



# Newborn Hearing Screening in Northern Ireland

## Annual Report 2020-21

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## Executive Summary

This report covers the time period from 1 April 2020 – 31 March 2021.

### Aim of Newborn Hearing Screening

Approximately one to two babies in every 1,000 are born with a hearing loss in one or both ears. Research studies have demonstrated the importance of detecting a hearing loss as early as possible. The aim of the newborn hearing screening programme (NHSP) is to identify babies who have a significant permanent childhood hearing impairment (PCHI)<sup>1</sup>, to allow early referral, diagnosis and intervention. Early detection and effective interventions can result in improved outcomes for children. This report summarises the performance of the Northern Ireland NHSP from **1 April 2020 to 31 March 2021**.

### Programme delivery

Newborn hearing screening is offered to all babies who are over 34 weeks gestational age and are born in, reside in, or move into Northern Ireland, from birth (day 0) up to 182 days (6 months old) inclusive.

The NHSP in Northern Ireland is commissioned and quality assured by the Public Health Agency (PHA) and is provided and managed by five Health and Social Care Trusts (HSCTs), involving a wide range of professional staff.

### NHSP protocols

The programme follows two separate screening protocols. The first is the well baby protocol, which is the primary screening protocol and the second is the neonatal unit (NNU) protocol. These are shown in **Appendix 1** and **Appendix 2** respectively.

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<sup>1</sup> ‘NHSP defines this as a bilateral permanent hearing loss averaging  $\geq 40\text{dBnHL}$  across 0.5 to 4kHz”. Sutton et al Guidelines for surveillance and audiological referral of infants & children following the newborn hearing screen, July 2012.

In certain situations, a derivative of the well baby protocol is used, namely, the early discharge protocol (also covered in **Appendix 1**). This is used in limited circumstances only, for example, when screening needs to be completed prior to discharge from hospital. In addition, the early discharge protocol may be used at outpatient clinics, so that screening is completed in one visit.

The NNU protocol is used if a baby has been in a neonatal or special care baby unit for more than 48 hours continuously and screening was not completed prior to admission to the unit.

### NHSP screening tests

Two types of hearing screening tests are provided. The type of test that a baby requires, and is offered, will depend on (a) which screening protocol is applicable and (b) the results of the initial hearing screening test; if following the well baby or early discharge protocol.

### Headline results

- Data for the period 1 April 2020 – 31 March 2021 show there were 21,456 current residents eligible for screening.

Of these:

- 99.4% (21,321) were offered screening.
- 94.6% (20,289) completed screening by the age of 4 weeks (**Standard 1** - acceptable threshold  $\geq 98.0\%$ ; achievable threshold  $\geq 99.5\%$ ).
- 97.5% (20,911) completed screening by the age of 3 months.

- 95.7% (19,423) of those who completed screening by the age of 4 weeks had a screening outcome of bilateral clear response (this means a clear response in both ears).
- 4.3% (866) of those who completed screening by the age of 4 weeks were referred to audiology services for diagnostic assessment  
**(Standard 3 - acceptable threshold  $\leq$  3.0%; achievable threshold  $\leq$  2.0%)**

Therefore, the programme as a whole did not meet the acceptable thresholds for Standard 1 and Standard 3 in 2020-21.

It is important, however, to note the context of these data in relation to the start of the COVID-19 pandemic in 2020. With the cancellation of outpatient appointments, some babies will not have been able to complete the screening pathway and some babies will not have been able to start the screening pathway (impacting on Standard 1) within the required timeframe. These babies were offered screening at a later date. During this time, significant efforts were made in all HSC Trusts to continue to offer the newborn hearing screening programme and to maximise the number of babies who completed screening prior to discharge from hospital. This included temporary enhanced use of the early discharge protocol, which is known to result in an increased referral rate to audiology (impacting on Standard 3).

Prior to March 2021 the programme was unable to collect routine data on Standards 2, 4 and 5. With the subsequent introduction of a new IT system to support the programme is now able to routinely monitor performance of each of the five national standards.

## Introduction

This annual report of the Northern Ireland NHSP summarises the performance of the programme from 1 April 2020 - 31 March 2021.

## Background

Screening is defined as '*the process of identifying apparently healthy people who may have an increased chance of a disease or condition*'<sup>2</sup>. The aim of screening is to reduce the impact of the underlying disease or condition that is being screened for.

Following the recommendation from the UK National Screening Committee (UKNSC) that a national neonatal hearing screening programme should be established, the Northern Ireland Newborn Hearing Screening Programme (NHSP) commenced in October 2005.

The NHSP is offered to all babies who are aged over 34 weeks gestational age and are born in, reside in, or move into Northern Ireland from birth (day 0) up to 182 days (6 months old) inclusive.

## Aim of the newborn hearing screening programme

The aim of the NHSP is to identify babies who have a bilateral, moderate or worse permanent childhood hearing impairment (PCHI)<sup>3</sup> at the earliest stage and ideally within 4 weeks of birth.

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<sup>2</sup><https://www.gov.uk/guidance/population-screening-explained>

<sup>3</sup>'Moderate or worse is defined as an average hearing threshold (over the frequencies 0.5, 1.0, 2.0 and 4.0 kHz) of 40 decibels (dB) or more in the better hearing ear - <https://www.gov.uk/government/publications/newborn-hearing-screening-programme-quality-standards/newborn-hearing-screening-supporting-information>

This allows timely referral, diagnosis and intervention. In the UK, approximately one to two babies in every 1,000 are born with a permanent hearing loss in one or both ears. This increases to approximately 1 in 100 for babies who spend over 48 hours in a neo-natal intensive care (NNU) or special care baby unit (SCBU).

Research studies have demonstrated the importance of detecting a hearing loss as early as possible. Early detection and effective interventions result in improved outcomes for children, in particular, improved speech and language development.

### Programme delivery

In Northern Ireland, the NHSP is commissioned and quality assured by the Public Health Agency (PHA). The service is provided by five Health and Social Care Trusts (HSCTs) who manage and deliver the programme.

It is a complex programme involving a wide range of professional staff including: local newborn hearing screening co-ordinators; screeners; child health system (CHS) and Smart4Hearing (S4H) system support staff; midwives; paediatric staff; neonatal and special care baby unit staff; health visitors; community and hospital paediatric audiology and ear, nose and throat (ENT) specialist staff.

## **Screening pathway**

### Offer to participate in screening

All babies who are born in, reside in, or move into Northern Ireland are offered newborn hearing screening from birth (day 0) until day 182 of life, inclusive. In line with national guidelines<sup>4</sup> newborn hearing screening in premature babies is not offered if they are less than 34 weeks gestational age. Newborn hearing screening is recommended, in order to detect hearing problems at the earliest stage. It is important that those with parental responsibility understand the programme in order to be able to provide informed consent to participate. Information leaflets have been developed to help explain the programme and these are provided to those with parental responsibility, prior to consent for participation being requested, by the trained newborn hearing screeners.

### Contraindications to screening

There are a number of circumstances when newborn hearing screening is not appropriate and, instead, an immediate referral is made by the medical team caring for baby, to audiology. This is referred to as screening contraindicated.

Newborn hearing screening is not appropriate (contraindicated) if any of the following are present.

#### **1. Microtia / external ear canal atresia**

Microtia is a congenital (i.e. present from birth) deformity affecting the outer ear, whereby it does not fully develop during pregnancy. Atresia is the absence, or closure, of the external auditory ear canal.

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<sup>4</sup><https://www.gov.uk/government/publications/newborn-hearing-screening-programme-nhsp-operational-guidance/6-patient-journey-from-screen-to-referral>

## **2. Neonatal bacterial meningitis or meningococcal septicaemia**

Bacterial meningitis occurs when bacteria infect the lining of the brain and the spinal cord. Meningococcal septicaemia – or blood poisoning – occurs when the bacteria in the blood multiply.

## **3. Programmable ventriculo-peritoneal shunts in place**

A ventriculo-peritoneal (VP) shunt is a medical device that relieves pressure on the brain caused by fluid accumulation.

## **4. Confirmed congenital cytomegalovirus (cCMV)**

Congenital cytomegalovirus is a condition that can occur when an infant is infected with a virus called cytomegalovirus (CMV) before birth.

### Screening protocols

The NHSP follows two separate screening protocols. The first is the well baby protocol, which is the primary screening protocol and which most babies follow. The second is the neonatal unit (NNU) Protocol. These are shown in **Appendix 1** and **Appendix 2** respectively.

In certain, limited, circumstances an early discharge protocol (also covered in **Appendix 1**) may be used instead of the well baby protocol. This will be determined by the newborn hearing screener / coordinator.

The NNU protocol is used if a baby has been in a neonatal or special care baby unit for more than 48 hours and screening has not been completed prior to admission. These babies have an increased risk of permanent hearing loss in one or both ears of around 1 in 100.

## Screening tests

Two types of hearing screening tests are provided within the NHSP. The type of test that a baby requires, and is offered, will depend on (a) which screening protocol is applicable and (b) the results of their initial test if they have been following the well baby or early discharge protocol.

A baby's newborn hearing screening test is often commenced and completed prior to discharge from hospital, but it can also be commenced and/or completed following discharge from hospital at an outpatient clinic. The screening tests are described below.

The **Automated Otoacoustic Emission (AOAE)** test involves placing a small, soft tipped earpiece in the outer part of a baby's ear to send clicking sounds to the inner ear. Using a computer, the screener carrying out the test can detect how the baby's inner ear (cochlea) responds to sound. The test causes no discomfort to the baby and is often conducted while the baby is asleep. This test measures the mechanical function of the inner ear. In the cochlea, when a noise is heard, acoustic energy is generated which causes vibration of special hair cells (these are known as otoacoustic emissions). The AOAE test detects these otoacoustic emissions. All babies are offered this test.

The **Automated Auditory Brainstem Response (AABR)** is a different type of test. Rather than measuring acoustic energy within the inner ear, it measures electrical brain activity. The test involves placing small sensors on a baby's head, shoulder and nape of the neck. Soft headphones are placed over baby's ears and a series of clicking sounds are played.

A computer measures how the baby's brain respond to these sounds. This test is only required for some babies in accordance with the screening protocols.

## Referral

Depending on the results of the newborn hearing screening tests, a baby may require referral for further specialist assessment by paediatric audiology services. This is to confirm a diagnosis of PCHI and allow timely follow up and treatment, if required.

Furthermore, regardless of their newborn hearing screening result, babies who, at the time of screening, are identified as having certain risk factors for hearing loss (see below), will be offered a follow up appointment with audiology when they are 8 months old.

## Hearing loss

While the aim of the newborn hearing screening programme is to identify babies who have a significant permanent childhood hearing impairment, it is important to note that no screening test is 100% accurate and that hearing loss can occur at any stage of life. It is therefore important that those with parental responsibility remain vigilant for any changes or concerns regarding their baby's hearing.

A developmental checklist (see **Appendix 3**) is shared with those with parental responsibility via the Personal Childhood Health Record (PCHR) or 'red book', to encourage monitoring of their baby's hearing throughout the early stages of life. Should a person with parental responsibility have any concern about hearing, *at any stage*, this should be discussed with their health visitor or GP.

## Hearing Risk Factors

### **Northern Ireland NHSP Risk Factors**

(Updated 19 Jan 2021)

An infant with one or more of the following risk factors (identified at the time of newborn hearing screening) will be offered audiological assessment at 8 months

Congenital Infection	Confirmed congenital infection such as toxoplasmosis or rubella
Craniofacial Anomalies	A (noticeable) cranio-facial anomaly such as cleft palate (excluding cleft lip only, minor pits or ear tags)
Syndrome	Confirmed Syndrome relating to hearing loss (e.g. Down's Syndrome)
NNU protocol results	NICU/SCBU>48 hours with bilateral clear response at AABR and the infant does <b>not have a clear response (C) in at least one ear at AOAE</b>

## **Failsafe**

Failsafe is a back-up mechanism which, in addition to usual care, seeks to ensure that all eligible babies are offered newborn hearing screening. The NHSP includes a robust failsafe mechanism to capture babies who have not yet been offered, or taken part, in screening. A failsafe 'mop up' report identifies all babies from aged from 7 days until age 182 days (i.e. for the duration of the programme) who do not have a screening outcome recorded. The report is run each week by the NHSP Coordinator in each Trust, using the Smart4Hearing IT system.

Once a baby has been identified on this report, the person with parental responsibility for baby will be contacted, to offer a newborn hearing screening test. Furthermore, the failsafe reports also run as a safety and quality measure, to ensure that referrals are made into paediatric audiology services as required.

From 1 April 2020 until 28 February 2021, failsafe reports were produced using the Northern Ireland Child Health System. From 1 March 2021, failsafe reports were produced in a similar way, using the new Smart4Hearing IT system.

## **Key developments 2020-21**

During 2020-21 there were a number of key developments in the NHSP.

These included:

### Response to the COVID-19 pandemic

- Ensuring the newborn hearing screening programme continued to successfully operate in Northern Ireland during the COVID-19 pandemic. Adaptations, to support the continuance of the programme, were made in Health and Social Care Trusts as required.
- Enhanced use of the early discharge protocol during the COVID-19 pandemic, in limited circumstances and as required. Use of this protocol supported completion of newborn hearing screening prior to discharge from hospital and, therefore, reduced the volume of offers to attend for screening at outpatient clinics.
- Development and use of a protocol for the management of babies who required further follow up during the COVID-19 pandemic.

### Smart4Hearing implementation

- Successful procurement and implementation of a new regional IT system, to support the newborn hearing screening programme in Northern Ireland took place during 2020-21 (namely, Smart4Hearing, which went live on 1 March 2021).
- Development and approval of business processes (including business cases), to allow all pre-requisites to procurement to be satisfied, prior to S4H implementation. This related to, for example, S4H on-boarding / pre-requisite activities, including software development and configuration.

- Ensuring all pre-requisites to S4H were in place prior to implementation. This included robust testing and development of a new electronic interface and data item exchange between the Northern Ireland Child Health System and S4H and ensuring all screening equipment in Northern Ireland was Screening Equipment Data Quality (SEDQ) compliant.
- Development of NHSP protocols, specific to the implementation of S4H.
- Engagement with key stakeholders to ensure information governance, legal, contractual and GDPR requirements were met.

Smart4Hearing is a fully managed IT service which supports provision of the NHSP in Northern Ireland. Once a baby participates in newborn hearing screening, the screening protocol used, along with screening results, are uploaded from the handheld screening device directly into S4H, using installed SEDQ software. This information is automatically matched to the demographic details for the relevant baby using information from the CHS registration feed.

Screener, who carry out the screening tests, upload the results to S4H. This IT system stores demographic information, screening results, wave forms detected during an AABR or AOAE test and details of referral to audiology, diagnostic assessment results and outcome data, where appropriate.

Procurement and implementation of S4H was an important quality improvement initiative for the programme and required significant planning prior to its launch in March 2021. Use of S4H has reduced the need for manual entry of data and enables automated capture and retention of NHSP screening results.

Going forward into 2021-22, use of this service will provide more timely access to programme data and allow routine monitoring of all five national standards.

## Quality Assurance

- Redevelopment and procurement of NHSP resources such as programme leaflets\* – this includes translation of resources and updating relevant websites i.e. the Public Health Agency, NI Direct and NI maternity websites.
- Mandatory use of Health and Care Number as the primary unique patient identifier for use in the NHSP.
- Public Health Agency participation and membership of the UK Four Countries NHSP Group and the national (UK) Newborn Hearing Screening Programme Advisory Group.
- Publication of 2017-18 NHSP Annual Report (July 2020).
- Publication of a composite 2018-19 and 2019-20 NHSP Annual Report (Dec 2020).
- Extending an invitation to key stakeholders to participate in a national consultation (provided by NHS England) regarding proposals to amend NHSP standards.
- Ensuring the NHSP is managed and resourced equitably across Northern Ireland.

Public information leaflets are available in multiple languages<sup>5</sup>. The programme keeps the need for additional translations under regular review using information provided by the Northern Ireland Health and Social Care Interpreting Service and additional translations can be added as required.

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<sup>5</sup><https://www.publichealth.hscni.net/publications/newborn-hearing-screening-english-and-translations>

## Programme Data 2020-21

### Overview

The NHSP routinely collects and collates anonymised data to measure and monitor programme performance.

During this reporting period (1 April 2020 – 31 March 2021) the Northern Ireland NHSP was able to report on two national programme standards. This relates to data for: Standard 1 (coverage) and Standard 3 – (referral rate to diagnostic audiological assessment). Going forward (from 1 April 2021), following successful implementation of Smart4Hearing, the programme will be able to present and analyse performance data for all five national programme standards.

### Definitions

- Data are produced on the offer, uptake and outcome of newborn hearing screening of current residents - this is the cohort.
- Current residents includes all babies who were:
  - born between 1 April 2020 and 31 March 2021; and
  - resident in Northern Ireland, at any time, between 1 April 2020 and 31 March 2021.

The current resident cohort may include babies who were not born in hospital (for example a home birth), or babies who were born outside Northern Ireland and moved into Northern Ireland aged up to and including 182 days of age.

- Source:
  - Northern Ireland Child Health System from 1 April 2020 - 28 February 2021.
  - Smart4Hearing from 1 March 2021 – 31 March 2021.

## Methodology

The annual figures included in this report have been calculated by summing the figures in each quarter. Figures are calculated using: sum of babies who completed screening in all quarters (Q1-Q4) / sum of current residents in all quarters (Q1-Q4) X 100 / 1.

## Frequency of reporting

- Quarterly data are produced to cover the periods
  1. Quarter 1 - April to June 2020
  2. Quarter 2 - July to September 2020
  3. Quarter 3 - October to December 2020
  4. Quarter 4 - January to March 2021

Data are analysed from approximately six weeks after the end of the quarter for Standards 1 – 3 and from approximately eight weeks for Standards 4 – 5.

## Data reporting boundaries

### Child Health System

- For the period 1 April 2020 – 28 February 2021 data on the performance of the programme were provided by the Northern Ireland Child Health System (CHS).

There are four CHS areas in Northern Ireland and these collectively cover the five health and social care trust geographies, namely:

1. Eastern (Belfast Health and Social Care Trust BHSCT and South Eastern Health and Social Care Trust SEHSCT)
2. Northern (Northern Health and Social Care Trust),
3. Southern (Southern Health and Social Care Trust)

#### 4. Western (Western Health and Social Care Trust).

##### Eastern area boundary:

The definition of the boundaries for Eastern area CHS data (i.e. for BHSCT and SEHSCT) are outlined below.

<b>HSCT</b>	<b>Geography included for current resident cohort</b>	<b>Geography included for live birth cohort</b>
BHSCT	Current residents in North, South, West Belfast and Lisburn.	Live births in the Royal Jubilee Maternity Hospital, Mater Infirmorum Hospital and Lagan Valley Hospital
SEHSCT	Current residents in North Down, Ards, Down, East Belfast and Castlereagh	Live births in the Downpatrick and Ulster Hospitals

##### Smart4Hearing

During the month 1 March 2021 – 31 March 2021, data were extracted and analysed using the Smart4Hearing system, following its implementation on 1 March 2021. An electronic interface from the Northern Ireland Child Health System informs Smart4Hearing of birth registration information and provides any updates to this. Babies who move into Northern Ireland will also be recorded via this electronic interface, from CHS to S4H. Following implementation of S4H, each baby is assigned to a Health and Social Care Trust which is responsible for offering screening; this is determined using postcode mapping.

## NHSP national standards

Until the introduction of S4H the programme in Northern Ireland was only able to routinely monitor performance against Standards 1 and 3.

Table 1: UK Newborn Hearing Screening Programme Standards, 2018<sup>6</sup>

Standard	Description	Acceptable	Achievable	
1	Coverage (This is also programme Key Performance Indicator (KPI) NH1)	The proportion of babies eligible for newborn hearing screening for whom the screening process is complete by 4 weeks corrected age (hospital programmes – well babies, neonatal intensive care unit (NICU) babies) or by 5 weeks corrected age (community programmes – well babies)	≥ 98.0%	≥ 99.5%
2	Test: well babies who do not show a clear response in both ears at automated optoacoustic emission 1 (AOAE1)	The proportion of well babies who do not show a clear response in both ears at AOAE1.	≤ 27.0% (hospital programme) ≤ 15.0% (community programme)	≤ 22.0% (hospital programme) ≤ 13.5% (community programme)
3	Test: referral rate to diagnostic audiological assessment	The proportion of eligible babies that receive a no clear response result in one or both ears or other result that requires an immediate onward	≤ 3.0% (hospital programme) ≤ 1.6% (community programme)	≤ 2.0% (hospital programme) ≤ 1.3% (community programme)

<sup>6</sup> PHE NHS Newborn Hearing Screening Programme Standards valid from 1<sup>st</sup> April 2018

[Newborn hearing screening programme standards: valid for data collected from 1 April 2018 to 31 March 2022 - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/publications/newborn-hearing-screening-programme-standards)

Standard	Description	Acceptable	Achievable
	referral for audiological assessment.		
4	Referral: time from screening outcome to offered appointment for diagnostic audiological assessment	The proportion of babies with a no clear response result in one or both ears or other result who require an immediate onward referral for audiological assessment, are referred for diagnostic audiological assessment in a timely manner i.e. either within 4 weeks of screen completion or by 44 weeks gestational age.	≥ 97.0% ≥ 99.0%
5	Diagnosis/intervention time from screening outcome to attendance at an audiological assessment appointment (This is also programme KPI NH2)	The proportion of babies with a no clear response result in one or both ears or other result that require an immediate onward referral for audiological assessment who receive audiological assessment within the required timescale i.e. either within 4 weeks of screen completion or by 44 weeks gestational age.	≥ 90.0% ≥ 95.0%

## Headline results

Data relating to the Northern Ireland Newborn Hearing Screening Programme highlight that from 1 April 2020 – 31 March 2021.

There were 21,456 current residents eligible for screening.

Of these:

- 99.4% (21,321) were offered screening.
- 94.6% (20,289) completed screening by the age of 4 weeks (**Standard 1** - acceptable threshold  $\geq 98.0\%$ ; achievable threshold  $\geq 99.5\%$ ).
- 97.5% (20,911) completed screening by the age of 3 months.
- 95.7% (19,423) of those who completed screening by the age of 4 weeks had a screening outcome of bilateral clear response (this means a clear response in both ears).
- 4.3% (866), of those who completed screening by the age of 4 weeks were referred to audiology services for diagnostic assessment (**Standard 3** - acceptable threshold  $\leq 3.0\%$ ; achievable threshold  $\leq 2.0\%$ ).

Therefore, the programme as a whole did not meet the acceptable thresholds for Standard 1 and Standard 3 in 2020-21.

## Performance by HSC Trust

Figure 1 and Table 1 show that for 2020-21, 99.4% of current residents in Northern Ireland were offered hearing screening. Figure 1 and Table 2 also illustrate that 94.6% of current residents in Northern Ireland completed screening by 4 weeks of age: this is a slight decrease of 1.2% compared with 2019-20 and 2.6% compared with 2018-19. (Figure 1 also shows that over 97% of current residents in Northern Ireland in 2020-21 completed screening by 3 months of age).

Figure 3 and Table 4 show that in relation to Standard 3 (referral rate), 4.3% of current residents who had completed screening in Northern Ireland by 4 weeks of age required referral to audiology services for further testing, following the result of their screening test. This is an increase of 2.1% compared with 2019-20 and 2.3% compared with 2018-19. The acceptable threshold for this standard is  $\leq 3.0\%$  and the achievable threshold is  $\leq 2.0\%$ . As shown in Figure 3, the referral rate varied by HSCT and, during 2020-21, was highest in NHSCT, with 7.7% of all current residents who completed screening by 4 weeks of age referred to audiology. (Provisional data for 2021-22 suggest the regional rate has since decreased). SHSCT and WHSCT both met the acceptable threshold with referral rates of 2.3% and 2.7% respectively.

As outlined above, screening may be declined or, in some instances, may not be appropriate / contraindicated. In 2020-21, 0.07% of current residents in Northern Ireland declined the offer to participate in newborn hearing screening.

It is important, however, to note the context of these data in relation to the start of the COVID-19 pandemic in 2020. With the cancellation of outpatient appointments some babies will not have been able to complete the screening pathway and some babies will not have been able to start the screening pathway (impacting on Standard 1) within the required timeframe. These babies were offered screening at a later date. During this time, significant efforts were made in all HSC Trusts to

continue to offer the newborn hearing screening programme and to maximise the number of babies who completed screening, prior to discharge from hospital. This included temporary enhanced use of the early discharge protocol, which can result in increased referral rates to audiology (impacting on Standard 3).

**Table 1:**  
**Proportion of current residents in each Trust who were offered newborn hearing screening 2020-21**

<b>Trust</b>	<b>No. of current residents</b>	<b>No. of current residents offered screen</b>	<b>Percentage of current residents offered screen</b>
<b>NHSCT</b>	<b>5,232</b>	<b>5,224</b>	<b>99.8%</b>
<b>SHSCT</b>	<b>4,894</b>	<b>4,791</b>	<b>97.9%</b>
<b>SEHSCT</b>	<b>3,607</b>	<b>3,604</b>	<b>99.9%</b>
<b>WHSCT</b>	<b>3,627</b>	<b>3,616</b>	<b>99.7%</b>
<b>BHSCT</b>	<b>4,096</b>	<b>4,086</b>	<b>99.8%</b>
<b>NI TOTAL</b>	<b>21,456</b>	<b>21,321</b>	<b>99.4%</b>

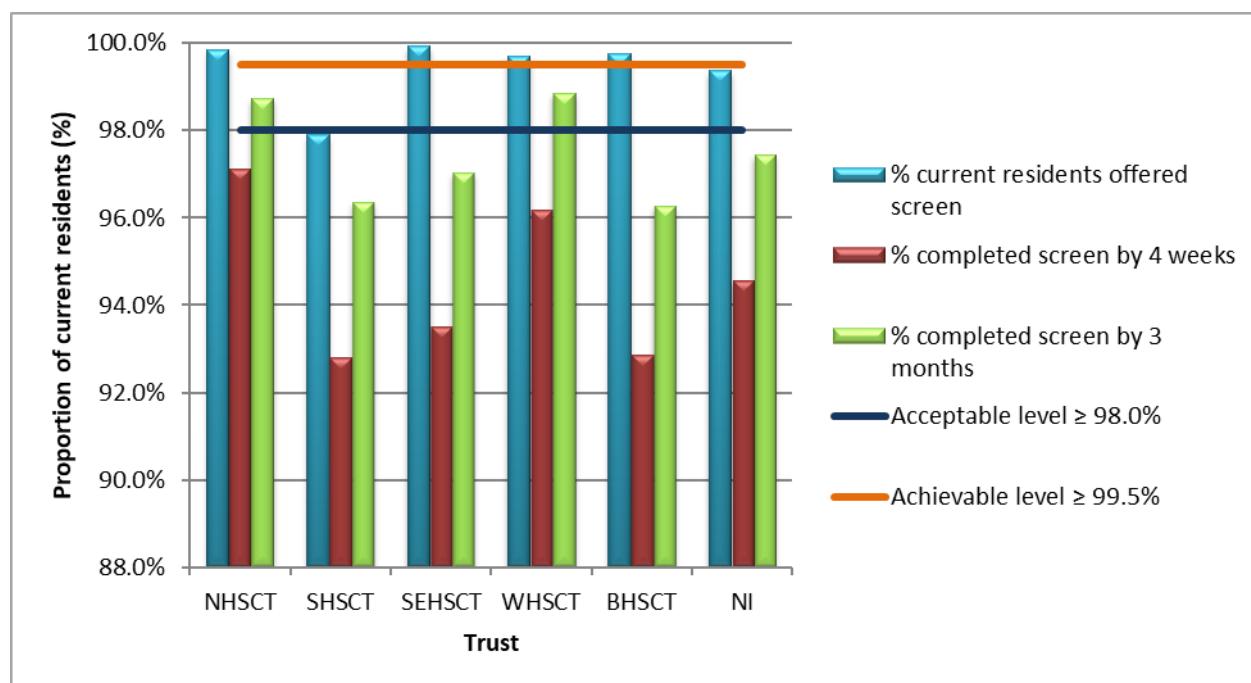
**Table 2:**

Proportion of current residents in each Trust who **completed** newborn hearing screening by 4 weeks 2020-21 (Standard 1 - acceptable threshold  $\geq 98.0\%$ ; achievable threshold  $\geq 99.5\%$ )

Trust	No. of current residents	No. of current residents who completed screen by 4 weeks	Percentage of current residents who completed screen by 4 weeks
NHSCT	5,232	5,081	97.1%
SHSCT	4,894	4,542	92.8%
SEHSCT	3,607	3,373	93.5%
WHSCT	3,627	3,489	96.2%
BHSCT	4,096	3,804	92.9%
<b>NI TOTAL</b>	<b>21,456</b>	<b>20,289</b>	<b>94.6%</b>

**Figure 1:**

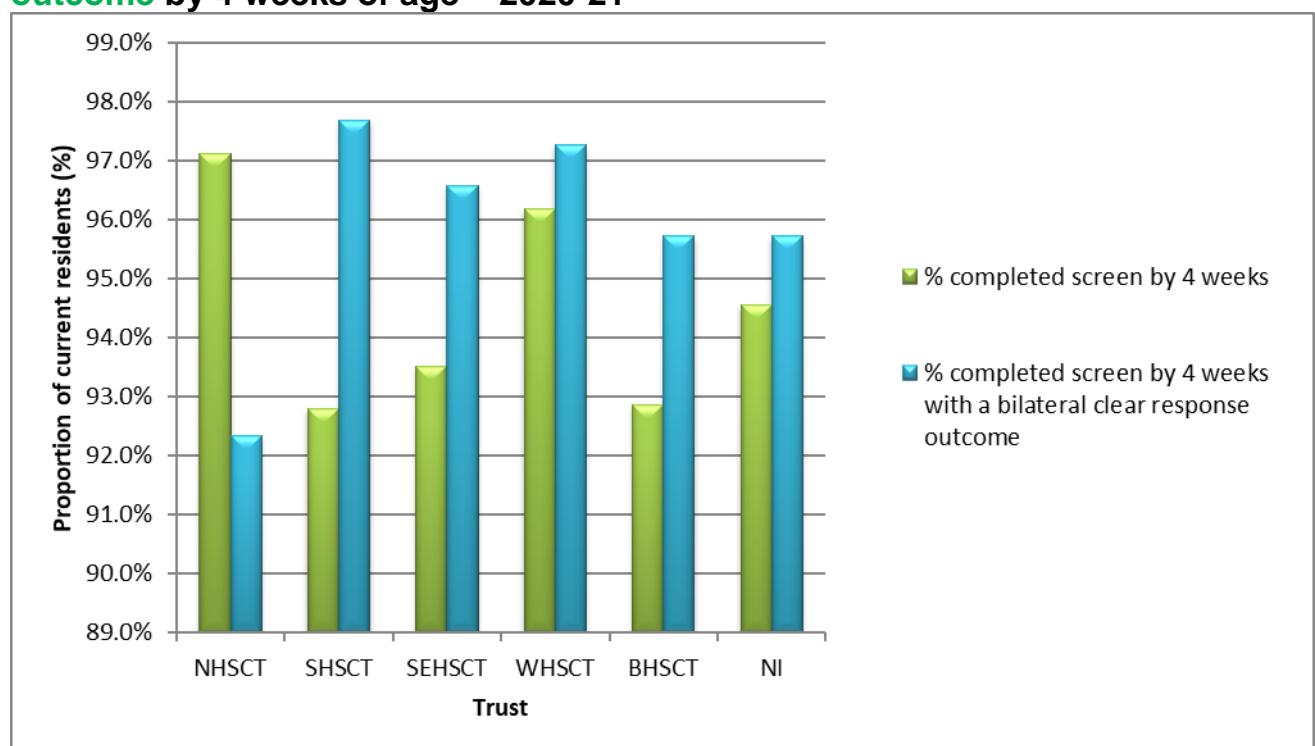
**Proportion of current residents in each Trust who were offered newborn hearing screening and completion rates 2020-21. The threshold levels relate to Standard 1 - % completed screening by 4 weeks**



**Table 3:**  
**Proportion of current residents in each Trust (who completed screening by 4 weeks) with a **bilateral clear response** outcome 2020-21**

Trust	No. of current residents who completed screening by 4 weeks	No. of current residents (who completed screening by 4 weeks) with a <b>bilateral clear response outcome</b>	Percentage of current residents (who completed screening by 4 weeks) with a <b>bilateral clear response outcome</b>
NHSCT	5,081	4,692	92.3%
SHSCT	4,542	4,437	97.7%
SEHSCT	3,373	3,258	96.6%
WHSCT	3,489	3,394	97.3%
BHSCT	3,804	3,642	95.7%
NI TOTAL	20,289	19,423	95.7%

**Figure 2:**  
**Proportion of current residents in each Trust with a **bilateral clear response outcome** by 4 weeks of age ~ 2020-21**



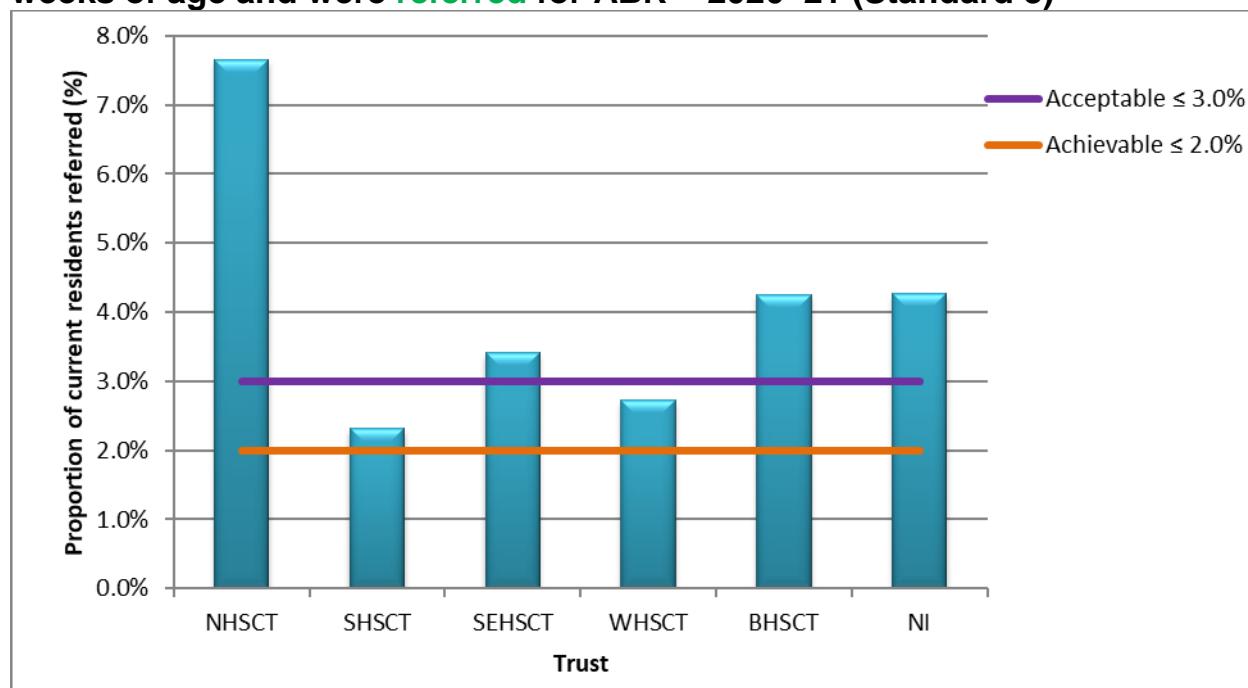
**Table 4:**

Proportion of current residents in each Trust (who *completed screening* by 4 weeks) and were **referred** for an immediate audiological assessment 2020-21 (Standard 3 - acceptable threshold  $\leq 3.0\%$ ; achievable threshold  $\leq 2.0\%$ )

Trust	No. of current residents who completed screening by 4 weeks	No. of current residents who <i>completed screening</i> by 4 weeks and were <b>referred</b> for an immediate audiological assessment	Percentage of current residents who <i>completed screening</i> by 4 weeks and were <b>referred</b> for an immediate audiological assessment
NHSCT	5,081	389	7.7%
SHSCT	4,542	105	2.3%
SEHSCT	3,373	115	3.4%
WHSCT	3,489	95	2.7%
BHSCT	3,804	162	4.3%
<b>NI TOTAL</b>	<b>20,289</b>	<b>866</b>	<b>4.3%</b>

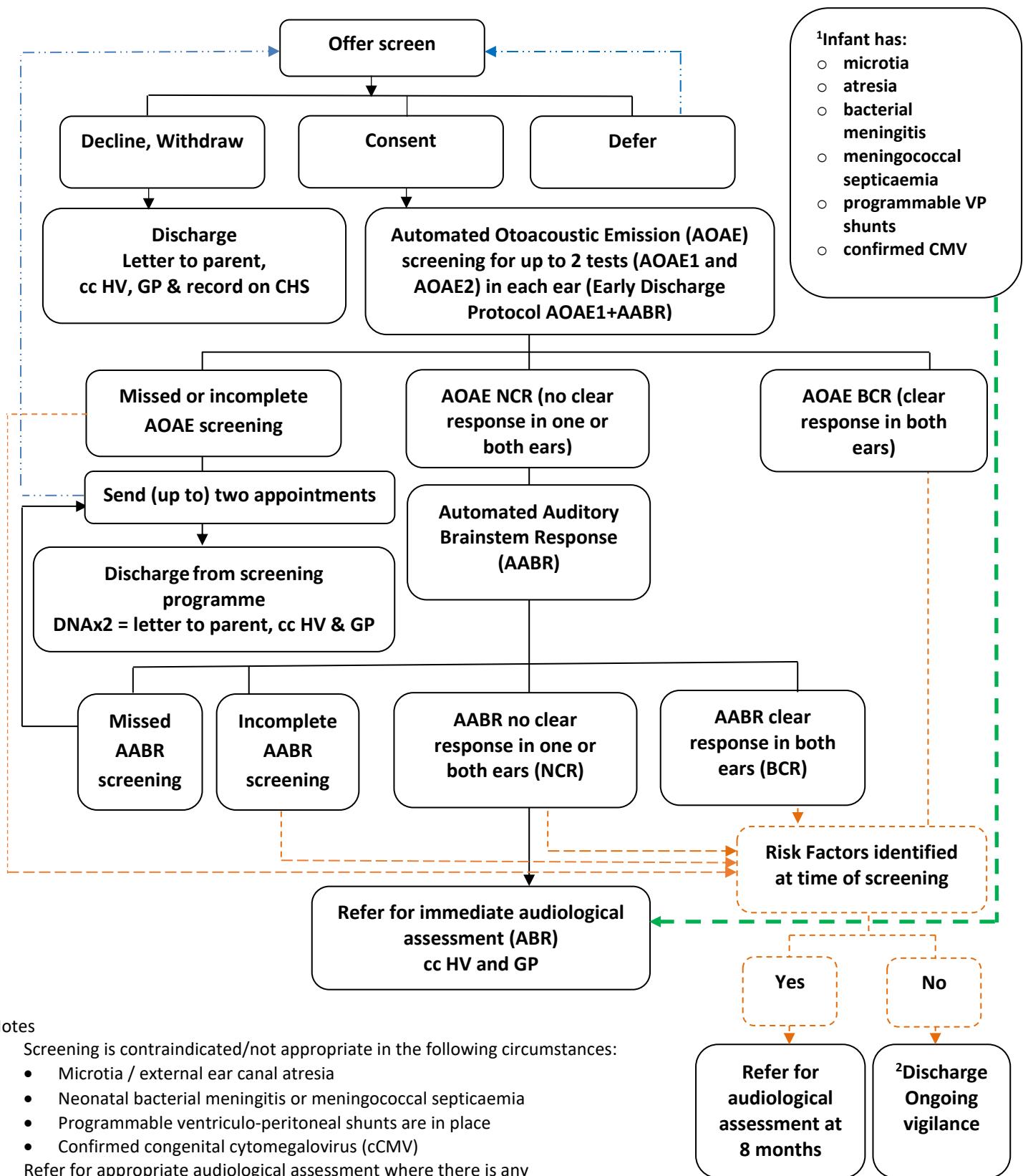
**Figure 3:**

**Proportion of 'current residents' in each Trust who completed screening by 4 weeks of age and were referred for ABR ~ 2020–21 (Standard 3)**



## Appendix 1

### Well Baby Protocol

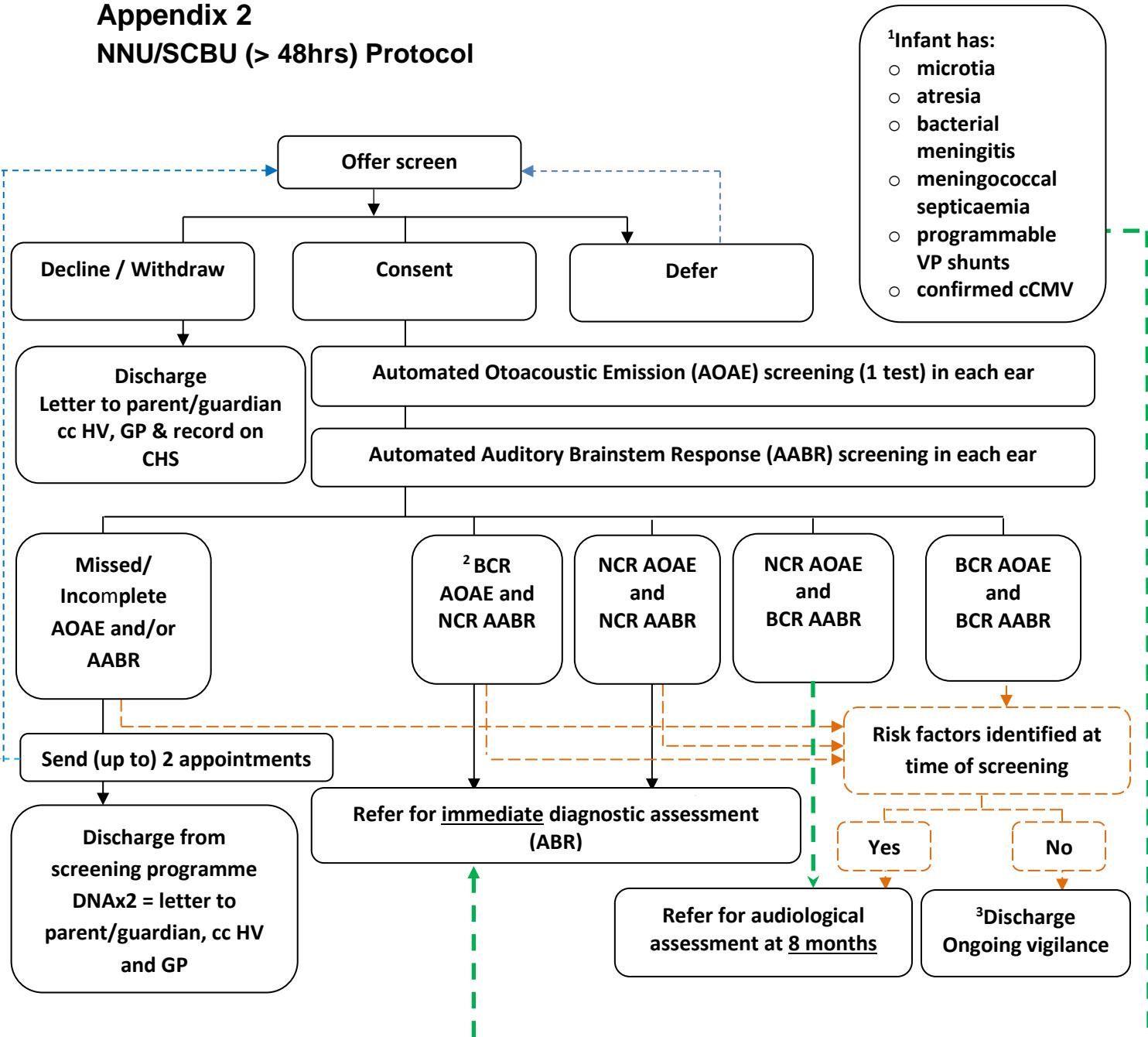


#### Notes

1. Screening is contraindicated/not appropriate in the following circumstances:
  - Microtia / external ear canal atresia
  - Neonatal bacterial meningitis or meningococcal septicaemia
  - Programmable ventriculo-peritoneal shunts are in place
  - Confirmed congenital cytomegalovirus (cCMV)
2. Refer for appropriate audiological assessment where there is any parental/guardian or professional concern.

## Appendix 2

### NNU/SCBU (> 48hrs) Protocol



#### Notes

1. Screening is contraindicated/not appropriate in the following circumstances:
  - Microtia / external ear canal atresia
  - Neonatal bacterial meningitis or meningococcal septicaemia
  - Programmable ventriculo-peritoneal shunts are in place
  - Confirmed congenital cytomegalovirus (cCMV)
2. Screening Outcomes:
 

BCR – clear response achieved in both ears
NCR – no clear response in one or both ears
3. Refer for appropriate audiological assessment where there is any parental/guardian or professional concern.

## Appendix 3

### Developmental checklist - Hearing, speech and language<sup>7</sup>

Extracted from the Northern Ireland Personal Child Health Record (PCHR, or 'red book'). The full version of '*Your Baby's Development*' is available within the PCHR.

#### Birth to 8 weeks

- Is startled by sudden loud noises, e.g. a hand clap or a door slamming.
- Blinks or opens eyes widely, stops sucking or starts to cry at loud noises.
- Pauses, appears to listen and may turn towards sudden ongoing sounds when they begin, e.g. a vacuum cleaner.
- 

#### 9-16 weeks

- Quietens or smiles to familiar voices even when unable to see speaker. Turns eyes or head towards voice. Shows excitement at sounds, e.g. voices, footsteps.
- Makes soft sounds when awake. Gurgles and coos.
- 

#### 5-9 months

- Makes laughter-like and sing-song sounds. e.g. 'a-a', 'muh', 'goo', 'der', 'aroo', 'adagh'.
- Turns immediately to familiar voices across the room or to very quiet noises on each side (if not too occupied with other things).
- Listens closely to familiar everyday sounds and looks for very quiet sounds made out of sight. Makes sounds to show friendliness or annoyance.
- Babbles, e.g. 'da', 'ma ma ma', 'ba ba ba'. Shows pleasure in babbling loudly and tunefully in response to others. Starts to copy other sounds like coughing or smacking lips.

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<sup>7</sup> References: B. McCormick, *Children's Hearing Assessment Centre, Nottingham, UK – 'Can Your Baby Hear You?'* (1982) and Mary D. Sheridan – '*Birth to Five Years*' (1997)

Other translations of this are available to view/download at:

<https://www.publichealth.hscni.net/publications/newborn-hearing-screening-english-and-translations>

## **9-12 months**

- Shows some response to own name.
- Babbles loudly, often making sounds with rhythm that sound like a simple conversation.
- Responds to words like 'no' and 'bye bye' even when the speaker's gestures cannot be seen.
- Waves 'bye bye' and claps hands.
- Around 12 months, may use 1 or 2 words.
- 

## **1-2 years**

- Around 15 months, makes lots of speech like sounds. Uses 2-6 words correctly that you understand, e.g. 'teddy' when seeing or wanting a teddy bear.
- Around 18 months, when playing, makes speech-like sounds with rhythm that sound like a simple conversation. Uses 6-20 words that you understand. Follows simple instructions, e.g. 'show me your shoes'.
- Finds and points to pictures in books by using words 'look' and 'see'. Turns pages one at a time.
- Around 24 months, uses 50 or more words correctly that you understand. Puts 2 or more words together to make simple sentences, e.g. 'more milk'. Joins in nursery rhymes and songs. Talks to self during play – speech may be unclear to others.
- 

## **2-3 years**

- Around 30 months, uses 200 or more words that you understand. Uses pronouns, e.g. 'I', 'me' and 'you'. Uses sentences but many will lack adult structure. Talks to self during play. Asks questions. Says a few nursery rhymes.
- Around 36 months, uses a large number of words – speech is clear to familiar listeners.

## **3-5 years**

- Speech is clear to unfamiliar listeners. Around 4-5 years, talks in sentences, where words and grammar are mostly in the correct order.

## Acknowledgements

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