



Universal Newborn Hearing Screening and Early Intervention Programme (UNHSEIP)

Monitoring Framework

September 2009

Acknowledgments

The National Screening Unit has produced this Monitoring Framework for the Universal Newborn Hearing Screening and Early Intervention Programme (UNHSEIP). The contribution of the UNHSEIP Monitoring, Policy and Information working group is much appreciated. This group met on a regular basis and provided valuable input into the direction and detail of the Framework.

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Acronyms

Health Sector Terms

DHB(s)	District Health Board(s)
ENT	Ear, Nose and Throat specialist
NHI	National Health Index number (in New Zealand)
NICU	Neonatal Intensive Care Unit
SCBU	Special Care Baby Unit

Universal Newborn Hearing Screening and Early Intervention Programme Terms

AoDC	Adviser on Deaf Children, Group Special Education, Ministry of Education
EI	Early Intervention education services, provided by Group Special Education, Ministry of Education
MoE	Ministry of Education, New Zealand Government
NSU	National Screening Unit, Ministry of Health, New Zealand Government
UNHS	Universal Newborn Hearing Screening (see UNHSEIP below)
UNHSEIP	The Universal Newborn Hearing Screening and Early Intervention Programme implemented in New Zealand. Formerly known as the UNHS but still used in this context to refer to the screening and audiological component of the UNHSEIP as distinct from the Early Intervention education component of the programme.

Overseas Newborn and Infant Hearing Screening Programmes Terms

EHDI	The US Early Hearing Detection and Intervention Program
JCIH	The Joint Committee on Infant Hearing (in the United States)
NHS	National Health Service (in the United Kingdom)
NHS NHSP	National Health Service Newborn Hearing Screening Programme (in the United Kingdom)
PCHI	Permanent Childhood Hearing Impairment
VIHSP	Victorian State Infant Hearing Screening Programme (in Australia).

Executive Summary

Universal newborn hearing screening has become the internationally accepted standard of care. This is because the early detection of hearing loss in children and the application of early interventions has been demonstrated to significantly improve their long-term language skills and cognitive ability.

The Universal Newborn Hearing Screening and Early Intervention Programme (UNHSEIP) is being progressively rolled out, throughout New Zealand, during the 2007 – 2010 period. A key goal of the programme is to reduce the age of detection of hearing loss. There is evidence that hearing loss in New Zealand is currently, on average, not being detected until children are three to four years of age, with diagnosis occurring even later in Māori and Pacific children.

The UNHSEIP is a joint Ministries initiative involving the Ministry of Health and the Ministry of Education, with the National Screening Unit (from the Ministry of Health) as the lead agency. District Health Boards (DHBs) will be undertaking newborn hearing screening as well as providing audiological and specialist medical services such as Paediatricians and Ear Nose and Throat Specialists. Babies detected with hearing loss of sufficient degree will be eligible for Early Intervention education services provided by the Ministry of Education.

The UNHSEIP is an organised screening programme. An organised screening programme is characterised by planning, co-ordination, monitoring and evaluation of all activities along the screening pathway in order to ensure quality in all parts of the programme.

This Monitoring Framework is a plan for the routine, systematic collection and recording of information about aspects of the programme over time. The purpose is to assess whether progress is being made on achieving the programme objectives.

Monitoring is a core aspect of ensuring quality processes. However, it is important to note that quality will also be addressed through initiatives such as the National Policy and Quality Standards, programme evaluation, regular audits of providers and contract management.

This Framework covers the entire pathway from newborn screening to audiology assessment to early medical and education intervention services. The framework is centred around the UNHSEIP “1-3-6” goals:

- Newborns to be screened by **1** month of age
- Audiology assessment to be completed by **3** months of age
- Initiation of appropriate medical and audiological services; and Early Intervention education services by **6** months of age.

The UNHSEIP is in the process of implementation and it is recognised that the performance of newborn hearing screening programmes improves as they become established. As such, the desired outcomes and performance targets in this Framework have been designed to be realistic and achievable in the short-term. These may differ from longer term aims and goals.

Although it is desirable to have a core set of indicators that are stable over time; the indicators, outcomes and targets will be reviewed regularly to ensure they are

meeting current priorities. A smaller set of indicators was chosen for the Framework to keep focus on key outcomes.

While monitoring provides added focus on accountability, it also highlights opportunities to learn by looking at DHBs or providers that are making great progress. Success factors and innovation needs to be shared if we are going to be a learning programme.

Background to the UNSHEIP

Each year, it is estimated that between 135 and 170 babies are born in New Zealand with mild to profound permanent congenital hearing loss. This represents a birth incidence of approximately three per one thousand births, which is within the range of international estimates.

The first six months of a baby's life is a critical period for learning to hear and speak. Lack of exposure to language during this critical period, through hearing loss, can affect a child's development, communication skills and educational achievement.

The early detection of hearing loss, and the application of early interventions, has been demonstrated to significantly improve long-term language skills and cognitive ability. With newborn hearing screening, the internationally recommended age for the diagnosis of hearing loss is three months, with interventions commencing by six months (Joint Committee on Infant Hearing, 2007).

While New Zealand's incidence of hearing loss is similar to international reports, the age of identification is late, particularly when compared with countries that have introduced newborn hearing screening programmes. Data from the New Zealand Deafness Notification Database indicate that only a small proportion of babies with hearing loss are identified by six months of age, and that the average age of detection is around three to four years of age (National Audiology Centre, 2005; 2007).

Furthermore, the Deafness Notification data suggests that Māori and Pacific children with hearing loss are detected at a later age compared to other children. Māori children may have disproportionately more hearing loss compared to other children.

Universal newborn hearing screening is now the internationally accepted standard of care, with programmes being implemented or established in the United Kingdom, the United States, Canada, Australia and a number of other nations.

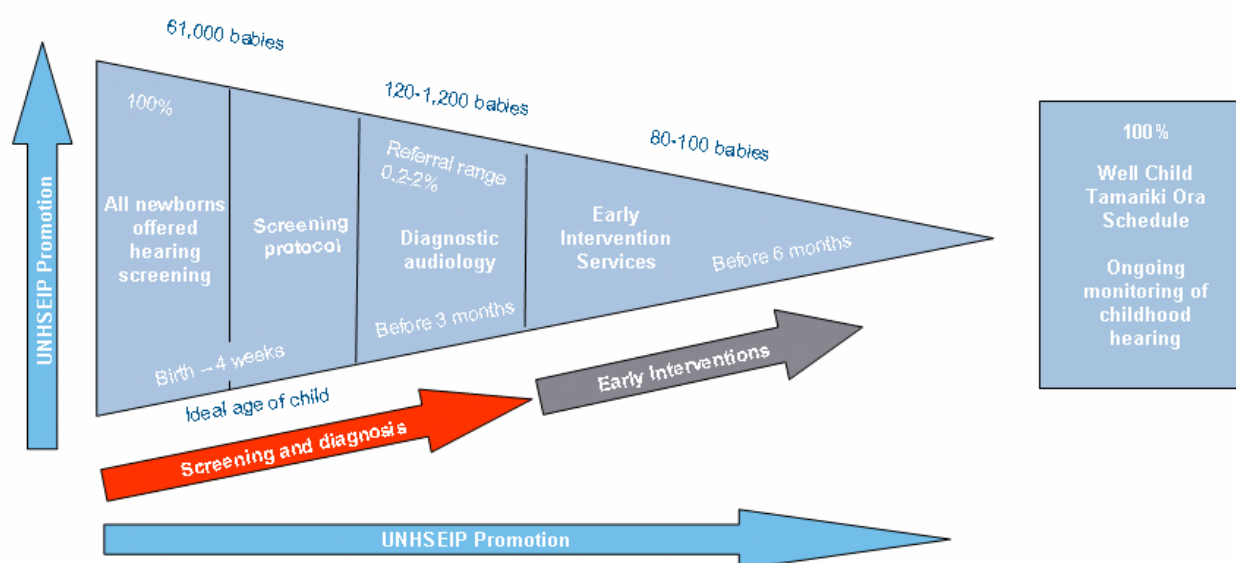
As a response to the success of newborn screening programmes in other countries, the Universal Newborn Hearing Screening and Early Intervention Programme (UNHSEIP) is being progressively rolled out in New Zealand over three years, a process which started in July 2007. The UNHSEIP is a joint Ministries programme involving the Ministries of Health and Education and spans from the newborn period through to school entry.

The aim of the UNHSEIP is for "early identification of newborns with hearing loss so that they can access timely and appropriate interventions, inequalities are reduced and the outcomes for these children, their families and whānau, communities and society are improved."

The core goals of the UNHSEIP are described as "1-3-6" goals which are based on international programmes:

- newborns to be screened by **1** month of age
- audiology assessment to be completed by **3** months of age
- initiation of appropriate medical and audiological services; and Early Intervention education services by **6** months of age.

Figure 1: Overview of the UNHSEIP screening pathway



When the UNHSEIP is fully implemented, all DHBs will be offering newborn hearing screening in the first weeks of life, to every baby born in their area, whether born in hospital or at home.

Based on international experience, it is estimated that <2% of newborns screened will be referred from screening to audiology assessment. Audiology services may be regionally based, covering more than one DHB as paediatric audiology is a specialised field.

If a baby is diagnosed with hearing loss, then a multidisciplinary team will develop an action plan for the baby and family. This team will include an audiologist and an Adviser on Deaf Children (AoDC), and an Ear Nose and Throat (ENT) Specialist, and depending on the degree of hearing loss and the needs of the family, other care providers such as Paediatricians and Speech and Language Therapists. For example, the fitting of hearing aids is generally managed by an audiologist, whereas fitting a cochlear implant requires specialised clinical and surgical care.

When the screening programme is fully implemented, it is estimated that between 80 and 120 babies each year will be identified with hearing losses of a sufficient degree to require Early Intervention education services, funded by the Ministry of Education.

Early Intervention education services for babies identified with hearing loss will also be regionally based according to Group Special Education districts and Advisers will include travel to the families/whānau as required. Other ongoing early interventions such as audiology, ENT services and genetic testing will be provided by DHBs.

Babies with milder hearing losses generally do not require assistive hearing technologies or intensive intervention, though families may choose to access support services, such as resource materials and parent support networks. Regular review and interaction with WellChild/Tamariki Ora providers will be important to detect progressive hearing loss and limit the impact of any hearing loss on development. The UNHSEIP is not specifically designed to detect and provide intervention for mild hearing loss.

UNHSEIP Logic Model and Stakeholder Map

The UNHSEIP

The rationales underpinning the introduction of the UNHSEIP to New Zealand were:

- there was delayed detection of hearing loss in children and appropriate interventions were not being accessed in a timely and coordinated manner
- the outcomes of children with congenital hearing loss and their families, whānau, communities and society were not being maximised
- it was likely that Māori were disproportionately affected by congenital hearing loss.

For further contextual information on the origins on the UNHSEIP, see:

- *Universal Newborn Hearing Screening for New Zealand: A report to the Universal Hearing Screening Advisory Group to the National Screening Unit* (Ministry of Health, 2005) and,
- *Project Hiedi Hearing Impairment: Early Detection and Intervention* (National Foundation for the Deaf, 2004).

The UNHSEIP Logic Model

A programme logic model is a planning tool to identify the programme's key objectives, outcomes and outputs. It describes the purpose, what, when, and how of the programme being implemented.

Outcomes are "specific statements about the intended change". The Monitoring Framework identifies core, meaningful and measurable outcomes, rather than just monitoring "inputs" and "outputs". Indicators are defined as "quantitative or qualitative measures that assess the direction and size of change being measured". The terms used in the programme logic, and in this monitoring framework, are defined in Appendix A.

Objectives/outcomes should be very clearly described in "SMART" terms (see Appendix B for further detail) with the avoidance of passive, non-specific and vague language. This will enable outcomes to be measured and monitored. An example of an outcome worded in SMART terms is "referral rates for audiology assessment to be < 4% for the programme".

Figure 2. below demonstrates the relationships between inputs, activities, outputs and outcomes. Additionally, this diagram shows the generic structure of a programme logic.

Figure 2: A diagram of the relationships among inputs, activities, outputs, outcomes, indicators, and targets of a generic programme logic.

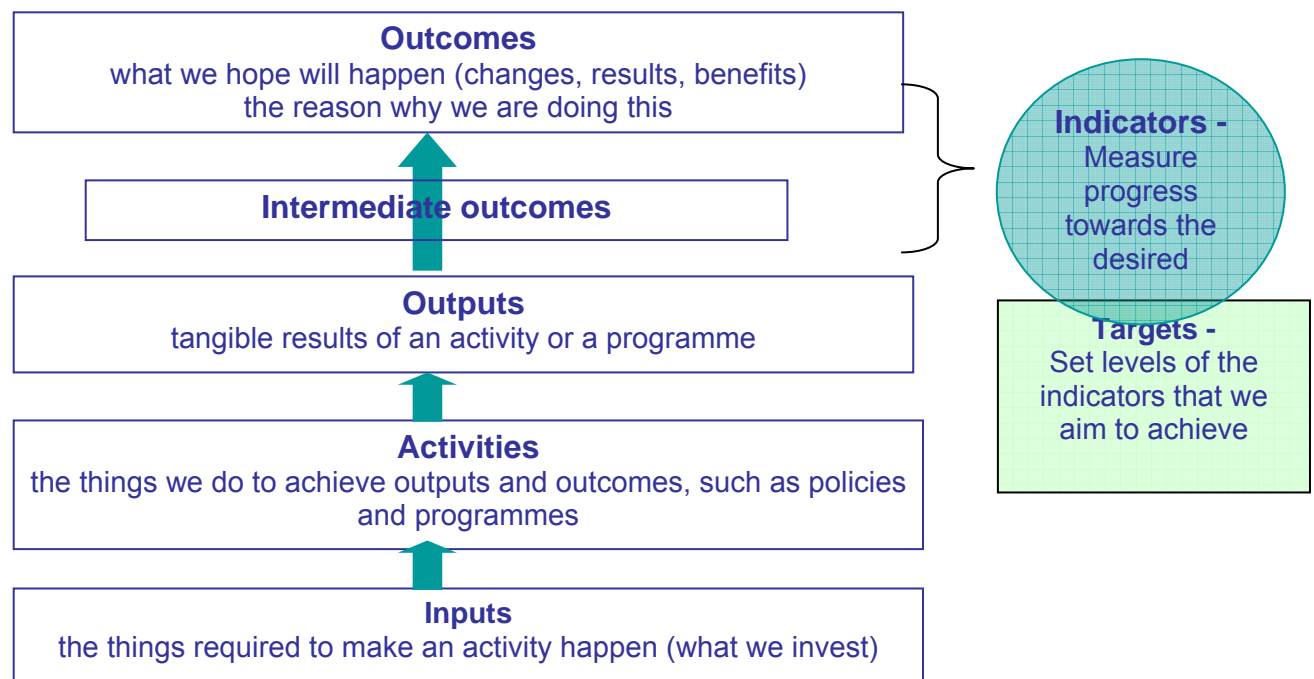


Figure 3 and Figure 4 present the UNHSEIP logic models (for implementation and the ongoing programme). The UNHSEIP logic models were developed in-line with current Ministry of Health guidelines; see *A Guide to Developing Public Health Programmes: a Generic Programme Logic Model* (Ministry of Health, 2006).

The UNHESIP Stakeholder Map

Figure 5 also presents a stakeholder map for the UNHSEIP. This programme has many partners and stakeholders. It is for this reason an Implementation Advisory Group was established to include representation from the following groups:

- Families
- Parent Support Organisations
- Midwives and Lead Maternity Carers
- Screeners
- Audiologists
- Otolaryngologists (ENT)
- Paediatricians
- Academic representatives
- Group Special Education, Ministry of Education
- Advisers on Deaf Children, Ministry of Education
- Child/Maternity Services, Ministry of Health
- National Screening Unit, Ministry of Health.

Figure 3: The UNHESIP Logic model – Implementation

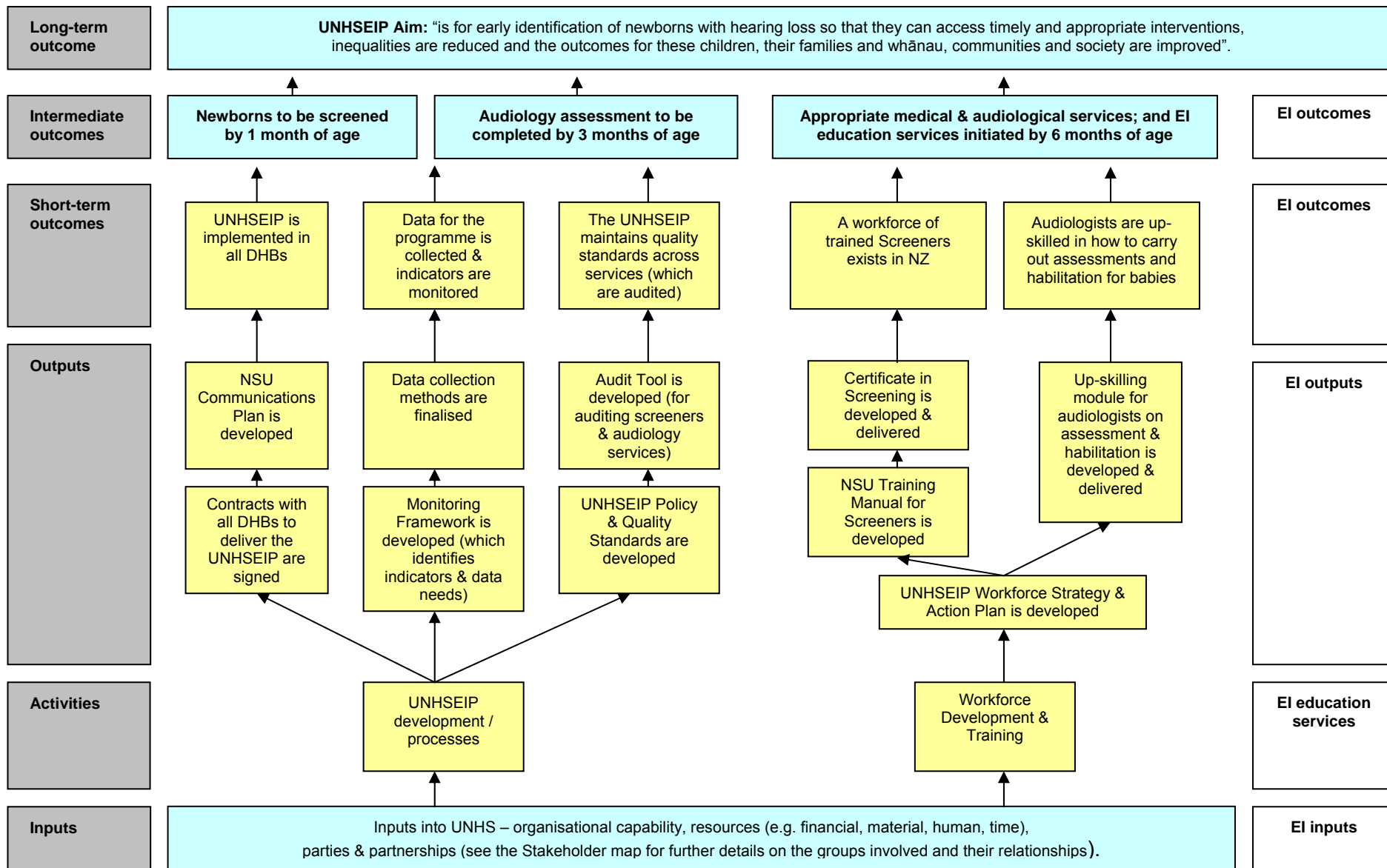


Figure 4: The UNHESIP Logic model – *Ongoing Programme*

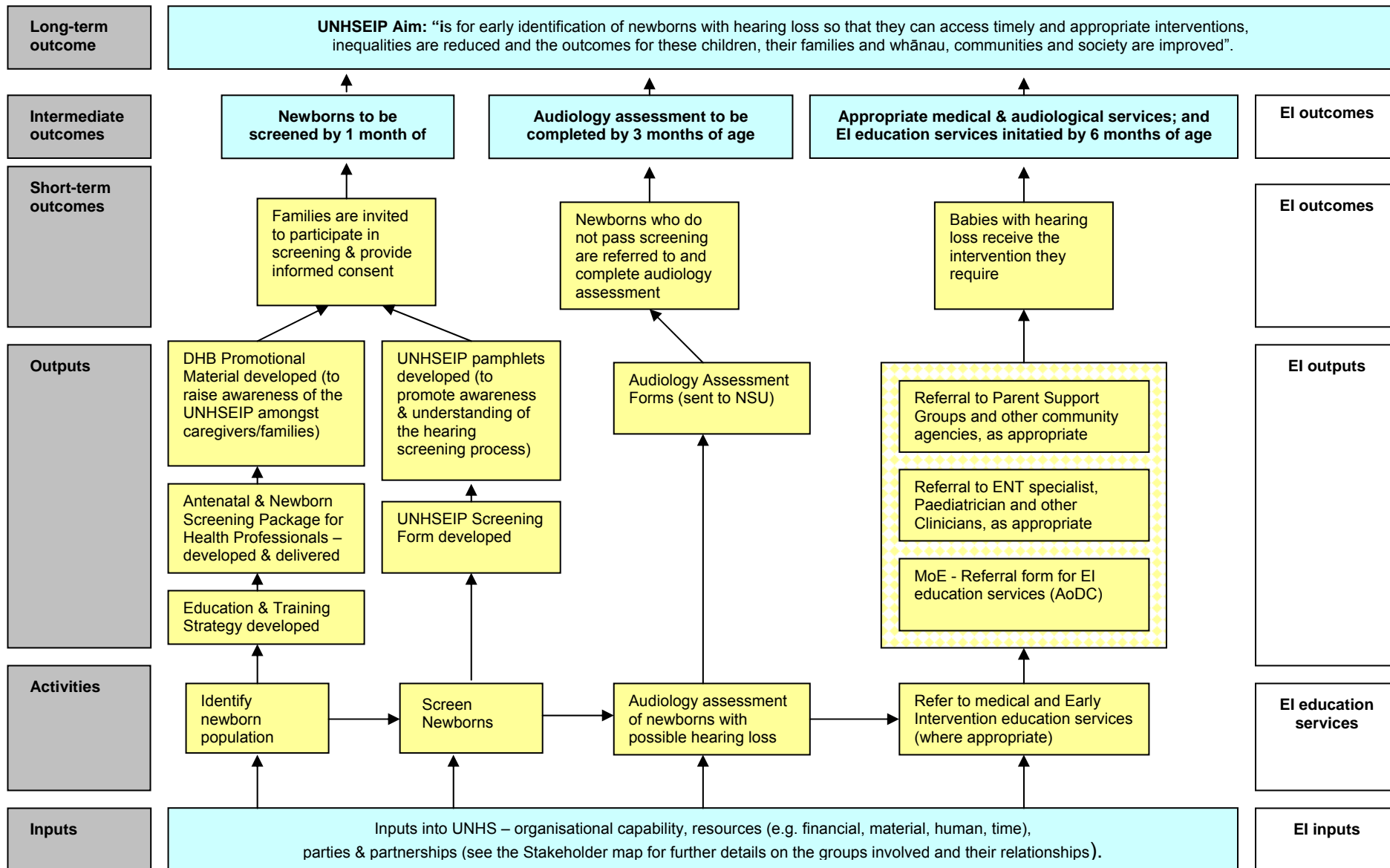
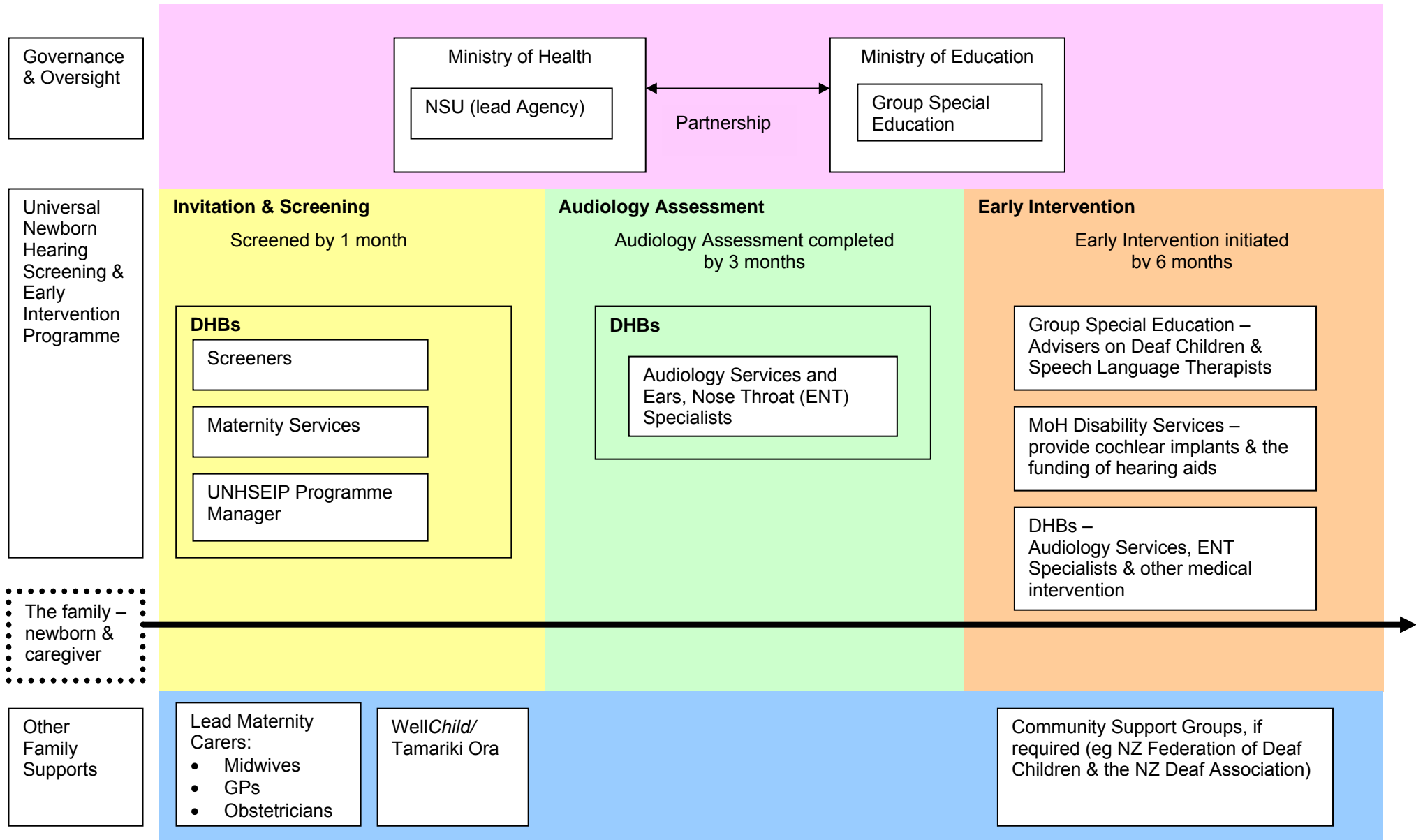


Figure 5: The UNHESIP Stakeholder Map



Development of the UNHSEIP Monitoring Framework

Developing a Monitoring Framework

Screening can occur opportunistically or as part of organised screening programmes. Centralised quality management processes distinguish organised screening programmes from opportunistic screening, and are essential for balancing the achievable benefits of screening with the potential harms.

Organised screening is usually delivered through a screening programme with planning, co-ordination, monitoring and evaluation of all activities along the screening pathway. With the introduction of the UNHSEIP as an organised screening programme, a monitoring framework was considered to be an essential component.

The selection of appropriate outcomes to monitor and target-setting is a complex process. During the development of this Monitoring Framework a number of documents and principles helped to inform decision-making. These included:

- a review of international newborn hearing screening programmes outcomes / indicators / targets (see Appendix C for programmes reviewed)
- a monitoring for population outcomes approach
- principles for target-setting
- an explicit reducing inequalities focus
- monitoring plans for other National Screening Unit screening programmes.

The *How to Monitor for Population Health Outcomes: Guidelines for Developing a Monitoring Framework* (Ministry of Health, 2007) was a key document in informing the development of indicators to monitor progress for the programme.

A Monitoring for Population Outcomes Approach

The UNHSEIP is in the process of implementation, and it is recognised that the performance of newborn hearing screening programmes improve as they become established. As such, the desired outcomes and performance targets in this Framework have been designed to be realistic and achievable in the short-term. These may differ from longer term aims and goals.

It is not always feasible, or necessary, to measure everything. A list of prioritised objectives / outcomes for monitoring needs to be established. Critical to any successful outcomes monitoring plan is to identify what could and should be measured in order to show that the programme is being implemented as planned, and that progress is being made to achieve the desired health outcome(s). The steps involved are:

- identify what *could* be measured
- prioritise these into those that *should* be measured if resources allow
- identify the essential few that *must* be monitored.

A smaller set of indicators was chosen for the Framework to keep the focus on key outcomes. Although it is desirable to have a core set of indicators that are stable over time, the indicators and outcomes will be reviewed regularly to ensure they are meeting current priorities.

Principles for Target-Setting in the Health Sector

Health targets are measures set to ensure our health system is contributing to maintaining and improving the health of our communities. A smaller set of targets helps to keep a sharper focus on those areas where we want to see faster traction.

It is recognised that achieving 100% targets is rare in the health sector in general. Although international newborn hearing screening programmes may use the words “all” in their goals / objectives their actual programme achievements are less than this.

DHB targets should be realistic, achievable, and contribute to progress at a national level. If each DHB achieves its target, the performance of the country as a whole will improve. The Ministry can assist in achieving the targets by ensuring that all DHBs make positive improvements over their current baseline levels so the collective effort will improve national performance.

Although health targets provide some added focus on accountability, they also highlight opportunities to learn by looking at how others are doing. If one DHB, or provider, is making good progress on achieving their targets, other DHBs or providers can learn from this. Success factors / innovations that occur in the health sector need to be shared so that the whole health sector can learn.

To date targets have not been set for the UNHSEIP. The decision was made not to set targets until the programme was fully implemented throughout the country, so that realistic and useful targets could be set.

Reduction in Inequalities

A key guiding principle underpinning all the health targets is the reduction of inequalities for those who have difficulty in accessing services or who currently have worse health status than other New Zealanders, particularly Māori and Pacific peoples, the most deprived and people living with disabilities. Progress cannot be said to have been made if current inequalities remain or the gaps become wider.

The UNHESIP monitoring framework has an explicit focus on monitoring for inequalities in access and outcomes with regards to ethnicity, particularly Māori and Pacific peoples, deprivation status and geography. Inequalities will be measured in the UNHSEIP by the collection of high quality ethnicity data (see Reporting of Indicators: Technical Notes for more information).

Strategic Context

The focus on reducing inequalities is a goal shared by the Ministry of Health and the Ministry of Education, and in turn is reflected in the aim for the UNHESIP. Reducing inequalities and improving Māori health are health and disability sector goals and efforts to achieve these goals are mandated by the New Zealand Health and Disability strategies (Minister of Health, 2000; Minister for Disability Issues, 2001) and the *He Korowai Oranga: Māori Health Strategy* (Minister of Health & Associate Minister of Health, 2002).

In addition, the Ministry of Education, which is responsible for the Early Intervention education services in the UNHSEIP, has an overall mission to “raise educational achievement and reduce disparity” (Ministry of Education, 2007). A key area for the Ministry

is the attainment of positive education outcomes for Māori and Pacific children, and children with special educational needs.

Inequalities and Hearing Loss in Children

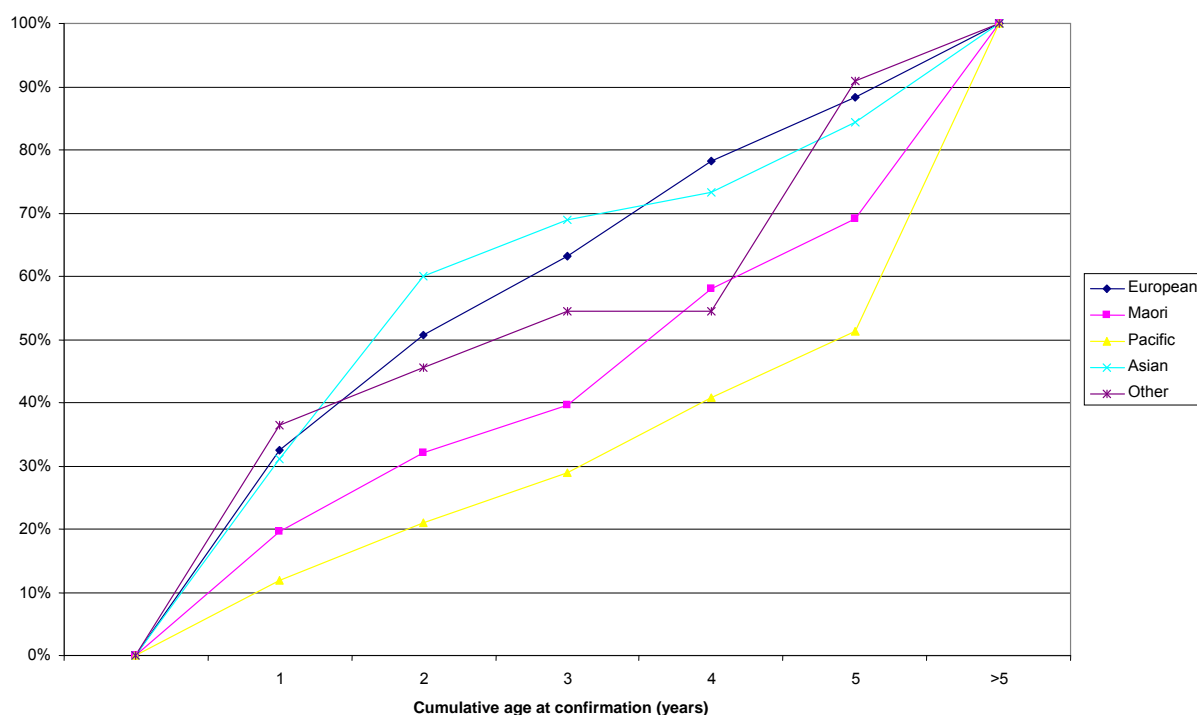
New Zealand Deafness Notification data showed that the average age of identification of moderate and greater hearing loss has been late (45 months in 2004; 33 months in 2005), particularly when compared with countries that have introduced newborn hearing screening programmes (National Audiology Centre 2005; 2007; National Screening Unit, 2005).

These data also suggest that there are ethnic inequalities: hearing loss was identified later in Māori children and even more so in Pacific children compared to other children (see Figure 6). Hearing loss was disproportionately reported in Māori children compared to other children, accounting for nearly half of all deafness notifications.

Moreover, given that we know that Māori, Pacific and low socioeconomic groups generally experience access issues to health services and programmes, proactiveness is needed to facilitate access.

With the introduction of the UNHSEIP, data completeness and quality will improve. The monitoring process will be critical in identifying any inequalities in access and outcomes throughout the entire UNHSEIP pathway, particularly for Māori, Pacific and families and their babies to have decreased access to services.

Figure 6: Cumulative percentage of children identified 1990-2005 at each age for hearing losses at least moderate in degree, by ethnicity (n=815)



Source: *New Zealand Deafness Notification Data January – December 2005 (National Audiology Centre, 2007).*

Indicators for Screening and Audiology Assessment

The following section covers in detail the screening and audiology-related indicators for the UNHSEIP.

Unless otherwise stated under each indicator, report data for all indicators:

- at an UNHSEIP national level
- by DHB
- by ethnicity
- by deprivation status
- by birth location (DHB birthing facility, private birthing facility and home births).

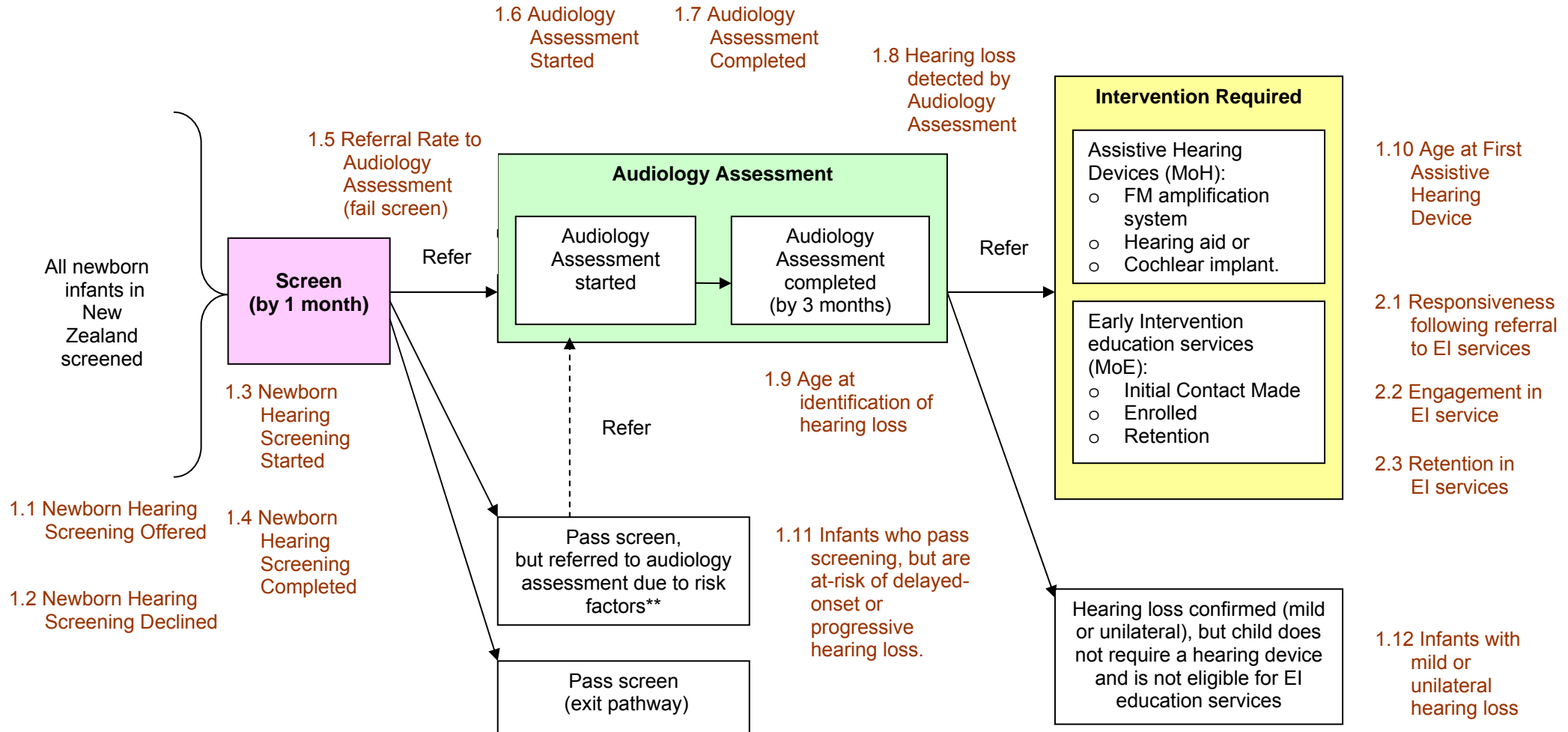
More detail on reporting the indicators by ethnicity and deprivation status is provided in a subsequent section (ie Reporting of Indicators - Technical Notes).

Figure 7 provides a visual diagram of the UNHESIP screening pathway and where each of the indicators (1.1 – 1.12) sit in this pathway. The following boxes detail how each indicator will be calculated and the rationale behind the indicator.

NB: For the calculations of all indicators “corrected age¹” for preterm infants should be used.

¹ “Corrected age” is the age a premature baby would be if he/she had been born on their due date. Using a babies’ *corrected age* allows for the physical and brain development to occur that would have occurred by this time had they been delivered full-term.

Figure 7: The UNHSEIP Screening Pathway and Indicators



** This group of infants have passed screening, but are still referred to audiology assessment because they are at-risk of delayed-onset or progressive hearing loss. These babies are recommended to have at least one audiology assessment between 24 and 30 months of age. Consequently, this group of infants are not included in the calculation of indicators 1.5 to 1.10, because they do not form part of the primary target group for the UNHSEIP.

1.1 NEWBORN HEARING SCREENING OFFERED

DESCRIPTION

The proportion of parents / guardians of eligible newborns offered newborn hearing screening.

RELEVANT OUTCOME

The UNHSEIP has a principle of “universality”: that all parents / guardians of eligible newborns should be offered newborn hearing screening. A high screen offered rate should result in high screening uptake rate.

METHODOLOGY

Indicator 1.1

Numerator: Number of eligible newborns offered screening.

Denominator: Number of eligible live births.

NOTES

- It is recognised that newborn hearing screening programmes do not usually achieve high coverage in the early stages of implementation. Additionally, programmes often have a phased implementation such as screening of hospital births occurring first, followed by implementation in the community. As a result, a percentage outcome target was not set at this stage of the programme.
- The UNHSEIP will regularly review coverage data for this indicator. If the goal of “All” is not being achieved, then the UNHSEIP will work collaboratively with DHBs and negotiate targets in order to improve coverage.

1.2 NEWBORN HEARING SCREEN DECLINED	
DESCRIPTION	The proportion of newborns whose parents / guardian decline screening.
RELEVANT OUTCOME	<p>The proportion of newborns whose parents / guardian decline screening is expected to be very low and in keeping with international programmes.</p> <p>No percentage outcome target at this stage of the programme (see rationale section).</p>
RATIONALE	<p>Parents / guardians have the same right to accept or decline hearing screening or any follow-up care for their newborn as for any other screening or evaluation procedures or intervention.</p> <p>A high decline rate (eg, for an individual DHB, for the programme relative to international figures or for particular ethnic groups) would warrant further investigation and consideration of outcome targets.</p>
METHODOLOGY	<p>Indicator 1.2</p> <p>Numerator: Number of eligible newborns whose parents/guardian declined newborn hearing screening.</p> <p>Denominator: Number of eligible newborns whose parents/guardian were offered screening.</p>
NOTES	There are some limitations to the decline data that will be available, mainly due to privacy concerns with regards to data. At a minimum, the UNHSEIP should receive data on the number of declines. If parents / guardians agree then the additional information will also be available. If more detailed information on declines is required, then the patient data form and Standards would need to be reviewed.

1.3 NEWBORN HEARING SCREENING STARTED

DESCRIPTION

The proportion of the eligible newborns whose parents / guardian consented to newborn hearing screening that start screening.

RELEVANT OUTCOME

All eligible newborns (whose parents / guardian consent to newborn hearing screening) start screening.

RATIONALE

For ongoing service and programme development it is important to compare consent for screening numbers, with screening started coverage and screening completed coverage, particularly from an inequalities perspective.

International programmes generally have a >95% screen completed target for all eligible births. As many of these programmes are achieving their targets after initial implementation (see screen completed indicator), a high screen started figure should be achievable once the UNHSEIP is fully implemented.

At this stage of programme implementation, a specific outcome target has not been set. However, if regular reviews of data for this indicator reveal issues with progression through the screening pathway from consent to screening started to screening completed, particularly from an inequalities perspective, then further investigation, working with DHBs and consideration of outcome targets would be necessary.

METHODOLOGY

Indicator 1.3

Numerator: Number of eligible newborns that started newborn hearing screening.

Denominator: Number of eligible newborns born whose parents / guardian consented to newborn hearing screening.

1.4 NEWBORN HEARING SCREENING COMPLETED

DESCRIPTION

1. The proportion of eligible newborns that complete the UNHS screening protocol.
2. The proportion of eligible newborns who complete the UNHS screening protocol by 1 month of age.

RELEVANT OUTCOME

A core goal of the programme is that eligible newborns, whose parents/guardians consented, should complete newborn screening by 1 month of age.

RATIONALE

“Newborns to be screened by 1 month of age” is a core goal of the UNHSEIP ie: the 1 part of the 1-3-6 goals.

Although the international targets are usually >95% of all newborns screened by 1 month of age, many are achieving above this:

- >95% coverage should be obtainable where screening occurs in a hospital environment
- >95% for community screening may depend on factors such as the timeliness of notification of birth, but should be achievable in the longer-term.

This indicator will be closely monitored and further investigation will be required if progression towards the goal is not occurring. The UNHSEIP will work collaboratively with DHBs to improve coverage and consider the introduction of specific percentage outcome targets.

METHODOLOGY

Indicator 1.4a

Numerator: Number of eligible newborns that complete newborn hearing screening.

Denominator: Number of eligible newborns who began newborn hearing screening.

Indicator 1.4b

Numerator: Number of eligible newborns that complete newborn hearing screening by 1 month of age.

Denominator: Number of eligible newborns who complete newborn hearing screening.

1.5 REFERRAL RATE TO AUDIOLOGY ASSESSMENT

DESCRIPTION

The proportion of newborns that do not pass the hearing screening process and are referred for audiology assessment.

RELEVANT OUTCOME

Less than 4% of eligible newborns screened in the UNHSEIP will be referred for audiology assessment.

RATIONALE

An unnecessarily high number of newborns being referred to audiology assessment could lead to potential strain on audiological capacity and parental anxiety issues. Conversely, if the referral rate is too low, newborns with a hearing loss may be being missed. High or low referral rates may indicate that further training of screeners or investigation is needed.

Internationally, the referral targets for audiology assessment are generally 4% or less. In keeping with international experience, it is anticipated that referral rates will be higher in the initial stages of implementation and decrease as the programme becomes established.

Subsequent reviews of the data and Monitoring Framework will revisit this indicator with respect to improving referral rates and consideration of outcome targets for DHBs.

METHODOLOGY

Indicator 1.5

Numerator: Number of eligible newborns who complete screening with a referral to audiology assessment (ie do not pass screen).

Denominator: The number of eligible newborns who complete screening.

1.6 AUDIOLOGY ASSESSMENT STARTED
<p>DESCRIPTION</p> <p>The average time from completing screening to commencing audiology assessment.</p> <p>The proportion of eligible newborns that are referred from screening who commence audiology assessment.</p>
<p>RELEVANT OUTCOME</p> <p>“Audiology assessment is completed by 3 months of age” is a core goal of the UNHSEIP ie: the 3 part of the 1-3-6 goals. Eligible newborns that <i>do not pass</i> hearing screening should have the audiology assessment completed by 3 months of age.</p>
<p>RATIONALE</p> <p>The UNHSEIP has the core goals of screening completed by 1 month of age and audiology assessment completed by 3 months of age.</p> <p>This indicator will monitor the time period between the two stages. Prolonged delays, or inequalities amongst groups, in this indicator would warrant investigation.</p>
<p>METHODOLOGY</p> <p><i>Indicator 1.6a</i></p> <p>Average time (in days) from when screening was completed for newborns to when audiology assessment commences².</p> <p><i>Indicator 1.6b</i></p> <p>Numerator: Number of eligible newborns who start audiology assessment.</p> <p>Denominator: Number of eligible newborns who were referred from screening for audiology assessment.</p>

²It is expected that this average time should be approximately 4 weeks.

1.7 AUDIOLOGY ASSESSMENT COMPLETED

DESCRIPTION

1. The proportion of eligible newborns that are referred from screening who complete the audiology assessment.
2. The number of eligible newborns that are referred from screening who complete the audiology assessment by 3 months of age.

RELEVANT OUTCOME

Eligible newborns that do not pass hearing screening should have the initial audiological assessment completed by 3 months of age.

RATIONALE

The audiology assessment by 3 months of age is a core goal for the UNHSEIP (ie the 3 in the 1-3-6 goals) and is based on international benchmarks.

There is, however, some variation with regards to international benchmarks as to whether the 3 months refers to audiology assessment *completed* or *started*. After discussion by the Monitoring, Policy and Indicators working group it was agreed that that completion of audiology assessment by 3 months of age should be the desired outcome.

Providers should strive to complete the audiology assessment by 3 months of age for all newborns requiring this service.

DHB and programme performance data for this indicator will be regularly reviewed, particularly from an inequalities perspective. The programme will work collaboratively with DHBs to improve performance as well as negotiating specific percentage targets if required.

METHODOLOGY

Quantitative indicator 1.7a

Numerator: Number of eligible newborns who complete audiology assessment.

Denominator: Number of eligible newborns who commence audiology assessment.

Quantitative indicator 1.7b

Numerator: Number of eligible newborns who complete audiology assessment by 3 months of age.

Denominator: Number of eligible newborns who complete audiology assessment.

1.8 HEARING LOSS DETECTED BY AUDIOLOGY ASSESSMENT

DESCRIPTION

This indicator reports the numbers/rate for permanent childhood hearing loss and classifies the loss into several categories (ie by severity and type of hearing loss).

RELEVANT OUTCOME

No minimum hearing loss detection outcome target for UNHSEIP at present (see rationale section). To be reviewed with subsequent reviews of Monitoring Framework.

RATIONALE

New Zealand Deafness Notification data on childhood hearing loss suggests that New Zealand's incidence of hearing loss is similar to international reports. However, there are some limitations to the data and the true extent of congenital hearing loss in New Zealand is currently unknown.

The New Zealand Deafness Notification data also suggests that Māori children are disproportionately represented in deafness notifications and are more likely to have mild hearing losses than other ethnic groups. Again, there are some uncertainties regarding these data.

Collecting detailed data on hearing loss will enable more accurate analyses, including assessing if there are inequalities in hearing loss with regards to ethnicity or deprivation status.

Most international programmes do not have a minimum detection of hearing loss rate. The potential requirement for a minimum detection rate will be revisited with subsequent reviews of the Monitoring Framework.

METHODOLOGY

Indicator 1.8

Numerator: Number of eligible newborns who had permanent childhood hearing loss confirmed by audiology assessment (and were referred through the UNHSEIP).

Denominator: Number of eligible newborns who completed audiology assessment (and were referred through the UNHSEIP).

1.9 AGE AT IDENTIFICATION OF HEARING LOSS

DESCRIPTION

The average age at which hearing loss is confirmed by audiology assessment.

RELEVANT OUTCOME

The relevant outcome is the UNHSEIP aim of lowering the age at which hearing loss is detected to 3 months of age or less.

RATIONALE

With newborn hearing screening, the internationally recommended age for the diagnosis of hearing loss is three months, with intervention commencing by six months.

While New Zealand's incidence of hearing loss is likely to be similar to international reports, New Zealand Deafness Notification data (National Audiology Centre, 2005; 2007) showed that the age of identification has been late, particularly when compared with countries that have introduced newborn hearing screening programmes.

Data from the 2004 New Zealand Deafness Notification Database indicated that only 6% of babies with hearing loss are identified by six months of age, and that the average age of detection was nearly four years of age (National Audiology Centre, 2005). There is also evidence of inequalities with the identification of hearing loss in Māori and Pacific children occurring even later.

This indicator will assess if the UNHSEIP is achieving its aim of lowering the age at which hearing loss is detected to 3 months of age or less.

METHODOLOGY

Indicator 1.9

Average age of eligible newborns (in months) at which hearing loss was confirmed by audiology assessment.

1.10 AGE AT FIRST ASSISTIVE HEARING DEVICE
<p>DESCRIPTION</p> <p>The age at which the first assistive hearing device³ is fitted.</p>
<p>RELEVANT OUTCOME</p> <p>No outcome target for the programme at present (see rationale section).</p>
<p>RATIONALE</p> <p>“Initiation of appropriate medical and audiological services; and Early Intervention education services by 6 months of age” is a core goal of UNHSEIP: ie the 6 part of the 1-3-6 goals.</p> <p>It is common for international programmes to monitor factors around hearing aid fitting, cochlear implants and follow-up.</p> <p>This indicator will be reviewed as data are collected, as well as, consideration of other potential medical indicators and the introduction of specific age/percentage outcome targets.</p>
<p>METHODOLOGY</p> <p><i>Indicator 1.10a – All Devices</i></p> <p>Average age of eligible children at which the first assistive hearing device was fitted.</p> <p><i>Indicator 1.10b – Hearing Aids</i></p> <p>Average age of eligible children at which a hearing aid was first fitted.</p> <p><i>Indicator 1.10c – Cochlear Implants</i></p> <p>Average age of eligible children at which a cochlear implant was first fitted⁴.</p>

³ An assistive hearing device includes: hearing aids, cochlear implants, or FM amplification systems.

⁴ It is expected that the average age for cochlear implants (Indicator 10c) would be much later than the average age for hearing devices (Indicator 10b).

1.11 NEWBORNS AT-RISK OF DELAYED-ONSET OR PROGRESSIVE HEARING LOSS

DESCRIPTION

The proportion of newborns that pass screening, but have risk factors for developing late-onset or progressive hearing loss.

RELEVANT OUTCOME

Eligible newborns that passed newborn screening with risk factors for developing late-onset or progressive hearing loss should be followed up as per UNHSEIP recommendations. Although this subset of children do not form part of the primary target group for the UNHSEIP, it is important to monitor the number being referred to audiology assessment services.

RATIONALE

There are a number of risk factors for developing late-onset or progressive hearing loss eg, family history of permanent childhood hearing loss; in-utero infections such as Cytomegalovirus (CMV), Herpes Simplex Virus (HSV) and Rubella; and certain syndromes (Joint Committee on Infant Hearing, 2007).

Children who pass newborn hearing screening but who have certain risk factors which require follow-up to detect any subsequent development of hearing loss. International programmes generally monitor follow-up of these children.

METHODOLOGY

Indicator 1.11

Numerator: Number of eligible newborns who passed screening, but have risk factors for developing late-onset or progressive hearing loss.

Denominator: Number of eligible newborns who passed screening (as part of the UNHSEIP).

1.12 NEWBORNS WITH MILD OR UNILATERAL HEARING LOSS

DESCRIPTION

The number of newborns with confirmed mild or unilateral hearing loss by audiology assessment.

RELEVANT OUTCOME

Eligible newborns with hearing loss detected through the UNHSEIP, but who do not require medical intervention or who are not eligible for Early Intervention education services (ie children with mild or unilateral hearing loss), need to be followed-up in the long-term.

RATIONALE

The UNHSEIP needs to monitor the number of children who have had hearing loss confirmed by audiology assessment, but who did not require immediate medical intervention and who did not meet the eligibility criteria for Early Intervention services (ie children with mild or unilateral hearing loss).

METHODOLOGY

Indicator 1.12

Numerator: Number of newborns who had hearing loss confirmed by audiology assessment, but did not require medical intervention or meet the eligibility criteria for Early Intervention services.

Denominator: Number of newborns who completed audiology assessment (and were referred through the UNHSEIP).

Indicators for the Early Intervention Education Service

This section outlines the draft Early Intervention education service measures, developed by Group Special Education from the Ministry of Education.

2.1 RESPONSIVENESS FOLLOWING REFERRAL TO EI EDUCATION SERVICES	
DESCRIPTION	
<p>The time taken for the Early Intervention education service to attempt to contact the families and whānau of children eligible for, and referred to, the service following diagnosis through Universal Newborn Hearing Screening (UNHS).</p>	
RELEVANT OUTCOME (TARGET)	
<p>Early Intervention staff will attempt to contact 95% of families and whānau of children eligible for, and referred to, the Early Intervention education service following diagnosis through UNHS within two full working days of receipt of referral at a district MoE Special Education office.</p>	
RATIONALE	
<p>The MoE Special Education Service Model for children with hearing loss diagnosed following newborn hearing screening states that two working days is the desired protocol.</p> <p>The target is worded as “attempt to contact” as despite the best efforts of staff, a family or whānau may be away from their usual place of residence or not answering their phone during these first 2 days. It is important that the efforts of staff to follow the protocol is measured, not the availability of families and whānau.</p> <p>Two working days has been chosen rather than one to reduce the impact of factors beyond the control of staff on the indicator, for example, sickness, attendance at professional development events and the considerable out-of-office time involved in delivering a home and school-based service over a sometimes large geographic area.</p> <p>Some families and whānau do not have access to telephones, cellphones, fax or email. Nationally, 2% of families and whānau do not have access to telecommunications. In some districts this is higher, for example, 4.9% of families and whānau in the Far North and 4% of families and whānau in Gisborne. In these instances, Early Intervention staff will attempt to contact families and whānau by letter or by visiting the home.</p>	
METHODOLOGY	
<i>Indicator 2.1</i>	
Numerator:	Number of families and whānau of children eligible for, and referred to, the Early Intervention education service (through UNHS) who staff attempt to contact within two full working days of receipt of referral at a district MoE Special Education office.

Denominator: Number of families and whānau of children eligible for, and referred to, the Early Intervention education service (through UNHS).

NOTES:

- Staff are required to record and date the attempts made to contact the families and whānau of children referred following diagnosis from the screening programme. This information is recorded in the individual child's file and on the district UNHSEIP data sheet.
- This data will be broken down by ethnicity to allow progress toward reducing inequalities to be assessed.
- When the target is not met, staff will be asked to report the reasons why. This information will be used to inform the refinement of the Monitoring Framework and inform service delivery protocols and practices.

2.2 ENGAGEMENT IN EI EDUCATION SERVICE

DESCRIPTION

The time taken for children eligible for, and referred to, the Early Intervention education service following diagnosis (through UNHS) to be enrolled in Early Intervention education services.

RELEVANT OUTCOMES (TARGETS)

Outcome One - 90% of children referred to, and eligible for, the Early Intervention education service will have begun receiving a service by one month following the receipt of the referral in a district MoE Special Education office.

Outcome Two - 90% of children referred to the Early Intervention education service by 5 months of age, and eligible for a service, will have begun receiving a service by 6 months of age.

RATIONALE

The MoE Special Education Service Model for children with hearing loss diagnosed following newborn hearing screening states that on contacting the family or whānau, staff offer to visit them at home or to meet them at the information sharing appointment, depending on parental preference. Initial informed consent is then obtained from the family or whānau. Once consent is given, the family or whānau are considered to be in receipt of Early Intervention services.

A benchmark of 90% aligns with the JCIH 2007 Position Statement recommendation that 90% of infants who qualify for Part C have an IFSP (Individualized Family Service Plan) signed by their parents by 6 months of age.

Outcome one measures the timeliness with which all children diagnosed following screening are engaged in Early Intervention education services.

Outcome two is in accordance with the international standard of screening by 1 month of age, diagnosis by 3 months and intervention by 6 months. This allows us to compare our programme with overseas programmes which report on their success or otherwise of meeting the 1-3-6 standard.

METHODOLOGY

Indicator 2.2a

Numerator: Number of children eligible for, and referred to, the Early Intervention education service who began receiving a service by one month following receipt of the referral at a district MoE Special Education office.

Denominator: Number of children eligible for, and referred to, the Early Intervention education service following diagnosis through UNHS.

Indicator 2.2b

Numerator: Number of children under 5 months of age who were eligible for, and referred to, the Early Intervention education service who began receiving a service by 6 months of age.

Denominator: Number of children under 5 months of age eligible for, and referred to, the Early Intervention education service following diagnosis through UNHS.

NOTE:

This data would be broken down by ethnicity to allow progress toward reducing inequalities to be assessed.

2.3 RETENTION OF CHILDREN IN THE EI EDUCATION SERVICE THROUGH THE EARLY CHILDHOOD YEARS
<p>DESCRIPTION</p> <p>The percentage of children referred to, and eligible for, the Early Intervention education service following UNHS who are still receiving a service at 3 years and at school entry.</p>
<p>RELEVANT OUTCOME</p> <p>The percentage of children referred to, and eligible for, the Early Intervention education service following UNHS will still be receiving a service at 3 years and at school entry.</p>
<p>RATIONALE</p> <p>This measure provides information about the percentage of children who enter the Early Intervention service following diagnosis who remain in the service through the foundation stage of communication development, birth to three years, and through to school entry.</p>
<p>METHODOLOGY</p> <p><i>Indicator 2.3a</i></p> <p>Numerator: Number of children referred to, and eligible for, the Early Intervention education service (through UNHS) still receiving a service at 3 years of age.</p> <p>Denominator: Number of families and whānau of children eligible for, and referred to, the Early Intervention education service (through UNHS).</p> <p><i>Indicator 2.3b</i></p> <p>Numerator: Number of children referred to, and eligible for, the Early Intervention education service (through UNHS) still receiving a service at school entry.</p> <p>Denominator: Number of families and whānau of children eligible for, and referred to, the Early Intervention education service (through UNHS).</p>
<p>NOTES:</p> <p>Measuring this indicator presents a challenge to the MoE Special Education given its current information system. This system was set up to report on particular aspects of service delivery required by the organisation, and the above measure is different to those supported by current systems. MoE Special Education will investigate how this might be achieved, and if necessary, the wording of the retention measure may need to be altered to</p>

reflect the information we are able to retrieve from our information systems.

As the Early Intervention education service is a national service, families and whānau moving within New Zealand are able to continue receiving service.

Most current families and whānau of children with hearing loss remain involved with the service throughout the early childhood and school years.

Interpretation of the data highlighted by this measure needs to be done so in a considered way. The reasons for withdrawal will be noted. For example, families and whānau may withdraw from the service because they are emigrating or because their child has age-appropriate development.

Reporting of the Indicators: Technical Notes

Ethnicity data

High quality ethnicity data is important to enable the UNHSEIP to effectively monitor its performance in improving outcomes and increasing equity. It also provides Māori with quality information about their health status and enables Māori to better participate in, and contribute to, strategies for Māori health improvement (Ministry of Health, 2004).

There has, however, been inconsistent collection, recording and analysis practices in the health and disability sector, resulting in poor-quality ethnicity data. Many Ministry of Health strategies and documents have identified improving the quality of ethnicity data as a priority. For example:

- *He Korowai Oranga: Māori Health Strategy* (Minister and Associate Minister of Health, 2002)
- *Reducing Inequalities in Health* (Ministry of Health, 2002)
- *Whakatātaka Tuarua: Māori Health Action Plan 2006–2011* (Minister of Health and Associate Minister of Health, 2006).

The Ministry of Health's (2004) *Ethnicity Data Protocols for the Health and Disability Sector*, describe procedures for the standardised collection, recording and output of ethnicity data for the New Zealand health and disability sector. These protocols are based on Statistics New Zealand Census ethnicity data practices.

Ethnicity data practices throughout the UNHSEIP (eg, screening, audiology, monitoring reports) should be in accordance with these protocols (or any subsequent update). Similarly, Ministry of Education reporting should follow standardised ethnicity data processes.

For the monitoring reports:

- Ethnicity data processes should be in accordance with the *Ethnicity Data Protocols for the Health and Disability Sector* (Ministry of Health, 2004)
- All indicators should be reported by prioritised ethnicity
- Report all indicators by level 1 ethnicity and also report by level 2 ethnicity where stated in the relevant indicators
- The reports should also comment on the quality of the ethnicity data.

Notes:

1. If numbers by ethnicity are low for some indicators, monitoring over several years may be necessary to ensure there are no inequalities.
2. Audits of DHBs undertaking newborn hearing screening (as part of the UNHSEIP) will take place in addition to the monitoring process. As part of these audits, aspects such as the accuracy, completeness of ethnicity data, accordance with the *Ethnicity Data Protocols for the Health and Disability Sector* (Ministry of Health, 2004) and staff training should be assessed.
3. There will potentially be two sources of ethnicity data available ie, the ethnicity data within the NHI (up to three ethnicities can be recorded) and the ethnicity data as recorded on screening data forms. In theory, the NHI ethnicity should be the most current as it should reflect the ethnicity for a person's latest interaction with the health system; however, details may not always be updated with each interaction. These issues will need to be worked through for the UNHSEIP.

Deprivation status

Indicator data will be reported by NZ Deprivation Index status (decile or quintile, depending on data numbers) where appropriate and available. Use domicile of the area in which the child resides. In situations with low numbers, data may need to be aggregated over longer time periods to allow analysis.

Population denominators

The monitoring reports should outline the data used for population denominators and issues associated with data availability and accuracy.

Note that the issue of accurate and current birth denominator data, particularly for home births, is an identified area of work that is being undertaken by the Ministry of Health.

Eligibility criteria

The term “eligible” refers to the population that are eligible for services. The eligibility for health services as part of the UNHSEIP are currently based on the Ministry of Health’s Eligibility Criteria for Publicly Funded Health and Disability Services - available from www.moh.govt.nz/eligibility.

The Ministry of Education’s criteria to be eligible for Early Intervention education services will be outlined in the UNHSEIP Policy and Quality Standards.

Confidence intervals

The monitoring reports should:

- report 95% confidence intervals indicators where appropriate
- use appropriate method(s) when analysing small numbers
- report the confidence interval method(s) used and notes on confidence intervals to aid the reader in interpretation.

Presentation of data

Data on averages, medians, minimums, maximums and percentiles should be presented as appropriate. The monitoring reports should have a strong focus on presenting data in a graphical manner where appropriate.

Other Potential Indicators

This section outlines other potential indicators for the UNHSEIP monitoring framework. Most of these indicators are subject to factors outside of the programme, but may provide value in the future.

Aetiology of hearing loss

For those children with permanent childhood hearing loss detected through the UNHSEIP, report data on the aetiology of the hearing loss, if data are available.

Other disabilities in children with hearing loss

For those children with permanent childhood hearing loss detected through the UNHSEIP, report the type of other disabilities / percentage in these children, if data are available.

Parental satisfaction surveys

Issues such as delays in diagnosis and intervention, interactions with staff, false positives and false negatives can cause parental concern and anxiety. Some international programmes perform parental satisfaction surveys. The details and frequency of any such survey for the UNHSEIP is an area that requires further work by the NSU.

The monitoring reports should present a summary of the parental satisfaction survey data when available.

False-negative newborn hearing screening

The aim of this indicator would be to identify children who passed newborn hearing screening as part of the UNHSEIP programme that presented at a later age with hearing loss. There are, however, a number of issues identified with this potential indicator:

- there are difficulties in ascertaining if cases are a true screening false-negative or not (for example, children may pass screening but go on to develop late-onset hearing loss)
- the methodology to ascertain if cases were a true false-negative needs to be discussed
- children may interact with a number of providers
- there are data issues on how to identify these children and link them back to the UNHSEIP
- the *WellChild*/Tamariki Ora programme is currently being reviewed and the B4 School Checks programme is being implemented.

Once the *WellChild* review, B4 School Checks and other data systems have been finalised, the UNHSEIP will better placed to review how best to identify false-negative screening results.

Workforce monitoring

There is much happening with workforce development/monitoring in the health sector in general and specifically for the UNHSEIP. A draft Newborn Hearing Screening and Audiology Workforce Strategy and Action Plan has been developed. The monitoring

reports should present a summary of the initiatives, progress towards achieving the objectives of the Workforce Strategy and Action Plan, and workforce demographics/survey data.

The Ministry of Education is also looking at their workforce issues with regards to Early Intervention education services for children with hearing loss. The monitoring reports should present a summary of workforce data in this area.

Strategies to improve programme performance

Although monitoring provides added focus on accountability, it also highlights opportunities to learn by looking at DHBs or providers that are making great progress. Success factors and innovation needs to be shared if the UNHSEIP is going to be a learning programme.

DHBs should provide information about their strategies to progress towards the programme coverage goals, including information on strategies to reduce any inequalities in newborn hearing screening uptake and access to audiological services (particularly for Māori, Pacific and deprived groups). Success factors and learnings should also be communicated.

Measurement of the communication skills of children during the early childhood years

This indicator is under development by MoE Special Education. One of the key tasks is the development of measures to evaluate the efficacy of the early intervention education service following newborn hearing screening. MoE Special Education will undertake to develop, monitor and report on these additional indicators.

The MoE Special Education will seek advice from its Early Intervention staff, research measures used internationally and review current practices used by the organisation to inform the development of efficacy measures for the education intervention service, following newborn hearing screening and diagnosis.

References

- Minister for Disability Issues (2001). New Zealand Disability Strategy: Making a world of difference - Whakanui Oranga. *Wellington: Ministry of Health.*
- Minister of Health (2000). New Zealand Health Strategy. *Wellington: Ministry of Health.*
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- National Foundation for the Deaf (2004). *Project Hiedi. Hearing Impairment: Early Detection and Intervention.* Auckland: Project Hiedi.

Appendix A: Key Terms and Definitions

The table below defines the terms frequently used in this document.

Term	Definition
Outcomes	Outcomes are specific statements about the intended change in public health related attitudes, knowledge, behaviours, or physical (including mental) health status in the target population(s) sought by undertaking the planned public health activity.
Objectives	Objectives are statements about the results a programme seeks to achieve. Objectives can usually be translated directly into “outcomes”, and can be hierarchical.
Outputs	Outputs are things (e.g. goods) produced, services delivered, events held, or participation generated resulting from the activities undertaken.
Indicators	Indicators are either quantitative or qualitative measures that assess the direction and size of change in the thing being measured.
Targets	A target is a level of performance that we aim to achieve against a specific “indicator”, within a health area.
Programme Logic	A programme logic in its simplest form is a picture of how a programme works – a flow chart. The model graphically identifies and links programme outcomes with interventions and processes and the theory and assumptions.
Monitoring Framework (or plan)	<p>A plan for the routine, systematic collection and recording of framework information about aspects of a programme over time.</p> <p>The purpose is to assess whether progress is being made on achieving the programme objectives.</p>
Policy and Quality Standards	<p>Policy and Quality Standards are an important aspect of ensuring programme quality and cover issues such as informed consent, privacy, the screening protocol and sentinel event reporting.</p> <p>The UNHESIP will have Policy and Quality Standards for the UNHS component of the programme and audits will be conducted against these standards.</p>

Source: These definitions are taken from:

- *How to Monitor for Population Health Outcomes: Guidelines for Developing a Monitoring Framework (Ministry of Health, 2007, pg 5 & 42);*
- *A Guide to Developing Public Health Programmes: a Generic Programme Logic Model (Ministry of Health, 2006, pg 3).*

Appendix B: Defining SMART Outcomes / Objectives

The table below specifies how to define SMART outcomes/objectives.

Item	Definition
Specific	An objective should address a specific target or accomplishment. Specific implies that an observable action, behaviour or achievement is described, which is also typically linked to an identifiable change in rate, number, percentage or frequency.
Measurable	A method should be established to indicate that an objective has been met. That is, there should be a system, method or procedure for tracking and recording the change in behaviour or action towards which the objective is directed.
Achievable*	Though not necessarily easy or simple, the objective should be feasible – that is, capable of being achieved. Objectives should be limited to what can realistically be done with available resources, and ideally the resulting change should be ‘attributable’ to the action undertaken.
Relevant*	An objective should be significant to the people involved in the programme (from beneficiaries to the programme’s sponsoring organisation), and the objectives should be capable of having an impact or making a change.
Time-based	An objective should be achievable within a specific timeframe. Generally this takes the form of a start and end date. The time may be short (two or three months, up to two years), medium (three to five years), or long term (five years to seven years).

*What "A" and "R" stand for is inconsistent in the literature:

- A is sometimes given as “accurate”, “action-oriented”, “accountable” or “attributable”.
- R is sometimes given as “relevant” or “realistic”.

Source:

- *How to Monitor for Population Health Outcomes: Guidelines for Developing a Monitoring Framework (Ministry of Health, 2007, pg 7).*

Appendix C: Overseas Programmes Reviewed

The table below presents the international newborn hearing screening programmes that were reviewed during the development of this monitoring framework.

Country	Screening Programme and References
United Kingdom	<p>NHS Newborn Hearing Screening Programme.</p> <p>NHS Newborn Hearing Screening Programme (2006). NHS Newborn Hearing Screening Programme Centre Annual Report for 2005-2006: Available from http://hearing.screening.nhs.uk [Accessed Oct 2007].</p> <p>NHS Newborn Hearing Screening Programme (2007a). Quality Standards in the NHS Newborn Hearing Screening Programme. NHS Newborn Hearing Screening Programme May 2007: Available from http://hearing.screening.nhs.uk [Accessed Oct 2007].</p> <p>NHS Newborn Hearing Screening Programme (2007b). NHS Newborn Hearing Screening Programme Centre Annual Report 2006-2007: Available from http://hearing.screening.nhs.uk [Accessed Nov 2007].</p>
United States	<p>Joint Committee on Infant Hearing (JCIH).</p> <p>Joint Committee on Infant Hearing (2000). Year 2000 Position Statement: Principles and guidelines for Early Hearing Detection and Intervention Programs. <i>Pediatrics</i> 106(4), 798-817.</p> <p>Joint Committee on Infant Hearing (2007). Position Statement: Principles and guidelines for early hearing detection and intervention: Available from www.asha.org/policy [Accessed Oct 2007].</p> <p>Early Hearing Detection and Intervention Program.</p> <p>Early Hearing Detection & Intervention (EHDI) Program (2006a). Estimated number of infants receiving a diagnostic audiologic evaluation by 3 months of age (2004) Version B. <i>Centers for Disease Control and Prevention Early Hearing Detection and Intervention Program.</i></p> <p>Early Hearing Detection and Intervention (EHDI) Program (2006b). National goals, program objectives, and performance measures for the Early Hearing Detection and Intervention (EHDI) Tracking and Surveillance System. <i>Centers for Disease Control and Prevention Early Hearing Detection and Intervention Program:</i> Available from http://www.cdc.gov/ncbddd/ehdi/nationalgoals.htm [Accessed July 2007].</p> <p>Early Hearing Detection and Intervention (EHDI) Program (2007). EHDI 2005 preliminary hearing screening summary, Version 6. <i>Centers for Disease Control and Prevention Early Hearing Detection and Intervention Program:</i> Available from www.cdc.gov/ncbddd/ehdi/data.htm.</p>

Canada	<p>Canadian Working Group on Childhood Hearing.</p> <p>Canadian Working Group on Childhood Hearing (2005). Early Hearing and Communication Development: Canadian Working Group on Childhood Hearing (CWGCH) Resource Document. Ottawa: Minister of Public Works and Government Services Canada: Available from www.phac-aspc.gc.ca/publicat/eh-dp/index.html.</p>
Australia (Victoria State)	<p>Victorian Infant Hearing Screening Program (VIHSP).</p> <p>Victorian Infant Hearing Screening Programme (2007). VIHSP Performance Indicators. Victorian Infant Hearing Screening Programme.</p>
International	<p>International Working Group on Childhood Hearing.</p> <p>International Working Group on Childhood Hearing. Summary of the 2004 Survey from the International Working Group on Childhood Hearing. International Working Group on Childhood Hearing: Available from http://childhearinggroup.isib.cnr.it/surveys.html [Accessed Oct 2007].</p>