



Newborn Hearing Screening in Northern Ireland

Annual Report 2017 - 18

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Executive Summary

Background

One or two babies in every 1,000 are born with a hearing loss in one or both ears¹. Research studies have demonstrated the importance of detecting a hearing loss as early as possible. The Newborn Hearing Screening Programme (NHSP) is offered to all babies, who are born or resident in Northern Ireland, up until the baby is aged 182 days. The aim of the screening programme is to identify babies who have a significant permanent childhood hearing loss² to allow early referral, diagnosis and intervention. Early detection and effective interventions result in improved outcomes for children. This annual report of the Northern Ireland NHSP summarises the performance of the programme from 1st April 2017 to 31st March 2018.

Programme delivery

The NHSP is commissioned and quality assured by the Public Health Agency (PHA) in collaboration with the five Health and Social Care Trusts (HSCTs) in Northern Ireland, who manage and deliver the programme. It is a complex programme involving a wide range of professional staff.

Screening tests

The programme follows two separate screening protocols, namely the Well Baby/Early Discharge Protocol and the Neonatal Unit (NNU) Protocol (set out in appendices 1 and 2). The latter is used if a baby has been in a neonatal/special care baby unit for more than 48 hours and screening has not been completed prior to admission.

¹PHA Your baby's hearing screen NINHSP Information for parents accessed via:
<https://www.publichealth.hscni.net/sites/default/files/ENGLISH%20-%20L1%20-%20Your%20Baby%27s%20Hearing%20Screen%20%28Well%20Baby%29.pdf>

² 'NHSP defines this as a bilateral permanent hearing loss averaging ≥ 40 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.

There are also two types of hearing screening tests provided. The type of test that a baby requires and is offered will depend on (a) which screening protocol is applicable (see appendix 1 and 2) and (b) the results of their initial hearing screening test, if they have been following a well baby/early discharge protocol.

Key developments

During 2017-18 there were a number of developments within the NHSP, most notably, further scoping out the potential to procure a managed regional IT service to support the programme and enhance current data processing and quality assurance practice, as well as sourcing a suitable service provider. Benchmarking with other regions took place in order to assure stakeholders that the suggested service would meet the needs of the programme. Currently results from screening tests are recorded on handwritten daily worklists which are entered into the Child Health System.

A full list of key developments during 2017-18 appears on page 10.

Headline results

The key statistics for the period 1st April 2017 – 31st March 2018 are:

- There were 22,866 ‘current residents’ (i.e. babies) eligible for screening. Of these:
 - 99.6% (22,777) were offered screening
 - 96.2% (21,998) completed screening by the age of 4 weeks;
 - 98.7% (22,570) completed screening by the age of 3 months
 - 2.1% (482) were referred, to audiology services by the age of 3 months, for diagnostic assessment.

In relation to ‘live births’ in hospitals in Northern Ireland during the same period:

- 72.8% (16,803/23,077) of babies had their hearing screening test completed before discharge from hospital.

BACKGROUND

Screening is defined as ‘the process of identifying healthy people who may have an increased chance of a disease or condition and offering them information, screening tests and, if required, further confirmatory (diagnostic) tests and treatment’³. The aim of screening is to reduce the problems and complications associated with the underlying disease or condition 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) was launched in October 2005.

Hearing screening is offered to all babies, who are born or resident in Northern Ireland, up to 6 months of age (i.e. from birth (day 0) until day 182 of life inclusive). This annual report of the Northern Ireland NHSP summarises the performance of the programme from 1st April 2017- 31st March 2018.

Aim of newborn hearing screening

One or 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 NHSP is to identify babies who have a significant permanent childhood hearing loss⁴, i.e. a bilateral hearing loss of 40 dBnHL or more⁵, in order to detect permanent childhood hearing impairment (PCHI) at the earliest stage, ideally within 4 weeks of birth. This allows timely referral, diagnosis and intervention. Early detection and effective interventions

³ PHE Screening explained <https://www.gov.uk/guidance/nhs-population-screening-explained>

⁴ ‘NHSP defines this as a bilateral permanent hearing loss averaging ≥ 40 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.

⁵ Davis A, Bamford J, Wilson I, Ramkalawan T, Forshaw M - A critical review of the role of neonatal hearing screening in the detection of congenital hearing impairment. *Health Technol Assess* 1997;1(10)

result in improved outcomes for children, in particular, normal speech and language development.

Programme delivery

In Northern Ireland the NHSP is commissioned and quality assured by the Public Health Agency (PHA) in collaboration with the 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 staff; midwives; paediatric staff; neonatal and special care baby unit staff; health visitors; community and hospital audiology and ear, nose and throat (ENT) specialist staff.

Screening pathway

Offer of screening

All resident babies (including those born in or who have moved in to Northern Ireland) are offered screening from over 34 weeks gestational age up until the age of 6 months⁶.

Exclusions

For some babies hearing screening can be inappropriate, e.g. if the infant has a condition (including developmental absence of the ear canal, bacterial meningitis or temporal bone fracture) which requires direct referral for diagnostic testing, or if the infant is receiving palliative care.

Screening protocols and tests

The programme follows one of two separate screening protocols. Most babies follow the Well Baby Protocol (see Appendix 1). However, if a baby has been in a neonatal/special care baby unit for more than 48 hours, prior to screening, they

⁶ 6 months is defined as day 182 of life, with birth being day 0

will follow the Neonatal Protocol (see Appendix 2); as they have an increased risk of hearing loss in one or both ears (around 1 in 100).

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 (see appendix 1 and 2) and (b) the results of their initial test if they have been following the Well Baby/Early Discharge Protocol.

A baby's newborn hearing screening test is often conducted prior to discharge from hospital, but can also be performed following discharge at an outpatient clinic. The screening tests are described below.

An **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 responds to sound. The test causes no discomfort to the baby and is often conducted while they are asleep. This test measures the mechanical function of the inner ear. In the cochlea, when a noise is heard, acoustic energy is generated which will cause vibration of hair cells in the inner ear (these are known as otoacoustic emissions). The AOAE test screens for these otoacoustic emissions. All babies are offered this test.

An **Automated Auditory Brainstem Response (AABR)** is a different type of test. Rather than measure acoustic energy within the inner ear, it measures electrical brain activity. This screening 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 ears respond to these sounds. This test is usually not required for all babies.

Referral

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

Hearing loss

It is, however, important to remember that no screening test is 100% accurate and also that hearing loss can occur at any stage of life. It is therefore important that parents remain vigilant for any changes or concerns regarding their child's hearing.

A developmental checklist (see appendix 3) is shared with parents via the Personal Childhood Health Record (PCHR), to encourage monitoring of their baby's hearing throughout the early stages of life. Should a parent/guardian have any concern about hearing, this can be discussed with the health visitor or GP.

Risk factors and 'targeted' follow up (as at 2017-18)

As outlined above, hearing loss can occur at any time in childhood, even in the absence of specific risk factors. However, the prevalence of hearing loss is higher among infants who have one or more of the following known risk factors:

Congenital Infection Proven or possible congenital infection due to toxoplasmosis, rubella, cytomegalovirus (CMV) or herpes as determined by TORCH⁷ screen, and notified at any age.

Craniofacial Anomalies A (noticeable) craniofacial anomaly (excluding minor pits and ear tags) at any age, e.g. cleft palate.

⁷ a TORCH screen is a blood test used to screen for a number of infectious diseases that are known by the acronym TORCH – Toxoplasmosis, Other agents (including syphilis and HIV), Rubella, Cytomegalovirus and Herpes simplex

| | |
|---|--|
| Syndrome | Confirmed syndrome related to hearing loss, e.g. Down's syndrome. |
| NNU⁸ protocol results | Bilateral clear response at AABR and the infant has not acquired a clear response in at least one ear at AOAE. |

At the time of newborn hearing screening, a child identified as having one or more of these known, nationally agreed, risk factors for hearing loss, is referred for a further hearing assessment at the age of 8 months, regardless of their hearing screening result.

Failsafe

A failsafe is a back-up mechanism which, in addition to usual care, ensures that if something does not go to plan in the screening pathway, the back-up process identifies what has happened and initiates appropriate action.

The NHSP includes a robust mechanism to capture babies who have not been offered, or taken part, in screening. This failsafe 'mop up' report identifies all babies from age 14 days until age 182 days (i.e. for the duration of the programme) with a nil or inconclusive result. The report is run each week by the NHSP Coordinator in each Trust, using the Child Health Information System. Once a baby has been identified on this list, their parent/guardian will be contacted to offer a screening hearing test.

⁸ NNU = neonatal unit

Key developments 2017-18

During 2017-18 there were a number of developments within the NHSP. These included:

- Development and approval of a business case to procure a regional information technology (IT) service to support the NHSP, namely Smart4Hearing, to enhance current data processing arrangements and quality assurance of the programme (May 17)
- A 'demonstration day' with the potential IT service provider (Feb 18)
- Benchmarking with other regions who use the dedicated Smart4Hearing service to support the NHSP
- Confirming the intention to procure S4H with key stakeholders (Mar 2018)
- Initial contract development in partnership with the service provider and other stakeholders
- Development of a first set of Key Performance Indicators for the NHSP (Jan 18)
- Preliminary work to reinstate a Regional Quality Improvement Group for the NHSP, to oversee future development and quality improvement work at a regional level, encourage strategic direction for the programme, approve key changes and provide ideas for programme modernisation
- Input into the national (UK) Newborn Hearing Screening Programme Advisory Group.

The screening programme identified considerable advantages associated with a bespoke IT infrastructure that would reduce the need for manual entry of data. An electronic mechanism would facilitate an automated capture and retention of NHSP screening results, including the 'waveform' which is captured at the time of screening. This would support patient management and allow data reporting against all national standards, which is limited at present. Furthermore, procurement of such a service would also allow for enhanced quality assurance and performance management. Further business processes, to procure this

system occurred during 2017-18, including engagement with regional stakeholders and service providers in order to shape the implementation of this complex system.

Public information leaflets are available in multiple languages⁹. 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.

Programme performance 2017-18

The NHSP routinely collects and collates anonymised data to measure and monitor programme performance. The procurement of a managed IT service will improve the data reports that can be produced, including in relation to timeliness of diagnostic assessment and outcomes in line with national standards.¹⁰

Programme data

- Cohort: data is produced on the offer, uptake and outcome of newborn hearing screening of:
 - ‘Live births’ before discharge from hospital and
 - ‘Current residents’
- Key definitions:
 - ‘Live births’ – this includes all babies who were born alive in hospitals in Northern Ireland from 1st April 2017 to 31st March 2018.
 - ‘Current residents’ – this includes all babies who were:

⁹ <https://www.publichealth.hscni.net/publications/newborn-hearing-screening-english-and-translations>

¹⁰ PHE NHS Newborn Hearing Screening Programme Standards 2016 to 2017 available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/685452/NHSP_Standards_2016_-_17.pdf

- born between 1st April 2017 and 31st March 2018 and
 - were resident in Northern Ireland, at some point, between 1st April 2017 and 31st March 2018.
- The current resident cohort may include babies who were not born in hospital, or who were born outside Northern Ireland and moved into Northern Ireland within the first six months of life. It may also vary from the total number of 'live births' as children may have been born in Northern Ireland hospitals but moved out of Northern Ireland.
- Source: Data on the performance of the programme is provided by the Child Health System (CHS). There are four CHS areas in Northern Ireland and these collectively cover the five health and social care trust geographies, i.e. Eastern (Belfast Health and Social Care Trust and South Eastern Health and Social Care Trust), Northern (Northern Health and Social Care Trust), Southern (Southern Health and Social Care Trust) and Western (Western Health and Social Care Trust).
- Health and Social Care Trust (HSCT) Definitions: When examining data at Trust level CHS data equates to Trust geographies in most cases (NHSCT, WHSCT, SHSCT). However BHSCT and SEHSCT data is provided by a single (Eastern) CHS. Therefore it is important to define the exact geographies included for each Trust. These differ for the 'current resident' and 'live birth' cohorts as outlined below.

| HSCT | Geography included for 'current resident' cohort | Geography included for 'live birth' cohort |
|--------|---|--|
| BHSCT | Current residents in North, South, West Belfast and Lisburn. | Live births in the Royal Jubilee Maternity 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 |

- Frequency of reporting: data are produced quarterly to cover the periods April to June, July to September, October to December and January to March. The reports that produce the data for a given quarter are run four months after the end of a quarter.
- Methodology: the annual figures included in this report have been calculated by summing the figures in each quarter.

Headline results

Regional data relating to the NI Newborn Hearing Screening Programme highlights that from 1st April 2017 – 31st March 2018:

- There were 22,866 'current residents' eligible for screening. Of these:
 - 99.6% (22,777) were offered screening
 - 96.2% (21,998) completed screening by the age of 4 weeks;
 - 98.7% (22,570) completed screening by the age of 3 months
 - 2.1% (482) of those who completed screening were referred to audiology services by the age of 3 months for diagnostic assessment.

In relation to 'live births' in hospitals in Northern Ireland during the same period:

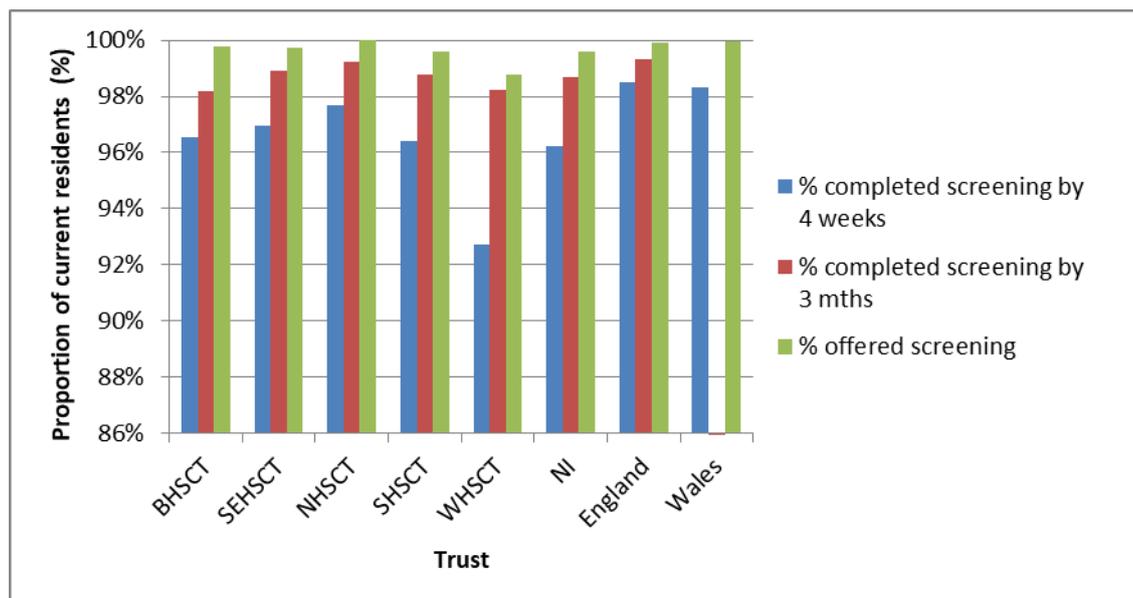
- 72.8% (16,803/23,077) of babies had hearing screening completed before discharge from hospital.

Trends in data

Figure 1 and Table 1 show that in 2017-18, as in 2016-17 and 2015-16, over 99% of current residents in Northern Ireland were offered hearing screening and 98.7% had completed screening by 3 months of age. As outlined above screening may be declined or, in some instances, may not be appropriate.

Figure 1 also shows each Trust's performance regarding offer of screening and completion rates, with comparative figures for England and Wales. Each Trust offered screening to over 98% of their current residents, with the NHSCCT achieving 100%. Over 96% of all current residents completed screening within 4 weeks in all Trusts, except in WHSCT (92.7%). Over 98% of all current residents completed screening by 3 months of age in all Trust areas.

Figure 1: Proportion of ‘current residents’ in each Health and Social Care Trust (HSCT) offered newborn hearing screening and completion rates by 4 weeks and 3 months of age in 2017-18



Notes

England data

Date source = Newborn hearing screening: standards data report April 2017 to March 2018 produced by Public Health England Screening <https://www.gov.uk/government/publications/newborn-hearing-screening-standards-data-report-april-2017-to-march-2018>

% completed screening by 4 weeks relates to screens completed by 4 to 5 weeks corrected age

Wales data

Data source = Newborn Hearing Screening Wales Annual Statistical Report 2017 – 18 produced by Screening Division of Public Health Wales

<http://www.wales.nhs.uk/sitesplus/documents/980/Newborn%20Hearing%20Screening%20Wales%20Annual%20Statistical%20Report%202017-18%20V1.pdf>

Table 1: Proportion of ‘current residents’ in each HSCT offered newborn hearing screening and completion rates by 4 weeks and 3 months of age 2017-18

| Trust | Number of current residents | No. offered screen | % offered | No. completed by | | % completed by | |
|----------|-----------------------------|--------------------|-----------|------------------|--------|----------------|--------|
| | | | | 4 wks | 3 mths | 4 wks | 3 mths |
| BHSCT | 4287 | 4277 | 99.8% | 4139 | 4209 | 96.5% | 98.2% |
| SEHSCT | 3904 | 3893 | 99.7% | 3785 | 3862 | 97.0% | 98.9% |
| NHSCT | 5450 | 5450 | 100.0% | 5323 | 5408 | 97.7% | 99.2% |
| SHSCT | 5365 | 5344 | 99.6% | 5172 | 5299 | 96.4% | 98.8% |
| WHSCT | 3860 | 3813 | 98.8% | 3579 | 3792 | 92.7% | 98.2% |
| NI Total | 22866 | 22777 | 99.6% | 21998 | 22570 | 96.2% | 98.7% |

Figure 2 and Table 2 show that in 2017-2018 there has also been a consistently high proportion of current residents (>98%) who have completed screening by 3 months of age. 2.1% of current residents who had completed screening in

Northern Ireland required referral to audiology services for further testing following the result of their screening test. As shown in Figure 3, the referral rate varied by HSCT and was highest in NHSCT with 4.2% of all current residents referred to audiology by the age of 3 months. Whilst this Trust has the highest referral rate it also has the highest rate of completion of screening before discharge, as shown in Figure 4 below.

Figure 2: Proportion of ‘current residents’ in each HSCT with a bilateral clear response screening outcome by 4 weeks and 3 months of age in 2017-18

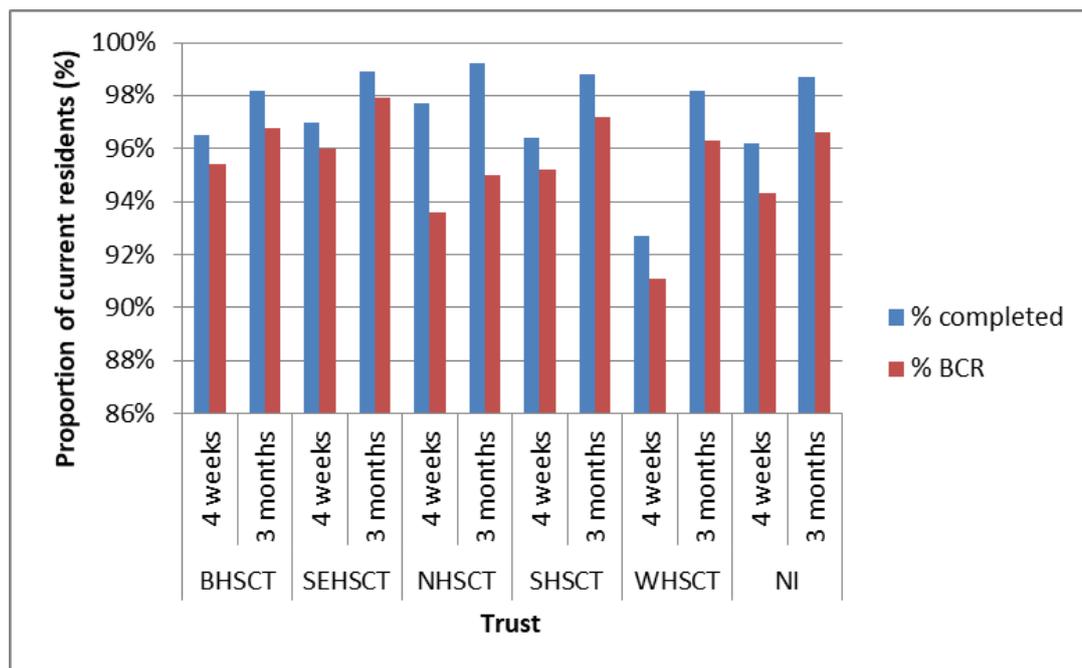
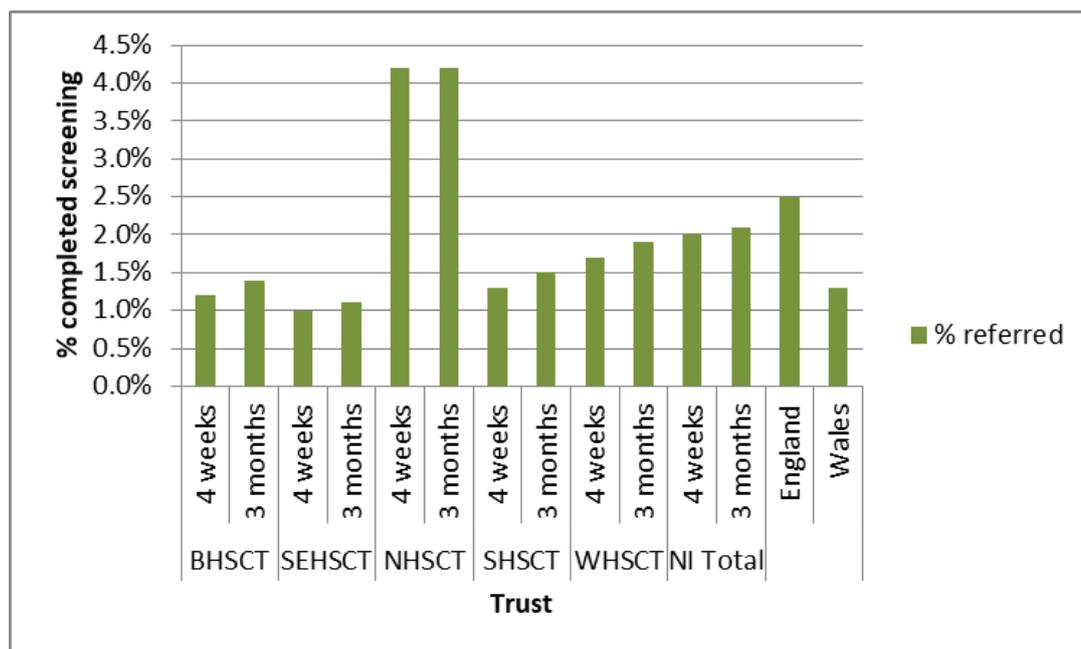


Figure 3: Proportion of ‘current residents’ who have completed screening in each HSCT referred for ABR by 4 weeks and 3 months of age in 2017 – 18



Notes

England data

Date source = Newborn hearing screening: standards data report April 2017 to March 2018 produced by Public Health England Screening <https://www.gov.uk/government/publications/newborn-hearing-screening-standards-data-report-april-2017-to-march-2018>

% referred = referral rate for hospital programme for well babies and NICU babies

Wales data

Data source = Newborn Hearing Screening Wales Annual Statistical Report 2017 – 18 produced by Screening Division of Public Health Wales

<http://www.wales.nhs.uk/sitesplus/documents/980/Newborn%20Hearing%20Screening%20Wales%20Annual%20Statistical%20Report%202017-18%20V1.pdf>

% referred = % screened babies referred for assessment

Table 2: Proportion of ‘current residents’ in each HSCT who completed screening with screening outcome (bilateral clear response (BCR) or referral for ABR) by 4 weeks and 3 months of age 2017-18

| Trust | by 4 weeks | | | by 3 months | | |
|----------|--|--------------------------|-------------------------------|--|--------------------------|-------------------------------|
| | No. of current residents who completed screening | % BCR of those completed | % referred of those completed | No. of current residents who completed screening | % BCR of those completed | % referred of those completed |
| BHSCT | 4139 | 98.8% (4090) | 1.2% (49) | 4209 | 98.6% (4151) | 1.4% (58) |
| SEHSCT | 3785 | 99.0% (3748) | 1.0% (37) | 3862 | 98.9% (3821) | 1.1% (41) |
| NHSCT | 5323 | 95.8% (5101) | 4.2% (222) | 5408 | 95.8% (5180) | 4.2% (228) |
| SHSCT | 5172 | 98.7% (5105) | 1.3% (67) | 5299 | 98.5% (5217) | 1.5% (82) |
| WHSCT | 3579 | 98.3% (3518) | 1.7% (61) | 3792 | 98.1% (3719) | 1.9% (73) |
| NI Total | 21998 | 98.0% (21562) | 2.0% (436) | 22570 | 97.9% (22088) | 2.1% (482) |

In 2017-18, as highlighted in Figure 4, 72.8% of all babies born alive in hospitals in Northern Ireland completed hearing screening before discharge from hospital. The proportion of live births completing hearing screening prior to discharge from hospital varied by Trust (Figure 4 and Table 3) with 90.8% completing screening prior to discharge from hospitals in the NHSCT and 54.3% completing hearing screening prior to discharge from hospitals in the WHSCT.

Figure 4: Proportion of ‘live births’ in each HSCT completing hearing screening before discharge from hospital in 2017-18

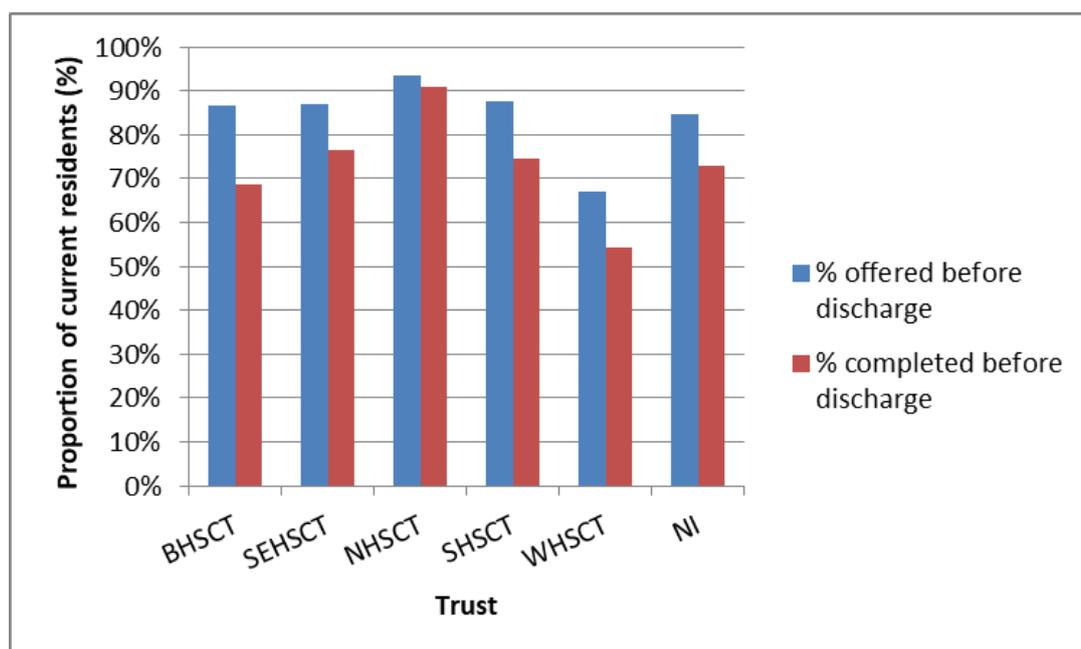


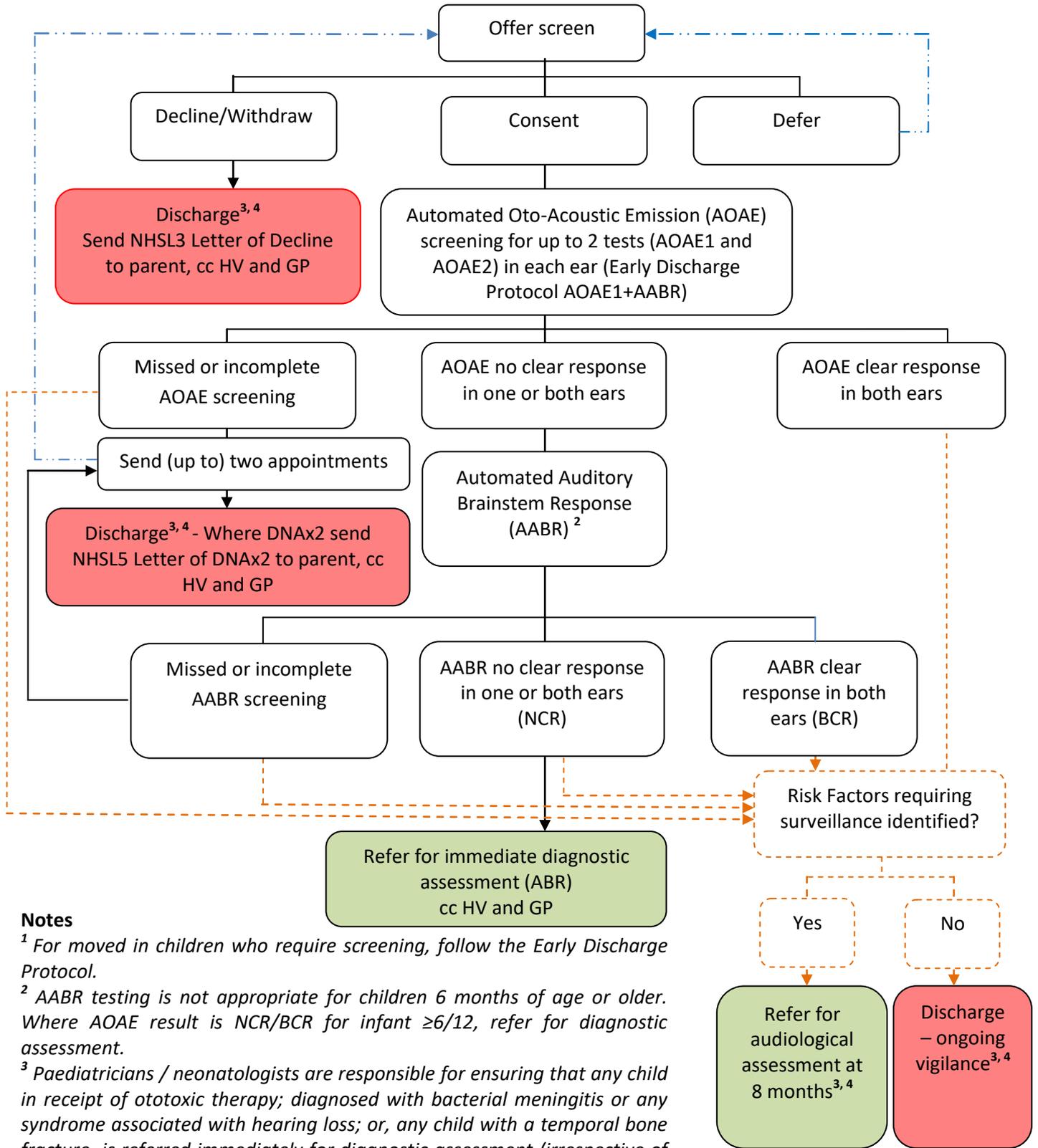
Table 3: Proportion of ‘live births’ in each HSCT offered and completing hearing screening before discharge from hospital in 2017-18

| Trust | Total number of live births | % offered before discharge | % completed before discharge | % referred before discharge |
|----------|-----------------------------|----------------------------|------------------------------|-----------------------------|
| BHSCT | 5377 | 86.6% (4654) | 68.8% (3699) | 0.8% (42) |
| SEHSCT | 4153 | 86.9% (3608) | 76.5% (3177) | 0.5% (19) |
| NHSCT | 3827 | 93.4% (3574) | 90.8% (3476) | 5.2% (200) |
| SHSCT | 5808 | 87.7% (5091) | 74.5% (4327) | 0.8% (46) |
| WHSCT | 3912 | 66.9% (2617) | 54.3% (2124) | 1.1% (42) |
| NI Total | 23077 | 84.7% (19544) | 72.8% (16803) | 1.5% (349) |

Appendix 1: Northern Ireland Newborn Hearing Screening Programme

Well Baby / Early Discharge Protocol - Patient Journey

Residents (including moved in children) up to 6 months of Age¹



Notes

¹ For moved in children who require screening, follow the Early Discharge Protocol.

² AABR testing is not appropriate for children 6 months of age or older. Where AOAE result is NCR/BCR for infant $\geq 6/12$, refer for diagnostic assessment.

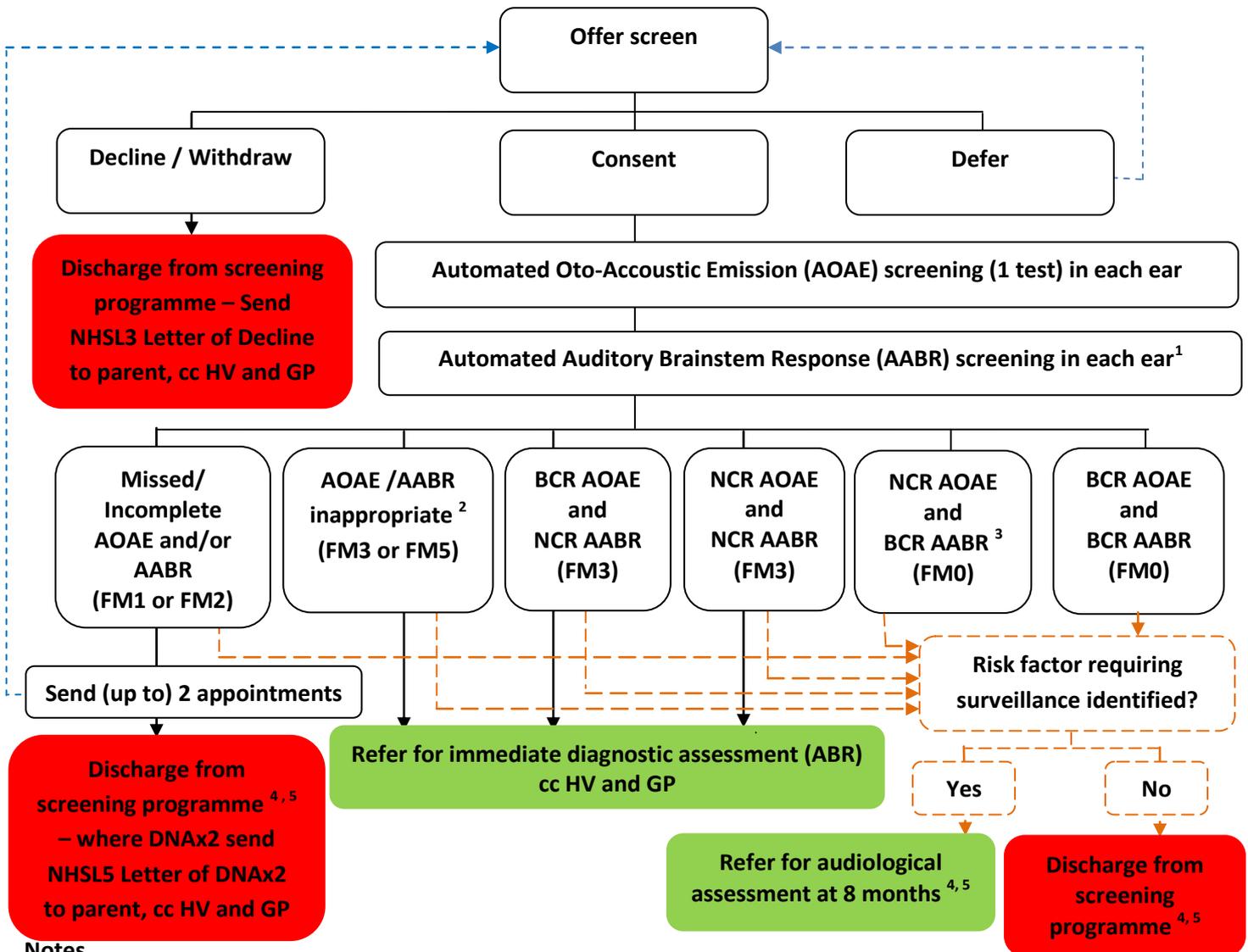
³ Paediatricians / neonatologists are responsible for ensuring that any child in receipt of ototoxic therapy; diagnosed with bacterial meningitis or any syndrome associated with hearing loss; or, any child with a temporal bone fracture is referred immediately for diagnostic assessment (irrespective of whether newborn hearing screening has taken place or the results of newborn hearing screening).

⁴ Children should be referred for appropriate audiological assessment where there is any parental or professional concern.

Appendix 2: Northern Ireland Newborn Hearing Screening Programme

NICU/SCBU (> 48hrs) Protocol – Patient Journey

Residents (including moved in infants) up to 6 months of age



Notes

¹ AABR testing is not appropriate for children who are 6 months of age or older. Where an AOAE result is NCR and the child has reached 6 months of age or older, refer for diagnostic assessment.

² Screening can be inappropriate because an infant has a condition, e.g. atresia, and requires direct referral for neurological ABR testing (FM3), or where an infant is receiving palliative care and screening is not indicated and referral for ABR is not required (FM5). Where (FM3) infants are seen by screeners before referral, risk assessment should be carried out, but risk factors should not be assessed where an infant is receiving palliative care (FM5).

³ This outcome is Risk Factor 10 and infants are automatically referred for audiological assessment at 8 months.

⁴ Paediatricians / neonatologists are responsible for ensuring that any child in receipt of ototoxic therapy; diagnosed with bacterial meningitis or any syndrome associated with hearing loss; or, any child with a temporal bone fracture is referred immediately for diagnostic assessment (irrespective of whether newborn hearing screening has taken place or the results of newborn hearing screening).

⁵ Children should be referred for appropriate audiological assessment where there is any parental or professional concern.

Screening Outcomes: BCR – clear response achieved in both ears; or
NCR – no clear response in one or both ears.

Further Management Codes: FM0 – no further action;
FM1 – for first screen;
FM2 – for further screen;
FM3 – refer for ABR test (to diagnostic audiology); and,
FM5 – not indicated

Appendix 3

YOUR BABY'S DEVELOPMENT (HEARING, SPEECH AND LANGUAGE)

Extracted from the Northern Ireland Personal Child Health Record (PCHR – 'red book') for translation of newborn hearing screening programme information. 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 da 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.

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.

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

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

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

Reproduced by the Northern Ireland Newborn Hearing Screening Quality Management Group

January 2015

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