

## **Patient journey: protocol for NICU > 48 hours**

### **1.0 Definitions**

**1.1** A satisfactory test is one that is completed and gives a result (clear response or no clear response) under good test conditions i.e.

- Probe fit/electrode impedances satisfactory
- Baby is in a suitably quiet state
- The background noise conditions are satisfactory

**1.2** A result is either a **clear response (CR)** or **no clear response (NCR)**.

**1.3** A test **attempt** is defined as placing, or attempting to place, a probe in the baby's ear or attaching, or attempting to attach, one or more electrodes even if the screener does not reach the point of pressing the "Start test" button.

### **2.0 Is screening appropriate?**

All babies are candidates for the screen unless there is unequivocal evidence of hearing impairment as in babies with unilateral or bilateral atresia. These babies should not be screened but referred directly for audiological assessment. The family should be offered an appointment within 4 weeks.

It is the responsibility of the local coordinator to discuss this with the parent(s) in conjunction with the paediatricians and midwives.

### **3.0 NICU protocol**

**3.1** All babies resident in NICU or SCBU for > 48 hours should be screened using the NICU protocol. Babies in "transitional care" should receive the NICU protocol only if they have been resident in NICU or SCBU for > 48 hours; otherwise they should follow the Well Baby protocol. The NICU protocol specifies using both AOAE and AABR. The order of testing is discretionary. Babies who do not show clear responses in both ears on AABR are referred to audiology irrespective of the AOAE result. Babies who have no clear response on AOAE but clear responses on AABR should be offered a follow up appointment at around 8 months of age (see Surveillance Guidelines).

### **3.2 Rationale for use of AOAE and AABR in NICU**

Otoacoustic Emission (AOAE) is a more sensitive test than Automated Auditory Brainstem Response (AABR) (especially when the stimulus level on the AABR is 45 dB). Therefore it is possible that babies with mild to moderate hearing impairment, who are more prevalent in the NICU population will be missed by the AABR. The consequences of such loss could be significant in the developmental progress of these children and these babies should be followed up at 8 months (this is included in the latest draft of the surveillance guidelines). In addition carrying out both tests enables early information in cases of possible auditory neuropathy.

### **3.3 Timing of the screen**

Ideally babies should be screened as close to discharge as possible, when they are well enough to test and preferably when any major medical treatment, ototoxic or other drug treatment is completed. This may not always be possible; for example babies who are being given reducing doses of morphine may need to be tested on the last day of drug treatment. Babies should never be screened at < 34 weeks gestational age. Babies who are being transferred to another NICU/SCBU should not be screened unless they meet the criteria described.

## **4.0 Patient journey**

### **4.1 AOAE**

- AOAE to be attempted in both ears unless this is considered inappropriate.
- If a result is obtained in both ears AOAE is complete.
- If satisfactory test conditions cannot be achieved for one or both ears consideration should be given as to whether a further test attempt is possible.

### **4.2 AABR**

- The AABR is carried out on both ears unless this is considered inappropriate. AABR may be considered inappropriate for the following reasons:-
  - Medically inadvisable to attach electrodes
  - Parental opinion
- Once a result has been obtained in both ears AABR is complete
- The AABR should not be repeated in an ear in which a result has already been obtained.
- If satisfactory test conditions cannot be achieved for one or both ears arrange to return to complete the test in the ear or ears which do not have a result

### **4.3 Screening process**

**4.3.1** The screening process should be completed as far as possible prior to discharge and while the baby is in hospital. If the process is not completed in hospital an outpatient appointment/clinic appointment/home visit will be required to complete the process. The screening process should normally be completed within 1 visit. The process should be completed by 44 weeks gestational age.

**4.3.2** If the screening process is not started in hospital (e.g. baby born elsewhere) the baby will be offered an outpatient appointment/clinic appointment/home visit to carry out the screening. The screening process should normally be completed within 1 visit. The process should be completed by 44 weeks gestational age

## **5.0 Consent and information**

- Parent(s) (or those with parental responsibility) to be given the NICU leaflet and appropriate verbal information about the screen at an appropriate time
- Informed written consent to be obtained
- Consent and decline forms to be filed in the baby's notes.
- Ideally these functions to be carried by the screener<sup>1</sup>. If not the screener then the individuals who carry out this function must receive appropriate training from the national or local NHSP team.
- A suitable time for screening should be negotiated with the mother if she wishes to be present during the screening. She should be offered the option of being present.
- If the parent(s) are not planning to be present during the screen an appropriate time for the parent to receive the results in person should also be negotiated.
- Where an individual other than the screener gives the result this individual should also receive appropriate training from the national or local NHSP team and should know how to contact the local coordinator if further information is required.

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<sup>1</sup> In NICU the screening may be carried out by a dedicated screener, nurse or nursery nurse or audiologist.

## 6.0 Scenarios

The following scenarios indicate how the protocol as defined above might work in practice. The appropriate further action is also indicated. The babies are all following the NICU protocol.

At the end of each scenario the **Screening Outcome Status Code** used in eSP is shown.

### Scenario 1

Stage	Day/time	Right	Left
AOAE	1 09.00	CR	CR
AABR	1 09.15	CR	CR

In this scenario a clear response was obtained on the AOAE in both ears at the first attempt. The baby was then tested using the AABR in both ears. A clear response was obtained in both ears for the AABR. The AABR result determines whether a referral to audiology is needed. In this case such a referral is not needed.

**Screening Outcome Status Code = Clear response**

### Scenario 2

Stage	Day/time	Right	Left
AOAE	1 09.00	NCR	NCR
AABR	1 09.15	CR	CR

In this scenario no clear response was obtained on the AOAE in both ears at the first attempt. The baby was then tested using the AABR in both ears. A clear response was obtained in both ears for the AABR. The AABR result determines whether a referral to audiology is needed. In this case such a referral is not needed. However it is recommended that these results should trigger a follow-up at 8 months of age.

**Screening Outcome Status Code = Clear response**

### Scenario 3

Stage	Day/time	Right	Left
AOAE	1 09.00	NCR	Not completed
AABR	1 10.00	CR	CR

In this scenario no clear response was obtained on the AOAE in the right ear and the test could not be completed in the left ear as the baby awoke. Eventually the baby was resettled and the screener decided to proceed to AABR rather than attempt to complete AOAE in the left ear as the baby is going home later that day. The baby was then tested using the AABR in both ears. A clear response was obtained in both ears for the AABR. The AABR result determines whether a referral to audiology is needed. In this case such a referral is not needed. In this case an appointment for routine follow-up at 8 months would probably not be made on the basis of the screen results alone (compare with scenario 2). eSP will regard this screen as incomplete as the AOAE has not been completed and will not suggest an outcome. If a decision has been made not to complete the AOAE then the screening outcome status code will need to be manually selected with a note entered to explain why the AOAE was not completed.

**Screening Outcome Status Code = Clear response**

**Scenario 4**

Stage	Day/time	Right	Left
AOAE	1 09.00	Not done	Not done
AABR	1 09.15	CR	CR

In this scenario the AOAE test was not done. The baby was tested using the AABR in both ears. A clear response was obtained in both ears for the AABR. The screen is finished and no referral to audiology is indicated. eSP will regard this screen as incomplete as the AOAE has not been completed and will not suggest an outcome. If a decision has been made not to do the AOAE then the screening outcome status code will need to be manually selected with a note entered to explain why the AOAE was not completed.

**Screening Outcome Status Code = Clear response**

**Scenario 5**

Stage	Day/time	Right	Left
AOAE	1 09.00	NCR	NCR
AABR	1 09.15	NCR	NCR

In this scenario the AOAE showed no clear response in both ears. The AABR also showed no clear response in both ears. This baby requires referral to audiology.

**Screening Outcome Status Code = No Clear response (bilateral referral)**

**Scenario 6**

Stage	Day/time	Right	Left
AOAE	1 09.00	Not completed	Not done
AABR	1 11.00	NCR	Not completed

In this scenario the AOAE was not completed in the right ear as the baby was unsettled and the AOAE was not attempted in the left. After settling the baby the screener was able to obtain an AABR result in the right ear which showed a no clear response. Testing could not be completed in the left ear as the baby again became unsettled. The baby is about to go home so no further screening attempts are possible without delaying discharge. It is clear that whatever the AABR result in the left ear this baby requires referral to audiology in view of the no clear response in the right ear. Further attempts to complete the AABR screen in the left ear will probably only serve to raise parental anxiety. It is suggested that in this case no further screening attempts are made and the baby is referred to audiology.

**Screening Outcome Status Code = Incomplete (baby or equipment reason). Note when the screening outcome has been set the follow up outcome should be activated and set to pending.**

**Scenario 7**

Stage	Day/time	Right	Left
AOAE	1 09.00	CR	CR
AABR	1 09.15	NCR	NCR

This baby showed clear responses in both ears on AOAE but no clear response in both ears on AABR. This baby requires referral to audiology and may be a baby with auditory neuropathy.

**Screening Outcome Status Code = No Clear response (bilateral referral)**