

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 2009 – March 2010**

### **Copyright**

The copyright owner of this publication is the Ministry of Health, which is part of the New Zealand Crown. The Ministry of Health permits the reproduction of material from this publication without prior notification, provided that all the following conditions are met:

- the content is not distorted or changed
- the information is not sold
- the material is not used to promote or endorse any product or service
- the material is not used in an inappropriate or misleading context having regard to the nature of the material
- any relevant disclaimers, qualifications or caveats included in the publication are reproduced
- the New Zealand Ministry of Health is acknowledged as the source.

### **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**

Many people have assisted in the production of this report. In particular, we would like to acknowledge those who have collected this information at the DHBs, those who have entered the data, and those who have facilitated the analysis of the data.

Version control  
Date:15/08/2011  
FINAL

# Contents

<b>Executive Summary .....</b>	<b>1</b>
Key Points from October 2009 – March 2010.....	1
<b>Summary of Recommendations.....</b>	<b>4</b>
<b>1. Introduction .....</b>	<b>5</b>
1.1 The Universal Newborn Hearing Screening and Early Intervention Programme.....	5
1.2 Programme Monitoring .....	5
<b>2. Data .....</b>	<b>8</b>
2.1 Data Collection Process .....	8
2.2 Information Included in this Report.....	8
2.3 Ethnicity Reporting.....	10
2.4 Deprivation Index.....	10
2.5 Known Data Quality Issues in this Report.....	11
<b>3. Monitoring Indicators.....</b>	<b>13</b>
3.1 Offer of Newborn Hearing Screening .....	14
3.2 Consent for Newborn Hearing Screening.....	16
3.3 Decline of Newborn Hearing Screening .....	22
3.4 Newborn Hearing Screening Started.....	25
3.5 Newborn Hearing Screening Completed .....	30
3.6 Referral to Audiology .....	36
3.7 Targeted Follow-up .....	41
3.8 Risk Factors .....	45
<b>4. Indicators not yet included in monitoring .....</b>	<b>47</b>

## List of Tables and Figures

<b>Table 1</b> Summary of newborn hearing screening indicators by DHB, Ethnicity, Deprivation and Birth Location for 1 Oct 2009-31 March 2010 .....	3
<b>Figure 1</b> The UNHSEIP Screening Pathway and Indicators .....	7
<b>Table 2</b> DHBs Participating in UNHSEIP October 2009 to March 2010 .....	9
<b>Table 3</b> Offer of Screening by DHB for 1 October 2009 - 31 March 2010 .....	14
<b>Figure 2</b> Live Births by DHB for October 2009 – March 2010 (n=31,937) and the proportion of offer of screening for the DHBs who had implemented screening .....	15
<b>Table 4</b> Consents for Newborn Hearing Screening by DHB.....	16
<b>Table 5</b> Comparison of DHB of birth with DHB of screening .....	17
<b>Figure 3</b> Consents for screening (total n=13,098) by prioritised ethnicity .....	18
<b>Figure 4</b> Consents for screening (total n=13,098) by deprivation .....	19
<b>Figure 5</b> Consents for screening (total n=13,098) by birth location.....	19
<b>Table 6</b> Decline of Screening by DHB for 1 October 2009 - 31 March 2010 .....	22
<b>Figure 6</b> Proportion of babies with consent who start newborn hearing screening .....	25
<b>Table 7</b> Newborn Hearing Screening Started compared with Consents to Screening by DHB .....	26
<b>Table 8</b> Newborn Hearing Screening Started compared with Consents to Screening by Ethnicity .....	27
<b>Table 9</b> Newborn Hearing Screening Started compared with Consents to Screening by Deprivation.....	27
<b>Figure 7</b> Proportion of babies who complete screening when started, and the proportion who complete screening by the time they are one month of age 30	
<b>Table 10</b> Newborn Hearing Screening Completed compared with Started by DHB .....	31
<b>Table 11</b> Newborn Hearing Screening Completed by one month of age by DHB .....	32
<b>Table 12</b> Newborn Hearing Screening Completed by Ethnicity.....	33
<b>Table 13</b> Newborn Hearing Screening Completed by Deprivation .....	33
<b>Table 14</b> Newborn Hearing Screening Completed by Birth Location .....	33
<b>Table 15</b> Referral to Audiology by DHB .....	36
<b>Table 16</b> Referral to Audiology by DHB and NICU/SCBU admission.....	37
<b>Table 17</b> Referral to Audiology by Ethnicity .....	38
<b>Table 18</b> Referral to Audiology by Deprivation.....	38
<b>Table 19</b> Referral to Audiology by Birth Location .....	38
<b>Table 20</b> Proportion of Targeted Follow-up by DHB .....	41
<b>Table 21</b> Proportion of Targeted Follow-up by Ethnicity.....	42
<b>Table 22</b> Proportion of Targeted Follow-up by Deprivation .....	42
<b>Table 23</b> Proportion of Targeted Follow-up by Deprivation .....	42
<b>Table 24</b> Proportion of Targeted Follow-up by DHB and NICU/SCBU .....	43
<b>Table 25</b> Frequency of Risk Factors .....	45
<b>Figure 8</b> Proportion of babies with one or more risk factors.....	46

## **Executive Summary**

The national implementation of the Universal Newborn Hearing Screening and Early Intervention Programme (UNHSEIP) was a phased process spanning three years 2007 – 2010. From August 2010, all 20 District Health Boards (DHBs) have been offering screening to the families/whānau of newborn babies.

This report is for the period October 2009 – March 2010, when 11 of the 20 DHBs had fully implemented newborn hearing screening and six DHBs had started the implementation process. A summary table of newborn hearing screening indicators for this period, prepared from data extracted from the national database, is presented in Table 1. Some DHBs noted that the number of babies included in the national database was less than the numbers they have in their records. This is likely due to the exclusion of some patient data forms with missing information, and also perhaps that some forms missed being copied and sent in to the National Screening Unit. This was the first time that patient data forms had been required to be sent to the National Screening Unit, and since this time systems and processes have been improved at both local and national levels to reduce missing information.

### **Key Points from October 2009 – March 2010**

- Within this six month period, screening information from 17 DHBs was recorded in the national database. There is limited information from Waitemata, Auckland, Counties Manukau, MidCentral and Nelson Marlborough, as these DHBs were just beginning implementation in the final weeks of this reporting period.
- Newborn hearing screening was just under half (47%) of full implementation at this time. In the areas where screening was occurring, an average of 94% of families were offered screening for their babies.
- In areas where screening was occurring, the proportion of consents for newborn hearing screening to live births was variable, which reflects that some DHBs were still implementing services across their region. DHBs that were screening for the whole six months had consistently above 80% consents for screening.
- Of the families/whānau who were offered newborn hearing screening, approximately 2% declined.
- Of the families/whānau who consented to newborn hearing screening for their babies, their prioritised ethnicities were 30% Māori, 6% Pacific, 7% Asian and 56% other ethnic group.
- For all ethnicities, greater than 99% of those who consented to screening started the newborn hearing screening process. Also for all ethnicities,

greater than 99% of those who started screening completed the process. Deprivation status did not seem to influence participation in, or completion of, newborn hearing screening.

- Of babies who completed newborn hearing screening, an average of 92.3% completed screening by the targeted of one month of age. For babies in NICU/SCBU for 48 hours or more, the proportion of completion by one month of age was less, at 84.6%.
- The average referral rate, directly from screening to audiology, was 1.6%. This meets the international benchmark of a 4% or less referral rate to audiology within one year of programme initiation.
- There was a significant difference in the screening referral rate between Well Babies, at 1.2%, and babies who had been in NICU/SCBU for 48 hours or more, at 6.6%. At this time, referral numbers are small, and no trends by ethnicity or deprivation can be seen.
- The proportion of babies who passed screening and were flagged for targeted follow-up was 6.8%. This was variable across DHBs.

**Table 1** Summary of newborn hearing screening indicators by DHB, Ethnicity, Deprivation and Birth Location for 1 Oct 2009-31 March 2010

DHB	Live Births	Consents for Screening	Started Screening	Completed Screening by 1 month of age	Completed Screening	Pass	Referred to Audiology	Passed with Targeted follow-up
Waitemata	3,918	112	112	99	102	101	1	2
Auckland	3,376	41	41	37	41	37	4	1
Counties Manukau	4,364	103	103	97	103	102	1	7
Waikato	2,802	2,559	2,557	2,427	2,553	2,521	32	180
Lakes	833	689	688	655	686	670	16	40
Bay of Plenty	1,460	1,305	1,293	1,198	1,273	1,257	16	101
Tairāwhiti	367	308	304	281	299	297	2	18
Taranaki	821	718	716	670	710	693	17	30
Hawke's Bay	1,233	1,111	1,111	1,004	1,107	1,086	21	99
Whanganui	462	403	402	349	401	391	10	29
Mid Central	1,125	31	31	22	31	26	5	14
Hutt Valley	1,119	1,148	1,141	1,107	1,131	1,117	14	139
Capital & Coast	1,996	1,692	1,692	1,609	1,692	1,686	6	84
Nelson Marlborough	851	32	31	30	31	30	1	5
West Coast	219	99	99	92	96	95	1	6
Canterbury	3,346	2,459	2,456	2,145	2,440	2,387	53	100
South Canterbury	329	288	288	274	285	280	5	13
<b>Grand Total</b>	<b>28,618</b>	<b>13,098</b>	<b>13,065</b>	<b>12,096</b>	<b>12,981</b>	<b>12,776</b>	<b>205</b>	<b>868</b>

Consent to Live Births	Started Screening to Consented for Screening	Completed Screening by 1 month to Consents	Completed Screening to Consents for Screening	Referral to audiology	Targeted follow-up
2.86%	100.0%	88.4%	91.1%	1.0%	2.0%
1.21%	100.0%	90.2%	100.0%	9.8%	2.7%
2.36%	100.0%	94.2%	100.0%	1.0%	6.9%
91.34%	99.9%	94.8%	99.8%	1.3%	7.1%
82.71%	99.9%	95.1%	99.6%	2.3%	6.0%
89.41%	99.1%	91.8%	97.5%	1.3%	8.0%
83.92%	98.7%	91.2%	97.1%	0.7%	6.1%
87.51%	99.7%	93.3%	98.9%	2.4%	4.3%
90.14%	100.0%	90.4%	99.6%	1.9%	9.1%
87.23%	99.8%	86.6%	99.5%	2.5%	7.4%
2.76%	100.0%	71.0%	100.0%	16.1%	53.8%
102.59%	99.4%	96.4%	98.5%	1.2%	12.4%
84.79%	100.0%	95.1%	100.0%	0.4%	5.0%
3.76%	96.9%	93.8%	96.9%	3.2%	16.7%
45.31%	100.0%	92.9%	97.0%	1.0%	6.3%
73.50%	99.9%	87.2%	99.2%	2.2%	4.2%
87.54%	100.0%	95.1%	99.0%	1.8%	4.6%
<b>45.77%</b>	<b>99.7%</b>	<b>92.3%</b>	<b>99.1%</b>	<b>1.6%</b>	<b>6.8%</b>

Ethnicity	Number of Live Births	Number of Consents for Screening	Number Started Screening	Number Completed Screening by 1 month of age	Number Completed Screening	Number of babies Pass	Number of Babies referred to Audiology	Passed with Targeted follow-up
Maori		3,866	3,845	3,470	3,804	3,726	78	312
Pacific		751	751	692	745	726	19	49
Asian		929	928	875	924	915	9	42
Other ethnic groups		7,480	7,472	7,001	7,439	7,340	99	455
Not Stated/Unspecified		72	69	58	69	69		10
<b>Grand Total</b>		<b>13,098</b>	<b>13,065</b>	<b>12,096</b>	<b>12,981</b>	<b>12,776</b>	<b>205</b>	<b>868</b>

Consent to Live Births	Started Screening to Consented for Screening	Completed Screening by 1 month to Consents	Completed Screening to Consents for Screening	Referral to audiology	Targeted follow-up
99.5%		89.8%	98.4%	2.1%	8.4%
100.0%		92.1%	99.2%	2.6%	6.7%
99.9%		94.2%	99.5%	1.0%	4.6%
99.9%		93.6%	99.5%	1.3%	6.2%
95.8%		80.6%	95.8%	0.0%	14.5%
<b>99.7%</b>		<b>92.3%</b>	<b>99.1%</b>	<b>1.6%</b>	<b>6.8%</b>

Deprivation	Number of Live Births	Number of Consents for Screening	Number Started Screening	Number Completed Screening by 1 month of age	Number Completed Screening	Number of babies Pass	Number of Babies referred to Audiology	Passed with Targeted Follow-up
Decile 1-2		1,913	1,911	1,799	1,907	1,883	24	110
Decile 3-4		1,973	1,970	1,834	1,959	1,932	27	110
Decile 5-6		2,499	2,492	2,325	2,475	2,450	25	153
Decile 7-8		3,240	3,230	2,956	3,196	3,136	60	217
Decile 9-10		3,466	3,455	3,175	3,437	3,368	69	278
UNKNOWN		7	7	7	7	7		
<b>Grand Total</b>		<b>13,098</b>	<b>13,065</b>	<b>12,096</b>	<b>12,981</b>	<b>12,776</b>	<b>205</b>	<b>868</b>

Consent to Live Births	Started Screening to Consented for Screening	Completed Screening by 1 month to Consent	Completed Screening to Consents for Screening	Referral to audiology	Targeted follow-up
99.9%		94.0%	99.7%	1.3%	5.8%
99.8%		93.0%	99.3%	1.4%	5.7%
99.7%		93.0%	99.0%	1.0%	6.2%
99.7%		91.2%	98.6%	1.9%	6.9%
99.7%		91.6%	99.2%	2.0%	8.3%
100.0%		100.0%	100.0%	0.0%	0.0%
<b>99.7%</b>		<b>92.3%</b>	<b>99.1%</b>	<b>1.6%</b>	<b>6.8%</b>

Birth Location	Number of Live Births	Number of Consents for Screening	Number Started Screening	Number Completed Screening by 1 month of age	Number Completed Screening	Number of babies Pass	Number of Babies referred to Audiology	Passed with Targeted follow-up
Public Hospital		12,846	12,814	11,874	12,732	12,532	200	850
Private Hospital		62	61	57	60	60		5
Home		187	187	162	186	181	5	13
Other Location		3	3	3	3	3		
<b>Grand Total</b>		<b>13,098</b>	<b>13,065</b>	<b>12,096</b>	<b>12,981</b>	<b>12,776</b>	<b>205</b>	<b>868</b>

Consent to Live Births	Started Screening to Consented for Screening	Completed Screening by 1 month to Consent	Completed Screening to Consents for Screening	Referral to audiology	Targeted follow-up
99.8%		92.4%	99.1%	1.6%	6.8%
98.4%		91.9%	96.8%	0.0%	8.3%
100.0%		86.6%	99.5%	2.7%	7.2%
100.0%		100.0%	100.0%	0.0%	0.0%
<b>99.7%</b>		<b>92.3%</b>	<b>99.1%</b>	<b>1.6%</b>	<b>6.8%</b>

# Summary of Recommendations

## RECOMMENDATIONS ON CONSENT FOR SCREENING

1. The National Screening Unit to explore options for reporting the category “other ethnic groups” in more detail, and still be consistent with the requirements of the *Ethnicity Data Protocols for the Health and Disability Sector* (2004).
2. The National Screening Unit to see if it is possible to report “birth location” by birthing unit.

## RECOMMENDATIONS ON DECLINE OF SCREENING

1. The National Screening Unit to clarify definitions used by DHBs to describe DNA, missed and decline.
2. The National Screening Unit to follow-up with South Canterbury about their decline rate.

## RECOMMENDATIONS ON NEWBORN HEARING SCREENING STARTED

1. The National Screening Unit to clarify definitions used by DHBs to describe consented to screening and started screening, and when this data should be reported.

## RECOMMENDATIONS ON NEWBORN HEARING SCREENING COMPLETED

1. To expand reporting for completed screening:
  - a. to include the range, and maximum and minimum timeframes
  - b. be broken down by Well Baby and NICU/SCBU.

## RECOMMENDATIONS ON REFERRAL TO AUDIOLOGY

1. For the annual report, the National Screening Unit to explore the possibility of reporting referrals to audiology by unilateral and bilateral referrals.

## RECOMMENDATIONS ON TARGETED FOLLOW-UP

1. For the annual report, to include the timing of targeted follow-up visit to audiology.



# **1. Introduction**

## **1.1 The Universal Newborn Hearing Screening and Early Intervention Programme**

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.

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, audiologic 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 for the 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 in 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.

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. As the UNHSEIP is still in the process of implementation in some areas, it is recognised performance will improve over time.

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.

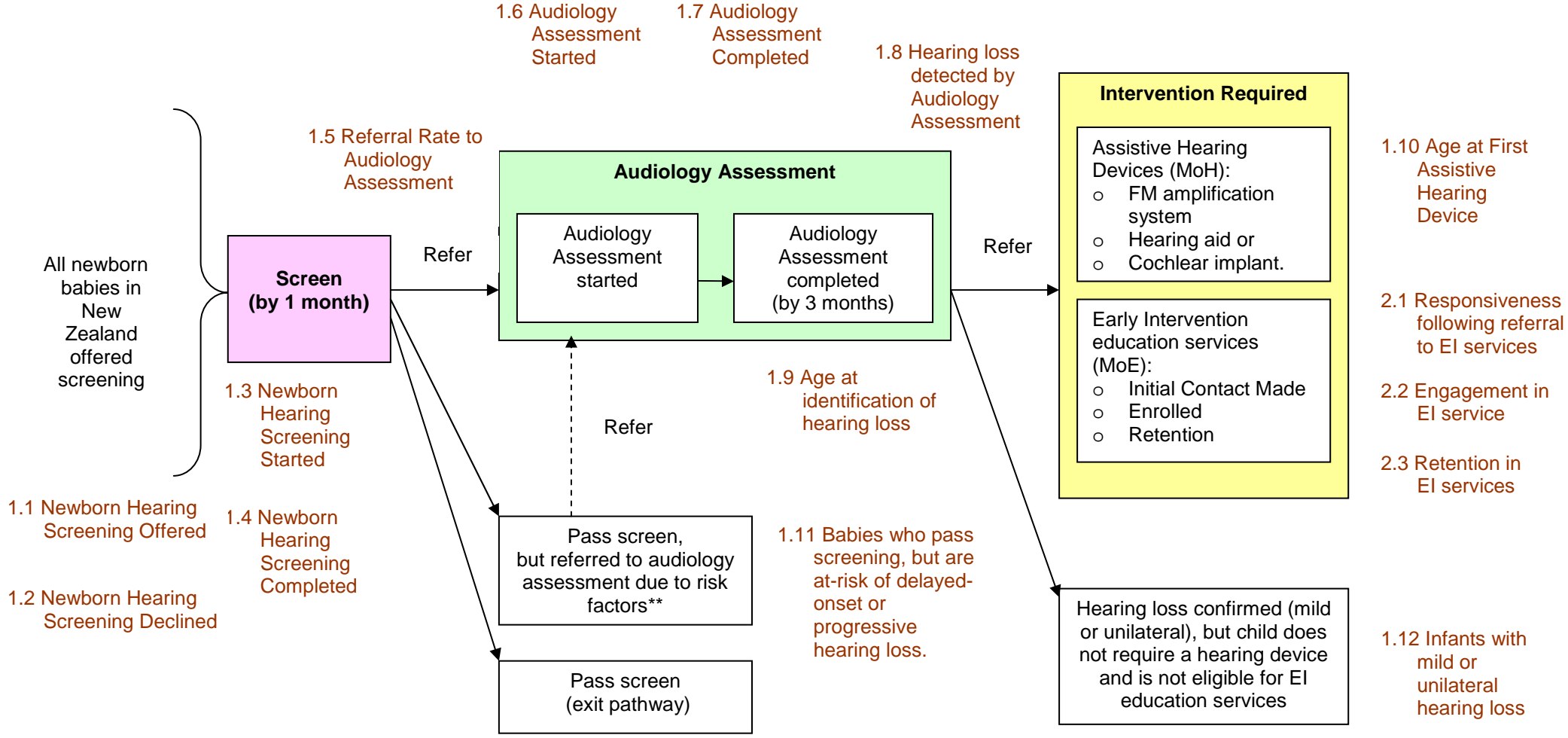
Routine monitoring, based on newborn hearing screening and audiology data provided to the Ministry by DHBs, will be reported on a quarterly basis. Quarterly monitoring will focus on babies who have screening, and their outcomes.

Annual reporting will be at a higher level, and incorporate other aspects of the Programme such as audiology and Early Intervention information. The full UNHSEIP screening pathway and associated indicators, as depicted in Figure 1, will be the basis of annual reporting.

This report, which is based on the data of babies who were screened during the six month period 1 October 2009 though to 31 March 2010, 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
- 1.11 Babies who pass screening but are flagged for targeted follow-up.

**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 between 24 and 30 months of age.

## **2. Data**

### **2.1 Data Collection Process**

Screening and audiology information is collected and recorded on paper forms by newborn hearing screening providers. The paper forms are regularly submitted to the Ministry of Health's National Screening Unit (NSU) and the data is entered in to the NSU's web-based application/database. The start date for entering newborn hearing screening information was for babies born from 1 October 2009 onwards, however the audiology form was not implemented until April/May 2010. Therefore audiology information is only available from this time forwards.

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 28 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.

### **2.2 Information Included in this Report**

The information reported is from newborn hearing screening forms where the date of screening started was between 1 October 2009 and 31 March 2010.

#### **Participating District Health Boards 1 October 2009 – 31 March 2010**

The information in this report relates to the 17 DHBs for which screening activity was recorded in the national database for the period 1 October 2009 to 31 March 2010. Out of the 20 DHBs only 3 - Northland, Wairarapa and Southern - had not yet started to implement screening. Of the 17 DHBs for which screening data was recorded, 11 were fully implemented and 6 began implementation during this time, as detailed in Table 2.

Five DHBs – Waitemata, Auckland, Counties Manukau, MidCentral and Nelson Marlborough – started implementation late in the reporting period. The data from these DHBs is included for completeness but no conclusions should be made due to the limited data.

**Table 2: DHBs Participating in UNHSEIP October 2009 to March 2010**

<b>DHB</b>	<b>Screening for October 2009 – March 2010</b>
Northland	No screening – implementation from April 10
Waitemata	Started implementation late March 10
Auckland	Started implementation late March 10
Counties Manukau	Started implementation late March 10
Waikato	Yes – screening as part of the national Programme since July 2007
Lakes	Yes – screening as part of the national Programme since March 2009
Bay of Plenty	Yes – screening as part of the national Programme since March 2009
Tairāwhiti	Yes – screening as part of the national Programme since July 2007
Taranaki	Yes – screening as part of the national Programme since April 2009
Hawke’s Bay	Yes – screening as part of the national Programme since July 2007
Whanganui	Yes – screening as part of the national Programme since June 2009
Mid-Central	Started implementation mid February 10
Wairarapa	No screening – implementation from April 10
Hutt Valley	Yes – screening as part of the national Programme since July 2009
Capital & Coast	Yes – screening as part of the national Programme since June 2009
Nelson Marlborough	Started implementation late March 10
West Coast	Started implementation December 09
Canterbury	Yes – screening as part of the national Programme since May 2009
South Canterbury	Yes – screening as part of the national Programme since April 2009
Southern	No screening – implementation from August 10

### **Audiology assessment**

This report does not include audiology assessment information, as the form for recording this was not implemented until April/May 2010. While audiology assessment information will be reported in the future, it is important to note that for many babies screened within a quarterly reporting period, their audiology assessment, with the goal “to be completed by 3 months of age”, may not be carried out in that same reporting period. Hence, annual reports will better present a complete overview of the screening process.

## **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 quarterly monitoring. Annual reporting will be a more useful way of portraying this information.

## **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 and European/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.

Ethnicity data is prioritisation means that the group of prioritised European/Other effectively refers to non-Māori, non-Pacific, non-Asian 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 New Zealand European ethnicity.

People may identify with as many ethnic groups as they choose. Within this population of babies, the maximum number of ethnicities recorded for one baby was five. Four ethnicities were recorded for 33 babies and three ethnicities were recorded for 2.5% of babies (n=331). Two ethnicities were recorded for 22% of babies (n=2924) and the remaining approximately 75% of babies had 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 (n=354). For babies born at less than full term, corrected age was calculated for the reporting of indicator 1.4 (b) screening completed by one month of age.

### **Accuracy of reporting**

Data is manually entered into the national database from hand written screening forms. The potential for errors in data entry is minimised by setting database rules that do not allow incorrect information to be entered, for example a birth date of 16 July 1980 would not be allowed. Each record must contain a value in nine 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
- prioritised ethnicity
- screening outcome
- DHB of screening test 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.

Some DHBs noted that the number of babies included in the national database was less than the numbers they have in their records. This is likely due to the exclusion of some patient data forms with missing information, and also perhaps that some forms missed being copied and sent in to the National Screening Unit. This was the first time that patient data forms had been required to be sent to the National Screening Unit, and since this time

systems and processes have been improved at both local and national levels to reduce missing information.

### **Denominator**

For the purpose of this report, birth data from Statistics New Zealand has been used. This is based on live birth registrations and is sourced from the Births, Deaths and Marriages Register. The denominator for this report is Statistics New Zealand live births for the period 1 October 2009 – 31 March 2010.

At this time, this is the only source of a denominator that is available in a timely manner – it is released about 8 weeks after the close of the quarter. Other denominator sources have a lag time of 6-12 months, which is not useful. The limitations of this denominator are discussed further under sections 3.1 and 3.2.



### 3. Monitoring Indicators

<b>1.1 NEWBORN HEARING SCREENING OFFERED</b>
<p><b>DESCRIPTION</b></p> <p>The proportion of parents / guardians of eligible newborns offered newborn hearing screening.</p>
<p><b>RELEVANT OUTCOME</b></p> <p>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.</p>
<p><b>METHODOLOGY</b></p> <p><i>Indicator 1.1</i></p> <p>Numerator:      Number of eligible newborns offered screening.</p> <p>Denominator:    Number of eligible live births.</p>
<p><b>NOTES</b></p> <ul style="list-style-type: none"><li>• 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.</li><li>• 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.</li></ul>

### 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.

Hence the information reported in Table 3 is not from the national database extract, it is sourced from DHB quarterly reports. However reporting on the offer of screening will enable the monitoring of trends over time. In the 12 DHBs who submitted quarterly reports, 94% of babies recorded as live births were offered newborn hearing screening. West Coast was screening for only four months, from December 2009, and Canterbury was still rolling out newborn hearing screening to regional areas.

**Table 3: Offer of Screening by DHB for 1 October 2009 - 31 March 2010**

<b>DHB</b>	<b>Offered Screening</b>	<b>Live Births</b>	<b>Percentage Offered</b>
Waikato	2,809	2,802	100.2
Lakes	812	833	97.5
Bay of Plenty	1,374	1,460	94.1
Tairāwhiti	373	367	101.6
Taranaki	789	812	96.0
Hawke's Bay	1,257	1,233	101.9
Whanganui	453	462	98.1
Hutt Valley	1,207	1,119	107.9
Capital & Coast	1,972	1,996	98.8
West Coast	135	219	61.6
Canterbury	2,577	3,346	77.0
South Canterbury	336	329	102.1
<b>TOTAL</b>	<b>14,094</b>	<b>14,987</b>	<b>94.0</b>

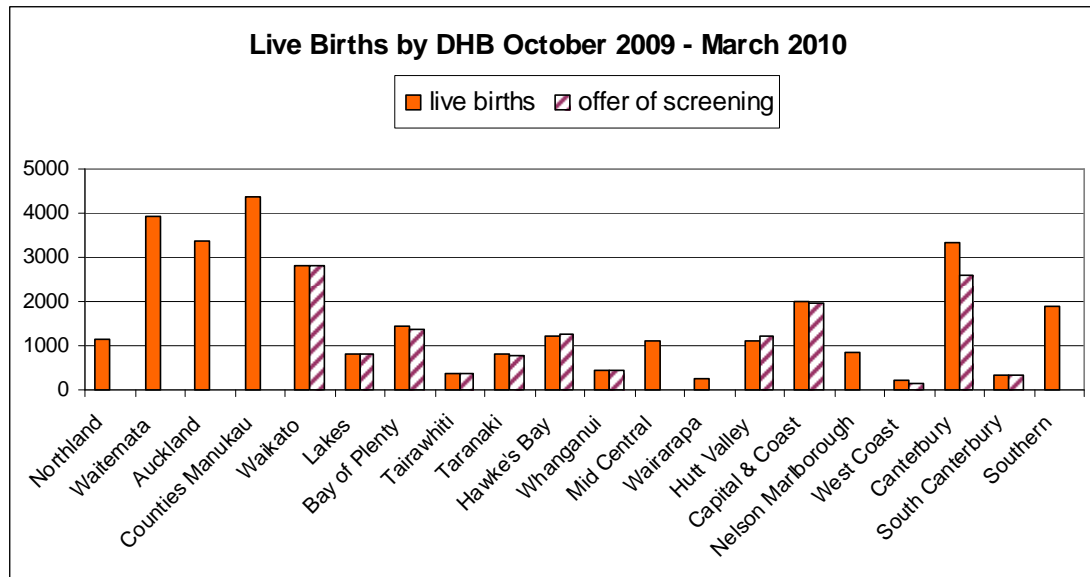
#### Challenges in reporting on the offer of newborn hearing screening

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. 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. Annual reporting will be based on babies born within a one year period, which will improve reporting against the denominator.

## Progress with national implementation

During this six month period, there were 31,937 live births recorded, distributed by DHB as shown in Figure 2. At this time, at a national level, newborn hearing screening was at just under half (47%) of full implementation.



**Figure 2** Live Births by DHB for October 2009 – March 2010 (n=31,937) and the proportion of offer of screening for the DHBs who had implemented screening

## RECOMMENDATIONS ON OFFER OF SCREENING

*The Advisory Group made 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 looking at screening coverage. All babies with informed consent for newborn hearing screening are captured in the national database. This information is compared with live births by DHB, to enable the proportion of families who consent to newborn hearing screening to be monitored. While this does not allow the separation of declines from those who were not offered screening, this information is important for monitoring trends over time.

Table 4 shows that Waitemata, Auckland, Counties Manukau, MidCentral and Nelson Marlborough were just at the beginning of implementing newborn hearing screening. These data have been included in the table for completeness of reporting, however no conclusions can be drawn from this limited information.

The lowest proportion of consents for screening to live births were in West Coast (45.3%), who were not screening for the full period, and in Canterbury (73.5%), who were moving from a hospital based service to include regional outreach clinics. DHBs that were screening for the entire period were consistently above 80% consents. Hutt Valley recorded more consents for screening than live births, which may indicate that babies who live elsewhere are being screened by this DHB.

**Table 4** Consents for Newborn Hearing Screening by DHB

DHB	Consents for screening	Live Births	Consents to Live Births
Waitemata	112	3,918	2.9%
Auckland	41	3,376	1.2%
Counties Manukau	103	4,364	2.4%
Waikato	2,559	2,802	91.3%
Lakes	689	833	82.7%
Bay of Plenty	1,305	1,460	89.4%
Tairāwhiti	308	367	83.9%
Taranaki	718	821	87.5%
Hawke's Bay	1,111	1,233	90.1%
Whanganui	403	462	87.2%
Mid Central	31	1,125	2.8%
Hutt Valley	1,148	1,119	102.6%
Capital & Coast	1,692	1,996	84.8%
Nelson Marlborough	32	851	3.8%
West Coast	99	219	45.3%
Canterbury	2,459	3,346	73.5%
South Canterbury	288	329	87.5%
	<b>13,098</b>	<b>28,618</b>	<b>45.8%</b>

## DHB of birth compared with DHB of screening

The DHB of a baby's birth is used as the parameter for data extraction, as the denominator sourced from Statistics New Zealand is based on where the baby is born. However, DHB screening activity is based on babies who are screened within the DHB, which can be different to the DHB of birth. A comparison of DHB of birth with DHB of screening is shown in Table 5. This information indicates that at this time, only a small proportion of babies are screened in a different DHB to where they were born. Waikato DHB shows the most babies being screened in a different DHB to where they were born, although the proportion is small, at less than 1%. It will be interesting to follow these trends over time, particularly when the Auckland/Northland region has implemented screening, to monitor the patterns of movement. Another comparison that will be interesting in the future will be with DHB of residence.

This matter was discussed by the Advisory Group, and it was agreed that for monitoring purposes, reporting should continue use DHB of baby's birth as the parameter for data extraction.

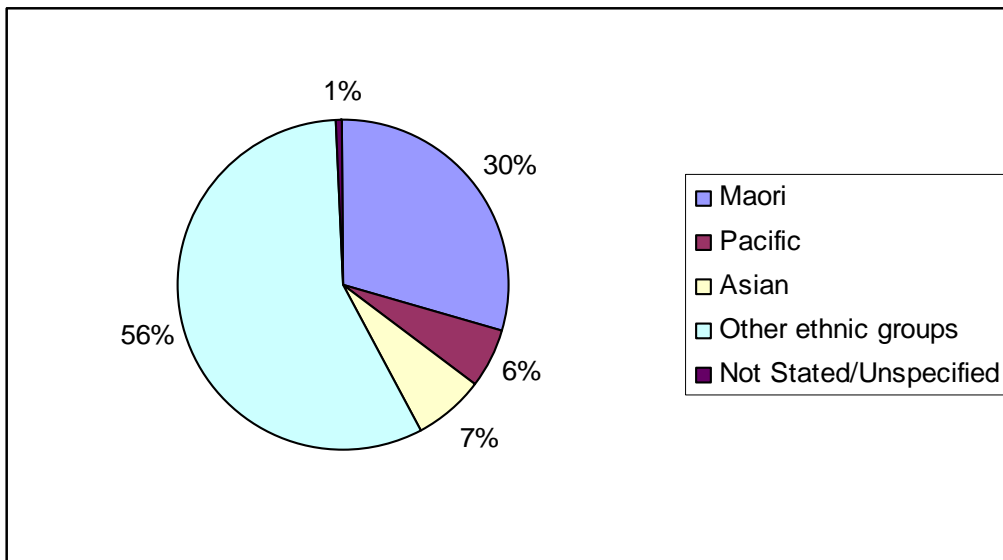
**Table 5** Comparison of DHB of birth with DHB of screening

DHB of birth	Total consents for screening	DHB of screening	Number of babies screened
Waitemata	112	Waitemata	111
		Canterbury	1
Auckland	41	Auckland	40
		Waikato	1
Counties Manukau	103	Counties Manukau	102
		Waikato	1
Waikato	2559	Waikato	2537
		Bay of Plenty	8
		Capital & Coast	1
		Lakes	5
		Mid Central	1
		Taranaki	7
Lakes	689	Lakes	684
		Waikato	5
Bay of Plenty	1305	Bay of Plenty	1301
		Waikato	4
Tairāwhiti	308	Tairāwhiti	307
		Hawke's Bay	1
Taranaki	718	Taranaki	718
		Hawke's Bay	1110
Whanganui	403	Whanganui	402
		Bay of Plenty	1
Mid Central	31	Mid Central	27
		Hawke's Bay	1
		Whanganui	3
Hutt Valley	1148	Hutt Valley	1123
		Capital & Coast	24
		Waikato	1
Capital & Coast	1692	Capital & Coast	1678
		Hutt Valley	13
		Whanganui	1
Nelson Marlborough	32	Nelson Marlborough	32
West Coast	99	West Coast	99
Canterbury	2459	Canterbury	2459
South Canterbury	288	South Canterbury	287
		Canterbury	1
Grand Total	13098		13098

### Consents for Screening by Ethnicity, Deprivation and Birth Location

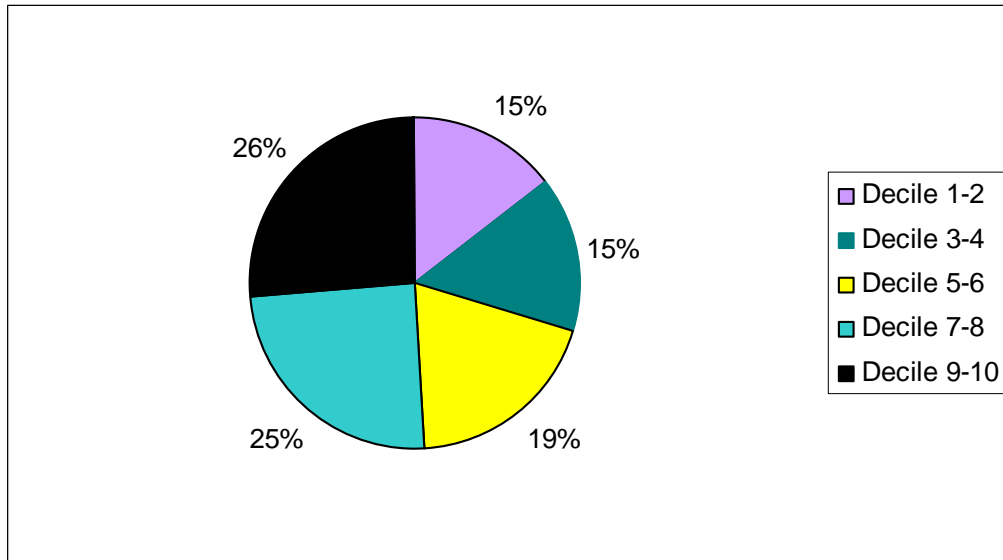
The live births denominator from Statistics New Zealand is only available by DHB at this time, so consents for screening cannot be compared with a denominator for ethnicity, deprivation status or birth location for this report. However, the proportion of consents for screening can be reported by these factors, as shown in Figures 3-5 below.

Figure 3 shows that more than half of the babies with consent for screening were in the “other ethnic group”, which is as expected because this group includes New Zealand European and other European ethnicities. Thirty percent of babies have been prioritised as Māori, and at this time, the proportions of Pacific and Asian ethnicities were quite similar. Over time, when all areas have implemented newborn hearing screening it is expected that the proportions of Pacific and Asian Ethnicities will change.



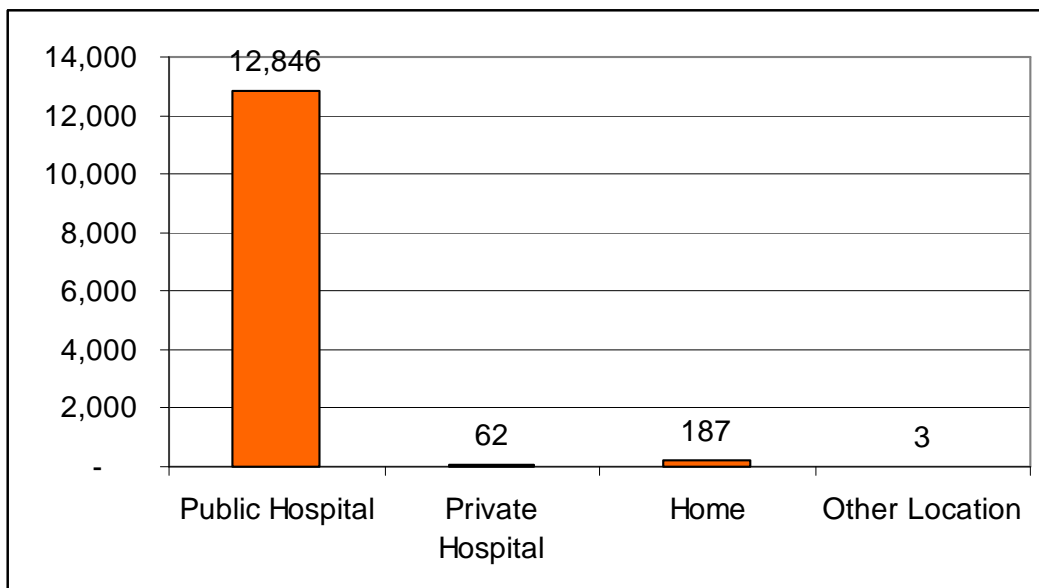
**Figure 3** Consents for screening (total n=13,098) by prioritised ethnicity

Figure 4 shows that approximately half of babies with consent for screening were in Decile 7 or greater, which are the more disadvantaged areas. This is consistent with the national picture, where a greater proportion of births occur in the more disadvantaged areas.



**Figure 4** Consents for screening (total n=13,098) by deprivation

Figure 5 shows that the majority of births had the location of a public hospital for this reporting period. This reflects the common implementation approach of starting newborn hearing screening in hospitals, and then rolling out screening to private and community settings. The birth patterns in New Zealand are strongly based in public hospitals, so this is likely to remain as the most frequent birth location.



**Figure 5** Consents for screening (total n=13,098) by birth location

## **RECOMMENDATIONS ON CONSENT FOR SCREENING**

1. The National Screening Unit to explore options for reporting the category “other ethnic groups” in more detail, and still be consistent with the requirements of the *Ethnicity Data Protocols for the Health and Disability Sector* (2004).
2. The National Screening Unit to see if it is possible to report “birth location” by birthing unit.



<b>1.2 NEWBORN HEARING SCREEN DECLINED</b>
<p><b>DESCRIPTION</b></p> <p>The proportion of newborns whose parents / guardian decline screening.</p>
<p><b>RELEVANT OUTCOME</b></p> <p>The proportion of newborns whose parents / guardian decline screening is expected to be very low and in keeping with international programmes.</p> <p>No percentage outcome target at this stage of the programme (see rationale section).</p>
<p><b>RATIONALE</b></p> <p>Parents / guardians have the same right to accept or decline hearing screening or any follow-up care for their newborn as for any other screening or evaluation procedures or intervention.</p> <p>A high decline rate (eg, for an individual DHB, for the programme relative to international figures or for particular ethnic groups) would warrant further investigation and consideration of outcome targets.</p>
<p><b>METHODOLOGY</b></p> <p><i>Indicator 1.2</i></p> <p>Numerator:           Number of eligible newborns whose parents/guardian declined newborn hearing screening.</p> <p>Denominator:        Number of eligible newborns whose parents/guardian were offered screening.</p>
<p><b>NOTES</b></p> <p>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.</p>

### 3.3 Decline of Newborn Hearing Screening

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.

Therefore the information reported in Table 6 is sourced from DHB quarterly reports, not from the national database extract. It is still useful to report on the decline of screening, as this will enable the monitoring of trends over time. Across the 12 DHBs who had provided quarterly reports, the overall decline rate was just under 2% of live births. 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. However information reported by South Canterbury indicates a significantly higher proportion of declines than other DHBs, at 8%, and potential reasons for this should be explored.

**Table 6** Decline of Screening by DHB for 1 October 2009 - 31 March 2010

<b>DHB</b>	<b>Declined Screening</b>	<b>Offered Screening</b>	<b>Percentage Declined</b>
Waikato	18	2,809	0.6
Lakes	13	812	1.6
Bay of Plenty	35	1,374	2.5
Tairāwhiti	0	373	0
Taranaki	15	789	1.9
Hawke's Bay	7	1,257	0.6
Whanganui	4	453	0.9
Hutt Valley	9	1,207	0.7
Capital & Coast	34	1,972	1.7
West Coast	5	135	3.7
Canterbury	62	2,577	2.4
South Canterbury	27	336	8.0
<b>TOTAL</b>	<b>229</b>	<b>14,094</b>	<b>2.0%</b>

## **RECOMMENDATIONS ON DECLINE OF SCREENING**

1. The National Screening Unit to clarify definitions used by DHBs to describe DNA, missed and decline.
2. The National Screening Unit to follow-up with South Canterbury about their decline rate.

### **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***

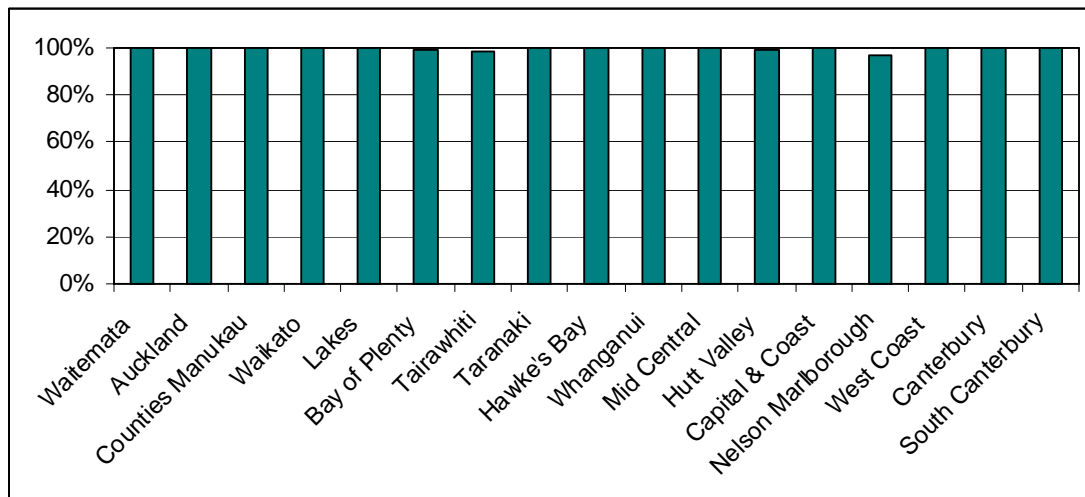
Numerator: Number of eligible newborns that started newborn hearing screening.

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/whānau has consented is important to identify potential gaps in systems and processes. For example if a high proportion of babies with consent are not starting screening due to early discharge, then solutions such as more outpatient clinics may need to be considered.

Factors such as whether the baby is admitted to NICU/SCBU, ethnicity, deprivation status and birth location may influence participation in newborn hearing screening. The information presented in Tables 7-9 indicates that none of these factors are significant at this time. Overall, 99.7% of babies with consent for screening do start screening, and this high proportion is consistent across DHBs, as show in Figure 6.



**Figure 6** Proportion of babies with consent who start newborn hearing screening

**Table 7 Newborn Hearing Screening Started compared with Consents to Screening by DHB**

<b>Universal Newborn Hearing Screening Programme</b>									
<b>Newborn Hearing Screening Started by DHB</b>									
For babies screened between 1 October 2009 to 31 March 2010									
	Well Baby			NICU/SCBU			Total		
DHB	Started Screening	Consents for screening	Started Screening to Consents	Started Screening	Consents for screening	Started Screening to Consents	Started Screening	Consents for screening	Started Screening to Consents
Waitemata	110	110	100.0%	2	2	100.0%	112	112	100.0%
Auckland	31	31	100.0%	10	10	100.0%	41	41	100.0%
Counties Manukau	96	96	100.0%	7	7	100.0%	103	103	100.0%
Waikato	2,353	2,355	99.9%	204	204	100.0%	2,557	2,559	99.9%
Lakes	628	629	99.8%	60	60	100.0%	688	689	99.9%
Bay of Plenty	1,178	1,189	99.1%	115	116	99.1%	1,293	1,305	99.1%
Tairāwhiti	281	285	98.6%	23	23	100.0%	304	308	98.7%
Taranaki	684	684	100.0%	32	34	94.1%	716	718	99.7%
Hawke's Bay	1,020	1,020	100.0%	91	91	100.0%	1,111	1,111	100.0%
Whanganui	374	375	99.7%	28	28	100.0%	402	403	99.8%
Mid Central	3	3	100.0%	28	28	100.0%	31	31	100.0%
Hutt Valley	1,043	1,049	99.4%	98	99	99.0%	1,141	1,148	99.4%
Capital & Coast	1,574	1,574	100.0%	118	118	100.0%	1,692	1,692	100.0%
Nelson Marlborough	30	31	96.8%	1	1	100.0%	31	32	96.9%
West Coast	98	98	100.0%	1	1	100.0%	99	99	100.0%
Canterbury	2,271	2,274	99.9%	185	185	100.0%	2,456	2,459	99.9%
South Canterbury	282	282	100.0%	6	6	100.0%	288	288	100.0%
<b>Grand Total</b>	<b>12,056</b>	<b>12,085</b>	<b>99.8%</b>	<b>1,009</b>	<b>1,013</b>	<b>99.6%</b>	<b>13,065</b>	<b>13,098</b>	<b>99.7%</b>

**Table 8** Newborn Hearing Screening Started compared with Consents to Screening by Ethnicity

<b>Universal Newborn Hearing Screening Programme</b>									
<b>Newborn Hearing Screening Started by Ethnicity</b>									
For babies screened between 1 October 2009 to 31 March 2010									
	<b>Well Baby</b>			<b>NICU/SCBU</b>			<b>Total</b>		
<b>Ethnicity</b>	<b>Started Screening</b>	<b>Consents for screening</b>	<b>Started Screening to Consents</b>	<b>Started Screening</b>	<b>Consents for screening</b>	<b>Started Screening to Consents</b>	<b>Started Screening</b>	<b>Consents for screening</b>	<b>Started Screening to Consents</b>
Maori	3,532	3,552	99.4%	313	314	99.7%	3,845	3,866	99.5%
Pacific Island	687	687	100.0%	64	64	100.0%	751	751	100.0%
Asian	874	875	99.9%	54	54	100.0%	928	929	99.9%
Other ethnic groups	6,903	6,909	99.9%	569	571	99.6%	7,472	7,480	99.9%
Not Stated/Unspecified	60	62	96.8%	9	10	90.0%	69	72	95.8%
<b>Grand Total</b>	<b>12,056</b>	<b>12,085</b>	<b>99.8%</b>	<b>1,009</b>	<b>1,013</b>	<b>99.6%</b>	<b>13,065</b>	<b>13,098</b>	<b>99.7%</b>

**Table 9** Newborn Hearing Screening Started compared with Consents to Screening by Deprivation

<b>Universal Newborn Hearing Screening Programme</b>									
<b>Newborn Hearing Screening Started by Deprivation</b>									
For babies screened between 1 October 2009 to 31 March 2010									
	<b>Well Baby</b>			<b>NICU/SCBU</b>			<b>Total</b>		
<b>Deprivation</b>	<b>Started Screening</b>	<b>Consents for screening</b>	<b>Started Screening to Consents</b>	<b>Started Screening</b>	<b>Consents for screening</b>	<b>Started Screening to Consents</b>	<b>Started Screening</b>	<b>Consents for screening</b>	<b>Started Screening to Consents</b>
Decile 1-2	1,777	1,778	99.9%	134	135	99.3%	1,911	1,913	99.9%
Decile 3-4	1,820	1,823	99.8%	150	150	100.0%	1,970	1,973	99.8%
Decile 5-6	2,318	2,325	99.7%	174	174	100.0%	2,492	2,499	99.7%
Decile 7-8	2,963	2,970	99.8%	267	270	98.9%	3,230	3,240	99.7%
Decile 9-10	3,172	3,183	99.7%	283	283	100.0%	3,455	3,466	99.7%
UNKNOWN	6	6	100.0%	1	1	100.0%	7	7	100.0%
<b>Grand Total</b>	<b>12,056</b>	<b>12,085</b>	<b>99.8%</b>	<b>1,009</b>	<b>1,013</b>	<b>99.6%</b>	<b>13,065</b>	<b>13,098</b>	<b>99.7%</b>

## **RECOMMENDATIONS ON NEWBORN HEARING SCREENING STARTED**

1. The National Screening Unit to clarify definitions used by DHBs to describe consented to screening and started screening, and when this data should be reported.



## 1.4 NEWBORN HEARING SCREENING COMPLETED

### DESCRIPTION

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

### RELEVANT OUTCOME

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

### RATIONALE

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

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

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

This indicator will be closely monitored and further investigation will be required if progression towards the goal is not occurring.

### 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***

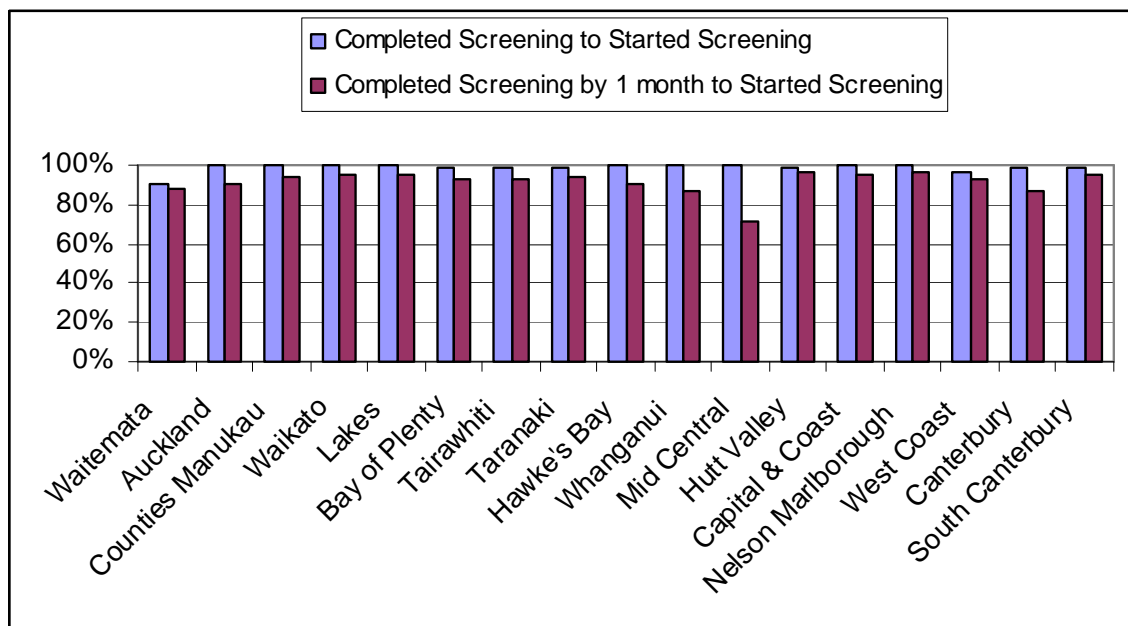
Numerator: Number of eligible newborns that complete newborn hearing screening by 1 month of age.

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, 99.4% of babies who started screening completed, and 92.6% of babies completed screening by the time they were one month of age. The high proportion of completion is consistent across DHBs, as show in Figure 7 (note that the information from MidCentral is only for 31 babies, 28 of which were admitted to SCBU). The information presented in Tables 10 and 11 shows that while admission to NICU/SCBU for 48 hours or more does not impact on the proportion of completion of screening, the proportion of babies with screening completed by one month of age is lower.



**Figure 7** Proportion of babies who complete screening when started, and the proportion who complete screening by the time they are one month of age

**Table 10** Newborn Hearing Screening Completed compared with Started by DHB

<b>Universal Newborn Hearing Screening Programme</b>									
<b>Newborn Hearing Screening Completed by DHB</b>									
For babies screened between 1 October 2009 to 31 March 2010									
	Well Baby			NICU/SCBU			Total		
DHB	Completed Screening	Started Screening	Completed to started screening	Completed Screening	Started Screening	Completed to started screening	Completed Screening	Started Screening	Completed to started screening
Waitemata	100	110	90.9%	2	2	100.0%	102	112	91.1%
Auckland	31	31	100.0%	10	10	100.0%	41	41	100.0%
Counties Manukau	96	96	100.0%	7	7	100.0%	103	103	100.0%
Waikato	2,350	2,353	99.9%	203	204	99.5%	2,553	2,557	99.8%
Lakes	626	628	99.7%	60	60	100.0%	686	688	99.7%
Bay of Plenty	1,158	1,178	98.3%	115	115	100.0%	1,273	1,293	98.5%
Tairāwhiti	276	281	98.2%	23	23	100.0%	299	304	98.4%
Taranaki	678	684	99.1%	32	32	100.0%	710	716	99.2%
Hawke's Bay	1,016	1,020	99.6%	91	91	100.0%	1,107	1,111	99.6%
Whanganui	373	374	99.7%	28	28	100.0%	401	402	99.8%
Mid Central	3	3	100.0%	28	28	100.0%	31	31	100.0%
Hutt Valley	1,033	1,043	99.0%	98	98	100.0%	1,131	1,141	99.1%
Capital & Coast	1,574	1,574	100.0%	118	118	100.0%	1,692	1,692	100.0%
Nelson Marlborough	30	30	100.0%	1	1	100.0%	31	31	100.0%
West Coast	95	98	96.9%	1	1	100.0%	96	99	97.0%
Canterbury	2,255	2,271	99.3%	185	185	100.0%	2,440	2,456	99.3%
South Canterbury	279	282	98.9%	6	6	100.0%	285	288	99.0%
<b>Grand Total</b>	<b>11,973</b>	<b>12,056</b>	<b>99.3%</b>	<b>1,008</b>	<b>1,009</b>	<b>99.9%</b>	<b>12,981</b>	<b>13,065</b>	<b>99.4%</b>

**Table 11** Newborn Hearing Screening Completed by one month of age by DHB

<b>Universal Newborn Hearing Screening Programme</b>									
For babies screened between 1 October 2009 to 31 March 2010									
	Well Baby			NICU/SCBU			Total		
DHB	Completed by 1 month of age	Started Screening	Completed Screening by 1 month of age	Completed by 1 month of age	Started Screening	Completed Screening by 1 month of age	Completed by 1 month of age	Started Screening	Completed Screening by 1 month of age
Waitemata	97	110	88.2%	2	2	100.0%	99	112	88.4%
Auckland	30	31	96.8%	7	10	70.0%	37	41	90.2%
Counties Manukau	92	96	95.8%	5	7	71.4%	97	103	94.2%
Waikato	2,260	2,353	96.0%	167	204	81.9%	2,427	2,557	94.9%
Lakes	598	628	95.2%	57	60	95.0%	655	688	95.2%
Bay of Plenty	1,090	1,178	92.5%	108	115	93.9%	1,198	1,293	92.7%
Tairāwhiti	263	281	93.6%	18	23	78.3%	281	304	92.4%
Taranaki	645	684	94.3%	25	32	78.1%	670	716	93.6%
Hawke's Bay	926	1,020	90.8%	78	91	85.7%	1,004	1,111	90.4%
Whanganui	322	374	86.1%	27	28	96.4%	349	402	86.8%
Mid Central	1	3	33.3%	21	28	75.0%	22	31	71.0%
Hutt Valley	1,018	1,043	97.6%	89	98	90.8%	1,107	1,141	97.0%
Capital & Coast	1,523	1,574	96.8%	86	118	72.9%	1,609	1,692	95.1%
Nelson Marlborough	29	30	96.7%	1	1	100.0%	30	31	96.8%
West Coast	91	98	92.9%	1	1	100.0%	92	99	92.9%
Canterbury	1,988	2,271	87.5%	157	185	84.9%	2,145	2,456	87.3%
South Canterbury	269	282	95.4%	5	6	83.3%	274	288	95.1%
<b>Grand Total</b>	<b>11,242</b>	<b>12,056</b>	<b>93.2%</b>	<b>854</b>	<b>1,009</b>	<b>84.6%</b>	<b>12,096</b>	<b>13,065</b>	<b>92.6%</b>

Factors such as ethnicity, deprivation status and birth location may influence completion rates, and/or the time taken for the completion for newborn hearing screening. The information presented in Tables 12-14 indicates that while ethnicity and deprivation status are not significant at this time, babies born at home may take longer to complete screening.

**Table 12 Newborn Hearing Screening Completed by Ethnicity**

<b>Universal Newborn Hearing Screening Programme</b>					
For babies screened between 1 October 2009 to 31 March 2010					
<b>Ethnicity</b>	<b>Completed Screening by 1 month of age</b>	<b>Completed Screening</b>	<b>Started Screening</b>	<b>Completed Screening to started</b>	<b>Completed Screening by 1 month of age to Started Screening</b>
Maori	3,470	3,804	3,845	98.9%	90.2%
Pacific	692	745	751	99.2%	92.1%
Asian	875	924	928	99.6%	94.3%
Other ethnic groups	7,001	7,439	7,472	99.6%	93.7%
Not Stated/Unspecified	58	69	69	100.0%	84.1%
<b>Grand Total</b>	<b>12,096</b>	<b>12,981</b>	<b>13,065</b>	<b>99.4%</b>	<b>92.6%</b>

**Table 13 Newborn Hearing Screening Completed by Deprivation**

<b>Universal Newborn Hearing Screening Programme</b>					
For babies screened between 1 October 2009 to 31 March 2010					
<b>Deprivation</b>	<b>Completed Screening by 1 month of age</b>	<b>Completed Screening</b>	<b>Started Screening</b>	<b>Completed Screening to started</b>	<b>Completed Screening by 1 month of age to Started Screening</b>
Decile 1-2	1,799	1,907	1,911	99.8%	94.1%
Decile 3-4	1,834	1,959	1,970	99.4%	93.1%
Decile 5-6	2,325	2,475	2,492	99.3%	93.3%
Decile 7-8	2,956	3,196	3,230	98.9%	91.5%
Decile 9-10	3,175	3,437	3,455	99.5%	91.9%
UNKNOWN	7	7	7	100.0%	100.0%
<b>Grand Total</b>	<b>12,096</b>	<b>12,981</b>	<b>13,065</b>	<b>99.4%</b>	<b>92.6%</b>

**Table 14 Newborn Hearing Screening Completed by Birth Location**

<b>Universal Newborn Hearing Screening Programme</b>					
For babies screened between 1 October 2009 to 31 March 2010					
<b>Birth Location</b>	<b>Completed Screening by 1 month of age</b>	<b>Completed Screening</b>	<b>Started Screening</b>	<b>Completed Screening to started</b>	<b>Completed Screening by 1 month of age to Started Screening</b>
Public Hospital	11,874	12,732	12,814	99.4%	92.7%
Private Hospital	57	60	61	98.4%	93.4%
Home	162	186	187	99.5%	86.6%
Other Location	3	3	3	100.0%	100.0%
<b>Grand Total</b>	<b>12,096</b>	<b>12,981</b>	<b>13,065</b>	<b>99.4%</b>	<b>92.6%</b>

## **RECOMMENDATIONS ON NEWBORN HEARING SCREENING COMPLETED**

1. To expand reporting for completed screening:
  - a. to include the range, and maximum and minimum timeframes
  - b. be broken down by Well Baby and NICU/SCBU.

## 1.5 REFERRAL RATE TO AUDIOLOGY ASSESSMENT

### DESCRIPTION

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

### RELEVANT OUTCOME

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

### RATIONALE

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

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

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

### METHODOLOGY

#### *Indicator 1.5*

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

Denominator: The number of eligible newborns who complete screening.

### 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. The average rate of referral to audiology in the period October 2009 to March 2010 was 1.6%, as detailed in Table 15 below.

As previously noted, Waitemata, Auckland, Counties Manukau, MidCentral and Nelson Marlborough had not fully implemented screening. Although the referral rates for Auckland and MidCentral look high, these must not be taken out of context and may not be a true reflection of the population. For example, Auckland was just starting to implement screening (41 screened babies only). MidCentral was in the process of implementing screening and were mainly screening the SCBU population.

Of the DHBs who had been screening for longer periods of time, the percentage of babies referred to audiology ranged between 0.4% in Capital & Coast and 2.5% in Whanganui. Given that referral numbers are statistically small, and some areas also have small population numbers, it is likely that there will always be variability in referral percentages across DHBs.

**Table15** Referral to Audiology by DHB

DHB	Number Referred to audiology	Screening Completed	Referral Percentage
Waitemata	1	102	1.0%
Auckland	4	41	9.8%
Counties Manukau	1	103	1.0%
Waikato	32	2,553	1.3%
Lakes	16	686	2.3%
Bay of Plenty	16	1,273	1.3%
Tairāwhiti	2	299	0.7%
Taranaki	17	710	2.4%
Hawke's Bay	21	1,107	1.9%
Whanganui	10	401	2.5%
Mid Central	5	31	16.1%
Hutt Valley	14	1,131	1.2%
Capital & Coast	6	1,692	0.4%
Nelson Marlborough	1	31	3.2%
West Coast	1	96	1.0%
Canterbury	53	2,440	2.2%
South Canterbury	5	285	1.8%
<b>TOTAL</b>	<b>205</b>	<b>12,981</b>	<b>1.6%</b>

Admission to NICU/SCBU (for 48 hours or more) resulted in a higher proportion of referrals to audiology, at an average of 6.6% as show in Table 16. More detail on referrals to audiology by ethnicity, deprivation status and birth location are presented in Tables 17-19. The information indicates that none of these factors are significant at this time, however monitoring trends will be important.



**Table 16** Referral to Audiology by DHB and NICU/SCBU admission

<b>Universal Newborn Hearing Screening Programme</b>									
<b>Referral Rate to Audiology by DHB</b>									
For babies screened between 1 October 2009 to 31 March 2010									
	Well Baby			NICU/SCBU			Total		
DHB	Referred to audiology	Screening Outcome	Referral Rate	Referred to audiology	Screening Outcome	Referral Rate	Referred to audiology	Screening Outcome	Referral Rate
Waitemata	1	100	1.0%		2	0.0%	1	102	1.0%
Auckland	1	31	3.2%	3	10	30.0%	4	41	9.8%
Counties Manukau	1	96	1.0%		7	0.0%	1	103	1.0%
Waikato	19	2,350	0.8%	13	203	6.4%	32	2,553	1.3%
Lakes	9	626	1.4%	7	60	11.7%	16	686	2.3%
Bay of Plenty	11	1,158	0.9%	5	115	4.3%	16	1,273	1.3%
Tairāwhiti	2	276	0.7%		23	0.0%	2	299	0.7%
Taranaki	13	678	1.9%	4	32	12.5%	17	710	2.4%
Hawke's Bay	14	1,016	1.4%	7	91	7.7%	21	1,107	1.9%
Whanganui	8	373	2.1%	2	28	7.1%	10	401	2.5%
Mid Central		3	0.0%	5	28	17.9%	5	31	16.1%
Hutt Valley	9	1,033	0.9%	5	98	5.1%	14	1,131	1.2%
Capital & Coast	5	1,574	0.3%	1	118	0.8%	6	1,692	0.4%
Nelson Marlborough	1	30	3.3%		1	0.0%	1	31	3.2%
West Coast	1	95	1.1%		1	0.0%	1	96	1.0%
Canterbury	38	2,255	1.7%	15	185	8.1%	53	2,440	2.2%
South Canterbury	5	279	1.8%		6	0.0%	5	285	1.8%
<b>Grand Total</b>	<b>138</b>	<b>11,973</b>	<b>1.2%</b>	<b>67</b>	<b>1,008</b>	<b>6.6%</b>	<b>205</b>	<b>12,981</b>	<b>1.6%</b>

**Table 17 Referral to Audiology by Ethnicity**

<b>Universal Newborn Hearing Screening Programme</b>			
For babies screened between 1 October 2009 to 31 March			
<b>Ethnicity</b>	<b>Referred to audiology</b>	<b>Screening Complete</b>	<b>Referral Rate</b>
Maori	78	3,804	2.1%
Pacific	19	745	2.6%
Asian	9	924	1.0%
Other ethnic groups	99	7,439	1.3%
Not Stated/Unspecified	-	69	0.0%
<b>Grand Total</b>	<b>205</b>	<b>12,981</b>	<b>1.6%</b>

**Table 18 Referral to Audiology by Deprivation**

<b>Universal Newborn Hearing Screening Programme</b>			
For babies screened between 1 October 2009 to 31 March			
<b>Deprivation</b>	<b>Referred to audiology</b>	<b>Screening Complete</b>	<b>Referral Rate</b>
Decile 1-2	24	1,907	1.3%
Decile 3-4	27	1,959	1.4%
Decile 5-6	25	2,475	1.0%
Decile 7-8	60	3,196	1.9%
Decile 9-10	69	3,437	2.0%
UNKNOWN	-	7	0.0%
<b>Grand Total</b>	<b>205</b>	<b>12,981</b>	<b>1.6%</b>

**Table 19 Referral to Audiology by Birth Location**

<b>Universal Newborn Hearing Screening Programme</b>			
For babies screened between 1 October 2009 to 31 March			
<b>Birth Location</b>	<b>Referred to audiology</b>	<b>Screening Complete</b>	<b>Referral Rate</b>
Public Hospital	200	12,732	1.6%
Private Hospital	-	60	0.0%
Home	5	186	2.7%
Other Location	-	3	0.0%
<b>Grand Total</b>	<b>205</b>	<b>12,981</b>	<b>1.6%</b>

## **RECOMMENDATIONS ON REFERRAL TO AUDIOLOGY**

1. For the annual report, the National Screening Unit to explore the possibility of reporting referrals to audiology by unilateral and bilateral referrals.

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

### **DESCRIPTION**

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

### **RELEVANT OUTCOME**

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

### **RATIONALE**

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

Children who pass newborn hearing screening but who have certain risk factors require follow-up to detect any subsequent development of hearing loss. International 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 6.8% 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.

The proportion of babies flagged for targeted follow-up is variable between DHBs, as summarised in Table 20 below. Information from Waitemata, Auckland, Counties Manukau, MidCentral and Nelson Marlborough is limited as screening had not been fully implemented. Of the DHBs who had been screening for longer periods of time, Hutt Valley had the highest proportion of babies referred for targeted follow-up, at more than 12%. Since this time, discussions have been held with Hutt Valley DHB to clarify risk factor interpretation, and it is expected that the targeted follow-up proportion will decrease over time.

**Table 20** Proportion of Targeted Follow-up by DHB

DHB	Proportion of Targeted Follow-up
Waitemata	2.0%
Auckland	2.7%
Counties Manukau	6.9%
Waikato	7.1%
Lakes	6.0%
Bay of Plenty	8.0%
Tairāwhiti	6.1%
Taranaki	4.3%
Hawke's Bay	9.1%
Whanganui	7.4%
Mid Central	53.8%
Hutt Valley	12.4%
Capital & Coast	5.0%
Nelson Marlborough	16.7%
West Coast	6.3%
Canterbury	4.2%
South Canterbury	4.6%
Total	6.8%

More detail on targeted follow-up by ethnicity, deprivation status and birth location are presented in Tables 21-23. The information indicates that none of these factors are significant at this time, however monitoring trends will be important. As would be expected, admission to NICU/SCBU (for 48 hours or more) resulted in a higher proportion of babies for targeted follow-up as shown in Table 24.

**Table 21** Proportion of Targeted Follow-up by Ethnicity

<b>Ethnicity</b>	<b>Passed Targeted follow-up required</b>	<b>Passed screening</b>	<b>Targeted Follow-up proportion</b>
Maori	312	3,726	8.4%
Pacific	49	726	6.7%
Asian	42	915	4.6%
Other ethnic groups	455	7,340	6.2%
Not Stated/Unspecified	10	69	14.5%
<b>Grand Total</b>	<b>868</b>	<b>12,776</b>	<b>6.8%</b>

**Table 22** Proportion of Targeted Follow-up by Deprivation

<b>Deprivation</b>	<b>Passed Targeted follow-up required</b>	<b>Passed screening</b>	<b>Targeted Follow-up proportion</b>
Decile 1-2	110	1,883	5.8%
Decile 3-4	110	1,932	5.7%
Decile 5-6	153	2,450	6.2%
Decile 7-8	217	3,136	6.9%
Decile 9-10	278	3,368	8.3%
UNKNOWN	-	7	0.0%
<b>Grand Total</b>	<b>868</b>	<b>12,776</b>	<b>6.8%</b>

**Table 23** Proportion of Targeted Follow-up by Birth Location

<b>Birth Location</b>	<b>Passed Targeted follow-up required</b>	<b>Passed screening</b>	<b>Targeted Follow-up proportion</b>
Public Hospital	850	12,532	6.8%
Private Hospital	5	60	8.3%
Home	13	181	7.2%
Other Location	-	3	0.0%
<b>Grand Total</b>	<b>868</b>	<b>12,776</b>	<b>6.8%</b>

**Table 24** Proportion of Targeted Follow-up by DHB and NICU/SCBU

<b>Universal Newborn Hearing Screening Programme</b>									
<b>Newborns at risk of delayed onset of progressive hearing loss by DHB</b>									
For babies screened between 1 October 2009 to 31 March 2010									
	Well Baby			NICU/SCBU			Total		
DHB	Passed Targeted follow-up required	Passed screening	Targeted follow-up proportion	Passed Targeted follow-up required	Passed screening	Targeted follow-up required	Passed Targeted follow-up required	Passed screening	Targeted follow-up proportion
Waitemata	2	99	2.0%		2	0.0%	2	101	2.0%
Auckland	1	30	3.3%		7	0.0%	1	37	2.7%
Counties Manukau	5	95	5.3%	2	7	28.6%	7	102	6.9%
Waikato	105	2,331	4.5%	75	190	39.5%	180	2,521	7.1%
Lakes	26	617	4.2%	14	53	26.4%	40	670	6.0%
Bay of Plenty	47	1,147	4.1%	54	110	49.1%	101	1,257	8.0%
Tairāwhiti	7	274	2.6%	11	23	47.8%	18	297	6.1%
Taranaki	16	665	2.4%	14	28	50.0%	30	693	4.3%
Hawke's Bay	68	1,002	6.8%	31	84	36.9%	99	1,086	9.1%
Whanganui	16	365	4.4%	13	26	50.0%	29	391	7.4%
Mid Central		3	0.0%	14	23	60.9%	14	26	53.8%
Hutt Valley	83	1,024	8.1%	56	93	60.2%	139	1,117	12.4%
Capital & Coast	23	1,569	1.5%	61	117	52.1%	84	1,686	5.0%
Nelson Marlborough	4	29	13.8%	1	1	100.0%	5	30	16.7%
West Coast	5	94	5.3%	1	1	100.0%	6	95	6.3%
Canterbury	77	2,217	3.5%	23	170	13.5%	100	2,387	4.2%
South Canterbury	10	274	3.6%	3	6	50.0%	13	280	4.6%
<b>Grand Total</b>	<b>495</b>	<b>11,835</b>	<b>4.2%</b>	<b>373</b>	<b>941</b>	<b>39.6%</b>	<b>868</b>	<b>12,776</b>	<b>6.8%</b>

## **RECOMMENDATIONS ON TARGETED FOLLOW-UP**

1. For the annual report, to include the timing of targeted follow-up visit to audiology.



### 3.8 Risk Factors

For this reporting period, it is interesting to note that 1,537 babies (12%) had at least one risk factor recorded (see Table 25), although just 868 (6.8%) of these babies had the screening outcome of “Pass Targeted follow-up required”. Some of this difference can be explained 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 were involved in assessing screening information, and making recommendations on whether targeted follow-up was necessary. This process seems to have had an impact and ongoing monitoring of this difference is needed.

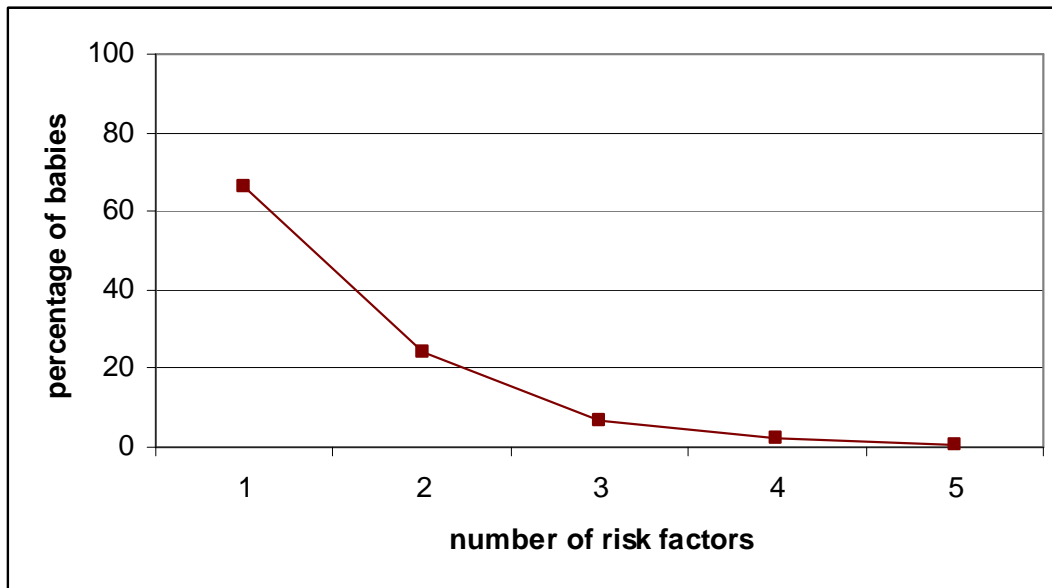
The most frequently reported risk factor was “other” during this reporting period. This was mostly a result of the over-reporting of babies being treated with antibiotics. Since this time, a review of risk factors has been undertaken, and discussions to clarify the interpretation of risk factors have been carried out with screeners and coordinators. For the Programme, it has been confirmed that only antibiotics at above therapeutic levels should be recorded as a risk factor for hearing loss. In these circumstances, the baby would have been significantly unwell, and parents would have been informed of the potential risks of treatment by the clinician looking after their baby.

The second most frequent risk factor was family history. Out of all babies who completed screening (n=12,981) the proportion with family history as a risk factor was approximately 2.8%. Over time it will be important to monitor this proportion, as policy changed in August 2010 to include second degree relatives. This policy change also clarified the interpretation of ventilation and TORCHS, and the proportion of these two risk factors is expected to decrease after this time.

Of the 1,537 babies with one or more risk factors recorded, 66% had just one risk factor, 24% has two, 7% had three, 2% had four and under one percent had the maximum of five risk factors, as show in Figure 5.

**Table 25** Frequency of Risk Factors

Risk factor	factor_1	factor_2	factor_3	factor_4	factor_5	total
Family History	352	4	1	0	1	358
Craniofacial Anomalies	250	9	0	1	0	260
Head Trauma	23	5	2	0	0	30
Meningitis	49	11	7	2	0	69
Syndrome	18	9	2	1	0	30
TORCHS	134	19	3	1	0	157
Jaundice phototherapy	250	25	2	1	1	279
Jaundice transfusion level	7	3	1	0	0	11
Ventilation	160	64	14	2	0	240
NICU more than 5 days	91	107	41	11	3	253
Other	203	114	32	13	5	367
<b>total</b>	<b>1537</b>	<b>370</b>	<b>105</b>	<b>32</b>	<b>10</b>	



**Figure 8** Proportion of babies with one or more risk factors

## **RECOMMENDATIONS ON RISK FACTORS**

*The Advisory Group made no recommendations.*

## 4. Indicators not yet included in monitoring

**Comment: this will be possible to report in the future, but we did not start using the audiology forms until April/May 2010**

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

---

<sup>1</sup>It is expected that this average time should be approximately 4 weeks.

## 1.7 AUDIOLOGY ASSESSMENT COMPLETED

### DESCRIPTION

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

### RELEVANT OUTCOME

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

### RATIONALE

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

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

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

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

### METHODOLOGY

#### ***Quantitative indicator 1.7a***

Numerator: Number of eligible newborns who complete audiology assessment.

Denominator: Number of eligible newborns who commence audiology assessment.

#### ***Quantitative indicator 1.7b***

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

Denominator: Number of eligible newborns who complete audiology assessment.

## 1.8 HEARING LOSS DETECTED BY AUDIOLOGY ASSESSMENT

### DESCRIPTION

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

### RELEVANT OUTCOME

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

### RATIONALE

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

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

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

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

### METHODOLOGY

#### *Indicator 1.8*

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

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

## **1.9 AGE AT IDENTIFICATION OF HEARING LOSS**

### **DESCRIPTION**

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

### **RELEVANT OUTCOME**

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

### **RATIONALE**

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

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

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

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

### **METHODOLOGY**

#### ***Indicator 1.9***

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

<b>1.10 AGE AT FIRST ASSISTIVE HEARING DEVICE</b>
<p><b>DESCRIPTION</b></p> <p>The age at which the first assistive hearing device<sup>2</sup> is fitted.</p>
<p><b>RELEVANT OUTCOME</b></p> <p>No outcome target for the programme at present (see rationale section).</p>
<p><b>RATIONALE</b></p> <p>“Initiation of appropriate medical and audiological services; and Early Intervention education services by 6 months of age” is a core goal of UNHSEIP: ie the 6 part of the 1-3-6 goals.</p> <p>It is common for international programmes to monitor factors around hearing aid fitting, cochlear implants and follow-up.</p> <p>This indicator will be reviewed as data are collected, as well as, consideration of other potential medical indicators and the introduction of specific age/percentage outcome targets.</p>
<p><b>METHODOLOGY</b></p> <p><b><i>Indicator 1.10a – All Devices</i></b></p> <p>Average age of eligible children at which the first assistive hearing device was fitted.</p> <p><b><i>Indicator 1.10b – Hearing Aids</i></b></p> <p>Average age of eligible children at which a hearing aid was first fitted.</p> <p><b><i>Indicator 1.10c – Cochlear Implants</i></b></p> <p>Average age of eligible children at which a cochlear implant was first fitted<sup>3</sup>.</p>

<sup>2</sup> An assistive hearing device includes: hearing aids, cochlear implants, or FM amplification systems.

<sup>3</sup> 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 UNHSEIP needs to monitor the number of children who have had hearing loss confirmed by audiology assessment, but who did not require immediate medical intervention and who did not meet the eligibility criteria for Early Intervention services (ie children with mild or unilateral hearing loss).

### METHODOLOGY

#### *Indicator 1.12*

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

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



# Indicators for the Early Intervention Education Service

---

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

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

## **METHODOLOGY**

### ***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.