Universal Newborn Hearing Screening and Early Intervention Programme

Universal Newborn Hearing Screening and Early Intervention Programme (UNHSEIP)

Monitoring Report on Newborn Hearing Screening Service Provision

April 2011 – September 2011

National Screening Unit

Disclaimer
This publication reports on information provided to the Ministry of Health by District Health Boards. The purpose of this publication is to inform discussion and assist ongoing UNHSEIP development. All care has been taken in the production of this report, and the data was deemed to be accurate at the time of publication. However, the data may be subject to slight changes over time as further information is received. Before quoting or using this information, it is advisable to check the current status with the Ministry of Health.

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Executive Summary

Universal newborn hearing screening is the standard of care internationally, and has now been introduced in New Zealand. The early detection of hearing loss, and the application of appropriate medical and educational interventions, has been demonstrated to significantly improve the baby's long-term language skills and cognitive ability.

In August 2010 the national implementation of the Universal Hearing Screening and Early Intervention Programme (UNHSEIP) was completed. All 20 District Health Boards (DHBs) offer screening to the families and whānau of newborn babies.

The core goals of the programme, which are based on international best practice, are described as '1-3-6' goals:

1= babies to be screened by 1 month of age
3= audiology assessment completed by 3 months of age
6= initiation of appropriate medical, audiological and early intervention education services by 6 months of age.

This monitoring report covers the six month period from 1 April 2011 to 30 September 2011. This report is the second in which all DHBs were offering screening for the full period covered by the report and the third report to provide information on both screening and audiology.

Tables 1 and 2 on pages 4-6 provide a summary of the screening and audiology information contained within this report.

Key Points from April to September 2011

- Within this reporting period, 94% of families and whānau nationally were offered newborn hearing screening, compared with the number of live birth data for the same period.
- Of the families who were offered screening, 1.5% declined to take it up.
- Of the families offered hearing screening for their baby, 95% consented to this screening.
- Of those with consent for screening, a high proportion started the process (99.7%). These high rates were consistent across DHBs, ethnicities and decile groups. Similarly high rates of completion were found once babies started screening with an average of 99.5% completion, once again showing only small differences across DHBs, ethnicity or decile ratings.
- In total 27,642 babies completed newborn hearing screening in this six month period, compared with the 31,229 live births. While these figures come from different data sets, this indicates that approximately 89% of babies born in this period completed screening.

- Of babies who completed screening, approximately 93% of babies completed by the target of one month of age (corrected age). This did show some variation by DHB, ranging from 59% to 99.3%, however most DHBs had rates of 86% and above. There were some small variations by ethnicity.
- Overall the referral rate to audiology was 2% (493 babies in this reporting period). This rate ranged from 1%- 6% between DHBs. The referral rate for NICU/SCBU babies was higher at 8%, as might be expected.
- Of those babies that passed screening, 5% were identified for targeted follow-up. This showed some variation between DHBs, ranging from 3% to 13%, and was significantly higher for babies from NICU/SCBU at 30%.
- Of those babies referred to audiology, 57% are reported to have started audiology assessment. This rate varied significantly between DHBs from 0% through to 100%. Of the 493 babies who did not pass screening and were referred to audiology, information was recorded in the national database for just 279 of these babies. This does not mean that just under half of the babies have not been seen by audiology. The data is limited because some DHBs have not submitted audiology forms to the NSU and some forms have yet to be entered into the national database due to missing information. The NSU continues to work with DHBs to improve the completeness of audiology data for future monitoring reports.
- Of those babies who completed audiological assessment, 67% did so within the target of three months of age. Variation between DHBs, ethnicity and decile can be seen but the numbers are too small to draw any strong conclusions.
- 24 babies (8.9%) of those that completed an audiology assessment) had a permanent congenital hearing loss identified.
- A greater percentage of babies completing audiology were identified with a conductive hearing loss, 29.5% (80 babies).
- For the 104 babies in total identified with a hearing loss, the ages at which the hearing loss was identified were: 15 by 4 weeks, 36 by 8 weeks, 33 by 12 weeks and the remaining 20 by over 12 weeks.

Table 1a Summary of newborn hearing screening indicators by DHB, for April to September 2011

DHB of birth	Live births	Consent for screen	Started screen	Completed screening	Completed screening by 1 month of age	Pass	Referred to audiology	Passed with targeted follow-up	Consents to live births	Started screening to consented for screening	Completed screening to started screening	Completed screening by 1 month to completed	Referral rate to audiology to completed	Targeted follow-up to passed
Northland	1,188	895	895	893	523	841	52	107	75.3%	100.0%	99.8%	58.6%	5.8%	12.7%
Waitemata	3,975	3,426	3,411	3,363	2,999	3,323	40	157	86.2%	99.6%	98.6%	89.2%	1.2%	4.7%
Auckland	3,349	3,092	3,091	3,060	2,912	2,988	72	143	92.3%	100.0%	99.0%	95.2%	2.4%	4.8%
Counties Manukau	4,419	3,127	3,123	3,101	2,730	2,981	120	166	70.8%	99.9%	99.3%	88.0%	3.9%	5.6%
Waikato	2,709	2,620	2,606	2,604	2,469	2,580	24	148	96.7%	99.5%	99.9%	94.8%	0.9%	5.7%
Lakes	799	767	767	765	750	760	5	25	96.0%	100.0%	99.7%	98.0%	0.7%	3.3%
Bay of Plenty	1,448	1,308	1,301	1,294	1,210	1,271	23	40	90.3%	99.5%	99.5%	93.5%	1.8%	3.1%
Tairawhiti	399	365	358	357	346	354	3	26	91.5%	98.1%	99.7%	96.9%	0.8%	7.3%
Taranaki	765	748	746	744	739	725	19	47	97.8%	99.7%	99.7%	99.3%	2.6%	6.5%
Hawke's Bay	1,158	1,120	1,120	1,119	1,106	1,101	18	65	96.7%	100.0%	99.9%	98.8%	1.6%	5.9%
Whanganui	396	356	352	350	326	346	4	19	89.9%	98.9%	99.4%	93.1%	1.1%	5.5%
Mid Central	1,192	1,028	1,027	1,026	879	1,023	3	74	86.2%	99.9%	99.9%	85.7%	0.3%	7.2%
Hutt Valley	1,017	984	983	978	974	969	9	50	96.8%	99.9%	99.5%	99.6%	0.9%	5.2%
Capital & Coast	1,888	1,908	1,906	1,906	1,878	1,878	28	81	101.1%	99.9%	100.0%	98.5%	1.5%	4.3%
Wairarapa	254	238	238	238	233	235	3	26	93.7%	100.0%	100.0%	97.9%	1.3%	11.1%
Nelson Marlborough	870	795	790	788	772	781	7	58	91.4%	99.4%	99.7%	98.0%	0.9%	7.4%
West Coast	230	183	182	182	172	181	1	16	79.6%	99.5%	100.0%	94.5%	0.5%	8.8%
Canterbury	2,970	2,826	2,824	2,815	2,664	2,774	41	79	95.2%	99.9%	99.7%	94.6%	1.5%	2.8%
South Canterbury	303	277	277	277	273	271	6	11	91.4%	100.0%	100.0%	98.6%	2.2%	4.1%
Southern	1,900	1,819	1,793	1,782	1,715	1,767	15	106	95.7%	98.6%	99.4%	96.2%	0.8%	6.0%
Total	**31,229**	**27,882**	**27,790**	**27,642**	**25,670**	**27,149**	**493**	**1,444**	**89.3%**	**99.7%**	**99.5%**	**92.9%**	**1.8%**	**5.3%**

Table 1b Summary of newborn hearing screening indicators by ethnicity and deprivation for April to September 2011

DHB of Birth		Consent for screen	Started screen	Completed screening	Completed screening by 1 month of age	Pass	Referred to audiology	Passed with targeted follow-up			Started screening to consented for screening	Completed screening to started screening	Completed screening by 1 month to completed	Referral rate to audiology to completed	Targeted follow-up to passed
Ethnicity															
Māori		6,860	6,827	6,793	6,116	6,623	170	478			99.5%	99.5%	90.0%	2.5%	7.2%
Pacific		3,017	3,010	2,970	2,686	2,871	99	158			99.8%	98.7%	90.4%	3.3%	5.5%
Asian		3,342	3,336	3,317	3,095	3,265	52	87			99.8%	99.4%	93.3%	1.6%	2.7%
European		13,938	13,918	13,866	13,119	13,701	165	686			99.9%	99.6%	94.6%	1.2%	5.0%
Unspecified		192	167	166	150	163	3	21			87.0%	99.4%	90.4%	1.8%	12.9%
Other ethnic groups		533	532	530	504	526	4	14			99.8%	99.6%	95.1%	0.8%	2.7%
Total		**27,882**	**27,790**	**27,642**	**25,670**	**27,149**	**493**	**1,444**			**99.7%**	**99.5%**	**92.9%**	**1.8%**	**5.3%**
Deprivation															
Decile 1-2		4,177	4,164	4,140	3,927	4,090	50	200			99.7%	99.4%	94.9%	1.2%	4.9%
Decile 3-4		4,407	4,396	4,377	4,110	4,318	59	199			99.8%	99.6%	93.9%	1.3%	4.6%
Decile 5-6		5,292	5,278	5,255	4,941	5,195	60	248			99.7%	99.6%	94.0%	1.1%	4.8%
Decile 7-8		6,649	6,627	6,583	6,128	6,473	110	350			99.7%	99.3%	93.1%	1.7%	5.4%
Decile 9-10		7,349	7,317	7,280	6,558	7,066	214	446			99.6%	99.5%	90.1%	2.9%	6.3%
Unknown		8	8	7	6	7	0	1			100.0%	87.5%	85.7%	0.0%	14.3%
Total		**27,882**	**27,790**	**27,642**	**25,670**	**27,149**	**493**	**1,444**			**99.7%**	**99.5%**	**92.9%**	**1.8%**	**5.3%**

Table 2a Summary of newborn hearing audiology indicators by DHB for April to September 2011

DHB of audiology	Commenced audiology	Completed audiology	Completed audiology in 3 months	Permanent congenital hearing loss	Conductive hearing loss		Completed audiology from commenced	Completed audiology in 3 months from completed audiology	Permanent congenital hearing loss from completed	Conductive hearing loss from completed
Northland	39	39	22	2	9		100.0%	56.4%	5.1%	23.1%
Waitemata										
Auckland	51	51	48	3	24		100.0%	94.1%	5.9%	47.1%
Counties Manukau	71	63	9	0	7		88.7%	14.3%	0.0%	11.1%
Waikato	19	19	17	4	9		100.0%	89.5%	21.1%	47.4%
Lakes	1	1	1	0	0		100.0%	100.0%	0.0%	0.0%
Bay of Plenty	9	9	8	0	3		100.0%	88.9%	0.0%	33.3%
Tairawhiti										
Taranaki	17	17	16	1	6		100.0%	94.1%	5.9%	35.3%
Hawke's Bay	6	6	3	1	2		100.0%	50.0%	16.7%	33.3%
Whanganui										
Mid Central	3	3	2	0	2		100.0%	66.7%	0.0%	66.7%
Hutt Valley	10	10	10	1	4		100.0%	100.0%	10.0%	40.0%
Capital & Coast	18	18	15	7	2		100.0%	83.3%	38.9%	11.1%
Wairarapa	1	1	1	0	1		100.0%	100.0%	0.0%	100.0%
Nelson Marlborough	4	4	3	2	0		100.0%	75.0%	50.0%	0.0%
West Coast										
Canterbury	17	17	14	1	7		100.0%	82.4%	5.9%	41.2%
South Canterbury	6	6	5	2	1		100.0%	83.3%	33.3%	16.7%
Southern	7	7	7	0	3		100.0%	100.0%	0.0%	42.9%
Total	**279**	**271**	**181**	**24**	**80**		**97.1%**	**66.8%**	**8.9%**	**29.5%**

Table 2b Summary of newborn hearing audiology indicators by ethnicity and deprivation for April to September 2011

	Commenced audiology	Completed audiology	Completed audiology in 3 months	Permanent congenital hearing loss	Conductive hearing loss		Completed audiology from commenced	Completed audiology in 3 months from completed audiology	Permanent congenital hearing loss from completed	Conductive hearing loss from completed
Ethnicity										
Māori	90	87	53	9	35		96.7%	60.9%	10.3%	40.2%
Pacific	54	49	25	5	10		90.7%	51.0%	10.2%	20.4%
Asian	28	28	19	3	7		100.0%	67.9%	10.7%	25.0%
European	102	102	80	7	26		100.0%	78.4%	6.7%	25.5%
Other ethnic groups	2	2	2	0	1		100.0%	100.0%	0.0%	50.0%
Not known/Unspecified	3	3	2	0	1		100.0%	66.7%	0.0%	33.3%
Total	**279**	**271**	**181**	**24**	**80**		**97.1%**	**66.8%**	**8.9%**	**29.5%**
Deprivation										
Decile 1-2	27	27	22	4	5		100.0%	81.5%	14.8%	18.5%
Decile 3-4	34	34	24	4	10		100.0%	70.6%	11.8%	29.4%
Decile 5-6	35	35	25	1	10		100.0%	71.4%	2.9%	28.6%
Decile 7-8	60	59	48	9	20		98.3%	81.4%	15.3%	33.9%
Decile 9-10	123	116	62	6	35		94.3%	53.4%	5.2%	30.2%
Total	**279**	**271**	**181**	**24**	**80**		**97.1%**	**66.8%**	**8.9%**	**29.5%**

1. Introduction

1.1. The Universal Newborn Hearing Screening and Early Intervention Programme

The early detection of hearing loss, and the application of appropriate medical and educational interventions, has been demonstrated to significantly improve the baby's long-term language skills and cognitive ability.

New Zealand's Universal Newborn Hearing Screening and Early Intervention Programme (UNHSEIP) was implemented over a three year period 2007 – 2010. The UNHSEIP is jointly overseen by two Government agencies, the Ministries of Health and Education. The Ministry of Health has responsibility for screening, audiological diagnosis of hearing loss and medical interventions, and the Ministry of Education has responsibility for early intervention services.

District Health Boards (DHBs) are the main providers of newborn hearing screening, follow-up audiology services, and medical interventions. Newborn hearing screening must be offered to the family/whānau of all eligible babies born in a DHB region, whether they are born in hospital or at home, within a framework of nationally consistent policies, standards and guidelines.

1.2. Programme Monitoring

The aim of the UNHSEIP is 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 benchmarks:

1. Babies to be screened by 1 month of age
3. Audiology assessment to be completed by 3 months of age
6. Initiation of appropriate medical and audiological services, and early intervention education services, by 6 months of age.

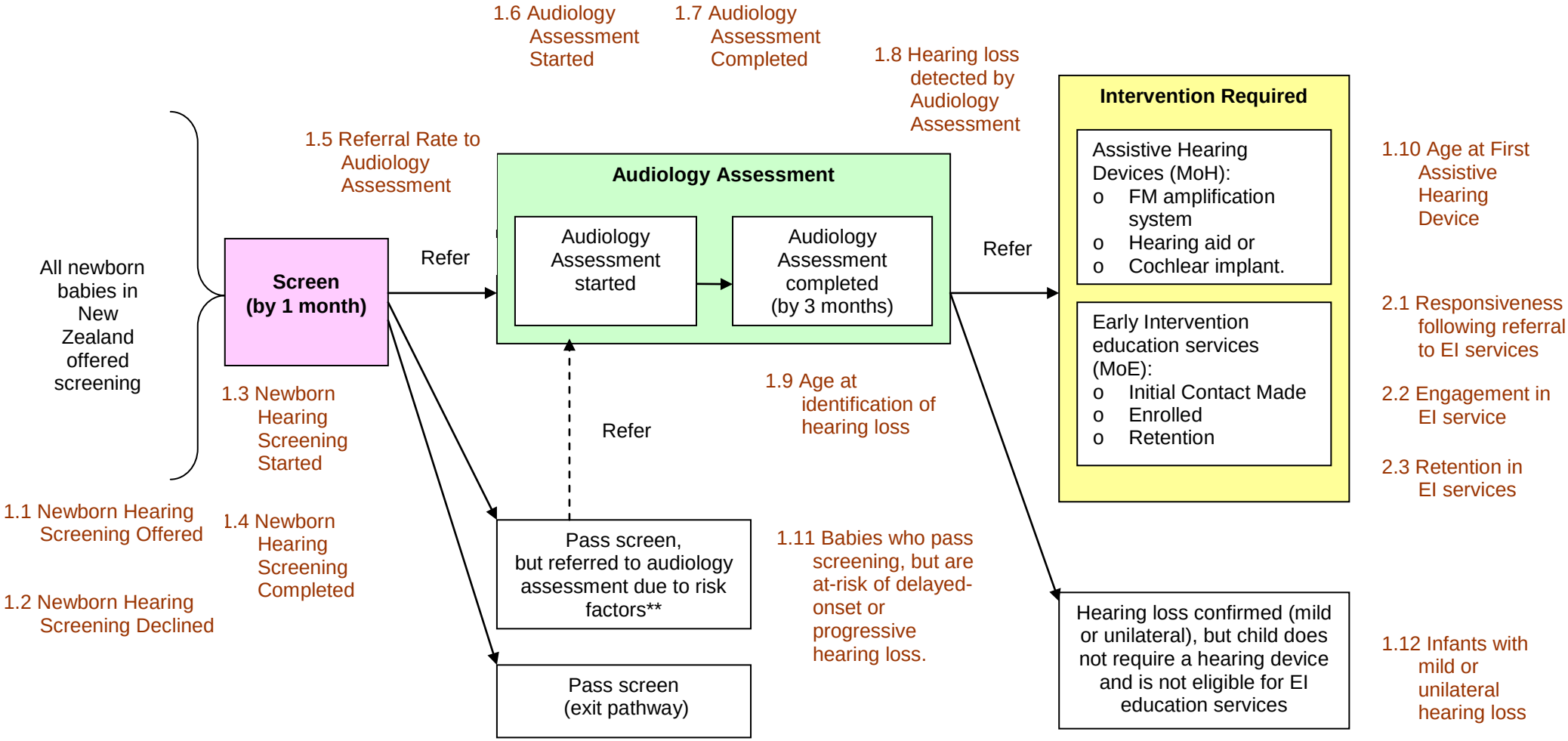
Monitoring is a core aspect of quality improvement activities, which are concerned with maximising the likelihood that the day-to-day operations of the screening programme will deliver the expected outcomes.

In 2007, a Monitoring Framework was developed, centred around the programme goals (http://www.nsu.govt.nz/health-professionals/3824.aspx). A 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 goals.
Routine monitoring based on newborn hearing screening and audiology data is reported to the Ministry by DHBs on a quarterly basis.

This report, which is based on the data of babies who were screened during the six month period 1 April 2011 through to 30 September 2011, covers the following indicators:

- 1.1 Newborn Hearing Screening Offered
- 1.2 Newborn Hearing Screening Declined
- 1.3 Newborn Hearing Screening Started
- 1.4 Newborn Hearing Screening Completed
- 1.5 Referral Rate to Audiology Assessment
- 1.6 Audiology Assessment Started
- 1.7 Audiology Assessment Completed
- 1.8 Hearing Loss Detected by Audiology Assessment
- 1.9 Age at Identification of Hearing Loss
- 1.11 Babies who Pass Screening but are at risk of delayed onset or progressive hearing loss.

Figure 1 The UNHSEIP screening pathway and indicators



**These babies passed screening, however it is recommended that they have "targeted follow-up" as they may be at-risk of delayed-onset or progressive hearing loss. While targeted follow-up is outside the primary screening pathway, it is recommended that these babies have at least one audiology assessment by the time they are 18 months of age.

2. Data

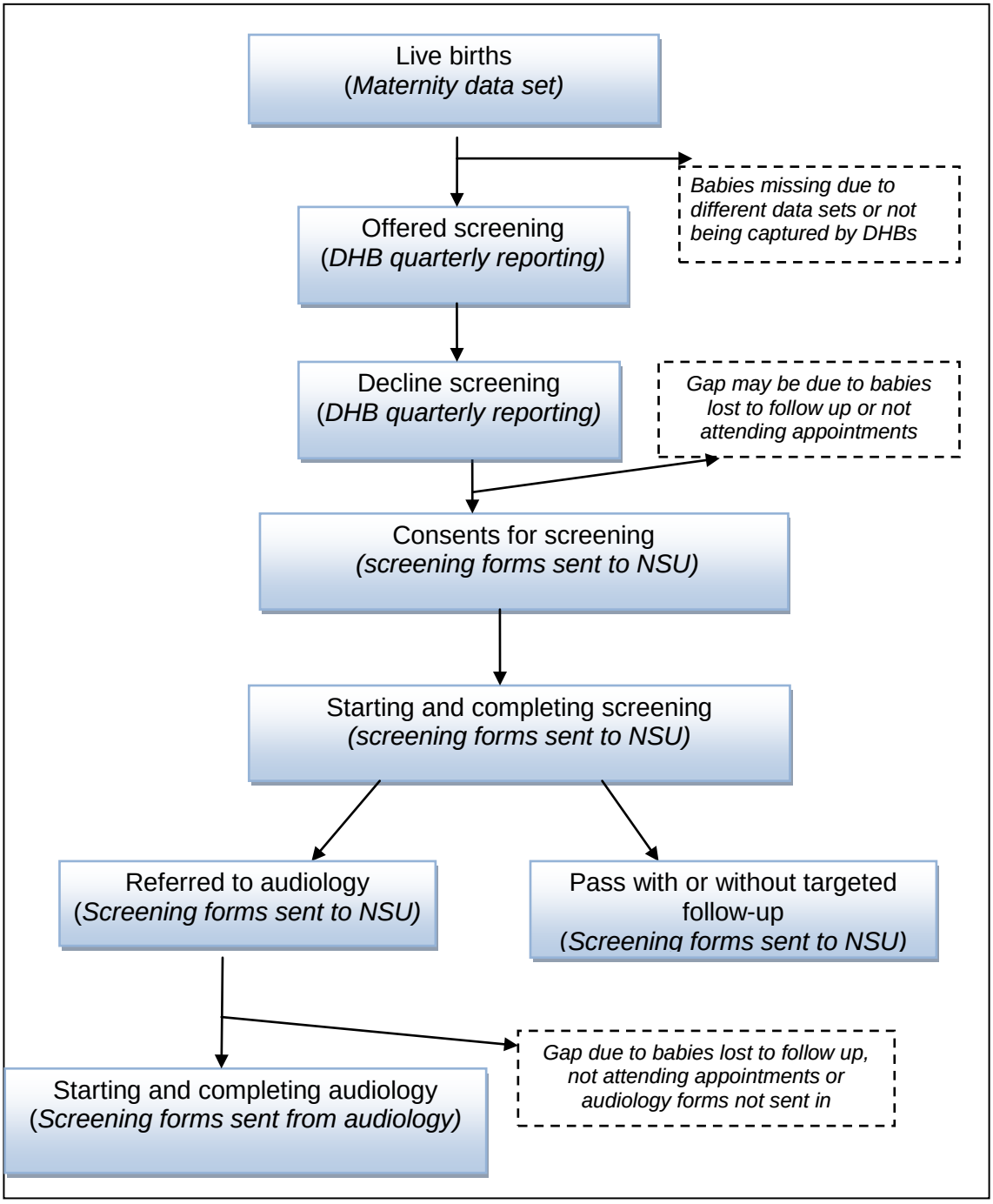
2.1. Data Collection Process

Newborn hearing screening and follow up audiology information is captured by the Ministry of Health's National Screening Unit (NSU) in two ways. . Some DHBs collect and record this information of paper forms, which are regularly submitted to the NSU and the data entered into the NSU's web-based application/database. An increasing number of DHBs enter their data directly into a database and extract the information for secure electronic transfer and uploading into the NSU's database.

The start date for entering newborn hearing screening information was for babies born from 1 April 2009 onwards, however the audiology form was not implemented until April/May 2010.
Data for babies who started screening during the reporting period is extracted from the NSU's web-based application via an Oracle package. Deprivation data is added to the screening data from the Ministry of Health's National Health Index database. The NSU then systematically checks the data for missing values and discrepancies. Over 30 business rules are applied to ensure the data reported on is of the highest quality. The data extract is produced in a tabular format, which is then analysed against the monitoring indicators and presented as tables and/or charts.

At this time, additional information for monitoring is sourced from quarterly DHB contractual reporting. This information is used to monitor trends in offer and decline of newborn hearing screening, as only information from babies with consent is recorded in the national database.

It is important to note the data for live births, offers and consents are from separate data sources so are not directly comparable. They do however provide a picture as to the flow of babies into the screening programme, as represented in the diagram below. Key points at which data for babies may be missing and the contributing reasons are suggested.


Live births
(Maternity data set)
Babies missing due to different data sets or not being captured by DHBs
Offered screening
(DHB quarterly reporting)
Decline screening
(DHB quarterly reporting)
Gap may be due to babies lost to follow up or not attending appointments
Consents for screening
(screening forms sent to NSU)
Starting and completing screening
(screening forms sent to NSU)
Referred to audiology
(Screening forms sent to NSU)
Pass with or without targeted follow-up
(Screening forms sent to NSU)
Gap due to babies lost to follow up, not attending appointments or audiology forms not sent in
Starting and completing audiology
(Screening forms sent from audiology)

2.2. Information Included in this Report

The information reported is from newborn hearing screening where the date of screening started was between 1 April 2011 and 30 September 2011. The information in this report relates to all 20 DHBs for which screening activity was recorded in the national database for this period. Table 3 the time of screening implementation for each DHB.

Table 3 DHBs starting date for UNHSEIP

DHB	Start date of implementation
Northland	April 2010
Waitemata	March 2010
Auckland	March 2010
Counties Manukau	March 2010
Waikato	July 2007
Lakes	March 2009
Bay of Plenty	March 2009
Tairawhiti	July 2007
Taranaki	April 2009
Hawke's Bay	July 2007
Whanganui	June 2009
Mid-Central	February 2010
Wairarapa	April 2010
Hutt Valley	July 2009
Capital & Coast	June 2009
Nelson Marlborough	March 2010
West Coast	December 2009
Canterbury	May 2009
South Canterbury	April 2009
Southern	August 2010

Audiology assessment

The audiology form was implemented in April/May 2010. The data is still quite limited but is beginning to provide useful information.

Early intervention education services

This report does not include information on the early intervention education service. Early intervention information will be included in annual reporting, as its goal of "initiation by 6 months of age" is not suited for shorter monitoring periods.

2.3. Ethnicity Reporting

Ethnicity data in this report is grouped according to a prioritised system. This is a common method of ethnicity reporting across the health sector. Prioritised ethnic groups involve each person being allocated to a single ethnic group based on the ethnicities they have identified with, in the prioritised order of Māori, Pacific, Asian, European and Other. For example, if someone identifies as being European and Māori, under the prioritised ethnic group method they are classified as Māori for the purpose of the analysis.

The group of prioritised 'Other' effectively refers to non-Māori, non-Pacific, non-Asian, non-European people. The aim of prioritisation is to ensure that where some need exists to assign people to a single ethnic group, ethnic groups of policy importance, or of small size, are not overwhelmed by the European ethnicity. People may identify with as many ethnic groups as they choose. Within this population of babies, the maximum number of ethnicities recorded (five) was recorded for three babies. Four ethnicities were recorded for 72 babies and three ethnicities were recorded for 3% of babies (n=726). Two ethnicities were recorded for 19% of babies (n=5383) and the remaining almost 78% of babies had only one ethnicity recorded.

2.4. Deprivation Index

The deprivation index is the average level of deprivation of people living in an area at a particular point in time, relative to the whole of New Zealand. Deprivation refers to areas (based on New Zealand Census meshblocks) rather than individuals. Nine indicators are combined to give the deprivation index. The indicators reflect aspects of material and social deprivation, and the nine indicators are:

1. income derived from benefits
2. unemployment
3. low income earning
4. access to car
5. access to telephone
6. sole-parent families
7. lack of formal educational qualifications
8. level of home ownership
9. living space within a home.

In the deprivation index system used by the health sector, areas classified as Decile 1-2 have the least deprivation and areas classified as Decile 9-10 have the most deprivation. This is opposite to some other systems of classification such as that used by education, where level 10 is the least disadvantaged and level 1 the most disadvantaged.

2.5. Known Data Quality Issues in this Report

The following data quality issues should be considered when interpreting the data presented in this publication.

Gestational age

Where gestational age was not recorded, a gestational age of 40 weeks was allocated (1.5% of records, n=422). This is an improvement on the previous report and DHBs will continue to be encouraged to include the correct gestational age on the data forms, as this is an important field. For babies born at less than full term, corrected age was calculated for the reporting of screening completed by one month of age and audiology completed by three months.

Accuracy of reporting

Where hand written screening forms are used, manual data entry occurs directly into the national database. Information is also imported into the database from DHBs electronically. The potential for errors in data entry is minimised by a two-step data checking process, one at data entry and the other during data processing. An example of this is that a birth date of 16 July 1980 would not be allowed. Each record must contain a value in twelve mandatory fields to be included in reporting. These fields are:

- valid NHI number
- consent = yes
- valid birth date
- screening protocol
- birth location*
- DHB of birth
- ethnicity
- screening outcome
- DHB of screening test 1
- DHB audiology test
- test Method 1.

All newborn hearing screening providers are responsible for maintaining a high quality of data. Although the National Screening Unit monitors the quality of the information, newborn hearing screening providers are also expected to have quality control mechanisms in place. During the data entry process, quality issues, such as missing information, were raised with DHBs, and data quality continues to improve.

*The majority of consent for screening occurred in public hospitals (97%). Previous reports have included information on the results by home births and private hospitals but the reporting is not reliable given both the high proportion of public hospital births and the inconsistent way in which other places of birth are allocated.

Audiology data

Limitations still exist as some DHBs have not submitted information, and some information is unable to be entered into the national database due to missing information. This report includes audiology information on 279 of the 493 babies that were referred for audiology assessment.

Denominator

For the purpose of this report, birth data is sourced from a newly available National Maternity Database. This data base combines information from live birth registrations from the Births, Deaths and Marriages Register along with hospital discharge information and Lead Maternity Carer claims. This provides a much more complete data set as registrations of births often take a long time. This is data set was first used in the previous six monthly report.

The DHB of a baby's birth is used as the parameter for data extraction, as the denominator is based on where the baby is born. However, DHB screening activity is reported based on babies who are screened within the DHB, which can be different to the DHB of birth. As has been discussed and agreed previously, all tables in the first section of this report refer to DHB of birth unless otherwise stated. DHB of audiology is used to report against the audiology indicators.

3. Monitoring Indicators

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.

3.1. Offer of Newborn Hearing Screening

At this time, the offer of newborn hearing screening is reported through DHB contractual reporting to the Ministry. This is because only babies with informed consent for screening can be recorded on the national database – families who do not consent, and those who are not offered screening, are not recorded in the national database. In the future, if a coordinated electronic system for maternity and newborn notes is in place, the offer of screening will be able to be nationally recorded.

From the offer of screening reported in DHB quarterly reports for this time, 93.8% of babies were offered newborn hearing screening, compared with live births. This is slight decrease from the 95.2% in the October 2010 to March 2011 reporting period.

Across DHBs the proportion of offers of screening to live births was generally between 80% and 100%. From Table 4, the lowest rates this quarter was in Counties Manukau at 72.2% and Waitemata at 76.3%. These rates are both slightly down on the last report (75.6% and 87.1% respectively).

A number of DHBs showed positive increases this period with 8-10% rise in percentage offered for Northland, Lakes and Whanganui.

Table 4 Offer of screening by DHB for April to September 2011

DHB	Live births	Offered screening	Percentage offered
Northland	1,188	1,099	92.5%
Waitemata	3,975	3,032	76.3%
Auckland	3,349	4,068	121.5%
Counties Manukau	4,419	3,192	72.2%
Waikato	2,709	2,716	100.3%
Lakes	799	774	96.9%
Bay of Plenty	1,448	1,316	90.9%
Tairawhiti	399	374	93.7%
Taranaki	765	789	103.1%
Hawkes Bay	1,158	1,123	97.0%
Whanganui	396	351	88.6%
MidCentral	1,192	1,184	99.3%
Hutt Valley	1,017	1,011	99.4%
Capital & Coast	1,888	1,833	97.1%
Wairarapa	254	254	100.0%
Nelson Marlborough	870	860	98.9%
West Coast	230	194	84.3%
Canterbury	2,970	2,969	100.0%
South Canterbury	303	294	97.0%
Southern	1,900	1,873	98.6%
Total	**31,229**	**29,306**	**93.8%**

Challenges in reporting on the offer of newborn hearing screening

The number of babies offered screening within a reporting period can be greater than the number of live births attributed to the DHB, leading to the percentage offered being more than 100%. One contributing factor is that live births are reported based on the baby's DHB of residence, and sometimes babies may be offered screening at a different DHB. This can most obviously be seen in Table 4 for Auckland DHB. The local over (and under) proportions should balance out at regional and national levels. Another issue for periodic reporting is that babies offered screening may have been born outside of the reporting period. For example a baby born in September may be offered screening in April, but this birth will not be included in the denominator. Annual reporting will be based on babies born within a one year period, which will improve reporting against the denominator.

RECOMMENDATIONS ON OFFER OF SCREENING

No recommendations.

3.2. Consent for Newborn Hearing Screening

Monitoring the proportion of families and whānau consenting to newborn hearing screening is a way of identifying points towards reporting coverage. This indicator is not reported by DHB as the two databases are inconsistent and babies offered screening in one DHB might have their consent reported via a different DHB based on their place of domicile. It is useful though to track this percentage over time nationally.

For this period 95.1% of babies that were recorded by DHBs as offering screening are recorded in the NSU database as having consented to screening. This figure is up from 91.7% in the previous six month period.

A small number of babies who were offered declined (see section below). It is not clear to what extent the remaining difference is the result of different data sets or is a genuine result of families not completing the consent process. Monitoring of this information will continue.

Table 5 shows that a higher proportion of babies from Asian and European ethnic groups appear to gain consent for screening as compared to Māori and Pacific babies.

Table 5 Consents to screening compared with live births, by ethnicity, April to September 2011

	Live Births	Consents	Difference	Percent
	N	N	N	%
Māori	8,488	6,860	1,628	81%
Pacific Island	3,651	3,017	634	83%
Asian	3,574	3,342	232	94%
European	14,859	13,938	921	94%
Not Stated/Unspecified/Other	657	725	-68	110%
Total	**31,229**	**27,882**	**3,347**	**89%**

Table 6 does not show any specific trend from Decile 1- 10 with regards to the number of babies who consent compared to live births but it does indicate that babies in Deciles 3-4 and 9-10 appear to have lower rates of consent.

Table 6 Consents to screening compared with live births, by deprivation, April to September 2011

	Live Births	Consents	Difference	Percent
	N	N	N	%
Decile 1-2	4,354	4,177	177	96%
Decile 3-4	5,019	4,407	612	88%
Decile 5-6	5,861	5,292	569	90%
Decile 7-8	7,170	6,649	521	93%
Decile 9-10	8,825	7,349	1,476	83%
Unknown	0	8	-8	-
Total	**31,229**	**27,882**	**3,347**	**89%**

RECOMMENDATIONS ON CONSENTS FOR SCREENING

No recommendations.

1.2 Newborn hearing screen declined

Description

The proportion of newborns whose parents / guardian decline screening.

Relevant outcome

The proportion of newborns whose parents / guardian decline screening is expected to be very low and in keeping with international programmes.

No percentage outcome target at this stage of the programme (see rationale section)

Rationale

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.

A high decline rate (e.g., 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.

Methodology

Indicator 1.2

Numerator:	Number of eligible newborns whose parents/guardiandeclined newborn hearing screening.
Denominator:	Number of eligible newborns whose parents/guardian were offered screening.

Notes

There are some limitations to the decline data that will be available due to privacy concerns. For this reason, only babies with informed consent are included in the database. The UNHSEIP receives data on the number of declines through DHB contractual reporting.

3.3. Newborn Hearing Screening Declined

At this time, the decline of newborn hearing screening is reported through DHB contractual reporting to the Ministry. This is because only babies with informed consent for screening can be recorded on the national database – families who decline, and those who are not offered screening, are not recorded in the national database. In the future, if a coordinated electronic system for maternity and newborn notes is in place, the decline of screening will be able to be nationally recorded.

Table 7 is sourced from DHB quarterly reports, not from the national database extract. Across all the DHBs, the overall decline rate was 1.5% of those offered screening. When looking at individual DHB information, it is important to take into account that when an area has a small number of live births, the percentage of declines may look disproportionate. The decline rate was highest in Northland at around 9%. Northland also had the highest decline rates in the previous report (7.4%).

Table 7 Decline of screening by DHB for April to September 2011

DHB	Offered screening	Declined screening	Percentage declined
Northland	1,099	102	*9.3%*
Waitemata	3,032	13	*0.4%*
Auckland	4,068	61	*1.5%*
Counties Manukau	3,192	19	*0.6%*
Waikato	2,716	20	*0.7%*
Lakes	774	10	*1.3%*
Bay of Plenty	1,316	17	*1.3%*
Tairawhiti	374	0	*0.0%*
Taranaki	789	14	*1.8%*
Hawkes Bay	1,123	3	*0.3%*
Whanganui	351	3	*0.9%*
MidCentral	1,184	26	*2.2%*
Hutt Valley	1,011	4	*0.4%*
Capital & Coast	1,833	14	*0.8%*
Wairarapa	254	2	*0.8%*
Nelson Marlborough	860	18	*2.1%*
West Coast	194	8	*4.1%*
Canterbury	2,969	41	*1.4%*
South Canterbury	294	7	*2.4%*
Southern	1,873	49	*2.6%*
Total	**29,306**	**431**	***1.5%***

RECOMMENDATION ON DECLINE OF SCREENING

1. Follow up with Northland regarding their decline rates.

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 on-going service and programme development it is important to compare consent for screening, 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.

3.4. Newborn Hearing Screening Started

Monitoring the proportion of babies who actually start screening when their family and whānau has consented is important to identify potential gaps in systems and processes. Started screening is when there is a valid date for screening test 1, and there is a valid screening outcome for at least one ear. For records to be included in each of the following indicators they must have started screening.

For this reporting period a high proportion of babies who have consent for screening commenced screening (99.7%). This high proportion is consistent across DHBs, as shown in Table 8.

Factors such as whether the baby is admitted to NICU/SCBU, ethnicity and deprivation status could influence participation in newborn hearing screening. The information presented in Tables 8-10 indicates that none of these factors are influential at this time.

RECOMMENDATION ON NEWBORN HEARING SCREENING STARTED

No recommendations.

Table 8 Newborn hearing screening started compared with consents to screening by DHB, April to September 2011

DHB	Well Baby			NICU/SCBU			Total		
	Consented to screening	Started screening	% of consents that started	Consented to screening	Started screening	% of consents that started	Consented to screening	Started screening	% of consents that started
Northland	800	800	100.0%	95	95	100.0%	895	895	100.0%
Waitemata	3,289	3,274	99.5%	137	137	100.0%	3,426	3,411	99.6%
Auckland	2,860	2,859	100.0%	232	232	100.0%	3,092	3,091	100.0%
Counties Manukau	2,953	2,949	99.9%	174	174	100.0%	3,127	3,123	99.9%
Waikato	2,410	2,398	99.5%	210	208	99.0%	2,620	2,606	99.5%
Lakes	715	715	100.0%	52	52	100.0%	767	767	100.0%
Bay of Plenty	1,195	1,188	99.4%	113	113	100.0%	1,308	1,301	99.5%
Tairawhiti	335	328	97.9%	30	30	100.0%	365	358	98.1%
Taranaki	685	683	99.7%	63	63	100.0%	748	746	99.7%
Hawke's Bay	1,016	1,016	100.0%	104	104	100.0%	1,120	1,120	100.0%
Whanganui	340	336	98.8%	16	16	100.0%	356	352	98.9%
Mid Central	942	941	99.9%	86	86	100.0%	1,028	1,027	99.9%
Hutt Valley	877	876	99.9%	107	107	100.0%	984	983	99.9%
Capital & Coast	1,741	1,741	100.0%	167	165	98.8%	1,908	1,906	99.9%
Wairarapa	226	226	100.0%	12	12	100.0%	238	238	100.0%
Nelson Marlborough	741	736	99.3%	54	54	100.0%	795	790	99.4%
West Coast	179	178	99.4%	4	4	100.0%	183	182	99.5%
Canterbury	2,613	2,611	99.9%	213	213	100.0%	2,826	2,824	99.9%
South Canterbury	267	267	100.0%	10	10	100.0%	277	277	100.0%
Southern	1,663	1,639	98.6%	156	154	98.7%	1,819	1,793	98.6%
Total	**25,847**	**25,761**	**99.7%**	**2,035**	**2,029**	**99.7%**	**27,882**	**27,790**	**99.7%**

Table 9 **Newborn hearing screening started compared with consents to screening by ethnicity, April to September 2011**

Ethnicity	Well Baby			NICU/SCBU			Total		
	Consented to screening	Started screening	% of consents that started	Consented to screening	Started screening	% of consents that started	Consented to screening	Started screening	% of consents that started
Māori	6,305	6,272	99.5%	555	555	100.0%	6,860	6,827	99.5%
Pacific Island	2,795	2,789	99.8%	222	221	99.5%	3,017	3,010	99.8%
Asian	3,169	3,163	99.8%	173	173	100.0%	3,342	3,336	99.8%
European	12,911	12,895	99.9%	1,027	1,023	99.6%	13,938	13,918	99.9%
Not stated/Unspecified	166	142	85.5%	26	25	96.2%	192	167	87.0%
Other ethnic groups	501	500	99.8%	32	32	100.0%	533	532	99.8%
Total	**25,847**	**25,761**	**99.7%**	**2,035**	**2,029**	**99.7%**	**27,882**	**27,790**	**99.7%**

Table 10 **Newborn hearing screening started** compared with consents to screening by deprivation, **April to September 2011**

Decile	Well Baby			NICU/SCBU			Total		
	Consented to screening	Started screening	% of consents that started	Consented to screening	Started screening	% of consents that started	Consented to screening	Started screening	% of consents that started
Decile 1-2	3,923	3,911	99.7%	254	253	99.6%	4,177	4,164	99.7%
Decile 3-4	4,127	4,116	99.7%	280	280	100.0%	4,407	4,396	99.8%
Decile 5-6	4,901	4,888	99.7%	391	390	99.7%	5,292	5,278	99.7%
Decile 7-8	6,115	6,095	99.7%	534	532	99.6%	6,649	6,627	99.7%
Decile 9-10	6,774	6,744	99.6%	575	573	99.7%	7,349	7,317	99.6%
Unknown	7	7	100.0%	1	1	100.0%	8	8	100.0%
Total	**25,847**	**25,761**	**99.7%**	**2,035**	**2,029**	**99.7%**	**27,882**	**27,790**	**99.7%**

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 that 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.

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.

3.5. Newborn Hearing Screening Completed

Monitoring the proportion of babies who complete screening when it has been started is important in identifying potential gaps in systems and processes. For example, if a high proportion of babies start screening but do not complete the process, protocols for following-up families and offering outpatient appointments may need to be strengthened, or transfer between DHBs may be an issue.

One of the core goals of the programme is for newborn hearing screening to be completed by the time the baby is one month of age (4 weeks corrected age).

Overall, 99.5% of babies who started screening completed, and 96.2% of those babies who had completed screening did so by the time they were one month of age, this is an increase from 92.9% in the previous period. The high proportion of completion overall is consistent across DHBs, as shown in Figure 2 and Table 11. There is more variation in the data for completion by one month. With the exception of Northland (58.6%), the remaining DHBs had completion rates at one month of 85% or more as shown in Table 12

Programme coverage

In total 27,642 babies completed newborn hearing screening in this six month period, compared with the 31,229 live births. While these figures come from different data sets, this indicates that approximately 89% of babies born in this period completed screening.

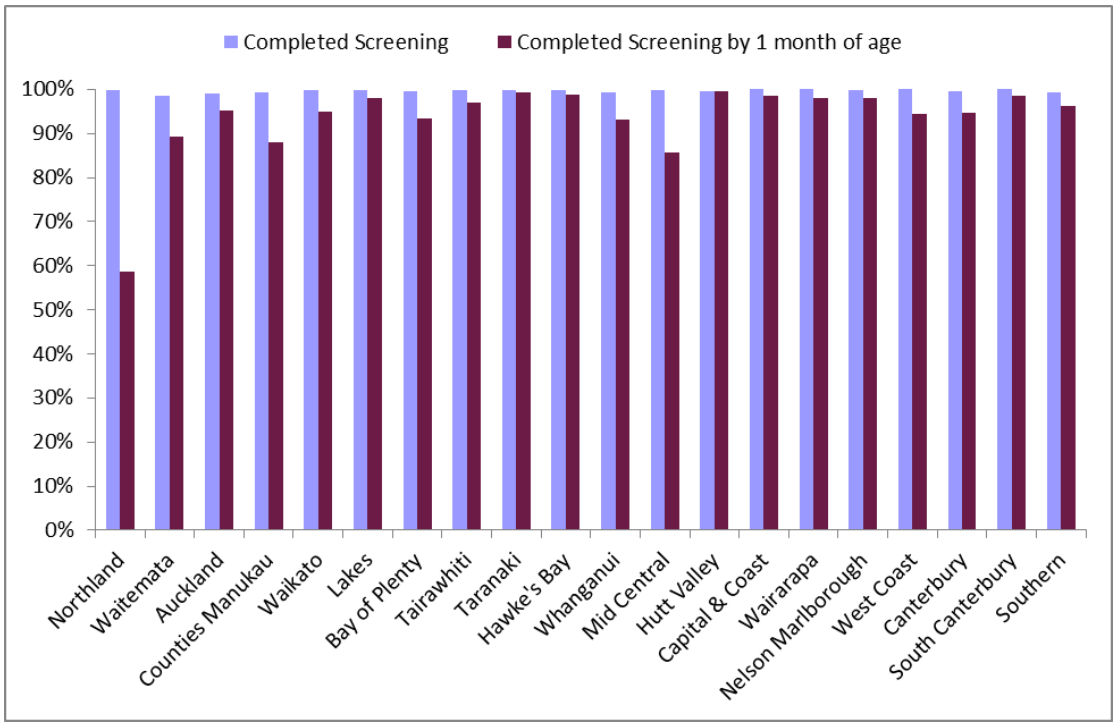


Figure 2 **Proportion of babies who complete screening after starting, and the proportion of those who completed screening by the time they were one month of age, April to September 2011**

This information can be seen in greater detail in Tables 11 and 12. Almost all screening started in NICU/SCBU was completed.

Figure 3 shows the spread of screening times for all those who completed screening. The data only shows screening times up to 56 days (8 weeks). The remaining 720 babies were screened between 8 weeks and 58 weeks, however the numbers are too small to be indicated on Figure 3. The majority of these were completed by 14 weeks (666 of the 720 babies).

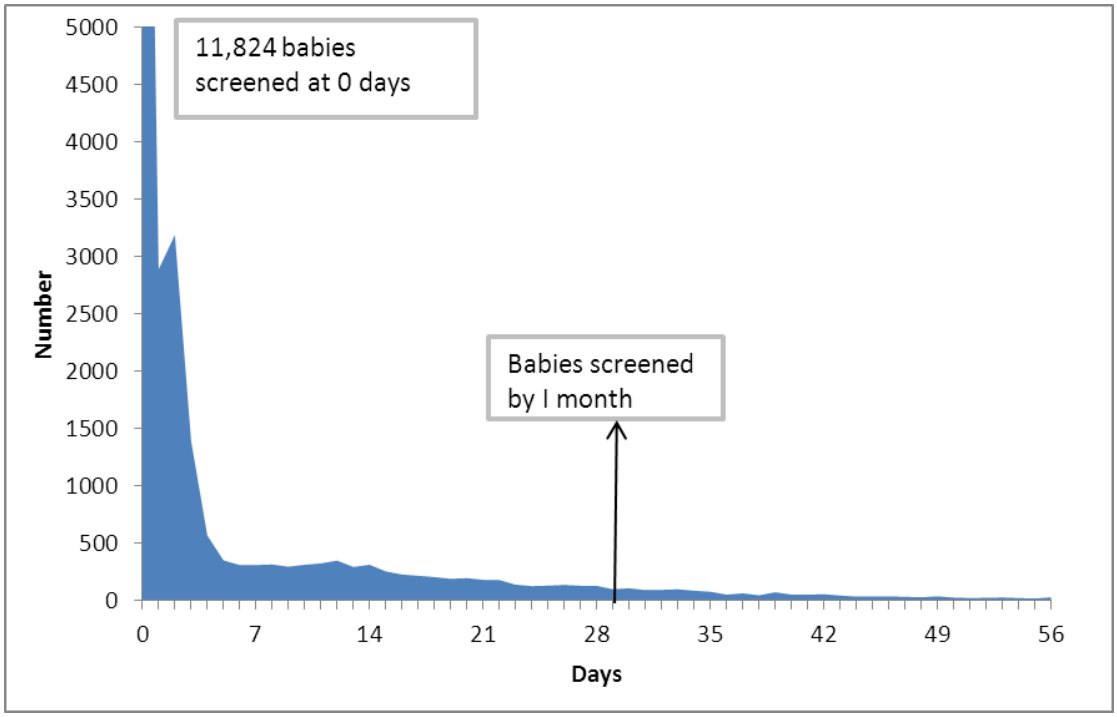


Figure 3 **Spread of screening completion times in days, April to September 2011**

Table 11 Newborn hearing screening completed compared with started by DHB, April to September 2011

DHB of birth	Well Baby			NICU/SCBU			Total		
	Started screening	Completed screening	% Started that completed	Started screening	Completed screening	% Started that completed	Started screening	Completed screening	% Started that completed
Northland	800	798	99.8%	95	95	100.0%	895	893	99.8%
Waitemata	3,274	3,226	98.5%	137	137	100.0%	3,411	3,363	98.6%
Auckland	2,859	2,829	99.0%	232	231	99.6%	3,091	3,060	99.0%
Counties Manukau	2,949	2,928	99.3%	174	173	99.4%	3,123	3,101	99.3%
Waikato	2,398	2,396	99.9%	208	208	100.0%	2,606	2,604	99.9%
Lakes	715	713	99.7%	52	52	100.0%	767	765	99.7%
Bay of Plenty	1,188	1,182	99.5%	113	112	99.1%	1,301	1,294	99.5%
Tairawhiti	328	327	99.7%	30	30	100.0%	358	357	99.7%
Taranaki	683	681	99.7%	63	63	100.0%	746	744	99.7%
Hawke's Bay	1,016	1,015	99.9%	104	104	100.0%	1,120	1,119	99.9%
Whanganui	336	334	99.4%	16	16	100.0%	352	350	99.4%
Mid Central	941	940	99.9%	86	86	100.0%	1,027	1,026	99.9%
Hutt Valley	876	871	99.4%	107	107	100.0%	983	978	99.5%
Capital & Coast	1,741	1,741	100.0%	165	165	100.0%	1,906	1,906	100.0%
Wairarapa	226	226	100.0%	12	12	100.0%	238	238	100.0%
Nelson Marlborough	736	734	99.7%	54	54	100.0%	790	788	99.7%
West Coast	178	178	100.0%	4	4	100.0%	182	182	100.0%
Canterbury	2,611	2,604	99.7%	213	211	99.1%	2,824	2,815	99.7%
South Canterbury	267	267	100.0%	10	10	100.0%	277	277	100.0%
Southern	1,639	1,629	99.4%	154	153	99.4%	1,793	1,782	99.4%
Total	**25,761**	**25,619**	**99.4%**	**2,029**	**2,023**	**99.7%**	**27,790**	**27,642**	**99.5%**

Table 12 Newborn hearing screening completed by one month of age by DHB, April to September 2011

DHB	Well Baby			NICU/SCBU			Total		
	Completed screening	Completed screening by 1 month of age	% Completed that completed by 1 month of age	Completed screening	Completed screening by 1 month of age	% Completed that completed by 1 month of age	Completed screening	Completed screening by 1 month of age	% Completed that completed by 1 month of age
Northland	798	448	56.1%	95	75	78.9%	893	523	58.6%
Waitemata	3,226	2,873	89.1%	137	126	92.0%	3,363	2,999	89.2%
Auckland	2,829	2,690	95.1%	231	222	96.1%	3,060	2,912	95.2%
Counties Manukau	2,928	2,575	87.9%	173	155	89.6%	3,101	2,730	88.0%
Waikato	2,396	2,271	94.8%	208	198	95.2%	2,604	2,469	94.8%
Lakes	713	699	98.0%	52	51	98.1%	765	750	98.0%
Bay of Plenty	1,182	1,098	92.9%	112	112	100.0%	1,294	1,210	93.5%
Tairawhiti	327	316	96.6%	30	30	100.0%	357	346	96.9%
Taranaki	681	676	99.3%	63	63	100.0%	744	739	99.3%
Hawke's Bay	1,015	1,003	98.8%	104	103	99.0%	1,119	1,106	98.8%
Whanganui	334	310	92.8%	16	16	100.0%	350	326	93.1%
Mid Central	940	798	84.9%	86	81	94.2%	1,026	879	85.7%
Hutt Valley	871	867	99.5%	107	107	100.0%	978	974	99.6%
Capital & Coast	1,741	1,719	98.7%	165	159	96.4%	1,906	1,878	98.5%
Wairarapa	226	222	98.2%	12	11	91.7%	238	233	97.9%
Nelson Marlborough	734	719	98.0%	54	53	98.1%	788	772	98.0%
West Coast	178	168	94.4%	4	4	100.0%	182	172	94.5%
Canterbury	2,604	2,458	94.4%	211	206	97.6%	2,815	2,664	94.6%
South Canterbury	267	264	98.9%	10	9	90.0%	277	273	98.6%
Southern	1,629	1,569	96.3%	153	146	95.4%	1,782	1,715	96.2%
Total	**25,619**	**23,743**	**92.7%**	**2,023**	**1,927**	**95.3%**	**27,642**	**25,670**	**92.9%**

Factors such as ethnicity and deprivation status may influence completion rates, and/or the time taken for the completion for newborn hearing screening. The information presented in Tables 13-14 shows little difference in overall completion rates by these parameters. Completion rates by one month vary a little more.

Table 13 Newborn hearing screening completed by ethnicity, April to September 2011

Ethnicity	Started screening	Completed screening	Completed screening by 1 month of age	% started that completed screening	% completed that completed by 1 month of age
Māori	6,827	6,793	6,116	99.5%	90.0%
Pacific	3,010	2,970	2,686	98.7%	90.4%
Asian	3,336	3,317	3,095	99.4%	93.3%
European	13,918	13,866	13,119	99.6%	94.6%
Not stated/Unspecified	167	166	150	99.4%	90.4%
Other ethnic groups	532	530	504	99.6%	95.1%
Total	**27,790**	**27,642**	**25,670**	**99.5%**	**92.9%**

Table 14 Newborn hearing screening completed by deprivation, April to September 2011

Decile	Started screening	Completed screening	Completed screening by 1 month of age	% started that completed screening	% completed that completed by 1 month of age
Decile 1-2	4,164	4,140	3,927	99.4%	94.9%
Decile 3-4	4,396	4,377	4,110	99.6%	93.9%
Decile 5-6	5,278	5,255	4,941	99.6%	94.0%
Decile 7-8	6,627	6,583	6,128	99.3%	93.1%
Decile 9-10	7,317	7,280	6,558	99.5%	90.1%
Unknown	8	7	6	87.5%	85.7%
Total	**27,790**	**27,642**	**25,670**	**99.5%**	**92.9%**

RECOMMENDATION ON NEWBORN HEARING SCREENING COMPLETED

No recommendations.

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 (i.e. do not pass screen).
Denominator:	The number of eligible newborns who complete screening.

3.6. Referral to Audiology

The maximum referral rate for audiology assessment from newborn hearing screening has been set at 4%, based on international literature. This is generally thought to be quite a high level, and rates of 1-2% are commonly reported by international screening programmes. The average rate of referral to audiology in this period was 1.8% as detailed by DHB in Table 15 below. This is very similar to the last reporting period (1.7% referred).

All DHBs this period had referrals, though for some the actual number was under five referrals for West Coast, Tairawhiti, Mid Central, Whanganui and Wairarapa. It is not possible to make any valid comments due to the small difference in percentages and small actual number of referrals in many DHBs, as noted above. However the highest rates of referral over the last three periods have been Northland and Counties Manukau, 5.8% and 3.9% respectively. The rate for Counties Manukau is fairly consistent but the rate for Northland is higher than the previous period (3.9%).

Admission to NICU/SCBU (for 48 hours or more) resulted in a higher proportion of referrals to audiology, at an average of 7.9% as show in Table 15, the same as the last period. More detail on referrals to audiology by ethnicity and deprivation status is presented in Tables 16 and 17. The information indicates that none of these factors have a significant impact at this time though referral rates are slightly higher for Māori, Pacific and babies in Decile 9-10.

Table 15 Referral to audiology by DHB and NICU/SCBU admission, April to September 2011

DHB of Birth	Well Baby			NICU/SCBU			Total		
	Number completed screening	Number referred to audiology	% completed screening that were referred	Number completed screening	Number referred to audiology	% completed screening that were referred	Number completed screening	Number referred to audiology	% completed screening that were referred
Northland	798	31	3.9%	95	21	22.1%	893	52	5.8%
Waitemata	3,226	29	0.9%	137	11	8.0%	3,363	40	1.2%
Auckland	2,829	48	1.7%	231	24	10.4%	3,060	72	2.4%
Counties Manukau	2,928	96	3.3%	173	24	13.9%	3,101	120	3.9%
Waikato	2,396	21	0.9%	208	3	1.4%	2,604	24	0.9%
Lakes	713	3	0.4%	52	2	3.8%	765	5	0.7%
Bay of Plenty	1,182	14	1.2%	112	9	8.0%	1,294	23	1.8%
Tairawhiti	327	3	0.9%	30	0	0.0%	357	3	0.8%
Taranaki	681	11	1.6%	63	8	12.7%	744	19	2.6%
Hawke's Bay	1,015	12	1.2%	104	6	5.8%	1,119	18	1.6%
Whanganui	334	3	0.9%	16	1	6.3%	350	4	1.1%
Mid Central	940	2	0.2%	86	1	1.2%	1,026	3	0.3%
Hutt Valley	871	3	0.3%	107	6	5.6%	978	9	0.9%
Capital & Coast	1,741	12	0.7%	165	16	9.7%	1,906	28	1.5%
Wairarapa	226	3	1.3%	12	0	0.0%	238	3	1.3%
Nelson Marlborough	734	6	0.8%	54	1	1.9%	788	7	0.9%
West Coast	178	1	0.6%	4	0	0.0%	182	1	0.5%
Canterbury	2,604	25	1.0%	211	16	7.6%	2,815	41	1.5%
South Canterbury	267	5	1.9%	10	1	10.0%	277	6	2.2%
Southern	1,629	6	0.4%	153	9	5.9%	1,782	15	0.8%
Total	**25,619**	**334**	**1.3%**	**2,023**	**159**	**7.9%**	**27,642**	**493**	**1.8%**

Table 16 Referral to audiology by ethnicity, April to September 2011

Ethnicity	Number completed screening	Number referred to audiology	% completed screening that were referred
Māori	6,793	170	2.5%
Pacific	2,970	99	3.3%
Asian	3,317	52	1.6%
European	13,866	165	1.2%
Not stated/Unspecified	166	3	1.8%
Other ethnic groups	530	4	0.8%
Total	**27,642**	**493**	**1.8%**

Table 17 Referral to audiology by deprivation, April to September 2011

Decile	Number completed screening	Number referred to audiology	% completed screening that were referred
Decile 1-2	4,140	50	1.2%
Decile 3-4	4,377	59	1.3%
Decile 5-6	5,255	60	1.1%
Decile 7-8	6,583	110	1.7%
Decile 9-10	7,280	214	2.9%
Unknown	7	0	0.0%
Total	**27,642**	**493**	**1.8%**

RECOMMENDATIONS ON REFERRAL TO AUDIOLOGY

No recommendations.

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) and rubella; and certain syndromes (Joint Committee on Infant Hearing, 2007).

Children who pass newborn hearing screening but who have certain risk factors require follow-up to detect any subsequent development of hearing loss. International programs 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).

3.7. Targeted Follow-up

An average of 5.3% of babies who passed screening were flagged for targeted follow-up due to the presence of one or more risk factors for delayed onset/progressive hearing loss. This indicator is calculated based on the screening outcome recorded as “Pass, targeted follow-up required” on the Newborn Hearing Screening data from. This is the same percentage as the last period

Table 18 below indicates that the proportion of babies flagged for targeted follow-up varies between DHBs. The highest proportion of targeted follow-up is seen in Northland (12.7%) and this is a little lower than in the previous report. There were no striking changes among any DHBs this period compared to the previous reporting period.

As would be expected, admission to NICU/SCBU (for 48 hours or more) resulted in a higher proportion of babies for targeted follow-up (30%).

More detail on targeted follow-up by ethnicity and deprivation status are presented in Tables 19 and 20. The information indicates that these factors do not seem to be influencing targeted follow-up rates at this time. The proportion of targeted follow-up appears to be slightly higher for Māori babies and slightly lower for Asian babies, this trend is similar to previous reports but the difference is not large.

The high rate this period for babies ‘not stated/unspecified’ is inconsistent with other quarters and is not specific to any DHB so is likely to be an anomaly with this report. This will be tracked in future reports.

Table 18 Proportion of targeted follow-up by DHB and NICU/SCBU, **April to September 2011**

DHB of birth	Well Baby			NICU/SCBU			Total		
	Passed screening	Passed targeted follow-up required	Targeted follow-up proportion	Passed screening	Passed targeted follow-up required	Targeted follow-up proportion	Passed screening	Passed targeted follow-up required	Targeted follow-up proportion
Northland	767	62	8.1%	74	45	60.8%	841	107	12.7%
Waitemata	3,197	115	3.6%	126	42	33.3%	3,323	157	4.7%
Auckland	2,781	68	2.4%	207	75	36.2%	2,988	143	4.8%
Counties Manukau	2,832	109	3.8%	149	57	38.3%	2,981	166	5.6%
Waikato	2,375	78	3.3%	205	70	34.1%	2,580	148	5.7%
Lakes	710	15	2.1%	50	10	20.0%	760	25	3.3%
Bay of Plenty	1,168	27	2.3%	103	13	12.6%	1,271	40	3.1%
Tairawhiti	324	22	6.8%	30	4	13.3%	354	26	7.3%
Taranaki	670	29	4.3%	55	18	32.7%	725	47	6.5%
Hawke's Bay	1,003	48	4.8%	98	17	17.3%	1,101	65	5.9%
Whanganui	331	10	3.0%	15	9	60.0%	346	19	5.5%
Mid Central	938	55	5.9%	85	19	22.4%	1,023	74	7.2%
Hutt Valley	868	22	2.5%	101	28	27.7%	969	50	5.2%
Capital & Coast	1,729	23	1.3%	149	58	38.9%	1,878	81	4.3%
Wairarapa	223	15	6.7%	12	11	91.7%	235	26	11.1%
Nelson Marlborough	728	38	5.2%	53	20	37.7%	781	58	7.4%
West Coast	177	14	7.9%	4	2	50.0%	181	16	8.8%
Canterbury	2,579	67	2.6%	195	12	6.2%	2,774	79	2.8%
South Canterbury	262	3	1.1%	9	8	88.9%	271	11	4.1%
Southern	1,623	68	4.2%	144	38	26.4%	1,767	106	6.0%
Total	**25,285**	**888**	**3.5%**	**1,864**	**556**	**29.8%**	**27,149**	**1,444**	**5.3%**

Table 19 Proportion of targeted follow-up by ethnicity, April to September 2011

Ethnicity	Passed screening	Passed -targeted follow-up required	Targeted follow-up proportion
Māori	6,623	478	7.2%
Pacific Island	2,871	158	5.5%
Asian	3,265	87	2.7%
European	13,701	686	5.0%
Not Stated/Unspecified	163	21	12.9%
Other ethnic groups	526	14	2.7%
Total	**27,149**	**1,444**	**5.3%**

Table 20 Proportion of targeted follow-up by deprivation, April to September 2011

Decile	Passed screening	Passed -targeted follow-up required	Targeted follow-up proportion
Decile 1-2	4,090	200	4.9%
Decile 3-4	4,318	199	4.6%
Decile 5-6	5,195	248	4.8%
Decile 7-8	6,473	350	5.4%
Decile 9-10	7,066	446	6.3%
Unknown	7	1	14.3%
Total	**27,149**	**1,444**	**5.3%**

RECOMMENDATION ON TARGETED FOLLOW-UP

No recommendations.

3.8. Risk Factors

From April to September 2011 2,316 (8.4%) of babies that completed screening had at least one risk factor recorded. This is similar to the last period and less than same time frame in 2010 (12% of babies). From the tables above 1,444 (5.2%) of all babies had a screening outcome of “Pass Targeted follow-up required”. This was also the same as the last period.

The difference in these two figures is explained in part because the risk factor of “jaundice phototherapy” does not require targeted follow-up, but this does not account for the complete difference. It is understood that in some areas clinicians are involved in assessing screening information, and making recommendations on whether targeted follow-up was necessary.

The most frequently reported risk factor was “Family History” (38.2%) followed by “Jaundice Requiring Phototherapy” (22.7%) during this reporting period, this is the same two risk factors that were highest in the last period. For all babies who completed screening these two risk factors accounted for 3.2% and 1.9% of all babies completing screening.

There was an expectation that “Family History” may increase as a proportion given the decision to include second degree relatives since August 2010. This is supported by the information in Table 21, where 38.2% of babies with a risk factor had family history. This is an increase from 25% of babies having this risk factor when this change occurred and consistent with the 43.2% with this risk factor in the previous report. This policy change also clarified the interpretation of ventilation, craniofacial anomalies and TORCHS, and the proportion of these risk factors remains lower as was expected. Ventilation decreased from 18% to 9.7% in the previous 6 months and decreased again to 5.9% for this report. Similarly craniofacial anomalies initially decreased from 13% to 7.3% and has further decreased to 5.3%. TORCH/S also remains lower with an initial decreased from 11% to 3.7% and this report the percentage is steady on 3%. The recording of “other” as a risk factors continues to drop initially from almost a quarter of babies (23%) down to 10.9% and in this report just 5.3%.

Table 21 Frequency of risk factors, April to September 2011

Risk Factor	Number of babies	Of those babies with a risk factor the proportion for each risk factor	Of those babies who started screening the proportion for each risk factor
Family History	884	38.2%	3.2%
Jaundice Requiring Phototherapy	525	22.7%	1.9%
Nicu more than 5 days	324	14.0%	1.2%
Ventilation	137	5.9%	0.5%
Cranio-facial Anomalies	122	5.3%	0.4%
TORCH/S	70	3.0%	0.3%
Syndrome	52	2.2%	0.2%
Bacterial/Viral Meningitis	33	1.4%	0.1%
Head Trauma	30	1.3%	0.1%
Jaundice Transfusion Level	17	0.7%	0.1%
Other	122	5.3%	0.4%

Of the 2,316 babies with one or more risk factors recorded, 82% had just one risk factor, 12% had two, 5% had three, 1% had four and less than one percent had the maximum of five risk factors

1.6 Audiology assessment started

Description

The average time from completing screening to commencing audiology assessment.

The proportion of eligible newborns that are referred from screening who commence audiology assessment.

Relevant Outcome

"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 *do not pass* hearing screening should have the audiology assessment completed by 3 months of age.

Rationale

The UNHSEIP has the core goals of screening completed by 1 month of age and audiology assessment completed by 3 months of age.

This indicator will monitor the time period between the two stages. Prolonged delays, or inequalities amongst groups, in this indicator would warrant investigation.

Methodology

Indicator 1.6a

Average time (in days) from when screening was completed for newborns to when audiology assessment commences[1].

Indicator 1.6b

Numerator:	Number of eligible newborns who start audiology assessment.
Denominator:	Number of eligible newborns who were referred from screening for audiology assessment.

[1] It is expected that this average time should be approximately 4 weeks.

3.9. Audiology Assessment Started

Data in this section is for babies who were referred from screening to audiology (did not pass screening). As per Table 15, 493 babies did not pass screening and were referred to audiology; however audiology information was provided to the NSU and therefore available for just 279 of these babies. This does not necessarily mean that only 57% of referred babies were seen by audiology, but it does mean that DHB audiologists must be encouraged to complete and submit the audiology forms.

The incomplete nature of this audiology information contributes to the variable rates of audiology assessment started between the DHBs. Also in many cases the actual numbers are small and statistical comparisons are not valid or useful.

While there were some referrals from all DHBs, four DHBs show no audiology assessment data (Waitemata, Whanganui, Tairawhiti and West Coast). For Waitemata, West Coast and Whanganui this is as expected because these DHBs have agreements with other DHBs for the provision of audiology services. Table 22 below shows where babies who had an initial screening test had their audiology test performed. The data in the table is based on the 279 babies who started audiology. It can be seen that the majority of audiology tests are undertaken in the same DHB as the initial screening.

For this indicator, the DHB of birth has been used so that DHBs are able to track their referrals. For the other audiology indicators, DHB of audiology has been used, as the responsibility of completing audiology rests with the DHB carrying out the audiology assessments.

Table 22 Comparison of DHB of screening with DHB of audiology assessment, April to September 2011

DHB of Initial Screening	Number of Babies	DHB of Audiology Test	Number of Babies
Northland	36	Northland	36
Waitemata	3	Northland	1
		Auckland	2
Auckland	55	Northland	2
		Auckland	49
		Counties Manukau	3
		Southern	1
Counties Manukau	68	Counties Manukau	68
Waikato	18	Waikato	18
Lakes	2	Waikato	1
		Lakes	1
Bay of Plenty	9	Bay of Plenty	9
Taranaki	17	Taranaki	17
Hawke's Bay	5	Hawke's Bay	5
Mid Central	3	Mid Central	3
Hutt Valley	10	Hutt Valley	9
		Capital & Coast	1
Capital & Coast	19	Hawke's Bay	1
		Capital & Coast	17
		Nelson Marlborough	1
Wairarapa	2	Hutt Valley	1
		Wairarapa	1
Nelson Marlborough	3	Nelson Marlborough	3
Canterbury	17	Canterbury	17
South Canterbury	6	South Canterbury	6
Southern	6	Southern	6
Total	**279**		**279**

Note: based on audiology commenced data

Table 23 below outlines those babies that were referred for audiology and those that commenced. Tables 24 to 25 show the information by ethnicity and decile. In this period 62% of babies categorised as European that were referred to audiology did start assessment, an increase from 52% in the last report. Percentages in other ethnic groups were lower but not markedly different from each other given the number of babies included. There is no consistent trend by decile.

Table 23 Commenced audiology assessment by DHB and NICU/SCBU admission, **April to September 2011**

DHB of birth	Well Baby			NICU/SCBU			Total		
	Refer for audiology	Commenced audiology assessment	Commenced audiology assessment to refer for audiology	Refer for audiology	Commenced audiology assessment	Commenced audiology assessment to refer for audiology	Refer for audiology	Commenced audiology assessment	Commenced audiology assessment to refer for audiology
Northland	31	22	71.0%	21	16	76.2%	52	38	73.1%
Waitemata	29	5	17.2%	11	2	18.2%	40	7	17.5%
Auckland	48	27	56.3%	24	20	83.3%	72	47	65.3%
Counties Manukau	96	62	64.6%	24	8	33.3%	120	70	58.3%
Waikato	21	15	71.4%	3	3	100.0%	24	18	75.0%
Lakes	3	1	33.3%	2	1	50.0%	5	2	40.0%
Bay of Plenty	14	5	35.7%	9	4	44.4%	23	9	39.1%
Tairawhiti	3	0	0.0%	0	0	0.0%	3	0	0.0%
Taranaki	11	9	81.8%	8	8	100.0%	19	17	89.5%
Hawke's Bay	12	3	25.0%	6	3	50.0%	18	6	33.3%
Whanganui	3	0	0.0%	1	0	0.0%	4	0	0.0%
Mid Central	2	2	100.0%	1	1	100.0%	3	3	100.0%
Hutt Valley	3	3	100.0%	6	6	100.0%	9	9	100.0%
Capital & Coast	12	8	66.7%	16	11	68.8%	28	19	67.9%
Wairarapa	3	1	33.3%	0	0	0.0%	3	1	33.3%
Nelson	6	3	50.0%	1		0.0%	7	3	42.9%
West Coast	1	0	0.0%	0	0	-	1	0	0.0%
Canterbury	25	13	52.0%	16	4	25.0%	41	17	41.5%
South Canterbury	5	5	100.0%	1	1	100.0%	6	6	100.0%
Southern	6	3	50.0%	9	4	44.4%	15	7	46.7%
Total	**334**	**187**	**56.0%**	**159**	**92**	**57.9%**	**493**	**279**	**56.6%**

Table 24 Commenced audiology assessment by ethnicity, April to September 2011

Ethnicity	Refer for audiology	Commenced audiology assessment	Commenced audiology assessment to refer for audiology
Māori	170	90	52.9%
Pacific	99	54	54.5%
Asian	52	28	53.8%
European	165	102	61.8%
Not stated/Unspecified	3	2	66.7%
Other ethnic groups	4	3	75.0%
Total	**493**	**279**	**56.6%**

Table 25 Commenced audiology assessment by decile, April to September 2011

Decile	Refer for audiology	Commenced audiology assessment	Commenced audiology assessment to refer for audiology
Decile 1-2	50	27	54.0%
Decile 3-4	59	34	57.6%
Decile 5-6	60	35	58.3%
Decile 7-8	110	60	54.5%
Decile 9-10	214	123	57.5%
Total	**493**	**279**	**56.6%**

RECOMMENDATIONS ON AUDIOLOGY ASSESSMENT STARTED

No recommendations.

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.

3.10. Audiology Assessment Completed

The number of audiology assessments completed and started is almost the same, as shown in Table 26. This is because generally audiology forms are sent to the NSU only when the audiology assessment is complete. Audiologists are being encouraged to send in initial and completed assessment forms if assessment is not completed on the same day, however this is not occurring very often yet. Electronic reporting separates out started from completed which means that this indicator will improve as more DHBs move to electronic reporting.

As shown in Table 27, data on audiology assessment completion by three months is variable. Percentages are particularly low for Counties Manukau, Hawkes Bay and Northland, although with small numbers in many DHBs it is not useful to make comparisons. Figure 4 below shows the percentage of babies who completed audiology along with the percent of those completing that did so by 3 months.

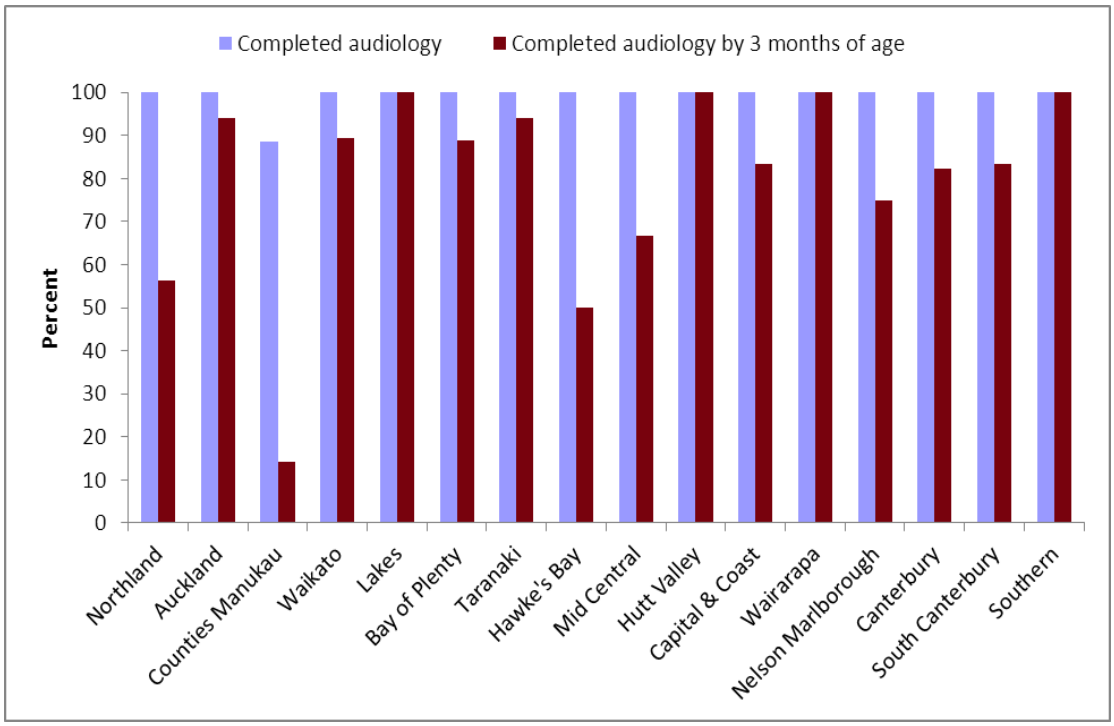


Figure 4 **Proportion of babies who complete audiology, and the proportion of those who had completed audiology by the time they were three months of age April to September 2011, by DHB of audiology**

Figure 5 shows the range of completion times for babies who underwent audiology assessment. There were 10 babies who took longer than 27 weeks, the longest being 51 weeks .

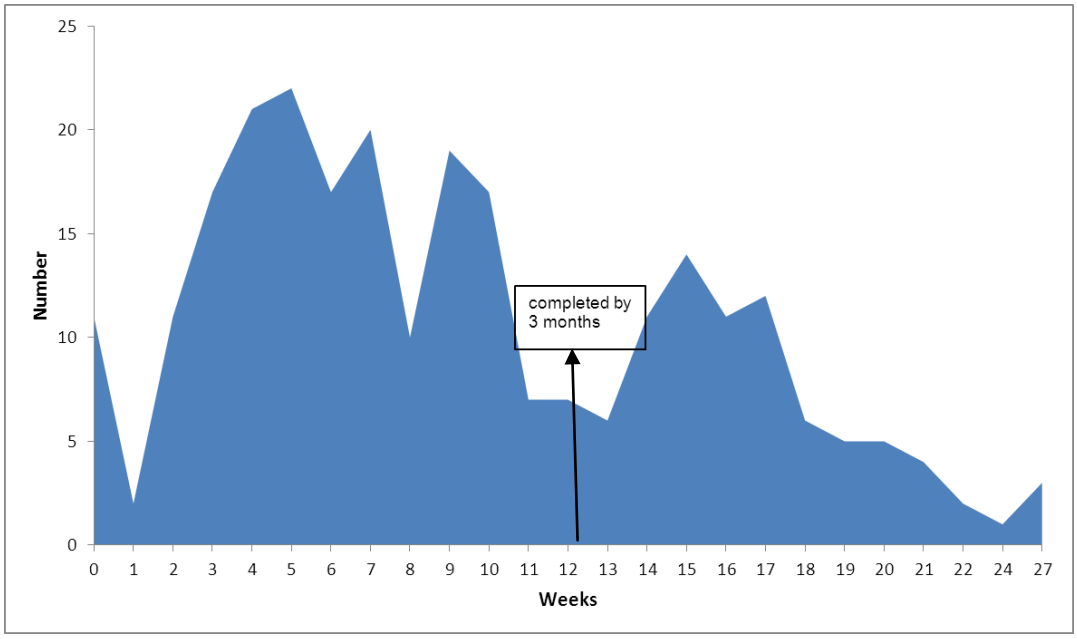


Figure 5 Audiology completion times, April to September 2011

Table 26 Audiology completed by DHB, April to September 2011

DHB of Audiology	Well Baby			NICU/SCBU			Total		
	Audiology commenced	Audiology completed	% Completed that commenced	Audiology commenced	Audiology completed	% Completed that commenced	Audiology commenced	Audiology completed	% Completed that commenced
Northland	23	23	100.0%	16	16	100.0%	39	39	100.0%
Waitemata									
Auckland	30	30	100.0%	21	21	100.0%	51	51	100.0%
Counties Manukau	62	55	88.7%	9	8	88.9%	71	63	88.7%
Waikato	15	15	100.0%	4	4	100.0%	19	19	100.0%
Lakes	1	1	100.0%				1	1	100.0%
Bay of Plenty	5	5	100.0%	4	4	100.0%	9	9	100.0%
Tairawhiti									
Taranaki	9	9	100.0%	8	8	100.0%	17	17	100.0%
Hawke's Bay	3	3	100.0%	3	3	100.0%	6	6	100.0%
Whanganui									
MidCentral	2	2	100.0%	1	1	100.0%	3	3	100.0%
Hutt Valley	4	4	100.0%	6	6	100.0%	10	10	100.0%
Capital & Coast	8	8	100.0%	10	10	100.0%	18	18	100.0%
Wairarapa	1	1	100.0%				1	1	100.0%
Nelson Marlborough	3	3	100.0%	1	1	100.0%	4	4	100.0%
West Coast									
Canterbury	13	13	100.0%	4	4	100.0%	17	17	100.0%
South Canterbury	5	5	100.0%	1	1	100.0%	6	6	100.0%
Southern	3	3	100.0%	4	4	100.0%	7	7	100.0%
Total	**187**	**180**	96.3%	**92**	**91**	98.9%	**279**	**271**	97.1%

Table 27 Audiology completed by three months of age by DHB, April to September 2011

DHB of Audiology	Well Baby			NICU/SCBU			Total		
	Audiology completed	Completed audiology by 3 months of age	% of completed by 3 month of age	Audiology completed	Completed audiology by 3 months of age	% of completed by 3 month of age	Audiology completed	Completed audiology by 3 months of age	% of completed by 3 month of age
Northland	23	10	43.5%	16	12	75.0%	39	22	56.4%
Waitemata									
Auckland	30	28	93.3%	21	20	95.2%	51	48	94.1%
Counties Manukau	55	4	7.3%	8	5	62.5%	63	9	14.3%
Waikato	15	13	86.7%	4	4	100.0%	19	17	89.5%
Lakes	1	1	100.0%	0	0	-	1	1	100.0%
Bay of Plenty	5	4	80.0%	4	4	100.0%	9	8	88.9%
Tairawhiti									
Taranaki	9	9	100.0%	8	7	87.5%	17	16	94.1%
Hawke's Bay	3	1	33.3%	3	2	66.7%	6	3	50.0%
Whanganui									
MidCentral	2	1	50.0%	1	1	100.0%	3	2	66.7%
Hutt Valley	4	4	100.0%	6	6	100.0%	10	10	100.0%
Capital & Coast	8	6	75.0%	10	9	90.0%	18	15	83.3%
Wairarapa	1	1	100.0%	0	0	-	1	1	100.0%
Nelson Marlborough	3	2	66.7%	1	1	100.0%	4	3	75.0%
West Coast									
Canterbury	13	10	76.9%	4	4	100.0%	17	14	82.4%
South Canterbury	5	5	100.0%	1	0	0.0%	6	5	83.3%
Southern	3	3	100.0%	4	4	100.0%	7	7	100.0%
Total	**180**	**102**	**56.7%**	**91**	**79**	**86.8%**	**271**	**181**	**66.8%**

Factors such as ethnicity and deprivation status may influence completion rates, and/or the time taken for the completion for newborn hearing screening. The information presented in Tables 28 and 29 indicates some difference by ethnicity and decile — specifically the percentage of Pacific and Māori babies that complete by 3 months and those in decile groups 9-10 appears to be lower than for others.

Table 28 Audiology screening completed by ethnicity, April to September 2011

Ethnicity	Audiology Commenced	Audiology Completed	Completed Audiology by 3 months of age	% Completed that commenced	% commenced that completed by 3 month of age
Māori	90	87	53	96.7%	60.9%
Pacific Island	54	49	25	90.7%	51.0%
Asian	28	28	19	100.0%	67.9%
European	102	102	80	100.0%	78.4%
Not Stated/Unspecified	2	2	2	100.0%	100.0%
Other ethnic groups	3	3	2	100.0%	66.7%
Total	**279**	**271**	**181**	**97.1%**	**66.8%**

Table 29 Audiology screening completed by deprivation, April to September 2011

Decile	Audiology Commenced	Audiology Completed	Completed Audiology by 3 months of age	% Completed that commenced	% commenced that completed by 3 month of age
Decile 1-2	27	27	22	100.0%	81.5%
Decile 3-4	34	34	24	100.0%	70.6%
Decile 5-6	35	35	25	100.0%	71.4%
Decile 7-8	60	59	48	98.3%	81.4%
Decile 9-10	123	116	62	94.3%	53.4%
Total	**279**	**271**	**181**	**97.1%**	**66.8%**

RECOMMENDATIONS ON AUDIOLOGY ASSESSMENT COMPLETED

No recommendations.

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 (i.e. by severity and type).

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).

3.11. Permanent Congenital Hearing Loss Detected By Audiology Assessment

For this indicator, permanent congenital hearing loss is defined by an audiology outcome of 'Auditory Neuropathy', 'Sensorineural' or 'Mixed' in at least one ear. Table 30 below summaries the results for the 24 babies identified within this indicator.

Table 30 Audiology test results by DHB, April to September 2011

DHB of audiology	Right test result	Left test result	Number of babies
Northland	Mixed	Mixed	1
Northland	Conductive Permanent	Mixed	1
Auckland	Normal	Auditory Neuropathy	1
Auckland	Sensorineural	Sensorineural	1
Auckland	Mixed	Mixed	1
Waikato	Mixed	Sensorineural	1
Waikato	Sensorineural	Sensorineural	2
Waikato	Normal	Mixed	1
Taranaki	Sensorineural	Sensorineural	1
Hawke's Bay	Auditory Neuropathy	Auditory Neuropathy	1
Hutt Valley	Sensorineural	Normal	2
Capital & Coast	Sensorineural	Normal	1
Capital & Coast	Sensorineural	Sensorineural	3
Capital & Coast	Normal	Sensorineural	2
Capital & Coast	Mixed	Mixed	1
Nelson Marlborough	Normal	Sensorineural	1
Canterbury	Sensorineural	Sensorineural	1
South Canterbury	Mixed	Mixed	1
South Canterbury	Sensorineural	Sensorineural	1
			24

Table 31 below indicates that 8.9% of babies that completed an audiology assessment had a permanent congenital hearing loss detected, up slightly from 7.2% last period.

Tables 32 to 33 outline the data by ethnicity and decile but again due to small numbers these are included as background information only. The numbers are too small to draw any conclusions.

Table 31 Permanent congenital hearing loss by DHB, April to September 2011

DHB of Audiology	Well Baby			NICU/SCBU			Total		
	Completed audiology	Permanent congenital hearing loss	Permanent hearing loss to completed audiology	Completed audiology	Permanent congenital hearing loss	Permanent hearing loss to completed audiology	Completed audiology	Permanent congenital hearing loss	Permanent hearing loss to completed audiology
Northland	23	1	4.3%	16	1	6.3%	39	2	5.1%
Waitemata									
Auckland	30	1	3.3%	21	2	9.5%	51	3	5.9%
Counties Manukau	55	0	0.0%	8	0	0.0%	63	0	0.0%
Waikato	15	3	20.0%	4	1	25.0%	19	4	21.1%
Lakes	1	0	0.0%	0	0		1	0	0.0%
Bay of Plenty	5	0	0.0%	4	0	0.0%	9	0	0.0%
Tairawhiti									
Taranaki	9	0	0.0%	8	1	12.5%	17	1	5.9%
Hawke's Bay	3	1	33.3%	3	0	0.0%	6	1	16.7%
Whanganui									
MidCentral	2	0	0.0%	1	0	0.0%	3	0	0.0%
Hutt Valley	4	1	25.0%	6	0	0.0%	10	1	10.0%
Capital & Coast	8	3	37.5%	10	4	40.0%	18	7	38.9%
Wairarapa	1	0	0.0%	0	0	-	1	0	0.0%
Nelson Marlborough	3	1	33.3%	1	1	100.0%	4	2	50.0%
West Coast									
Canterbury	13	1	7.7%	4	0	0.0%	17	1	5.9%
South Canterbury	5	1	20.0%	1	1	100.0%	6	2	33.3%
Southern	**3**	**0**	0.0%	**4**	**0**	0.0%	**7**	0	0.0%
Total	**180**	**13**	**7.2%**	**91**	**11**	**12.1%**	**271**	**24**	**8.9%**

Table 32 Permanent congenital hearing loss by ethnicity, April to September 2011

Ethnicity	Completed audiology	Permanent congenital hearing loss	Permanent hearing loss to completed audiology
Māori	87	9	10.3%
Pacific	49	5	10.2%
Asian	28	3	10.7%
European	102	7	6.7%
Not Stated/Unspecified	2	0	0.0%
Other ethnic groups	3	0	0.0%
Total	**271**	**24**	**8.9%**

Table 33 Permanent congenital hearing loss by deprivation, April to September 2011

Decile	Completed audiology	Permanent congenital hearing loss	Permanent hearing loss to completed audiology
Decile 1-2	27	4	14.8%
Decile 3-4	34	4	11.8%
Decile 5-6	35	1	2.9%
Decile 7-8	59	9	15.3%
Decile 9-10	116	6	5.2%
Total	**271**	**24**	**8.9%**

RECOMMENDATIONS ON HEARING LOSS DETECTED BY AUDIOLOGY ASSESSMENT

2) Mixed Hearing loss to be included in Permanent Congenital Hearing Loss category.

3.12. Newborns with Conductive Loss

This indicator has been used to capture all the outcomes from audiology which were not 'Auditory Neuropathy', 'Sensorineural' or 'Mixed' in at least one ear, or "Normal". In this stage of reporting audiology, all information will be presented, however over time, some amalgamation of categories may be recommended. Table 34 summarises the audiology results for these 80 babies.

Table 34 Audiology test results by DHB of audiology, April to September 2011

DHB of audiology	Right test result	Left test result	No. babies
Auckland	Conductive Temporary	Conductive Temporary	13
Auckland	Conductive Temporary	Normal	5
Auckland	Conductive Temporary	Not Yet Determined	2
Auckland	Normal	Conductive Temporary	4
Bay of Plenty	Conductive Temporary	Conductive Temporary	3
Canterbury	Conductive Permanent	Conductive Permanent	3
Canterbury	Conductive Temporary	Normal	2
Canterbury	Normal	Conductive Permanent	2
Capital & Coast	Conductive Permanent	Conductive Permanent	2
Counties Manukau	Conductive Temporary	Conductive Temporary	4
Counties Manukau	Conductive Temporary	Normal	1
Counties Manukau	Not Yet Determined	Conductive Temporary	2
Hawke's Bay	Normal	Conductive Temporary	2
Hutt Valley	Conductive Temporary	Conductive Temporary	2
Hutt Valley	Conductive Temporary	Normal	2
Mid Central	Conductive Temporary	Conductive Temporary	1
Mid Central	Normal	Conductive Temporary	1
Northland	Conductive Temporary	Conductive Temporary	3
Northland	Conductive Temporary	Normal	2
Northland	Conductive Temporary	Not Yet Determined	2
Northland	Normal	Conductive Temporary	2
South Canterbury	Conductive Temporary	Conductive Temporary	1
Southern	Conductive Temporary	Conductive Temporary	2
Southern	Not Yet Determined	Conductive Temporary	1
Taranaki	Conductive Permanent	Conductive Permanent	1
Taranaki	Conductive Temporary	Conductive Temporary	4
Taranaki	Not Yet Determined	Conductive Temporary	1
Waikato	Conductive Temporary	Conductive Temporary	7
Waikato	Conductive Temporary	Normal	2
Wairarapa	Conductive Temporary	Conductive Temporary	1
			80

Table 35 identifies 29.5% of babies that completed audiology assessment had some kind of hearing loss, excluding sensorineural and auditory neuropathy. As with other data in the audiology section of this report, numbers are too small to make meaningful comparisons between DHBs. The percentage of NICU/SCBU babies that completed audiology with a mild hearing loss was 38.5% compared to 25.0% for well babies.

Differences do appear in the percentages of babies identified with a mild hearing loss among those completing audiology. Specifically the percentage for Māori (40%) is much higher than other ethnic groups. There is a slight, but not consistent increase across decile levels with the lowest percentage in Decile 1-2 (18.5%) and the highest in Decile 7-8 (33.9%). Further detail can be seen in Tables 36 and 37.

RECOMMENDATIONS ON CONDUCTIVE HEARING LOSS

No recommendations.

Table 35 Conductive hearing loss by DHB, April to September 2011

DHB of Audiology	Well Baby			NICU/SCBU			Total		
	Completed audiology	Conductive hearing loss	Conductive hearing loss to completed audiology	Completed audiology	Conductive hearing loss	Conductive hearing loss to completed audiology	Completed audiology	Conductive hearing loss	Conductive hearing loss to completed audiology
Northland	23	4	17.4%	16	5	31.3%	39	9	23.1%
Waitemata									
Auckland	30	12	40.0%	21	12	57.1%	51	24	47.1%
Counties Manukau	55	5	9.1%	8	2	25.0%	63	7	11.1%
Waikato	15	8	53.3%	4	1	25.0%	19	9	47.4%
Lakes	1	0	0.0%	0	0	-	1	0	0.0%
Bay of Plenty	5	2	40.0%	4	1	25.0%	9	3	33.3%
Tairawhiti									
Taranaki	9	4	44.4%	8	2	25.0%	17	6	35.3%
Hawke's Bay	3	1	33.3%	3	1	33.3%	6	2	33.3%
Whanganui									
MidCentral	2	1	50.0%	1	1	100.0%	3	2	66.7%
Hutt Valley	4	0	0.0%	6	4	66.7%	10	4	40.0%
Capital & Coast	8	1	12.5%	10	1	10.0%	18	2	11.1%
Wairarapa	1	1	100.0%	0	0	-	1	1	100.0%
Nelson Marlborough	3	0	0.0%	1	0	0.0%	4	0	0.0%
West Coast									
Canterbury	13	5	38.5%	4	2	50.0%	17	7	41.2%
South Canterbury	5	1	20.0%	1	0	0.0%	6	1	16.7%
Southern	**3**	**0**	0.0%	**4**	**3**	75.0%	**7**	3	42.9%
Total	**180**	**45**	**25.0%**	**91**	**35**	**38.5%**	**271**	**80**	**29.5%**

Table 36 Conductive hearing loss by ethnicity, April to September 2011

Ethnicity	Completed audiology	Conductive hearing Loss	Conductive hearing loss to completed audiology
Māori	87	35	40.2%
Pacific	49	10	20.4%
Asian	28	7	25.0%
European	102	26	25.5%
Not Stated/Unspecified	2	1	50.0%
Other ethnic groups	3	1	33.3%
Total	**271**	**80**	**29.5%**

Table 37 Conductive hearing loss by deprivation, April to September 2011

Decile	Completed audiology	Conductive hearing Loss	Conductive hearing loss to completed audiology
Decile 1-2	27	5	18.5%
Decile 3-4	34	10	29.4%
Decile 5-6	35	10	28.6%
Decile 7-8	59	20	33.9%
Decile 9-10	116	35	30.2%
Total	**271**	**80**	**29.5%**

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 under.

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 weeks) at which hearing loss was confirmed by audiology assessment.

3.13. Age at Identification of Hearing Loss

The aim of the UNHSEIP is to have hearing loss detected by the time the baby is 3 months of age. As was seen in Table 27, around 66.8% of those babies that completed audiology in this period had their audiology assessment completed by three months of age. Table 38 below identifies how the age of identification is spread across months, based on the corrected age of the baby.

Table 38 Count of average age at identification of hearing loss, by DHB and protocol, April to September 2011

DHB of Audiology	Well Baby				NICU/SCBU				All Babies				**Total**
	By 4 weeks	By 8 weeks	By 12 weeks	Over 12 weeks	By 4 weeks	By 8 weeks	By 12 weeks	Over 12 weeks	By 4 weeks	By 8 weeks	By 12 weeks	Over 12 weeks	
Northland	0	1	2	2	1	2	3	0	1	3	5	2	11
Auckland	0	4	8	1	5	7	1	1	5	11	9	2	27
Counties Manukau	0	0	1	4	0	0	1	1	0	0	2	5	7
Waikato	0	4	5	2	1	0	1	0	1	4	6	2	13
Bay of Plenty	0	1	0	1	1	0	0	0	1	1	0	1	3
Taranaki	0	2	2	0	1	0	1	1	1	2	3	1	7
Hawke's Bay	0	1	0	1	0	0	0	1	0	1	0	2	3
Mid Central	0	0	1	0	0	0	1	0	0	0	2	0	2
Hutt Valley	0	1	0	0	1	3	0	0	1	4	0	0	5
Capital & Coast	1	1	0	2	2	2	0	1	3	3	0	3	9
Wairarapa	0	1	0	0	0	0	0	0	0	1	0	0	1
Nelson Marlborough	0	1	0	0	0	1	0	0	0	2	0	0	2
Canterbury	0	1	4	1	0	1	1	0	0	2	5	1	8
South Canterbury	1	1	0	0	0	0	0	1	1	1	0	1	3
Southern	0	0	0	0	1	1	1	0	1	1	1	0	3
Total	**2**	**19**	**23**	**14**	**13**	**17**	**10**	**6**	**15**	**36**	**33**	**20**	**104**

RECOMMENDATIONS ON AGE AT HEARING LOSS DETECTED

No recommendations.

4. Indicators not yet included in monitoring

Comment: this will be possible to report in the future, but the data is not yet available

1.10 Age at first assistive hearing device
Description The age at which the first assistive hearing device[2] is fitted.
Relevant Outcome No outcome target for the programme at present (see rationale section).
Rationale "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. It is common for international programmes to monitor factors around hearing aid fitting, cochlear implants and follow-up. 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.
Methodology ***Indicator 1.10a – All Devices*** Average age of eligible children at which the first assistive hearing device was fitted. ***Indicator 1.10b – Hearing Aids*** Average age of eligible children at which a hearing aid was first fitted. ***Indicator 1.10c – Cochlear Implants*** Average age of eligible children at which a cochlear implant was first fitted[3].

[2] An assistive hearing device includes: hearing aids, cochlear implants, or FM amplification systems.

[3] 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).

1.12 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 UNHESIP 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

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).

Relevant Outcome (Target)

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.

Rationale

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.

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.

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.

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.

Methodology

Indicator 2.1

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

Description

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.

Relevant Outcome

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.

Rationale

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.

Methodology

Indicator 2.3a

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.

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

Indicator 2.3b

Numerator: Number of children referred to, and eligible for, the Early Intervention education service (through UNHS) still receiving a service at school entry.

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

NOTES:

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 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.