Snr Audiologist
Ms Katye Hives / Ms Emma Rushbrooke	Hear and Say	Audiologist
Ms Karen Pedley	Queensland Hearing Services	Audiologist
Ms Tania Sargent	Nambour General Hospital	Audiologist
Ms Susan Walmsley	Mater Hospital and Diagnostic Centre Rockhampton	Snr Audiologist

Healthy Hearing Consultative Group

Name	Organisation	Position
Ms Jacqui Bartholomeusz	Australian Hearing	Parent Representative
Ms Samantha Blackmore	Deaf Children Australia	Parent Representative
Mr Peter Bonser	Queensland Deaf Society	Manager, Client Services
Ms Jackie Brown	St Gabriel's	Teacher in Charge
Ms Margaret Byrne	Disability Services Queensland	Manager Community and Specialist Services Ipswich and South West
Ms Dimity Dornan	Hear and Say	Clinical Director
Ms Sharon Ewing	Deaf Children Australia	Regional Officer, SEQ
Ms Shirley Glennon	Healthy Hearing Program Queensland Health	Statewide Coordinator
Ms Clare Gardiner-Barnes (represented by Ms Bronwyn Green, Acting Principal Education Officer)	Education Queensland Student Services Directorate	Assistant Director
Ms Bronwyn Green	Education Queensland Disability Support Services Unit	Statewide Advisory Visiting Teacher, Hearing Loss
Professor Merv Hyde	Griffith University	Professor and Director Centre for Applied Studies in Deafness
Dr Joseph Kei	University of Queensland	Senior Lecturer in Audiology
Dr Mary Lawson rsm	Catholic Education	Senior Education Officer Hearing Loss Services
Ms Helen Little	Statewide Health & Community Services Branch, Queensland Health	Director, Statewide Health Services Unit
Ms Karen Lovelock	Australian Hearing	Clinical Coordinator
Mr Tim Lowry	Qld Hearing Loss Family Support Facilitator	Snr Family Support Facilitator
Ms Marina Lye	Yeerongpilly SEDU Education Queensland	Head of Special Education Services
Ms Jackie Moon	Mater Health Services	Senior Audiologist
Ms Kelly Nicholls	Royal Children's Hospital	Senior Audiologist
Dr Fiona Panizza	Mater Health Services	ENT
Ms Rebecca Reedman	Cochlear Implant Program Royal Children's Hospital	Parent Representative
Ms Peta Ruwoldt / Ms Peta Rowe	Australian Association of Teachers of the Deaf	Teacher of the Deaf
Ms Ven-nice Ryan	Community Child Health, RCH Health Service District	Director, Child Development
Dr Elizabeth Hurrian	Mater Health Services	Neonatologist
Ms Tina Worland	Deafness Forum	Parent Representative
Ms Gretchen Young	Healthy Hearing Program Queensland Health	Senior Project Officer

Healthy Hearing Screening Protocol



- 
- <sup>1</sup> Mason JA and Herrmann KR. (1998) Universal Infant Hearing Screening by Automated Auditory Brainstem response Measurement. *Pediatrics*, Vol 101, No 2, pp221-228.
- <sup>22</sup> Vohr BR, Carty LM, Moore PE and Letourneau K. The Rhode Island hearing assessment program: experience with statewide hearing screening (1993-1996). *Journal of Pediatrics*, Vol 133, No 3.
- <sup>3</sup> Yoshinago-Itano C, Sedey AL, Coulter, DK and Mehl AL. (1998) Language of early – and later-identified children with hearing loss. *Pediatrics*, Vol 102, pp1161-1171.
- <sup>4</sup> Joint Committee on Infant Hearing. (2000) Year 200- position statement: Principles and guidelines for early hearing detection and intervention programs. *American Journal of Audiology*, Vol 9, pp9-29.
- <sup>5</sup> Marlowe J. (2003) Newborn hearing screening: Testing, Follow-up and Communication with Families. Association of Women's Health, Obstetric and Neonatal Nurses.