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

October 2011 – March 2012

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.

Acknowledgements
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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 October 2011 to 31 March 2012. This report completes two years of UNHSEIP monitoring on both screening and audiology.

Tables 1 and 2 on pages 3-4 provide a summary of the screening and audiology information contained within this report.

Key Points from October 2011 to March 2012

- Within this reporting period, 93% 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% declined to take it up.
- Of parents/guardians offered hearing screening for their baby, 96% consented to this screening.
- In this period almost all families who consented to screening did start the process (99.9%). These high rates were consistent across DHBs, ethnicities and decile groups. Similarly high rates of completion were found once babies started screening (99.1%) completion, once again showing little difference across DHBs, ethnicity or decile ratings.
- In total 27,042 babies completed newborn hearing screening in this six month period, compared with the 30,829 live births. While these figures come from different data sets, this indicates that approximately 88% 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 67.7% to 99.6%, however

most DHBs had rates of 88% and above. There was only small variations by ethnicity and virtually none by decile.

- Overall the referral rate to audiology was low in this period at just 1.5% (408 babies). This rate ranged from 0.3% to 4.5% between DHBs. The referral rate for NICU/SCBU babies was higher at 7% 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 2% to 10% and was higher for babies from NICU/SCBU at 26%.
- Of those babies referred to audiology, 62% are reported to have started audiology assessment. This rate varied significantly between DHBs from 0% through to 100%. Of the 408 babies who did not pass screening and were referred to audiology, information was recorded in the national database for just 254 of these babies.

  This does not mean that 40% 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, 86% 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.
- 30 babies (12.1% 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 or mixed hearing loss, 29% (73 babies).
- For the 103 babies in total identified with a hearing loss the ages at which the hearing loss was identified were: 24 by 4 weeks, 39 by 8 weeks, 20 by 12 weeks and the remaining 20 by over 12 weeks.

Table 1a Summary of newborn hearing screening indicators by DHB, for October 2011 to March 2012

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 consents for screening	Completed screening by 1 month to completed	Referral rate to audiology	Targeted follow-up
Northland	1,172	904	904	903	612	862	41	80		77.1%	100.0%	99.9%	67.8%	4.5%	9.3%
Waitemata	3,987	3,371	3,365	3,337	3,002	3,300	37	140		84.5%	99.8%	99.0%	90.0%	1.1%	4.2%
Auckland	3,331	3,002	3,000	2,982	2,827	2,931	51	122		90.1%	99.9%	99.3%	94.8%	1.7%	4.2%
Counties Manukau	4,327	3,092	3,092	2,964	2,624	2,907	57	177		71.5%	100.0%	95.9%	88.5%	1.8%	6.1%
Waikato	2,708	2,546	2,543	2,541	2,408	2,507	34	143		94.0%	99.9%	99.8%	94.8%	1.3%	5.7%
Lakes	779	754	754	753	737	746	7	25		96.8%	100.0%	99.9%	97.9%	0.9%	3.4%
Bay of Plenty	1,417	1,269	1,269	1,268	1,174	1,246	22	26		89.6%	100.0%	99.9%	92.6%	1.7%	2.1%
Tairawhiti	368	326	325	323	316	319	4	26		88.6%	99.7%	99.1%	97.8%	1.2%	8.2%
Taranaki	792	735	735	735	730	717	18	74		92.8%	100.0%	100.0%	99.3%	2.4%	10.3%
Hawke's Bay	1,110	1,057	1,057	1,055	1,042	1,045	10	60		95.2%	100.0%	99.8%	98.8%	0.9%	5.7%
Whanganui	429	375	374	372	364	371	1	27		87.4%	99.7%	99.2%	97.8%	0.3%	7.3%
Mid Central	1,112	821	821	821	582	812	9	62		73.8%	100.0%	100.0%	70.9%	1.1%	7.6%
Hutt Valley	1,054	1,049	1,047	1,037	1,032	1,031	6	35		99.5%	99.8%	98.9%	99.5%	0.6%	3.4%
Capital & Coast	1,943	1,929	1,928	1,926	1,886	1,895	31	88		99.3%	99.9%	99.8%	97.9%	1.6%	4.6%
Wairarapa	280	269	269	269	243	265	4	20		96.1%	100.0%	100.0%	90.3%	1.5%	7.5%
Nelson Marlborough	759	756	756	752	715	740	12	40		99.6%	100.0%	99.5%	95.1%	1.6%	5.4%
West Coast	211	151	151	148	143	147	1	5		71.6%	100.0%	98.0%	96.6%	0.7%	3.4%
Canterbury	2,980	2,909	2,898	2,896	2,774	2,855	41	108		97.6%	99.6%	99.6%	95.8%	1.4%	3.8%
South Canterbury	289	277	277	275	273	273	2	7		95.8%	100.0%	99.3%	99.3%	0.7%	2.6%
Southern	1,781	1,729	1,729	1,685	1,601	1,665	20	86		97.1%	100.0%	97.5%	95.0%	1.2%	5.2%
Total	**30,829**	**27,321**	**27,294**	**27,042**	**25,085**	**26,634**	**408**	**1,351**		**88.6%**	**99.9%**	**99.0%**	**92.8%**	**1.5%**	5.1%

Table 1b Summary of newborn hearing screening indicators by ethnicity and deprivation for October 2011 to March 2012

DHB of Birth		Consent for screen	Started screen	Completed screening	Completed screening by 1 month of age	Pass	Referred to sudiology	Passed with targeted follow-up			Started screening to consented for screening	Completed screening to consents for screening	Completed screening by 1 month to completed	Referral rate to audiology	Targeted follow-up
Ethnicity															
Maori		6,531	6,518	6,460	5,802	6,310	150	443			99.8%	98.9%	89.8%	2.3%	6.8%
Pacific		2,725	2,721	2,653	2,373	2,606	47	123			99.9%	97.4%	89.4%	1.7%	4.5%
Asian		3,413	3,413	3,377	3,193	3,336	41	102			100.0%	98.9%	94.6%	1.2%	3.0%
European		13,894	13,885	13,806	13,021	13,646	160	661			99.9%	99.4%	94.3%	1.2%	4.8%
Unspecified		123	123	115	103	111	4	5			100.0%	93.5%	89.6%	3.3%	4.1%
Other ethnic groups		635	634	631	593	625	6	17			99.8%	99.4%	94.0%	0.9%	2.7%
Total		**27,321**	**27,294**	**27,042**	**25,085**	**26,634**	**408**	**1,351**			**99.8%**	**99.0%**	**92.8%**	**1.5%**	**4.9%**
Deprivation															
Decile 1-2		4,188	4,187	4,150	3,950	4,099	51	164			100.0%	99.1%	95.2%	1.2%	3.9%
Decile 3-4		4,340	4,339	4,311	4,076	4,261	50	203			100.0%	99.3%	94.5%	1.2%	4.7%
Decile 5-6		5,196	5,194	5,161	4,825	5,082	79	230			100.0%	99.3%	93.5%	1.5%	4.4%
Decile 7-8		6,486	6,476	6,425	5,961	6,331	94	339			99.8%	99.1%	92.8%	1.4%	5.2%
Decile 9-10		7,097	7,084	6,982	6,261	6,849	133	415			99.8%	98.4%	89.7%	1.9%	5.8%
Unknown		14	14	13	12	12	1	**0**			100.0%	92.9%	92.3%	7.1%	0.0%
Total		**27,321**	**27,294**	**27,042**	**25,085**	**26,634**	**408**	**1,351**			**99.9%**	**99.0%**	**92.8%**	**1.5%**	**4.9%**

Table 2a Summary of newborn hearing audiology indicators by DHB for October 2011 to March 2012

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	38	38	27	0	7		100.0%	71.1%	0.0%	18.4%
Waitemata										
Auckland	40	39	39	1	12		97.5%	100.0%	2.6%	30.8%
Counties Manukau	17	12	10	0	0		70.6%	83.3%	0.0%	0.0%
Waikato	30	30	23	9	13		100.0%	76.7%	30.0%	43.3%
Lakes	5	5	5	2	2		100.0%	100.0%	40.0%	40.0%
Bay of Plenty	13	13	12	3	0		100.0%	92.3%	23.1%	0.0%
Tairawhiti										
Taranaki	17	17	15	2	8		100.0%	88.2%	11.8%	47.1%
Hawke's Bay	8	8	7	2	1		100.0%	87.5%	25.0%	12.5%
Whanganui	1	1	0	0	0		100.0%	0.0%	0.0%	0.0%
Mid Central	10	10	10	0	3		100.0%	100.0%	0.0%	30.0%
Hutt Valley	12	12	12	2	8		100.0%	100.0%	16.7%	66.7%
Capital & Coast	14	14	13	3	3		100.0%	92.9%	21.4%	21.4%
Wairarapa				0					-	
Nelson Marlborough	11	11	10	2	3		100.0%	90.9%	18.2%	27.3%
West Coast										
Canterbury	21	21	16	2	7		100.0%	76.2%	9.5%	33.3%
South Canterbury	2	2	2	1	0		100.0%	100.0%	50.0%	0.0%
Southern	15	15	12	1	6		100.0%	80.0%	6.7%	40.0%
Total	**254**	**248**	**213**	**30**	**73**		**97.6%**	**85.9%**	**12.1%**	**29.4%**

Table 2b Summary of newborn hearing audiology indicators by ethnicity, deprivation and birth location for October 2011 to March 2012

	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										
Maori	100	98	73	12	32		98.0%	74.5%	12.2%	32.7%
Pacific	16	14	13	1	2		87.5%	92.9%	7.1%	14.3%
Asian	22	21	21	1	7		95.5%	100.0%	4.8%	33.3%
European	109	108	99	16	30		99.1%	91.7%	14.8%	27.8%
Other ethnic groups	3	3	3	0	0		100.0%	100.0%	0.0%	0.0%
Not known/Unspecified	4	4	4	0	2		100.0%	100.0%	0.0%	50.0%
Total	**254**	**248**	**213**	**30**	**73**		**97.6%**	**85.9%**	**12.1%**	**29.4%**
Deprivation										
Decile 1-2	29	29	27	4	7		100.0%	93.1%	13.8%	24.1%
Decile 3-4	40	40	35	6	10		100.0%	87.5%	15.0%	25.0%
Decile 5-6	50	50	40	7	17		100.0%	80.0%	14.0%	34.0%
Decile 7-8	64	63	54	10	20		98.4%	85.7%	15.9%	31.7%
Decile 9-10	71	66	57	3	19		93.0%	86.4%	4.5%	28.8%
Total	**254**	**248**	**213**	**30**	**73**		**97.6%**	**85.9%**	**12.1%**	**29.4%**

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.

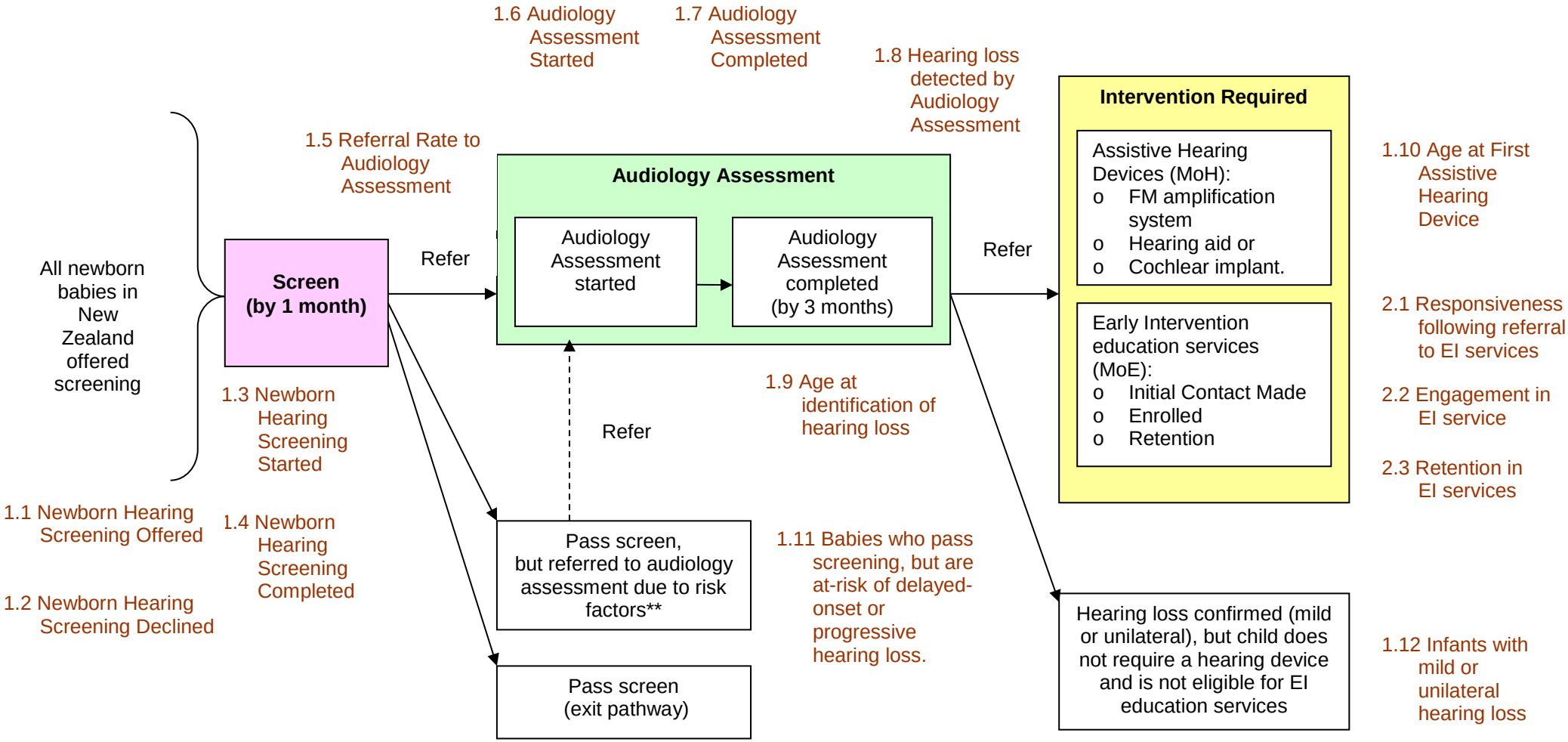
In 2007, a Monitoring Framework, centred around the Programme goals, was developed (http://www.nsu.govt.nz/health-professionals/3824.aspx). A Monitoring Framework is a plan for the routine, systematic collection and recording of information about aspects of the programme over time. The purpose is to 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 October 2011 through to 31 March 2012, 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

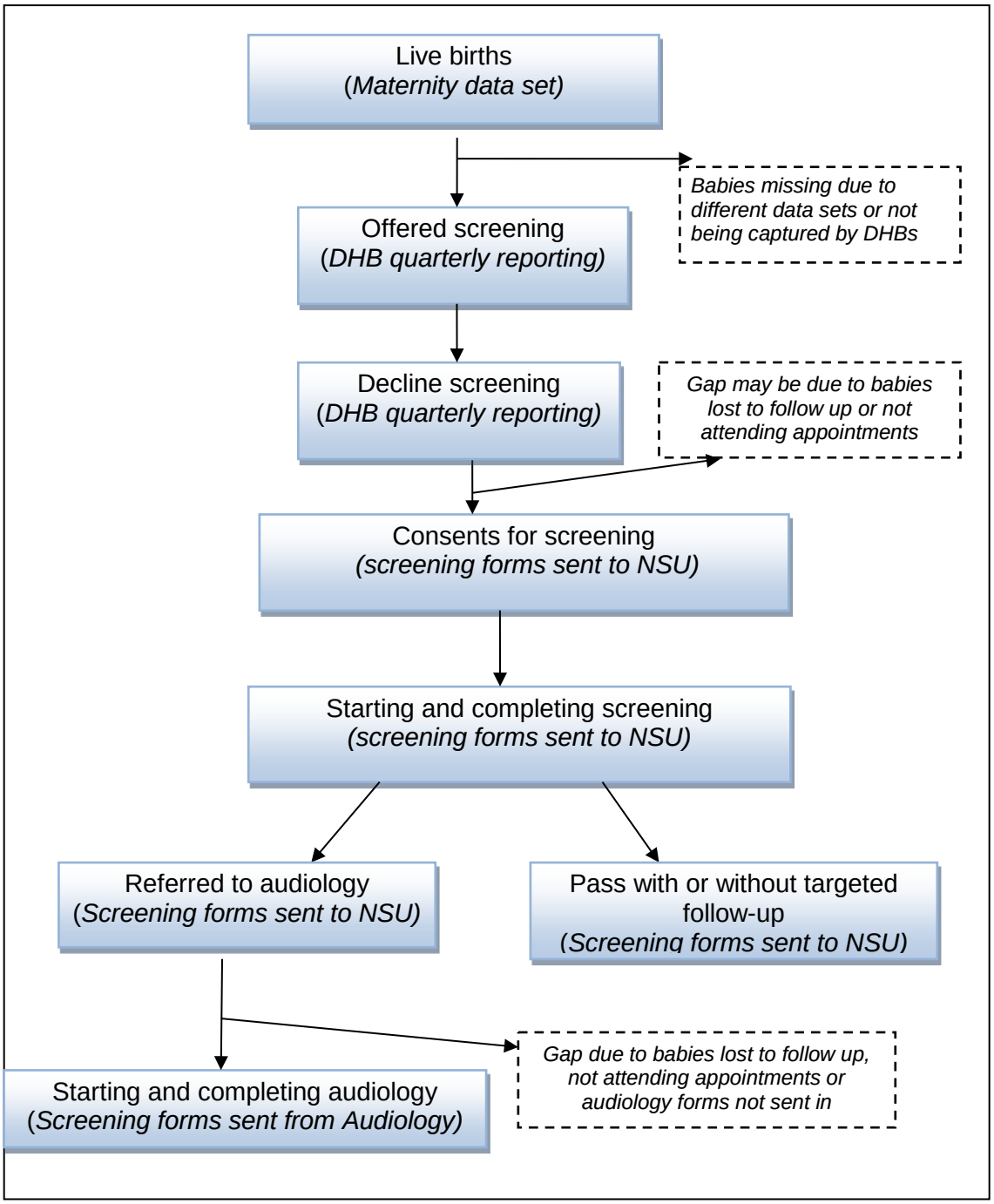
Newborn hearing screening and follow up audiology information is captured by the Ministry of Health's National Screening Unit (NSU) in two ways. Some DHBs collect and recorded this information on paper forms, which are regularly submitted NSU and the data is entered into the NSU's web-based application/database. 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. Then the NSU systematically checks the data for missing values and discrepancies. There are over 30 business rules 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 October 2011 and 31 March 2012. 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 shows 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 six babies. Four ethnicities were recorded for 61 babies and three ethnicities were recorded for 3% of babies (n=673). Two ethnicities were recorded for 18% of babies (n=4863) and the remaining 80% 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:

- income derived from benefits
- unemployment
- low income earning
- access to car
- access to telephone
- sole-parent families
- lack of formal educational qualifications
- level of home ownership
- 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 (1.2% of records, n=328). 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.

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 254 of the 408 babies that were referred for audiology assessment.

Denominator

For the purpose of this report, birth data is sourced from the 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 has been used for the past 18 months of reporting.

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, 92.7% of babies were offered newborn hearing screening, compared with live births. This is slight decrease from the 93.8 % in the April to September 2011 reporting period.

Across the 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 West Coast 74.4%. The low rates for Counties Manukau, Waitemata and Northland is off set by the greater than 100% rate for Auckland (see discussion below).

There were no notable increase in the percentage offered this period but Northland and West Coast show a decrease from the last report of over 10 percentage points.

Table 4 Offer of Screening by DHB for 1 October 2011 to 31 March 2012

DHB	Live births	Offered screening	Percentage offered
Northland	1,172	924	78.8%
Waitemata	3,987	3,067	76.9%
Auckland	3,331	3,999	120.1%
Counties Manukau	4,327	3,043	70.3%
Waikato	2,708	2,595	95.8%
Lakes	779	758	97.3%
Bay of Plenty	1,417	1,264	89.2%
Tairawhiti	368	343	93.2%
Taranaki	792	802	101.3%
Hawkes Bay	1,110	1,085	97.7%
Whanganui	429	433	100.9%
MidCentral	1,112	993	89.3%
Hutt Valley	1,054	1,074	101.9%
Capital & Coast	1,943	1,984	102.1%
Wairarapa	280	282	100.7%
Nelson Marlborough	759	756	99.6%
West Coast	211	157	74.4%
Canterbury	2,980	2,965	99.5%
South Canterbury	289	290	100.3%
Southern	1,781	1,755	98.5%
Total	**30,829**	**28,569**	**92.7%**

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. So looking at the table above a baby may be born in Auckland DHB and offered screening there but the domicile of the family is in Waitemata. When the three DHBs are combined the rate of offers to live births is 86%. 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 October, but this birth will not be included in the denominator.

RECOMMENDATIONS ON OFFER OF SCREENING

No recommendations

3.2. Consent for Newborn Hearing Screening

Monitoring the proportion of families and whanau 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 nationally to track this percentage over time.

Over this period the proportion babies that were recorded by DHBs as offering screening and are in the NSU database as having consented is 95.6% virtually the same as the previous report (95.1%).

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 Maori and Pacific babies, this is consistent with the last report.

Table 5 Consents for screening compared with live births, by ethnicity, October 2011 to March 2012

	Live births	Consents	Difference	Percent
	N	N	N	%
Maori	8,059	6,531	1,528	81%
Pacific Island	3,421	2,725	696	80%
Asian	3,834	3,413	421	89%
European	14,909	13,894	1,015	93%
Not Stated/Unspecified/Other	606	758	-152	125%
Total	**30,089**	**27,321**	**3,508**	**89%**

Table 6 does not show any specific trend from Decile 1- 10 with regards to the proportion 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, this is consistent with the last report.

Table 6 Consents for screening compared with live births, by deprivation, October 2011 to March 2012

	Live births	Consents	Difference	Percent
	N	N	N	%
Decile 1-2	4,540	4,188	352	92%
Decile 3-4	4,992	4,340	652	87%
Decile 5-6	5,759	5,196	563	90%
Decile 7-8	6,990	6,486	504	93%
Decile 9-10	8,536	7,097	1,439	83%
Unknown	137	14	-2	117%
Total	**30,829**	**27,321**	**3,508**	**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 (eg, for an individual DHB, for the programme relative to international figures or for particular ethnic groups) would warrant further investigation and consideration of outcome targets.

methodology

Indicator 1.2

Numerator:	Number of eligible newborns whose parents/guardian declined 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% 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 rates were highest in Northland at around 6.9%, this has been consistent for the past three reports but is a lower rate than the previous report where the decline rate was 9.3%

Table 7 Decline of screening by DHB for October 2011 to March 2012

DHB	Offered screening	Declined screening	Percentage declined
Northland	924	64	6.9%
Waitemata	3,067	11	0.4%
Auckland	3,999	47	1.2%
Counties Manukau	3,043	8	0.3%
Waikato	2,595	18	0.7%
Lakes	758	7	0.9%
Bay of Plenty	1,264	17	1.3%
Tairawhiti	343	0	0.0%
Taranaki	802	9	1.1%
Hawkes Bay	1,085	2	0.2%
Whanganui	433	4	0.9%
MidCentral	993	8	0.8%
Hutt Valley	1,074	8	0.7%
Capital & Coast	1,984	11	0.6%
Wairarapa	282	0	0.0%
Nelson Marlborough	756	11	1.5%
West Coast	157	2	1.3%
Canterbury	2,965	29	1.0%
South Canterbury	290	5	1.7%
Southern	1,755	34	1.9%
Total	**28,569**	**295**	**1.0%**

RECOMMENDATION ON DECLINE OF SCREENING

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

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

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

Methodology

Indicator 1.3

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

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

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 commence screening (99.9%). 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, October 2011 to March 2012

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	834	834	100.0%	70	70	100.0%	904	904	100.0%
Waitemata	3,192	3,187	99.8%	179	178	99.4%	3,371	3,365	99.8%
Auckland	2,794	2,793	100.0%	208	207	99.5%	3,002	3,000	99.9%
Counties Manukau	2,926	2,926	100.0%	166	166	100.0%	3,092	3,092	100.0%
Waikato	2,361	2,359	99.9%	185	184	99.5%	2,546	2,543	99.9%
Lakes	698	698	100.0%	56	56	100.0%	754	754	100.0%
Bay of Plenty	1,169	1,169	100.0%	100	100	100.0%	1,269	1,269	100.0%
Tairawhiti	304	303	99.7%	22	22	100.0%	326	325	99.7%
Taranaki	680	680	100.0%	55	55	100.0%	735	735	100.0%
Hawke's Bay	967	967	100.0%	90	90	100.0%	1,057	1,057	100.0%
Whanganui	346	345	99.7%	29	29	100.0%	375	374	99.7%
Mid Central	746	746	100.0%	75	75	100.0%	821	821	100.0%
Hutt Valley	956	954	99.8%	93	93	100.0%	1,049	1,047	99.8%
Capital & Coast	1,740	1,739	99.9%	189	189	100.0%	1,929	1,928	99.9%
Wairarapa	256	256	100.0%	13	13	100.0%	269	269	100.0%
Nelson Marlborough	703	703	100.0%	53	53	100.0%	756	756	100.0%
West Coast	146	146	100.0%	5	5	100.0%	151	151	100.0%
Canterbury	2,613	2,603	99.6%	296	295	99.7%	2,909	2,898	99.6%
South Canterbury	276	276	100.0%	1	1	100.0%	277	277	100.0%
Southern	1,656	1,656	100.0%	73	73	100.0%	1,729	1,729	100.0%
Total	**25,363**	**25,340**	**99.9%**	**1,958**	**1,954**	**99.8%**	**27,321**	**27,294**	**99.9%**

Table 9 **Newborn hearing screening started compared with consents to screening by ethnicity, October 2011 to March 2012**

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
Maori	5,993	5,982	99.8%	538	536	99.6%	6,531	6,518	99.8%
Pacific Island	2,537	2,534	99.9%	188	187	99.5%	2,725	2,721	99.9%
Asian	3,209	3,209	100.0%	204	204	100.0%	3,413	3,413	100.0%
European	12,917	12,909	99.9%	977	976	99.9%	13,894	13,885	99.9%
Not stated/Unspecified	115	115	100.0%	8	8	100.0%	123	123	100.0%
Other ethnic groups	592	591	99.8%	43	43	100.0%	635	634	99.8%
Total	**25,363**	**25,340**	**99.9%**	**1,958**	**1,954**	**99.8%**	**27,321**	**27,294**	**99.9%**

Table 10 **Newborn hearing screening started** compared with consents to screening by deprivation, **October 2011 to March 2012**

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	3,921	3,920	100.0%	267	267	100.0%	4,188	4,187	100.0%
Decile 3-4	4,041	4,041	100.0%	299	298	99.7%	4,340	4,339	100.0%
Decile 5-6	4,871	4,869	100.0%	325	325	100.0%	5,196	5,194	100.0%
Decile 7-8	6,005	5,996	99.9%	481	480	99.8%	6,486	6,476	99.8%
Decile 9-10	6,514	6,503	99.8%	583	581	99.7%	7,097	7,084	99.8%
Unknown	11	11	100.0%	3	3	100.0%	14	14	100.0%
Total	**25,363**	**25,340**	**99.9%**	**1,958**	**1,954**	**99.8%**	**27,321**	**27,294**	**99.9%**

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, 99.1% of babies who started screening completed, and 91.8% of those babies who had completed screening did so by the time they were one month of age, this is drop from the previous report (96.2%) but a similar rate to the same time period a year previous (92.9%). 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 (67.7%) and MidCentral (70.9%), the remaining DHBs had completion rates at one month of 85% or more as shown in Table 12.

Program coverage

In total 27,042 babies completed newborn hearing screening in this six month period, compared with the 30,829 live births. While these figures come from different data sets, this indicates that approximately 88% of babies born in this period completed screening.

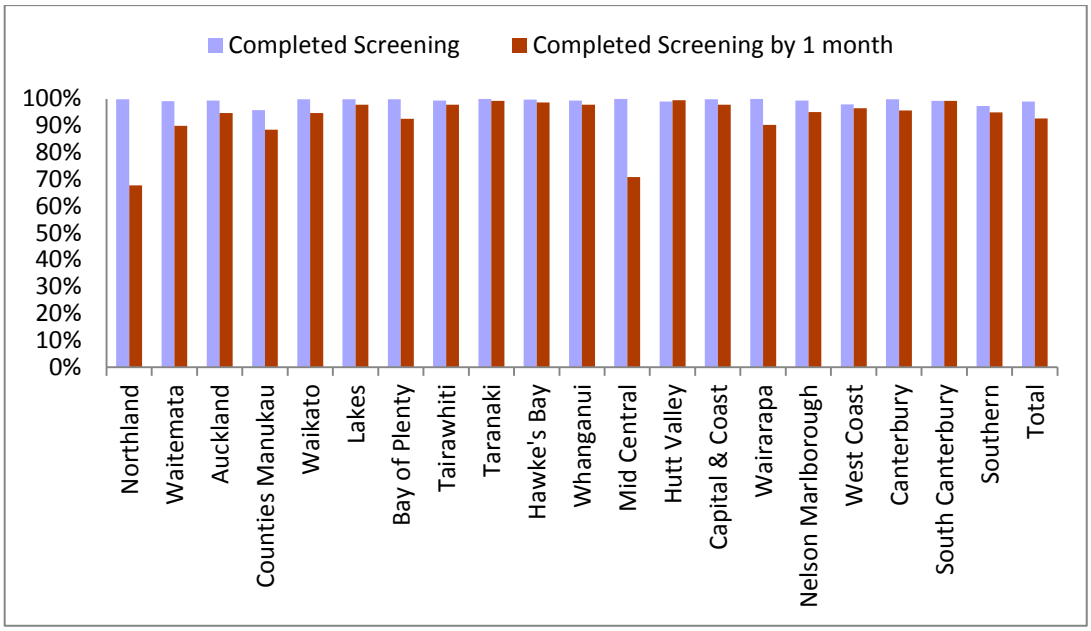


Figure 2 **Proportion of babies who complete screening after starting, and the proportion of those who completed screening by the time they were one month of age, October 2011 to March 2012**

This information can be seen in greater detail in Tables 11 and 12. Once again 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 shows screening times up to 56 days (8 weeks). The remaining 600 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 (564 of the 600 babies).

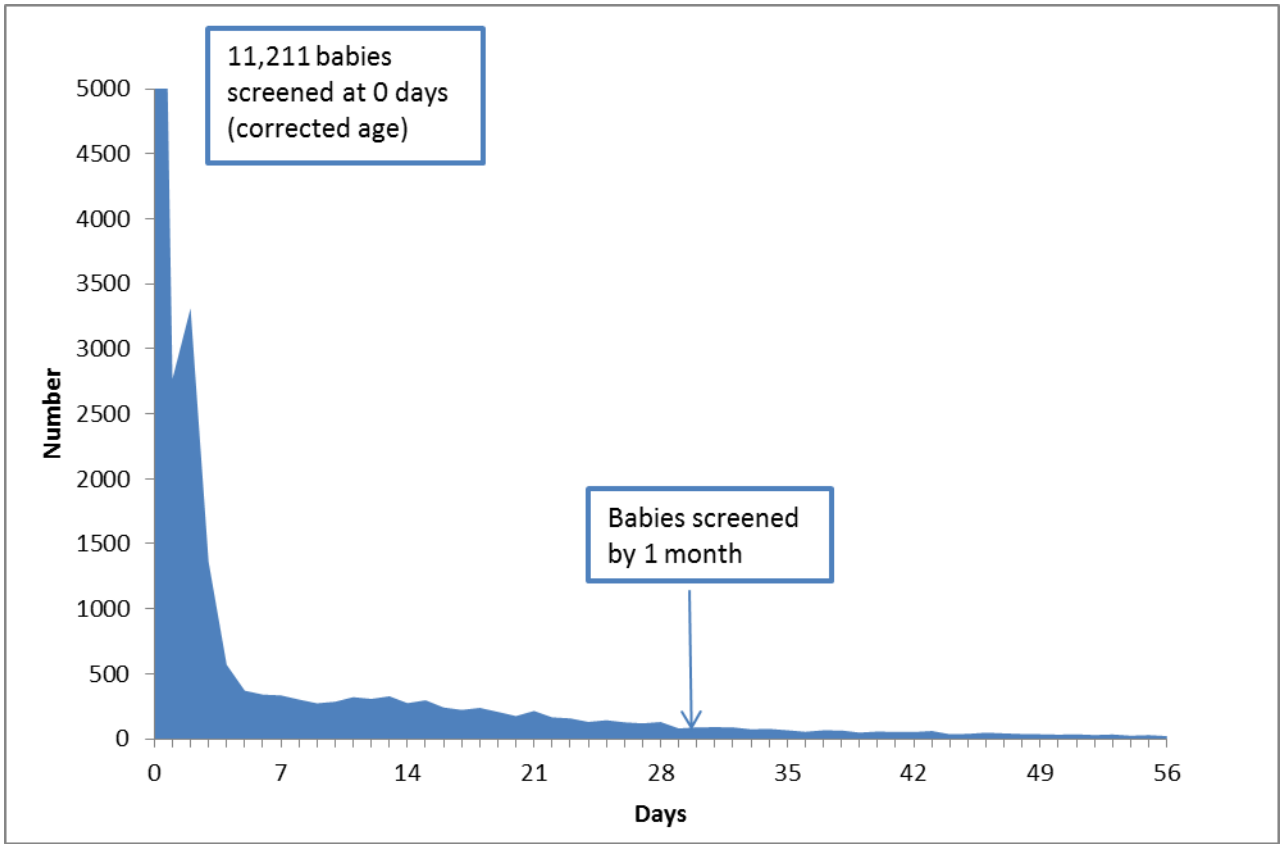


Figure 3 **Spread of screening completion times in days, October 2011 to March 2012**

Table 11 Newborn hearing screening completed compared with started by DHB, October 2011 to March 2012

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	834	833	99.9%	70	70	100.0%	904	903	99.9%
Waitemata	3,187	3,160	99.2%	178	177	99.4%	3,365	3,337	99.2%
Auckland	2,793	2,775	99.4%	207	207	100.0%	3,000	2,982	99.4%
Counties Manukau	2,926	2,799	95.7%	166	165	99.4%	3,092	2,964	95.9%
Waikato	2,359	2,357	99.9%	184	184	100.0%	2,543	2,541	99.9%
Lakes	698	697	99.9%	56	56	100.0%	754	753	99.9%
Bay of Plenty	1,169	1,168	99.9%	100	100	100.0%	1,269	1,268	99.9%
Tairawhiti	303	301	99.3%	22	22	100.0%	325	323	99.4%
Taranaki	680	680	100.0%	55	55	100.0%	735	735	100.0%
Hawke's Bay	967	965	99.8%	90	90	100.0%	1,057	1,055	99.8%
Whanganui	345	344	99.7%	29	28	96.6%	374	372	99.5%
Mid Central	746	746	100.0%	75	75	100.0%	821	821	100.0%
Hutt Valley	954	944	99.0%	93	93	100.0%	1,047	1,037	99.0%
Capital & Coast	1,739	1,738	99.9%	189	188	99.5%	1,928	1,926	99.9%
Wairarapa	256	256	100.0%	13	13	100.0%	269	269	100.0%
Nelson Marlborough	703	699	99.4%	53	53	100.0%	756	752	99.5%
West Coast	146	143	97.9%	5	5	100.0%	151	148	98.0%
Canterbury	2,603	2,601	99.9%	295	295	100.0%	2,898	2,896	99.9%
South Canterbury	276	274	99.3%	1	1	100.0%	277	275	99.3%
Southern	1,656	1,612	97.3%	73	73	100.0%	1,729	1,685	97.5%
Total	**25,340**	**25,092**	**99.0%**	**1,954**	**1,950**	**99.8%**	**27,294**	**27,042**	**99.1%**

Table 12 Newborn hearing screening completed by one month of age by DHB, October 2011 to March 2012

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	833	549	65.9%	70	63	90.0%	903	612	67.8%
Waitemata	3,160	2,828	89.5%	177	174	98.3%	3,337	3,002	90.0%
Auckland	2,775	2,628	94.7%	207	199	96.1%	2,982	2,827	94.8%
Counties Manukau	2,799	2,468	88.2%	165	156	94.5%	2,964	2,624	88.5%
Waikato	2,357	2,231	94.7%	184	177	96.2%	2,541	2,408	94.8%
Lakes	697	682	97.8%	56	55	98.2%	753	737	97.9%
Bay of Plenty	1,168	1,077	92.2%	100	97	97.0%	1,268	1,174	92.6%
Tairawhiti	301	295	98.0%	22	21	95.5%	323	316	97.8%
Taranaki	680	675	99.3%	55	55	100.0%	735	730	99.3%
Hawke's Bay	965	952	98.7%	90	90	100.0%	1,055	1,042	98.8%
Whanganui	344	336	97.7%	28	28	100.0%	372	364	97.8%
Mid Central	746	511	68.5%	75	71	94.7%	821	582	70.9%
Hutt Valley	944	939	99.5%	93	93	100.0%	1,037	1,032	99.5%
Capital & Coast	1,738	1,707	98.2%	188	179	95.2%	1,926	1,886	97.9%
Wairarapa	256	232	90.6%	13	11	84.6%	269	243	90.3%
Nelson Marlborough	699	663	94.8%	53	52	98.1%	752	715	95.1%
West Coast	143	138	96.5%	5	5	100.0%	148	143	96.6%
Canterbury	2,601	2,488	95.7%	295	286	96.9%	2,896	2,774	95.8%
South Canterbury	274	272	99.3%	1	1	100.0%	275	273	99.3%
Southern	1,612	1,529	94.9%	73	72	98.6%	1,685	1,601	95.0%
Total	**25,092**	**23,200**	**92.5%**	**1,950**	**1,885**	**96.7%**	**27,042**	**25,085**	**92.8%**

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 13-14 shows only small difference in overall completion rates by these parameters. Completion rates by 1 month vary a little more with Maori, Pacific and deciles 9-10 slightly less likely to complete within a month.

Table 13 Newborn hearing screening completed by ethnicity, October 2011 to March 2012

Ethnicity	Started screening	Completed screening	Completed screening by 1 month of age	% started that completed screening	% completed that completed by 1 month of age
Maori	6,518	6,460	5,802	99.1%	89.8%
Pacific	2,721	2,653	2,373	97.5%	89.4%
Asian	3,413	3,377	3,193	98.9%	94.6%
European	13,885	13,806	13,021	99.4%	94.3%
Not stated/Unspecified	123	115	103	93.5%	89.6%
Other ethnic groups	634	631	593	99.5%	94.0%
Total	**27,294**	**27,042**	**25,085**	**99.1%**	**92.8%**

Table 14 Newborn hearing screening completed by deprivation, October 2011 to March 2012

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	4,187	4,150	3,950	99.1%	95.2%
Decile 3-4	4,339	4,311	4,076	99.4%	94.5%
Decile 5-6	5,194	5,161	4,825	99.4%	93.5%
Decile 7-8	6,476	6,425	5,961	99.2%	92.8%
Decile 9-10	7,084	6,982	6,261	98.6%	89.7%
Unknown	14	13	12	92.9%	92.3%
Total	**27,294**	**27,042**	**25,085**	**99.1%**	**92.8%**

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 1.5% as detailed by DHB in Table 15 below. This is very similar to the last reporting period (1.8% referred).

All DHBs this period had referrals, though for some the actual number was under five referrals for West Coast, Tairawhiti, Whanganui, Wairarapa and South Canterbury. 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 (4.5%). Previously Counties Manukau had the next highest rates but this period their rates are consistent with most other DHBs.

Admission to NICU/SCBU (for 48 hours or more) resulted in a higher proportion of referrals to audiology, at an average of 6.9% as show in Table 15, the same as the last period. More detail on referrals to audiology by ethnicity and deprivation status are presented in Tables 16-17. The information indicates that none of these factors have a significant impact at this time though referral rates are slightly higher for Maori, Pacific and babies in Decile 9-10.

Table 15 Referral to audiology by DHB and NICU/SCBU admission, October 2011 to March 2012

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	833	27	3.2%	70	14	20.0%	903	41	4.5%
Waitemata	3,160	25	0.8%	177	12	6.8%	3,337	37	1.1%
Auckland	2,775	37	1.3%	207	14	6.8%	2,982	51	1.7%
Counties Manukau	2,799	43	1.5%	165	14	8.5%	2,964	57	1.9%
Waikato	2,357	23	1.0%	184	11	6.0%	2,541	34	1.3%
Lakes	697	3	0.4%	56	4	7.1%	753	7	0.9%
Bay of Plenty	1,168	14	1.2%	100	8	8.0%	1,268	22	1.7%
Tairawhiti	301	4	1.3%	22		0.0%	323	4	1.2%
Taranaki	680	14	2.1%	55	4	7.3%	735	18	2.5%
Hawke's Bay	965	8	0.8%	90	2	2.2%	1,055	10	1.0%
Whanganui	344		0.0%	28	1	3.6%	372	1	0.3%
Mid Central	746	4	0.5%	75	5	6.7%	821	9	1.1%
Hutt Valley	944	2	0.2%	93	4	4.3%	1,037	6	0.6%
Capital & Coast	1,738	14	0.8%	188	17	9.0%	1,926	31	1.6%
Wairarapa	256	2	0.8%	13	2	15.4%	269	4	1.5%
Nelson Marlborough	699	9	1.3%	53	3	5.7%	752	12	1.6%
West Coast	143	1	0.7%	5		0.0%	148	1	0.7%
Canterbury	2,601	26	1.0%	295	15	5.1%	2,896	41	1.4%
South Canterbury	274	2	0.7%	1		0.0%	275	2	0.7%
Southern	1,612	15	0.9%	73	5	6.8%	1,685	20	1.2%
Total	**25,092**	**273**	**1.1%**	**1,950**	**135**	**6.9%**	**27,042**	**408**	**1.5%**

Table 16 Referral to audiology by ethnicity, October 2011 to March 2012

Ethnicity	Number completed screening	Number referred to audiology	% Completed screening that were referred
Maori	6,460	150	2.3%
Pacific	2,653	47	1.8%
Asian	3,377	41	1.2%
European	13,806	160	1.2%
Not stated/Unspecified	115	4	3.5%
Other ethnic groups	631	6	1.0%
Total	**27,042**	**408**	**1.5%**

Table 17 Referral to audiology by deprivation, October 2011 to March 2012

Decile	Number completed screening	Number referred to audiology	% Completed screening that were referred
Decile 1-2	4,150	51	1.2%
Decile 3-4	4,311	50	1.2%
Decile 5-6	5,161	79	1.5%
Decile 7-8	6,425	94	1.5%
Decile 9-10	6,982	133	1.9%
Unknown	13	1	7.7%
Total	**27,042**	**408**	**1.5%**

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 no 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 programmes generally monitor follow-up of these children.

Methodology

Indicator 1.11

Numerator:	Number of eligible newborns who passed screening, but have risk factors for developing late-onset or progressive hearing loss.
Denominator:	Number of eligible newborns who passed screening (as part of the UNHSEIP).

3.7. Targeted Follow-up

An average of 5.1% 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 reporting 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 Taranaki (10.3%) and Northland (9.3%). This an increase for Taranaki and a drop for Northland from previous reports (6.5% and 12.7% respectively). The only other notable decrease was for Wairarapa 7.5% this period compared to 11.1% in the previous report.

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

More detail on targeted follow-up by ethnicity and deprivation status are presented in Tables 19-20. 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 Maori babies and slightly lower for Asian babies, this trend is similar to previous reports but the difference is not large.

Table 18 Proportion of targeted follow-up by DHB and NICU/SCBU, **October 2011 to March 2012**

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	806	54	6.7%	56	26	46.4%	862	80	9.3%
Waitemata	3,135	88	2.8%	165	52	31.5%	3,300	140	4.2%
Auckland	2,738	64	2.3%	193	58	30.1%	2,931	122	4.2%
Counties Manukau	2,756	126	4.6%	151	51	33.8%	2,907	177	6.1%
Waikato	2,334	85	3.6%	173	58	33.5%	2,507	143	5.7%
Lakes	694	12	1.7%	52	13	25.0%	746	25	3.4%
Bay of Plenty	1,154	12	1.0%	92	14	15.2%	1,246	26	2.1%
Tairawhiti	297	21	7.1%	22	5	22.7%	319	26	8.2%
Taranaki	666	55	8.3%	51	19	37.3%	717	74	10.3%
Hawke's Bay	957	43	4.5%	88	17	19.3%	1,045	60	5.7%
Whanganui	344	16	4.7%	27	11	40.7%	371	27	7.3%
Mid Central	742	40	5.4%	70	22	31.4%	812	62	7.6%
Hutt Valley	942	18	1.9%	89	17	19.1%	1,031	35	3.4%
Capital & Coast	1,724	30	1.7%	171	58	33.9%	1,895	88	4.6%
Wairarapa	254	17	6.7%	11	3	27.3%	265	20	7.5%
Nelson Marlborough	690	25	3.6%	50	15	30.0%	740	40	5.4%
West Coast	142	4	2.8%	5	1	20.0%	147	5	3.4%
Canterbury	2,575	87	3.4%	280	21	7.5%	2,855	108	3.8%
South Canterbury	272	6	2.2%	1	1	100.0%	273	7	2.6%
Southern	1,597	75	4.7%	68	11	16.2%	1,665	86	5.2%
Total	**24,819**	**878**	**3.5%**	**1,815**	**473**	**26.1%**	**26,634**	**1,351**	**5.1%**

Table 19 Proportion of targeted follow-up by Ethnicity, October 2011 to March 2012

Ethnicity	Passed screening	Passed -targeted follow-up required	Targeted follow-up proportion
Maori	6,310	443	7.0%
Pacific Island	2,606	123	4.7%
Asian	3,336	102	3.1%
European	13,646	661	4.8%
Not Stated/Unspecified	111	5	4.5%
Other ethnic groups	625	17	2.7%
Total	**26,634**	**1,351**	**5.1%**

Table 20 Proportion of targeted follow-up by deprivation, October 2011 to March 2012

Decile	Passed screening	Passed -targeted follow-up required	Targeted follow-up proportion
Decile 1-2	4,099	164	4.0%
Decile 3-4	4,261	203	4.8%
Decile 5-6	5,082	230	4.5%
Decile 7-8	6,331	339	5.4%
Decile 9-10	6,849	415	6.1%
Unknown	12	0	0.0%
Total	**26,634**	**1,351**	**5.1%**

RECOMMENDATION ON TARGETED FOLLOW-UP

No recommendations

3.8. Risk Factors

For the period of this report 1,873 (6.9%) of babies that completed screening had at least one risk factor recorded, this is slightly less than the last report (8.4%) and has been decreasing slightly over the past 2 years. From the tables above 1,351 (5.1%) of all babies had a screening outcome of “Pass Targeted follow-up required”. This was also the same as the previous two reports.

The difference in these two figures above 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” (19.8%) during this reporting period, this is the same two risk factors that were highest in the last two periods. For all babies who completed screening these two risk factors accounted for 2.6% and 1.4% of all babies completing screening.

Since the decision to include second degree relatives under “Family History” in August 2010 the proportion of babies in this category has increased as was expected. Prior to the change the rate sat at around 25% for this period it is 38.2%. This is the same rate as the last report.

The 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 initially decreased from 18% to 9.7% and then 5.9% in the previous six month period but has climbed again to 9.9% for this current period. Craniofacial anomalies initially decreased from 13% to 7.3% and now remains steady around 5.3% and 5.1% for the two most recent reports. This same trend is obvious for TORCH/S with remains lower after an initial decrease from 11% to 3.7% it has stayed around the 3-4% mark. The recording of “other” as a risk factors continues to drop initially from almost a quarter of babies (23%) down to 10.9% then 5.3% and in this report 4.5%.

Table 21 Frequency of risk factors, October 2011 to March 2012

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	716	38.2%	2.6%
Jaundice Requiring Phototherapy	370	19.8%	1.4%
Nicu more than 5 days	240	12.8%	0.9%
Ventilation	186	9.9%	0.7%
Cranio-facial Anomalies	96	5.1%	0.4%
TORCH/S	77	4.1%	0.3%
Syndrome	33	1.8%	0.1%
Bacterial/Viral Meningitis	28	1.5%	0.1%
Head Trauma	24	1.3%	0.1%
Jaundice Transfusion Level	19	1.0%	0.1%
Other	84	4.5%	0.3%

Of the 1,873 babies with one or more risk factors recorded, 83% had just one risk factor, 11% had two, 5% had three, and just under 1% of babies had four or 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 16, 408 babies did not pass screening and were referred to audiology; however audiology information was provided to the NSU and therefore available for just 254 of these babies. This does not necessarily mean that only 62% 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 percentage of records received by the screening unit is increasing with each reporting period.

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, two DHBs show no audiology assessment data at this time Tairawhiti and West Coast. Note that for Waitemata, Whanganui and West Coast DHBs there is an arrangement with other DHBs to undertake their audiology screening.

Table 22 below shows where babies who had an initial screening test had their audiology test was performed. The data in the table is based on the 254 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, October 2011 to March 2012

DHB of initial screening	Number of babies	DHB of audiology test	Number of babies
Northland	35	Northland	35
Waitemata	4	Auckland	4
Auckland	39	Auckland	36
		Hutt Valley	1
		Northland	1
		Waikato	1
Counties Manukau	19	Counties Manukau	17
		Hawke's Bay	1
		Northland	1
Waikato	29	Waikato	29
Lakes	5	Lakes	5
Bay of Plenty	13	Bay of Plenty	13
Taranaki	16	Taranaki	16
Hawke's Bay	7	Hawke's Bay	7
Whanganui	1	Whanganui	1
Mid Central	10	Mid Central	10
Hutt Valley	6	Hutt Valley	6
Capital & Coast	15	Capital & Coast	14
		Hutt Valley	1
Wairarapa	4	Hutt Valley	4
Nelson Marlborough	10	Nelson Marlborough	10
Canterbury	23	Canterbury	21
		Nelson Marlborough	1
		Southern	1
South Canterbury	2	South Canterbury	2
Southern	16	Northland	1
		Southern	14
		Taranaki	1
Total	**254**		**254**

Note: based on audiology commenced data

Table 23 below outlines those babies that were referred for audiology and those that commenced. Tables 24 and 25 show the information by ethnicity and decile. In this period 68.1% of babies categorised as European that were referred to audiology did start assessment, an increase from 62% in the last report. Percentages in other ethnic groups, with the exception of Maori, were lower especially for Pacific (34%). There is no consistent trend by decile though the lowest and highest decile groups appear to have the lowest percentages.

Table 23 Commenced audiology assessment by DHB and NICU/SCBU admission, **October 2011 to March 2012**

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	27	23	85.2%	14	13	92.9%	41	36	87.8%
Waitemata	25	4	16.0%	12	2	16.7%	37	6	16.2%
Auckland	37	25	67.6%	14	8	57.1%	51	33	64.7%
Counties Manukau	43	15	34.9%	14	5	35.7%	57	20	35.1%
Waikato	23	20	87.0%	11	11	100.0%	34	31	91.2%
Lakes	3	3	100.0%	4	3	75.0%	7	6	85.7%
Bay of Plenty	14	8	57.1%	8	4	50.0%	22	12	54.5%
Tairawhiti	4	0	0.0%	0	0	-	4	0	0.0%
Taranaki	14	13	92.9%	4	3	75.0%	18	16	88.9%
Hawke's Bay	8	5	62.5%	2	2	100.0%	10	7	70.0%
Whanganui	0	0	0.0%	1	1	100.0%	1	1	100.0%
Mid Central	4	4	100.0%	5	5	100.0%	9	9	100.0%
Hutt Valley	2	2	100.0%	4	4	100.0%	6	6	100.0%
Capital & Coast	14	8	57.1%	17	9	52.9%	31	17	54.8%
Wairarapa	2	2	100.0%	2	2	100.0%	4	4	100.0%
Nelson	9	7	77.8%	3	3	100.0%	12	10	83.3%
West Coast	1	0	0.0%	0	0	-	1	0	0.0%
Canterbury	26	12	46.2%	15	9	60.0%	41	21	51.2%
South Canterbury	2	2	100.0%	0	0	-	2	2	100.0%
Southern	15	13	86.7%	5	4	80.0%	20	17	85.0%
Total	**273**	**166**	**60.8%**	**135**	**88**	**65.2%**	**408**	**254**	**62.3%**

Table 24 Commenced audiology assessment by ethnicity, October 2011 to March 2012

Ethnicity	Refer for audiology	Commenced audiology assessment	Commenced audiology assessment to refer for audiology
Maori	150	100	66.7%
Pacific	47	16	34.0%
Asian	41	22	53.7%
European	160	109	68.1%
Not stated/Unspecified	4	3	75.0%
Other ethnic groups	6	4	66.7%
Total	**408**	**254**	**62.3%**

Table 25 Commenced audiology assessment by decile, October 2011 to March 2012

Decile	Refer for audiology	Commenced audiology assessment	Commenced audiology assessment to refer for audiology
Decile 1-2	51	29	56.9%
Decile 3-4	50	40	80.0%
Decile 5-6	79	50	63.3%
Decile 7-8	94	64	68.1%
Decile 9-10	133	71	53.4%
Unknown	1	0	0.0%
Total	**408**	**254**	**62.3%**

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 28. 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 the assessment is not completed on the same day, however this is currently not occurring very often. Electronic reporting separates out started from completed which means this indicator accuracy will improve as more DHBs move to electronic reporting.

As shown in Table 26, data on audiology assessment completion by three months is variable but overall has increased from 67% of babies last period to 85.9% for this period.

Percentages are particularly low for Counties Manukau, Hawkes Bay and Northland, although with small numbers in many DHB's it is not useful to make any comparisons. Figure 4 below shows the percentage of babies who completed audiology and the percent of those completing did so by 3 months.

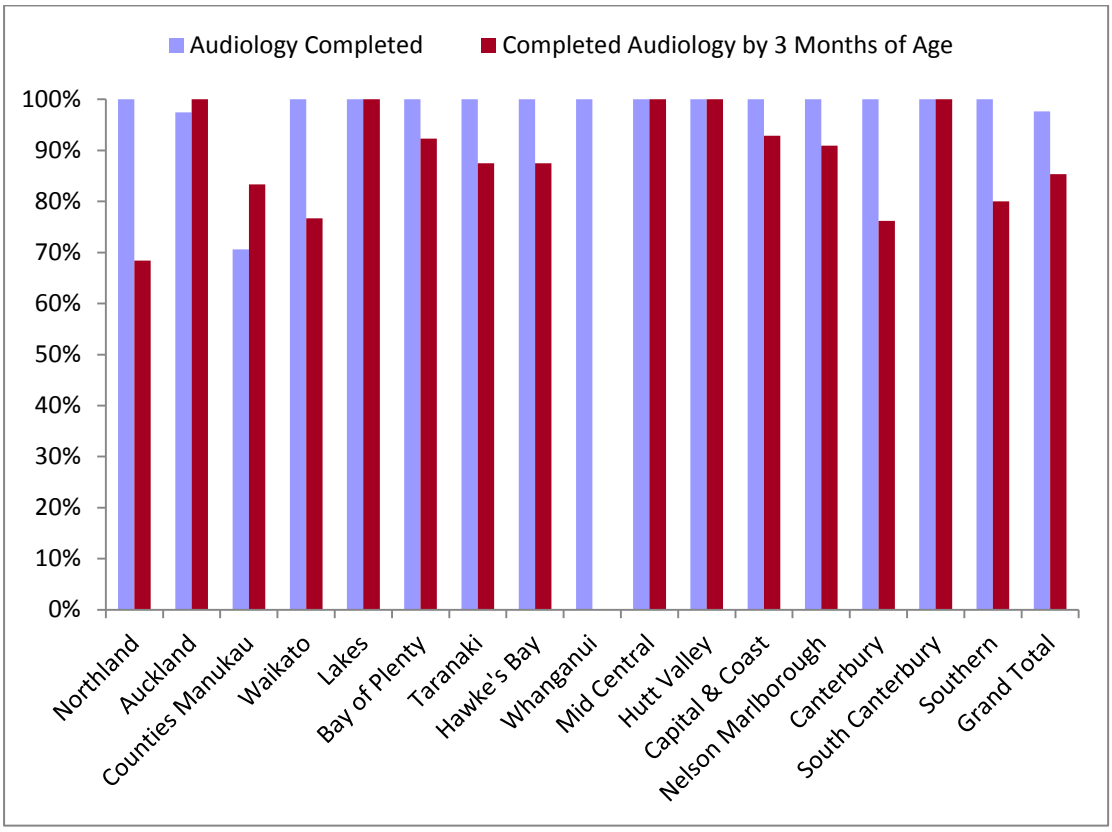


Figure 4 **Proportion of babies who complete audiology, and the proportion who had completed audiology by the time they were three months of age October 2011 to March 2012, by DHB of audiology**

Figure 5 shows the range of completion times for babies who underwent audiology assessment. There were 7 babies who took longer than 22 weeks, the longest being 40 weeks.

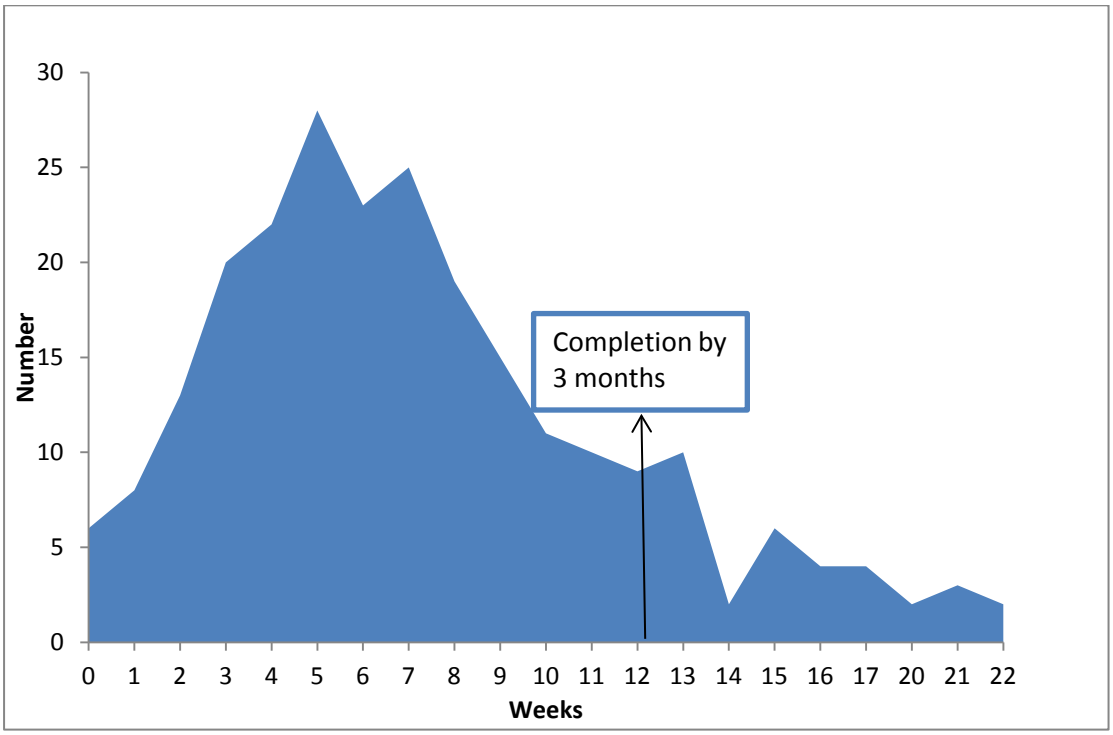


Figure 5 Audiology completion times, October 2011 to March 2012

Table 26 Audiology completed by DHB, October 2011 to March 2012

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	24	24	100.0%	14	14	100.0%	38	38	100.0%
Waitemata									
Auckland	29	29	100.0%	11	10	90.9%	40	39	97.5%
Counties Manukau	14	11	78.6%	3	1	33.3%	17	12	70.6%
Waikato	20	20	100.0%	10	10	100.0%	30	30	100.0%
Lakes	2	2	100.0%	3	3	100.0%	5	5	100.0%
Bay of Plenty	9	9	100.0%	4	4	100.0%	13	13	100.0%
Tairawhiti									
Taranaki	13	13	100.0%	4	4	100.0%	17	17	100.0%
Hawke's Bay	5	5	100.0%	3	3	100.0%	8	8	100.0%
Whanganui	0	0	-	1	1	100.0%	1	1	100.0%
MidCentral	4	4	100.0%	6	6	100.0%	10	10	100.0%
Hutt Valley	4	4	100.0%	8	8	100.0%	12	12	100.0%
Capital & Coast	8	8	100.0%	6	6	100.0%	14	14	100.0%
Wairarapa									
Nelson Marlborough	7	7	100.0%	4	4	100.0%	11	11	100.0%
West Coast									
Canterbury	12	12	100.0%	9	9	100.0%	21	21	100.0%
South Canterbury	2	2	100.0%	0		-	2	2	100.0%
Southern	13	13	100.0%	2	2	100.0%	15	15	100.0%
Total	**166**	**163**	**98.2%**	**88**	**85**	**96.6%**	**254**	**248**	**97.6%**

Table 27 Audiology completed by three months of age by DHB October 2011 to March 2012-

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	24	14	58.3%	14	13	92.9%	38	27	71.1%
Waitemata									
Auckland	29	29	100.0%	10	10	100.0%	39	39	100.0%
Counties Manukau	11	10	90.9%	1		0.0%	12	10	83.3%
Waikato	20	15	75.0%	10	8	80.0%	30	23	76.7%
Lakes	2	2	100.0%	3	3	100.0%	5	5	100.0%
Bay of Plenty	9	8	88.9%	4	4	100.0%	13	12	92.3%
Tairawhiti									
Taranaki	13	12	92.3%	4	3	75.0%	17	15	88.2%
Hawke's Bay	5	4	80.0%	3	3	100.0%	8	7	87.5%
Whanganui	0	0	-	1	0	0.0%	1	0	0.0%
MidCentral	4	4	100.0%	6	6	100.0%	10	10	100.0%
Hutt Valley	4	4	100.0%	8	8	100.0%	12	12	100.0%
Capital & Coast	8	8	100.0%	6	5	83.3%	14	13	92.9%
Wairarapa									
Nelson Marlborough	7	7	100.0%	4	3	75.0%	11	10	90.9%
West Coast									
Canterbury	12	9	75.0%	9	7	77.8%	21	16	76.2%
South Canterbury	2	2	100.0%	0	0	-	2	2	100.0%
Southern	13	10	76.9%	2	2	100.0%	15	12	80.0%
Total	**163**	**138**	**84.7%**	**85**	**75**	**88.2%**	**248**	**213**	**85.9%**

Factors such as ethnicity and deprivation 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 Maori babies that complete by 3 months and those in decile groups 9-10 appears to be lower than for others. This trend is consistent across a number of reports but with small numbers it is not possible to say if it is significant.

Table 28 Audiology screening completed by ethnicity, October 2011 to March 2012

Ethnicity	Audiology commenced	Audiology completed	Completed audiology by 3 months of age	% Completed that commenced	% commenced that completed by 3 month of age
Maori	100	98	73	98.0%	74.5%
Pacific Island	16	14	13	87.5%	92.9%
Asian	22	21	21	95.5%	100.0%
European	109	108	99	99.1%	91.7%
Not Stated/Unspecified	3	3	3	100.0%	100.0%
Other ethnic groups	4	4	4	100.0%	100.0%
Total	**254**	**248**	**213**	**97.60%**	**85.9%**

Table 29 Audiology screening completed by deprivation, October 2011 to March 2012

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	29	29	27	100.0%	93.1%
Decile 3-4	40	40	35	100.0%	87.5%
Decile 5-6	50	50	40	100.0%	80.0%
Decile 7-8	64	63	54	98.4%	85.7%
Decile 9-10	71	66	57	93.0%	86.4%
Total	**254**	**248**	**213**	**97.6%**	**85.9%**

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 (ie by severity and type of hearing loss).

Relevant Outcome

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

Rationale

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

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

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

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

Methodology

Indicator 1.8

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

3.11. Permanent Congenital Hearing Loss Detected By Audiology Assessment

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

Table 30 Audiology test results by DHB October 2011 to March 2012

DHB of audiology	Right test result	Left test result	Number of babies
Auckland	Sensorineural	Sensorineural	1
Waikato	Sensorineural	Sensorineural	4
Waikato	Normal	Sensorineural	1
Waikato	Auditory Neuropathy	Auditory Neuropathy	1
Waikato	Mixed	Sensorineural	1
Waikato	Sensorineural	Normal	1
Waikato	Not Yet Determined	Mixed	1
Lakes	Auditory Neuropathy	Auditory Neuropathy	1
Lakes	Sensorineural	Sensorineural	1
Bay of Plenty	Sensorineural	Conductive Temporary	1
Bay of Plenty	Mixed	Mixed	1
Bay of Plenty	Mixed	Normal	1
Taranaki	Sensorineural	Sensorineural	2
Hawke's Bay	Sensorineural	Sensorineural	2
Hutt Valley	Auditory Neuropathy	Auditory Neuropathy	1
Hutt Valley	Sensorineural	Normal	1
Capital & Coast	Normal	Sensorineural	2
Capital & Coast	Mixed	Conductive Temporary	1
Nelson Marlborough	Sensorineural	Normal	2
Canterbury	Normal	Sensorineural	1
Canterbury	Sensorineural	Sensorineural	1
South Canterbury	Auditory Neuropathy	Normal	1
Southern	Sensorineural	Sensorineural	1
		Total	30

Table 31 below indicates that 12.1% of babies that completed an audiology assessment had a permanent congenital hearing loss detected; this is up from the previous two reports which were 6.6% and 7.2% of babies with this category of hearing loss.

Tables 32 and 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 and birth location, October 2011 to March 2012

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	24	0	0.0%	14	0	0.0%	38	0	0.0%
Waitemata									
Auckland	29	0	0.0%	10	1	10.0%	39	1	2.6%
Counties Manukau	11	0	0.0%	1	0	0.0%	12	0	0.0%
Waikato	20	8	40.0%	10	1	10.0%	30	9	30.0%
Lakes	2	1	50.0%	3	1	33.3%	5	2	40.0%
Bay of Plenty	9	2	22.2%	4	1	25.0%	13	3	23.1%
Tairawhiti									
Taranaki	13	2	15.4%	4	0	0.0%	17	2	11.8%
Hawke's Bay	5	2	40.0%	3	0	0.0%	8	2	25.0%
Whanganui	0	0	-	1	0	0.0%	1	0	0.0%
MidCentral	4	0	0.0%	6	0	0.0%	10	0	0.0%
Hutt Valley	4	0	0.0%	8	2	25.0%	12	2	16.7%
Capital & Coast	8	3	37.5%	6	0	0.0%	14	3	21.4%
Wairarapa	0	0	-	0	0	-	0	0	-
Nelson Marlborough	7	2	28.6%	4	0	0.0%	11	2	18.2%
West Coast									
Canterbury	12	1	8.3%	9	1	11.1%	21	2	9.5%
South Canterbury	2	1	50.0%	0	0	-	2	1	50.0%
Southern	13	1	7.7%	2	0	0.0%	15	1	6.7%
Total	**163**	**23**	**14.1%**	**85**	**7**	**8.2%**	**248**	**30**	**12.1%**

Table 32 Permanent congenital hearing loss by Ethnicity, October 2011 to March 2012

Ethnicity	Completed audiology	Permanent congenital hearing loss	Permanent hearing loss to completed audiology
Maori	98	12	12.2%
Pacific	14	1	7.1%
Asian	21	1	4.8%
European	108	16	14.8%
Not Stated/Unspecified	3	0	0.0%
Other ethnic groups	4	0	0.0%
Total	**248**	**30**	**12.1%**

Table 33 Permanent congenital hearing loss by deprivation, October 2011 to March 2012

Decile	Completed audiology	Permanent congenital hearing loss	Permanent hearing loss to completed audiology
Decile 1-2	29	4	13.8%
Decile 3-4	40	6	15.0%
Decile 5-6	50	7	14.0%
Decile 7-8	63	10	15.9%
Decile 9-10	66	3	4.5%
Total	**248**	**30**	**12.1%**

RECOMMENDATIONS ON HEARING LOSS DETECTED BY AUDIOLOGY ASSESSMENT

3.12. Newborns with Conductive Hearing Loss

This indicator has been used to capture all the outcomes from audiology which were not ‘Auditory Neuropathy’, ‘Mixed’ or ‘Sensorineural’ 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 73 babies.

Table 34 Audiology test results by DHB of audiology October 2011 to March 2012

DHB of audiology	Right test result	Left test result	Number of babies
Northland	Conductive Temporary	Conductive Temporary	3
Northland	Conductive Temporary	Normal	3
Northland	Normal	Conductive Temporary	1
Auckland	Conductive Temporary	Not Yet Determined	1
Auckland	Conductive Temporary	Conductive Temporary	8
Auckland	Conductive Temporary	Normal	1
Auckland	Normal	Conductive Temporary	2
Waikato	Conductive Temporary	Conductive Temporary	7
Waikato	Conductive Temporary	Normal	3
Waikato	Normal	Conductive Temporary	1
Waikato	Not Yet Determined	Conductive Temporary	2
Lakes	Conductive Temporary	Normal	1
Lakes	Normal	Conductive Temporary	1
Taranaki	Conductive Temporary	Conductive Temporary	3
Taranaki	Conductive Temporary	Normal	2
Taranaki	Conductive Temporary	Not Yet Determined	1
Taranaki	Normal	Conductive Temporary	2
Hawke's Bay	Conductive Temporary	Normal	1
Mid Central	Conductive Temporary	Normal	1
Mid Central	Conductive Temporary	Conductive Temporary	1
Mid Central	Normal	Conductive Temporary	1
Hutt Valley	Conductive Temporary	Conductive Temporary	7
Hutt Valley	Normal	Conductive Temporary	1
Capital & Coast	Conductive Temporary	Conductive Temporary	1
Capital & Coast	Conductive Temporary	Not Yet Determined	1
Capital & Coast	Not Yet Determined	Conductive Temporary	1
Nelson Marlborough	Conductive Temporary	Normal	1
Nelson Marlborough	Normal	Conductive Temporary	2
Canterbury	Conductive Temporary	Conductive Temporary	2
Canterbury	Conductive Temporary	Normal	2
Canterbury	Normal	Conductive Permanent	3
Southern	Conductive Temporary	Not Yet Determined	1
Southern	Conductive Temporary	Conductive Temporary	3
Southern	Normal	Conductive Temporary	2
		Total	**73**

Table 37 identifies 29.4% of babies that completed audiology assessment had some kind of hearing loss, excluding sensorineural, mixed and auditory neuropathy. As with other data in the audiology section of this report numbers are too small to make meaningful comparisons between DHBs.

Some differences do appear in the percentages of babies identified with a mild hearing loss by ethnicity and decile among those completing audiology.

The percentage for Maori, Asian and European is quite similar at 28-33% but the percentage for Pacific people is much lower at just 14%. There is no clear trend by decile as can be seen in Table 37 and 39 though the lowest rates appear to be for those in deciles 1-4.

RECOMMENDATIONS ON CONDUCTIVE HEARING LOSS

2) Mixed category to be included within permanent congenital hearing loss

Table 35 Conductive hearing loss by DHB, October 2011 to March 2012

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	24	5	20.8%	14	2	14.3%	38	7	18.4%
Waitemata									
Auckland	29	10	34.5%	10	2	20.0%	39	12	30.8%
Counties Manukau	11	0	0.0%	1	0	0.0%	12	0	0.0%
Waikato	20	6	30.0%	10	7	70.0%	30	13	43.3%
Lakes	2	1	50.0%	3	1	33.3%	5	2	40.0%
Bay of Plenty	9	0	0.0%	4	0	0.0%	13	0	0.0%
Tairawhiti									
Taranaki	13	7	53.8%	4	1	25.0%	17	8	47.1%
Hawke's Bay	5	0	0.0%	3	1	33.3%	8	1	12.5%
Whanganui	0	0	-	1	0	0.0%	1	0	0.0%
MidCentral	4	0	0.0%	6	3	50.0%	10	3	30.0%
Hutt Valley	4	3	75.0%	8	5	62.5%	12	8	66.7%
Capital & Coast	8	1	12.5%	6	2	33.3%	14	3	21.4%
Wairarapa									
Nelson Marlborough	7	1	14.3%	4	2	50.0%	11	3	27.3%
West Coast									
Canterbury	12	7	58.3%	9	0	0.0%	21	7	33.3%
South Canterbury	2	0	0.0%	0	0	-	2	0	0.0%
Southern	13	5	38.5%	2	1	50.0%	15	6	40.0%
Total	**163**	**46**	**28.2%**	**85**	**27**	**31.8%**	**248**	**73**	**29.4%**

Table 36 Conductive hearing loss by ethnicity, October 2011 to March 2012

Ethnicity	Completed audiology	Conductive hearing Loss	Conductive hearing loss to completed audiology
Maori	98	32	32.7%
Pacific	14	2	14.3%
Asian	21	7	33.3%
European	108	30	27.8%
Not Stated/Unspecified	3	0	0.0%
Other ethnic groups	4	2	50.0%
Total	**248**	**73**	**29.4%**

Table 37 Conductive hearing loss by deprivation, October 2011 to March 2012

Decile	Completed audiology	Conductive hearing Loss	Conductive hearing loss to completed audiology
Decile 1-2	29	7	24.1%
Decile 3-4	40	10	25.0%
Decile 5-6	50	17	34.0%
Decile 7-8	63	20	31.7%
Decile 9-10	66	19	28.8%
Total	**248**	**73**	**29.4%**

1.9 Age at identification of hearing loss

Description

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

Relevant Outcome

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

Rationale

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

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

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

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

Methodology

Indicator 1.9

Average age of eligible newborns (in 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 85.9% 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, October 2011 to March 2012

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			4	1	1	1			1	1	4	1	7
Auckland	1	7	2		2		1		3	7	3	0	13
Waikato		8	3	3	2		3	3	2	8	6	6	22
Lakes		2			2				2	2	0	0	4
Bay of Plenty			2		1				1	0	2	0	3
Taranaki	2	2	3	2	1				3	2	3	2	10
Hawke's Bay		1		1		1			0	2	0	1	3
Mid Central					3				3	0	0	0	3
Hutt Valley	1	2			3	4			4	6	0	0	10
Capital & Coast	1	2		1		1		1	1	3	0	2	6
Nelson Marlborough		3				1		1	0	4	0	1	5
Canterbury	1	1	2	4				1	1	1	2	5	9
South Canterbury	1								1	0	0	0	1
Southern	2	2		2		1			2	3	0	2	7
Total	**9**	**30**	**16**	**14**	**15**	**9**	**4**	**6**	**24**	**39**	**20**	**20**	**103**

RECOMMENDATIONS ON AGE AT HEARING LOSS DETECTED

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.