

Patient journey: protocol for screening well babies in hospital

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 Patient journey

3.1 Initial test

The initial test is AOAE unless this is considered inappropriate due to the presence of obvious debris or fluid in one or both ear canals **and** the baby is due to be discharged soon i.e. before the ear canals can reasonably be expected to clear. In this case the AABR may be used as the initial test.

3.2 AOAE1

- AOAE1 to be attempted in both ears. If a result is obtained in both ears AOAE1 is complete.
- 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 have not been tested. This would normally be within the same session i.e. within half a day and would only exceptionally involve more than 2 further test attempts. A visit to the bedside to check in with the mother does not constitute a test attempt in this context.
- At the end of this time period AOAE1 is considered complete even if a result has not been obtained in both ears.

At completion of AOAE1 there are a number of possible outcomes

- result in both ears
- result in one ear only
- result in neither ear

If the result is a clear response in both ears the screen is complete. For all other results move to AOAE2 unless this is considered inappropriate, in which case move to AABR. AOAE2 may be considered to be inappropriate for the following reasons:-

- lack of suitable time interval since AOAE1 and imminent discharge of the baby
- parental preference
- technical difficulty with the test due, for example, to persistent noisy breathing
- evidence of discomfort on probe insertion

3.3 AOAE 2

- AOAE2 is required to be carried out only in ears which have not shown a clear response on AOAE1. When the ear(s) that require AOAE2 have a result AOAE2 is complete.
- If satisfactory test conditions cannot be achieved arrange to return to complete the test in the ear or ears that have not been tested. This would normally be within the same session as the start of AOAE2 i.e. within half a day and would only exceptionally involve more than 2 further test attempts. A visit to the bedside to check in with the mother does not constitute a test attempt in this context.
- At the end of this time period AOAE2 is considered complete even if a result is not obtained in both ears.

At the end of AOAE2 there are a number of possible outcomes based on the combined results from AOAE1 and AOAE2.

- result in both ears
- result in one ear only
- result in neither ear

If the result is a clear response in both ears the screen is complete. For all other results move to AABR unless this is considered inappropriate. AABR may be considered inappropriate for the following reasons:-

- medically inadvisable to attach electrodes
- parental opinion

3.4 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
- The AABR is carried out on both ears irrespective of the results obtained on AOAE1 and AOAE2.
- 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

3.5 Screening process

3.5.1 The screening process should be completed as far as possible prior to discharge 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. At this appointment the baby should resume the journey from the point that was previously reached. Screening completion should normally be accomplished within 1 visit.

3.5.2 If the screening process is not started in hospital (home birth, born elsewhere, early discharge) the baby will be offered an outpatient appointment/clinic appointment/home visit to carry out the screening. Screening completion should normally be accomplished within 1 visit.

4.0 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 “Well Baby” protocol and do not have any risk factors for which a targeted follow up would be indicated.

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

Scenario 1

Stage	Day/time	Right	Left
AOAE1	1 09.00	CR	CR
AOAE2			
AABR			

In this scenario a result was obtained in both ears on AOAE1 at the first attempt. AOAE1 is therefore complete. The result is a clear response in both ears. The screening is complete and no follow up is required.

Screening Outcome Status Code = Clear response

Scenario 2

Stage	Day/time	Right	Left
AOAE1	1 09.00	CR	NCR
AOAE2	1 16.30		CR
AABR			

In this scenario a result was obtained in both ears on AOAE1 at the first attempt. AOAE1 is therefore complete. The result for the left ear was no clear response. After a suitable time interval AOAE2 is carried out in the ear that did not show a clear response on AOAE1. This ear now shows a clear response and therefore AOAE2 is complete.

Screening Outcome Status Code = Clear response

Scenario 3

Stage	Day/time	Right	Left
AOAE1	1 09.00	CR	Not complete
	1 12.30		CR
AOAE2			
AABR			

In this scenario a result was obtained in the right ear on AOAE1 at the first attempt but testing on the left ear was not completed as the baby woke up half way through the test and could not be settled. The screener therefore returned within the prescribed time interval (within 1 session) to complete AOAE1 on the left ear. At this time the baby was in a satisfactory state to be tested and a clear response was obtained. AOAE1 is thus complete and no further testing is required.

Screening Outcome Status Code = Clear response

Scenario 4

Stage	Day/time	Right	Left
AOAE1	1 09.00	CR	Not complete
	1 12.30		NCR
AOAE2	1 18.30		CR
AABR			

In this scenario a result was obtained in the right ear on AOAE1 at the first attempt but testing on the left ear was not completed as the baby woke up half way through the test and could not be settled. The screener therefore returned within the prescribed time interval (within 1 session) to complete AOAE1 on the left ear. At this time the baby was in a satisfactory state to be tested but no clear response was obtained. AOAE1 is thus complete. After a suitable time interval AOAE2 is carried out in the ear that did not show a clear response on AOAE1. This ear now shows a clear response and therefore AOAE2 is complete.

Screening Outcome Status Code = Clear response

Scenario 5

Stage	Day/time	Right	Left
AOAE1	1 09.00	CR	Not complete
	1 12.30		Not complete
AOAE2	1 17.00		Not complete
AABR	2 10.00	CR	CR

In this scenario a result was obtained in the right ear on AOAE1 at the first attempt but testing on the left ear was not completed as the baby woke up half way through the test and could not be settled. The screener therefore returned within the prescribed time interval (within 1 session) to complete AOAE1 on the left ear. At this time the baby was still unsettled and a satisfactory test could not be carried out. At this point AOAE1 is considered to be complete in spite of the fact that no result has been obtained for the left ear as time has run out. After a suitable time interval AOAE2 is attempted in the ear that did not show a clear response on AOAE1. It is still not possible to obtain a result but again time has run out for AOAE2. The screener therefore proceeds to AABR, testing both ears even though the right ear has shown a clear response on AOAE1. The AABR shows a clear response in both ears and thus screening is complete.

Screening Outcome Status Code = Clear response

Scenario 6

Stage	Day/time	Right	Left
AOAE1	1 09.00	CR	Not complete
	1 12.30		Not complete
AOAE2	1 17.00		Not complete
	1 18.30		CR
AABR			

In this scenario a result was obtained in the right ear on AOAE1 at the first attempt but testing on the left ear was not completed as the baby woke up half way through the test and could not be settled. The screener therefore returned within the prescribed time interval (within 1 session) to complete AOAE1 on the left ear. At this time the baby was still unsettled and a satisfactory test could not be carried out. At this point AOAE1 is considered to be complete in spite of the fact that no result has been obtained for the left ear as time has run out. After a suitable time interval AOAE2 is attempted in the ear that did not show a clear response on AOAE1. At the first attempt it was not possible to obtain a result but the screener is able to return within the prescribed time for AOAE2. At this time the test is completed and a clear response obtained.

Screening Outcome Status Code = Clear response

Scenario 7

Stage	Day/time	Right	Left
AOAE1	1 09.00	CR	Not complete
	1 12.30		Not complete
AOAE2	1 17.00		Not complete
	1 18.30		NCR
AABR	2 10.00	Not complete	Not complete
	2 12.00	CR	CR

In this scenario a result was obtained in the right ear on AOAE1 at the first attempt but testing on the left ear was not completed as the baby woke up half way through the test and could not be settled. The screener therefore returned within the prescribed time interval (within 1 session) to complete AOAE1 on the left ear. At this time the baby was still unsettled and a satisfactory test could not be carried out. At this point AOAE1 is considered to be complete in spite of the fact that no result has been obtained for the left ear as time has run out. After a suitable time interval AOAE2 is attempted in the ear which did not show a clear response on AOAE1. At the first attempt it is not possible to obtain a result but the screener is able return within the prescribed time period for AOAE2 and this time obtains a result which is no clear response. The screener therefore proceeds to AABR, testing both ears even though the right ear has shown a clear response on AOAE1. At the first attempt the baby awakes part way through the test and testing is not completed. The screener returns later on and is now able to carry out the AABR test successfully obtaining a clear response in both ears.

Screening Outcome Status Code = Clear response

Scenario 8

Stage	Day/time		Right	Left
AOAE1	1	09.00	CR	Not complete
	1	12.30		Not complete
AOAE2	1	17.00		Not complete
	1	18.30		NCR
AABR	2	10.00	Not complete	Not complete
	2	12.00	CR	NCR

In this scenario a result was obtained in the right ear on AOAE1 at the first attempt but testing on the left ear was not completed as the baby woke up half way through the test and could not be settled. The screener therefore returned within the prescribed time interval (within 1 session) to complete AOAE1 on the left ear. At this time the baby was still unsettled and a satisfactory test could not be carried out. At this point AOAE1 is considered to be complete in spite of the fact that no result has been obtained for the left ear as time has run out. After a suitable time interval AOAE2 is attempted in the ear which did not show a clear response on AOAE1. At the first attempt it is not possible to obtain a result but the screener is able to return within the prescribed time period for AOAE2 and this time obtains a result which is no clear response. The screener therefore proceeds to AABR, testing both ears even though the right ear has shown a clear response on AOAE1. At the first attempt the baby awakes part way through the test and testing is not completed. The screener returns later on and is now able to carry out the AABR test successfully obtaining a clear response in the right ear and no clear response in the left ear. The screen is now complete and the baby is referred to audiology.

Screening Outcome Status Code = No clear response (unilateral referral)

Scenario 9

Stage	Day/time		Right	Left
AOAE1	1	09.00	CR	Not complete
	1	12.30		Not complete
AOAE2	1	17.00		Not complete
	1	18.30		NCR
AABR	2	10.00	Not complete	Not complete
	2	12.00	Not complete	CR

In this scenario a result was obtained in the right ear on AOAE1 at the first attempt but testing on the left ear was not completed as the baby woke up half way through the test and could not be settled. The screener therefore returned within the prescribed time interval (within 1 session) to complete AOAE1 on the left ear. At this time the baby was still unsettled and a satisfactory test could not be carried out. At this point AOAE1 is considered to be complete in spite of the fact that no result has been obtained for the left ear as time has run out. After a suitable time interval AOAE2 is attempted in the ear which did not show a clear response on AOAE1. At the first attempt it is not possible to obtain a result but the screener is able to return within the prescribed time period for AOAE2 and this time obtains a result which is no clear response. The screener therefore proceeds to AABR, testing both ears even though the right ear has shown a clear response on AOAE1. At the first attempt the baby awakes part way through the test and testing is not completed. The screener returns later on and is now able to carry out the AABR test in the left ear obtaining a clear response. Unfortunately the baby awakes before testing is complete in the right ear. The mother and baby are going home and there is no opportunity for any further testing before discharge.

In this case a literal adherence to the protocol requires an outpatient screening appointment to complete the AABR testing in the right ear or a referral to audiology for an incomplete screen. Either of these

options is likely to cause considerable parental anxiety. It would be reasonable in this case to take into account the clear response on AOAE1 in the right ear and not arrange any further follow up at the present time. This recommendation is subject to the usual proviso that the parents are happy with this course of action.

Screening Outcome Status Code = Incomplete (baby or equipment reason)

Scenario 10

Stage	Day/time	Right	Left
AOAE1	1 09.00	CR	Not complete
	1 12.30		Not complete
AOAE2	1 17.00		Not complete
	1 18.30		NCR
AABR	2 10.00	Not complete	Not complete
	2 12.00	Not complete	NCR

In this scenario a result was obtained in the right ear on AOAE1 at the first attempt but testing on the left ear was not completed as the baby woke up half way through the test and could not be settled. The screener therefore returned within the prescribed time interval (within 1 session) to complete AOAE1 on the left ear. At this time the baby was still unsettled and a satisfactory test could not be carried out. At this point AOAE1 is considered to be complete in spite of the fact that no result has been obtained for the left ear as time has run out. After a suitable time interval AOAE2 is attempted in the ear which did not show a clear response on AOAE1. At the first attempt it is not possible to obtain a result but the screener is able return within the prescribed time period for AOAE2 and this time obtains a result which is no clear response. The screener therefore proceeds to AABR, testing both ears even though the right ear has shown a clear response on AOAE1. At the first attempt the baby awakes part way through the test and testing is not completed. The screener returns later on and is now able to carry out the AABR test in the left ear obtaining a no clear response. Unfortunately the baby awakes before testing is complete in the right ear. The mother and baby are going home and there is no opportunity for any further testing before discharge.

It is clear that whatever the AABR result in the right ear this baby requires referral to audiology in view of the no clear response in the left ear. Further attempts to complete the AABR screen in the right 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)

Scenario 11

Stage	Day/time	Right	Left
AOAE1		Not appropriate	Not appropriate
AOAE2		Not appropriate	Not appropriate
AABR	1 11.30	NCR	NCR

This baby is < 6 hours old. The mother and baby are due to be discharged very shortly. It is obvious to the screener that there is a considerable amount of debris in both ear canals and after discussion with the mother it is decided not to attempt AOAE but to proceed straight to AABR. The test is completed successfully but no clear response is obtained in either ear. The baby is referred to audiology.

Screening Outcome Status Code = No clear response (bilateral referral)

Scenario 12

Stage	Day/time	Right	Left
AOAE1	1 14.00	CR	Not complete NCR
	1 16.30		
AOAE2		Not done	Not done
AABR	1 17.00	CR	CR

In this scenario a result was obtained in the right ear on AOAE1 at the first attempt but testing on the left ear was not completed as the baby woke up half way through the test and could not be settled. The screener therefore returned within the prescribed time interval (within 1 session) to complete AOAE1 on the left ear. At this time the baby a satisfactory test was carried out showing no clear response. Mother and baby are due to be discharged later on the afternoon and the mother is very keen for the screening to be completed before she goes home. It is therefore agreed that it is not appropriate to proceed to AOAE2 as there is insufficient time interval between AOAE1 and AOAE2 and it is agreed to proceed to AABR. The AABR is carried out and shows a clear response in both ears. Thus screening is complete and no further follow up is required.

Screening Outcome Status Code = Clear response

Scenario 13

Stage	Day/time	Right	Left
AOAE1	1 14.00	CR	Not complete NCR
	1 16.30		
AOAE2		Not done	Not done
AABR	1 17.00	CR	NCR

In this scenario a result was obtained in the right ear on AOAE1 at the first attempt but testing on the left ear was not completed as the baby woke up half way through the test and could not be settled. The screener therefore returned within the prescribed time interval (within 1 session) to complete AOAE1 on the left ear. At this time the baby a satisfactory test was carried out showing no clear response. Mother and baby are due to be discharged later on the afternoon and the mother is very keen for the screening to be completed before she goes home. It is therefore agreed that it is not appropriate to proceed to AOAE2 as there is insufficient time interval between AOAE1 and AOAE2 and it is agreed to proceed to AABR. The AABR is carried out and shows a clear response in the right ear but no clear response in the left ear. Thus screening is complete and the baby is referred to audiology.

Screening Outcome Status Code = No clear response (unilateral referral)

