SMaRT4Hearing (S4H) Audiology User Guide

Contents

1.   Logging into S4H

1.1   User Rights

To add **audiological assessment data** a user needs to have the appropriate permissions.

Audiology appointments can be added in either a screening or audiology **location** within S4H.

Audiology **assessment data** can be added in the **overall site view** (OSV) or an audiology **location** within S4H.

1.2   User ID and password

User IDs and **passwords** are set up by the NEC (formerly Northgate) helpdesk on request from the NHSP local manager. If you forget your password, use the **forgotten password** feature in the first instance. If you are still unable to log in, contact the S4Hhelpdesk.

If you see babies referred from more than one local screening service, you will need a **user ID** for each service.

2.   Requirements for audiological data entry

2.1   Consent for audiology data
Parental **consent** that is obtained for newborn hearing screening includes consent to screen and consent to share screening and referral follow-up data for national audit.

For babies who are referred immediately to audiology without having a hearing screen the audiologist should gain **consent** for storage of audiology assessment data in the national IT system.

2.2.   Immediate screen referrals
Children with a screening outcome of:

- no clear response - unilateral referral
- no clear response - bilateral referral
- incomplete - baby/equipment reason (historic records)
- incomplete - screening contraindicated
- incomplete - baby unsettled
- incomplete - equipment malfunction
- incomplete - equipment not available
- incomplete - lack of service capacity

Data is required for each appointment until a **PCHI** of any degree in either ear is confirmed or ruled out. Where a **PCHI** has been ruled out, even if the hearing is not normal, the record can be **deactivated**. Set the reason for deactivation as **inactive - other** and choose **no PCHI identified – no further data entry required** from the **reason** box drop down list.

Where immediate follow up assessment has been inconclusive the **hearing loss type - not yet determined** can be used. If it is decided that the baby's next audiology appointment will be a behavioural assessment at 7-9 months the **patient status** should be set to **active follow up (targeted).**

Where **PCHI** is confirmed update the record annually until the child is 5 years of age. At age 5 years do a final update of the record. **Deactivate** the record, setting the reason for deactivation as **inactive - other** and choose, **PCHI – more than 5 years of age** from the **reason** box drop down list.

Records for children who have received cochlear implant (CI) in one or both ears can be **deactivated** before 5 years. Update the record with the **date of implant** and **current amplification** status. Then **deactivate** the record, setting the **reason** for deactivation as **inactive - other** and choose, **child referred to cochlear implant centre or implanted** from the **reason** box drop down list. It is best for the audiologist in the **responsible site** to enter this information on the national IT system from the reports supplied by the CI centre. Otherwise contact the CI centre and ask for this information.

2.3.   All children listed for targeted follow-up
Records with:

- Clear response from screen and targeted follow up outcome
- Immediate follow up from screen with either:
    - satisfactory assessment at the immediate follow up appointment and a risk factor
    - not yet determined (inconclusive)
    - deferred to targeted follow up

Data is required for the **first offered appointment** and the **first attended appointment** (if there is one). This will enable the national programme to audit the offer and uptake of the targeted follow-up for babies referred from the screen.

If the child fails to attend, add or amend the appointment details (date, duration and status) and **deactivate** the record by changing the **patient status** to **inactive - appointments missed** and add a brief explanation in the **reason** box.

If there is no response to a partial booking letter and the child is discharged, update the **patient status** using **inactive - appointments missed** and add a brief explanation in the **reason** box.

Following the targeted follow up appointment, the **audiology appointment details**, and **assessment data** should be added to the record. **See section 3.**

If the child has satisfactory hearing, the **patient status** will automatically change to **inactive - no confirmed hearing loss** and no further action is required.

Where a PCHI has been ruled out or the results are inconclusive (**hearing loss type – not yet determined**), even if the hearing is not normal, the record should be **deactivated**. **See section 2.2**

Please note: If at any point a bilateral moderate or worse SNHL is identified, deactivated records can be reactivated. **See section 4.3**

2.4 Record management flow chart

The below flow chart shows how the baby's record should be managed through the national IT system for immediate and targeted follow up.

```
                    ┌─────────────────────────────────────┐
                    │   NHSP Immediate follow up referral   │
                    │   Follow up status = Pending          │
                    │   Patient status = Active - follow up  │
                    │              (immediate)              │
                    └─────────────────────────────────────┘
                                      │
                    ┌─────────────────────────────────────┐
                    │  AUDIOLOGY DIAGNOSTIC TESTING COMPLETED │
                    └─────────────────────────────────────┘
```

NHSP Immediate follow up referral
Follow up status = Pending
Patient status = Active - follow up (immediate)

AUDIOLOGY DIAGNOSTIC TESTING COMPLETED

- PCHI
- Satisfactory hearing
- PCHI ruled out
- Was Not Brought (WNB)
- Inconclusive results

Are there any NHSP risk factors?

No | Ye

Annual review until age 5 or Cochlear implant fitted

No further action Required (NFA)

Action: Change patient status to: Inactive - Other

Action: Change patient status to: Inactive - appointments

Further follow up is required:
Action: Change patient status to Active - Follow up

Audiology follow up at 7-9 months due to targeted follow up from NHSP or risk factors following an immediate follow up

- Satisfactory hearing
- PCHI ruled out
- Inconclusive results
- WNB

Follow up status = Complete - Hearing Satisfactory
Or
If record is reactivated: Change patient status to Inactive - Other
NFA

Change patient status to Inactive - Other
Reactivate if at any time a PCHI is identified
NFA

Local DNA policy followed
Change patient status to: Inactive - appointments missed
NFA

3. Enter/edit assessment data on S4H

3.1 Locate the record

Locate the record using the **NHS number** or **confidential ID**. On the **demographics** tab, check the **date of birth** and **gestational age** are entered correctly and amend if necessary. This information is used to calculate the **estimated thresholds** for ABR results.

3.1.1 Add appointment to enter assessment data

- Add an appointment by clicking the **+** button in the header:

- enter appointment **status, date/time, department** and **audiologist** (if known)
- click on the **save** button

3.1.2 Edit appointments

On the **audiology** tab, if an **offered appointment** is already present, click the **edit** ✏ button beside the appointment, update the status to **attended** and enter the **assessment data**.

> **Please note: Offered** appointments can only have a future date. Only one **offered** appointment is permitted per record.

The date and attendance **status** of an appointment can be edited to show as **attended, cancelled** or **DNA**.

If **audiological assessment data** has been added to an appointment in error, that appointment cannot be changed to a **cancelled, DNA**, or **offered** status without first deleting the **assessment data.**

When an appointment is edited, the **PCHI** status is re-calculated according to the latest added **assessment data**. If the **calculated estimate of hearing loss** or **override value** falls below the PCHI threshold this will result in a **PCHI flag** being removed.

When an appointment is changed to **attended**, the user will automatically be presented with the **assessment data** page, followed by the **summary** page, these must be completed and saved individually.

3.2 Enter assessment data

Select the appropriate **assessment type** performed from the drop-down menu and enter any assessment results in the table shown.

Select the tick box to show that masking has been used. **Mask all** will tick all boxes in the row.

Use the tabs to switch between **data entry** and **calculated estimate**.

When all the data has been entered, click the **save** button at the bottom of the page.

The data is validated (but not saved) when another **assessment type** is selected from the drop-down menu. If there are errors, invalid fields are highlighted, and an appropriate error message is displayed. Correct all errors before adding another **assessment type** or saving the data.

3.2.1 OAE and cochlear microphonics

Enter the outcome for each ear. The options are:

- **not done** - Use this option if an assessment was not attempted for whatever reason
- **recordable** - Use this option if an assessment was carried out and a response is judged to be present
- **not recordable** - Use this option if an assessment was carried out under good recording conditions and a response was judged to be not present
- **inconclusive** - Use this option if an assessment was attempted but could not be completed or was completed with an inconclusive result due to poor recording conditions for example

3.2.2 Guide to entering threshold data

For each threshold use the ≤, = or > option as appropriate:

- **= equals** – when a threshold of 60 dB is measured, record the threshold as =60.
- **≤ less than or equal to** – for example if a threshold is measured down to 35 dB but there has been no attempt to explore levels below this record the threshold as ≤35.

- **> greater than** – for example if no response is obtained at 100 dB record the threshold as >100.

For each threshold the default setting is not masked. Change to masked as appropriate.
All thresholds should be entered uncorrected in the dB scale in which they were measured.

The table displaying calculated estimates of thresholds is accessed by clicking the **switch to calculated estimates** button. This shows values which are calculated automatically.

When all the **assessment data** is entered, click on the **save** button at the bottom of the screen and the **summary** screen will be displayed.

Select the **type of hearing loss** and, if required, **category of PCHI** before clicking **save** again.

The **audiology appointment** tab is displayed

Each appointment can be highlighted and selected from the list and the appropriate **summary and notes/data** tabs will then be seen below it.

Always check the assessment data tab to ensure the results entered have been saved.

Add audiology **notes** by clicking the **+** button and the **user**, **date** and **time** will be displayed when **saved**.

Details of **referral for aetiological investigations** should be added if appropriate.

3.3   Audiology appointment summary

The **calculated estimate of hearing loss** is calculated automatically from the dBeHL.

If there is no **assessment data** added to calculate this and there is a previous session with **threshold data**, S4H will carry forward the previous **calculated estimate of hearing loss** and place it in the **override value**. The following message will appear:

This must be accepted for this data to be used, but it can be edited in the session summary. Records with a **type of hearing loss** - **ANSD** can have no value in the **calculated estimate of hearing loss** or **override value** fields.

3.3.1   Enter type of hearing loss for both ears (mandatory).

The options for type of hearing loss are:

- **satisfactory**: use when threshold have been measured down to a satisfactory discharge criterion. For example, this would normally be 20 dB if assessment is by conventional pure tone audiometry. For assessment by ABR/ASSR ≤30 dB eHL is considered an acceptable level at which to discharge the baby from follow up, refer to British Society of Audiology (BSA)
- **not yet determined**: use when there is insufficient information to assign any other category
- **conductive temporary**: use when the cause is Otitis media with effusion, even if persistent
- **conductive permanent**: use when the cause is a structural abnormality of the outer/middle ear
- **sensorineural**
- **mixed**
- **ANSD**: Auditory neuropathy – see BSA auditory neuropathy guidelines for details, but generally includes absent or grossly abnormal ABR with present otoacoustic emissions and/or cochlear microphonic

3.3.2 Enter Category of PCHI (mandatory if type of hearing loss allows an entry here)

The option **congenital** will be applicable to most children identified by the newborn screen. This field allows the collection of improved data for children with **later identified PCHI**.

3.3.3 Guide to override values

The **override value** for average threshold (if applicable) can be entered **only** if the **calculated estimate of hearing loss** is misleading or absent. Where OAE's only have been performed for well baby referrals an **override value** is not required.

The **calculated estimate of hearing loss** will be used in reports unless an **override value** is entered.

Here are some examples where it would be appropriate to enter an **override value**:

1. Previous assessments have indicated a significant high frequency loss, but the latest assessment data show limited low frequency **thresholds** available for the session, such that the **calculated estimate of hearing loss** is misleading. In this case enter a more appropriate **override value** based on previous assessments.
2. Distraction test data is a mixture of warble tone and non-warble tone data. The non-warble tone data is not included, resulting in a misleading **calculated estimate of hearing loss**.
3. Distraction test data using stimuli other than warble tones is not used in the **calculated estimate of hearing loss**, therefore enter an **override value**.
4. Unilateral sound field data from Visual Response Audiometry (VRA) or Conditioned Play Audiometry (CPA)/performance testing may not provide **calculated estimate of hearing loss** for each ear. If previous and current assessments do not give any indications of a significant asymmetry, then enter the same **calculated estimated of hearing loss** into the other ears **override value**.
5. If a child has atresia and no air conduction (AC) thresholds were measured, it is acceptable to enter an **override value** of 66 until AC thresholds can be measured. Using 66 will flag up that this is not a true measured threshold but a device to ensure the child's **PCHI** status can be set
6. If a child is diagnosed with a unilateral hearing loss and subsequent sound field data is added to the system it is acceptable to enter an **override value** outlined in the below example;

Baby is tested at ABR and a unilateral hearing loss is found in the left ear.

The calculated estimate of hearing loss and category of PCHI cause the baby to be added to the PCHI register.

The baby attends a follow up appointment and is tested with soundfield VRA which is entered on the left side.

S4H calculates an estimate of hearing loss on the data entered for the left side and prompts the user to pull through the data for the Rt side from the previous test session.

S4H will remove the PCHI flag and the baby will be removed from the PCHI register because of the new calculated estimate of hearing loss.

The audiologist should add an **override value** using the ear specific calculated estimate of hearing loss for the left ear.

The baby will remain on the PCHI register.

> **Please note:** Do not enter **override values** to place records with mild hearing loss on the PCHI register. Records with a mild PCHI can be found by filtering search results by the mild PCHI flag **P**, or using the audiology predefined search 11 (see section 8)

3.4   Key Dates and Amplification

To add or edit any data in the **key dates and amplification** tab, click the **edit** button at the right-hand end of the tile headings.

When adding data to 'Initial Amplification Device Details', 'Current Amplification Status' and in 'Cochlear Implant Details' a checkbox enables the data to be automatically copied to both ears when applicable. When selected the system will copy any entered/updated data from one ear to the other as it is entered.

When all data has been added, click **save** to confirm.

3.4.1 Key dates:

PCHI confirmed is defined as the date when the results of the **audiological assessment** indicate a degree of permanent hearing loss with sufficient certainty for the clinician to inform the parents.

Date aid offered is the date at which the clinician first offers amplification as an appropriate method of management to the family.

ABR traces ready for review is the date the ABR traces will be ready to review. This field is only for use in departments with a link from S4H to the ABR review management software SONAR.

Decision to aid is the date at which the clinician and the family agree to aiding even if the actual fitting is delayed.

Referred to Teacher of the Deaf (ToD) is whether the baby is referred to the ToD or if the family declined, select the appropriate option from the drop-down list.

ToD referral date is the date a child is referred to a ToD.

3.4.2 Initial amplification device details:

This section is intended to capture information about the child's **first** amplification device.

3.4.3 Current amplification status:

Update the currently prescribed amplification (even if not used consistently) annually until the child is 5 years of age. At age 5 years do a final update of the record. Then **deactivate** the record. Set the reason for deactivation as **inactive - other** and choose, **PCHI – more than 5 years of age** from the **reason** box drop down list.

3.4.4 Cochlear implant details:

Update as required, **(see section 2.2)**

3.5 To add a professional contact of ToD (optional):

At the bottom of the **demographics** tab is the **patient professional contact's** section. Click on the **add professional contact (+)** button.

- enter a name (if known) and select the **service type [education (Teacher of the Deaf)]** from the drop-down menu
- click the **search** button
- select the desired contact from the list by ticking the box
- click the **save** button to close the pop-up and return to the demographics tab

3.6   Review the follow-up status and patient status:

The **follow-up status** is set automatically according to the information in the audiology summary for the appointment.

The **patient status** will change automatically if the assessment data and summary details entered indicate satisfactory hearing, but can be changed by the user, for example the record may be deactivated if no further appointments are to be made, or the record can be moved from **active - follow-up (immediate)** to **(targeted)** where the baby has a risk factor that requires further assessment.

To update the patient:

1. Click the **patient status** blue hyperlink, in the patient summary section on the **demographics** tab
2. Choose the correct **patient status** from the list offered
3. Enter an appropriate option in the **reason** dropdown list
4. Add any additional information in the **details** text box
5. Click the save button to confirm

If there is a permanent hearing loss in one or both ears follow the guidance in **section 4.**

3.7   Edit audiological data in existing appointments

On the audiology tab of the patient record, select an appointment from the list. Click the **edit appointment** button, select the **data** tab and click on the **edit** button.

Make the changes, and then click on the **save** button. This opens the **audiology appointment summary**. Make any changes required and then click the **save** button to return to the audiology overview screen.

3.8   To view audiology data from multiple sessions at the same time

Click on the **audiology tab** on the patient record.
Highlight the appointments to be viewed, using *shift + click* to select a range or *ctrl + click* to select individual appointments.
Data is displayed for the selected appointments grouped into tables of assessment data. Tables are shown in the order of the associated tabs within the audiology appointment data entry/edit screen, and in the order in which they occur within those tabs. Tables that do not contain any data, and rows without data, are not displayed. Results for different appointments are listed in date order, with the latest at the top. Each table row includes the associated date.

3.9   Delete appointments

Users can delete **appointments** in the **audiology tab**, providing there is no **audiology data** present. From the list of appointments, click the **dustbin** icon beside the appointment that needs to be deleted. A message is displayed checking the user is sure and clicking **Yes** will confirm the deletion.

> **Please note:** If there are notes associated with the session these will also be deleted.
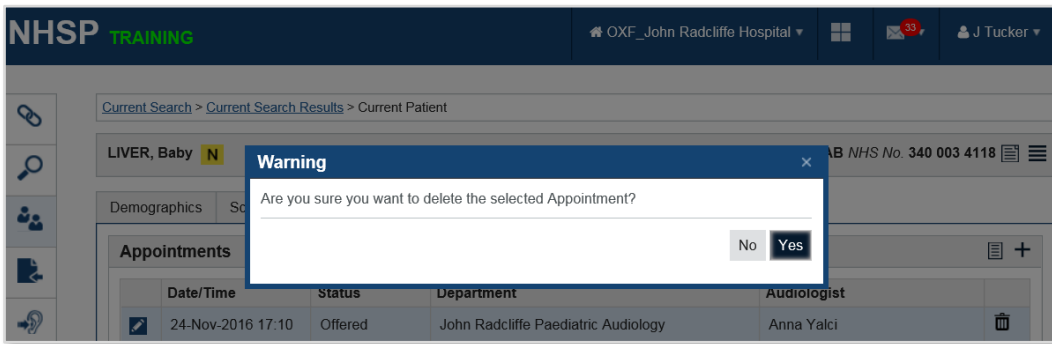
4.   Ongoing data entry requirements

4.1   After each attended appointment

Review and update:

- **assessment data** including **thresholds** and **dates**, **type of hearing loss** and **category of PCHI (if applicable)**
- **current amplification** status
- **key dates** - date of confirmation of PCHI, aids offered, agreed and fitted, referral to early intervention (if applicable)
- **initial hearing aid fitting** details (if applicable). There is no need to update this information after the initial fitting, for example, if the type of hearing aid is changed
- **cochlear implant details**: name of implant centre, date of referral and date of implant

Data is required for each appointment until a **PCHI** of any degree in either ear is confirmed or ruled out. Where a **PCHI** has been ruled out, even if the hearing is not normal, **deactivate** the record, setting the **reason** as **other** and choosing **no PCHI identified – no further data entry required** from the **reason** box drop down list.

4.2   Other Audiology data entry

If the child is seen at the audiology department of another provider, email the relevant audiologist and ask them to share and update the record as appropriate.

If the child is **deceased** update the record with information that pertained at the time, including setting the **current amplification status** and then the record should be marked as **deceased,** adding the **date of death.**

If the child has gone to a private audiology provider, **deactivate** the record as **out of coverage**.

The national programme monitors the quality and completeness of audiological data and supplies a monthly report to the local manager highlighting records that need updating. Notes on how to correct or complete the records can be found in the S4H reports guide on the resource tile in S4H

4.3   Cases of later identified PCHI

Guidance on reviewing and reporting case of later identified PCHI can be found in Chapter 9 of the NHSP operational guidance. The reporting form is located on the resource tile in S4H.

A historic or national search may be required to locate the record using the NHS number. The local manager for NHSP may be required to migrate or share the record into the site before it can be updated.

Where the record in S4H has been **deactivated** the **patient status** should be changed to a**ctive follow up (immediate)** selecting the appropriate reason from the dropdown list before any audiology data is added. Once reactivated the record should be updated **see section 4.1**

5.   eHL calculations

There are 2 steps involved.

1. Calculation of estimated hearing levels (eHL).
2. Calculation of the average hearing level.

Details are given below.

1. Calculation of estimated hearing levels (eHL)

- measured thresholds (ABR, sound field thresholds) are converted to estimated thresholds (eHL) and displayed in the threshold data tables.
- if the date of birth or gestational age is altered after data has been entered, S4H will not automatically recalculate the eHL values.
- full details of the conversion factors used and their derivation are given in the appendix.
- the current ABR conversion factors are aligned to the BSA guidelines for the early audiological assessment and management of babies referred from the newborn hearing screening programme

> **Please note:** The changes are not retrospectively applied. Data entered previously will use the correction values that applied at the time of data entry.

2. Calculation of the average hearing level

- audiology assessment data is used to calculate the **calculated estimate of hearing loss** which is displayed in the audiology session summary. This enables S4H to determine which records should appear on the PCHI register and classification into mild, moderate, severe and profound hearing loss.
- the average is calculated for each ear for each assessment type; if there is data for more than one assessment type the averages are averaged.
- **ABR**: average uses 0.5, 1, 2, 4 and click thresholds or whichever of these are available
- **VRA**: average uses 0.5, 1, 2 and 4 or whichever of these are available; uses all data except front sound/field
- **PTA**: average uses 0.5, 1, 2 and 4 or whichever of these are available; uses all data from all transducers
- **distraction**: average uses warble tone data only at 0.5, 1, 2 and 4 or whichever of these are available
- **soundfield**: average uses left and right warble tone data only at 0.5, 1, 2 and 4 or whichever of these are available

Thresholds entered as <=x are set as x-10 for averaging purposes

Thresholds entered as >x are set as x+10 for averaging purposes

5.1   ASSR eHL entry

ASSR eHL thresholds will not be automatically calculated using the raw data values. Instead they must be manually entered by the audiologist in the **eHL table** in agreement with British Society of Audiology guidance. Audiologists should refer to the data and references provided by their equipment manufacturer when calculating eHL thresholds.

In fields where raw data values are entered into the **ASSR data entry** page, the audiologist will be required to enter a relevant eHL threshold in the eHL table.

The eHL table for ASSR assessment type will show the qualifier and masking status as read only (extracted from the raw data entry), the eHL threshold value will be a text box which allows the data to be entered.

6. The audiology proforma

Child Details

Name: «PatientFirstName» «PatientLastName»	**GP Practice:** «GPName»
Address:	**GP Address:**
«ContactAddress1»	«GPAddress1»
«ContactAddress2»	«GPAddress2»
«ContactAddress3»	«GPAddress3»
«ContactAddress4»	«GPAddress4»
«ContactAddress5»	«GPAddress5»
Postcode:	**Postcode:**
«ContactPostCode»	«GPPostCode»
NHS Number:	**Date of Birth:**
«PatientNHSNo»	«PatientDOB»
Local Number:	**GA:**
«PatientLocalNo»	«PatientGA»

Assessment Appointment Information

«AudiologyAppointments»

Referral Reason

History

Test Results

«AudiologyData»

Summary and Conclusions

Signed	
Name	
Designation	
Copies to	

An **audiology proforma** can be generated from the audiology tab within the patient record. It provides a downloadable Microsoft Word document that can then be edited as required and printed.

This proforma is generated directly from the audiology tab of the patient record by selecting one or more **attended** appointments from the audiology appointments table and then clicking the **print proforma** button in the appointments title bar.

The view documents page is then displayed with the newly generated audiology proforma at the top of the list. Clicking on the **Microsoft Word icon** in the right-hand column will download the document to the computer from S4H.

The audiological proforma can be exported from S4H into other audiology software.

7.   PCHI flag

PCHI is defined as an average hearing level of >=40 (average of 0.5, 1, 2 and 4 kHz) and 'type' = sensorineural, mixed, sensorineural/mixed* or conductive-permanent or 'type' = auditory neuropathy (irrespective of threshold).

> **Please note:** Records with no value in the **calculated estimate of hearing loss** or **override value** fields will not be flagged as a PCHI **see section 3.7.**

Records with a PCHI in one or both ears at their most recent attended assessment are flagged by a **P** button to the right of their name on the patient record title bar.
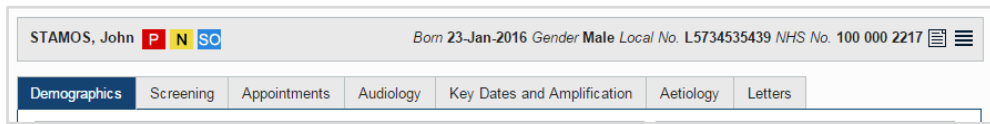
The PCHI indicator **P** is displayed on the search results screen. The indicator is red to provide consistency with other areas of the application that display a patient's PCHI status.

The record is included on the PCHI register and appears in the PCHI searches in the Audiology Predefined Searches menu.

Mild PCHI

Mild PCHI is defined as an average hearing level of 21-39 in (average of 0.5, 1,2 and 4 KHz) and 'type' = sensorineural, mixed, sensorineural/mixed* or conductive-permanent. Records with a mild PCHI are not included in the PCHI register. They can be identified using audiology search 11: mild PCHI search.

Records with a mild PCHI are flagged by a **P** to the right of their name on the patient record title bar.
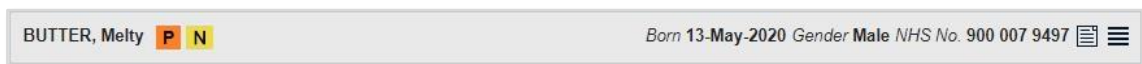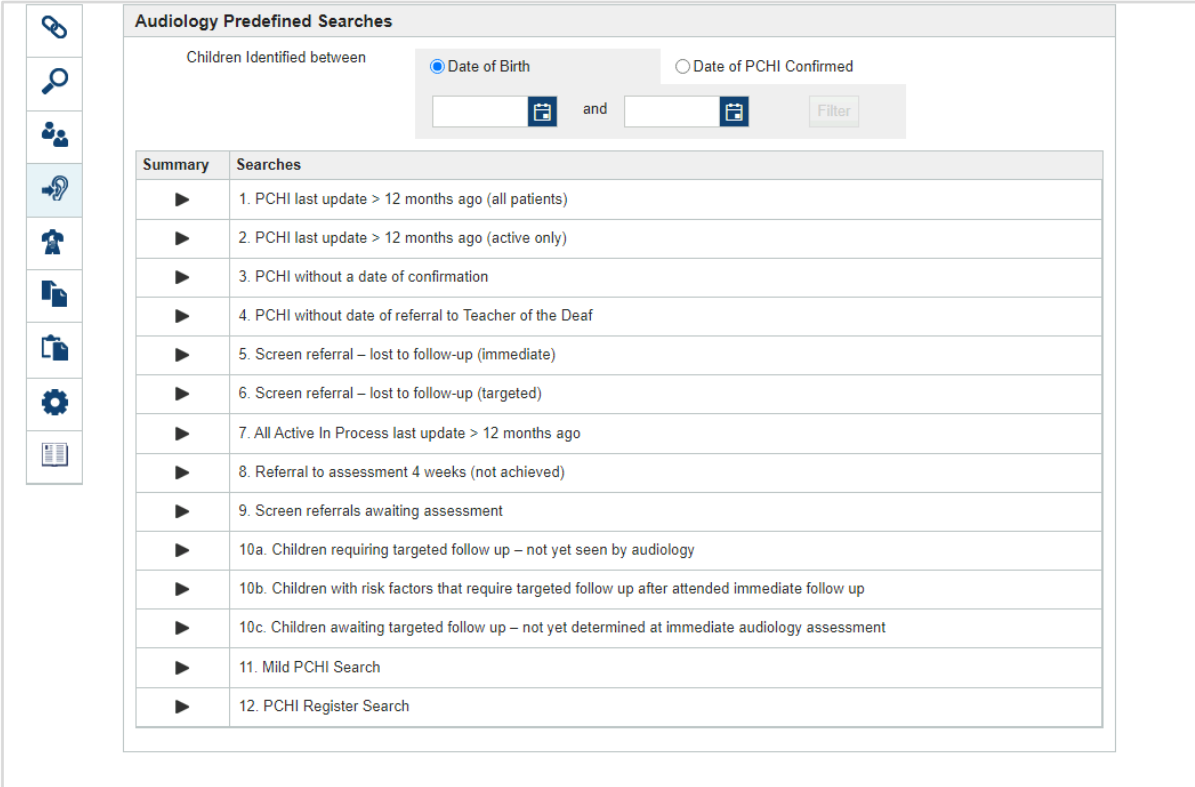
The mild PCHI indicator **P** is displayed on the search results screen.

8. Audiology predefined searches

These are accessed by hovering the mouse pointer over the **audiology** button on the left-side toolbar and selecting **predefined searches** from the drop-down menu. Each search can be refined by specifying a **date of birth** date range or **date of PCHI confirmed** date range. All patients in the site meeting the criteria for the searches will be displayed, including Shared In patients.

Please note: records marked as deceased will not appear in the predefined search results

---

.

Summary	Searches
▶	1. PCHI last update > 12 months ago (all patients)
▶	2. PCHI last update > 12 months ago (active only)
▶	3. PCHI without a date of confirmation
▶	4. PCHI without date of referral to Teacher of the Deaf
▶	5. Screen referral – lost to follow-up (immediate)
▶	6. Screen referral – lost to follow-up (targeted)
▶	7. All Active In Process last update > 12 months ago
▶	8. Referral to assessment 4 weeks (not achieved)
▶	9. Screen referrals awaiting assessment
▶	10a. Children requiring targeted follow up – not yet seen by audiology
▶	10b. Children with risk factors that require targeted follow up after attended immediate follow up
▶	10c. Children awaiting targeted follow up – not yet determined at immediate audiology assessment
▶	11. Mild PCHI Search
▶	12. PCHI Register Search

Clicking the **recalculate** ▶ button in the **summary** column runs the search and produces a number next to the button that indicates if there any records that match that search. Clicking on the search title then shows the results of the search.

Please note: for the purpose of newborn hearing screening, the use of corrected age is applied to all babies whose gestational age is ≤ 40 weeks at birth.

Search 1: PCHI last update > 12 months ago (all patients)
This search will list all records with a PCHI, where the last attended appointment was over one calendar year ago (no exclusions based on activity/inactivity of record).

Search 2: PCHI last update > 12 months ago (active only)
This search will list all records with a PCHI, where the last attended appointment was over 1 calendar year ago, excluding inactive records (inactivity is defined by the patient status).

Search 3: PCHI without date of confirmation

This search will list all PCHI records where the date of confirmation of PCHI has not been set (no exclusions). All records with a PCHI should have a date of confirmation. Review records and add the date of confirmation.

Search 4: PCHI without date of referral to Teacher of the Deaf

This search will list all PCHI records where the date of referral to a Teacher of the Deaf has not been set and to exclude records with-

• **ToD referral** set to **No**

• **ToD referral** set to **Declined by Family**

• Inactive - Deceased status

All records with a PCHI should have a date of referral. Review and update records with no date.

Search 5: Screen referral – lost to follow-up (immediate)

The number of records lost to follow-up is defined by the following combination of **screening outcomes**, **follow up status**, and **patient status** at 6 months corrected age:

Screening outcome is one of the following:

- no clear response - unilateral referral
- no clear response - bilateral referral
- incomplete - baby equipment reason (historic outcome no longer used)
- incomplete - screening contraindicated
- incomplete - baby unsettled
- incomplete - equipment not available
- incomplete - equipment malfunction
- incomplete - lack of service capacity

AND a **follow-up status** of 'pending'

AND the **patient status** is one of the following:

- inactive - appointments missed
- inactive - declined
- inactive - out of screening coverage
- inactive - lost contact
- inactive - other
- active - follow up (immediate)
- active - follow up (targeted)

It does NOT include:

Records of babies under six months corrected age.

Records with a **patient status** of 'inactive - deceased'.

Search 6: Screen referral – lost to follow-up (targeted)

The number of records lost to targeted follow-up is defined by the following combination of **screening outcomes, follow up status**, and **patient status** at 12 months corrected age:

Screening outcome is one of the following:

- clear response-targeted follow up required
- incomplete – appointments missed
- incomplete - declined screen
- incomplete - withdrew consent

AND a **follow-up status** of pending

AND the **patient status** is one of the following:

- inactive - appointments missed
- inactive - declined
- inactive - out of coverage
- inactive - lost contact
- inactive - other
- active - follow up (immediate)
- active - follow up (targeted)

It does NOT include:

Records of babies under twelve months corrected age

Records with a **patient status** of inactive - deceased

Search 7: All active in process last update > 12 months ago

This search will list all active records where the last attended appointment was over one calendar year ago, excluding inactive records (inactivity is defined by the **patient status**). The **follow-up status** or **screening outcome** does not affect this search.

Search 8: Referral to assessment 4 weeks (not achieved)

This search will list all records which have been referred, where the time from the date of the last screening test or date screening outcome set (whichever is earlier) to the date of the first attended audiological assessment is greater than 28 days, excluding babies where the corrected age at date of first attended audiological assessment was 44 weeks or less. It will also include babies who have been referred but do not have an attended Audiology assessment and the 28 day period has already elapsed.

These records will have one of the following **screening outcomes**:

- no clear response - unilateral referral
- no clear response - bilateral referral
- incomplete - baby/equipment reason (historic records)
- incomplete - screening contraindicated
- incomplete - baby unsettled
- incomplete - equipment not available

- incomplete - equipment malfunction
- incomplete - lack of service capacity

Audiology Predefined Searches > 8. Referral to assessment 4 weeks (not achieved)

8. Referral to assessment 4 weeks (not achieved)

Name	ID	Patient Status	Date of Birth ↓	KPI/Appt.	Flags
example A	111111	Active - Follow-up (Immediate)	28-Feb-2022	27-Mar-2022 NH2	C
example B	2222222	Active - Follow-up (Immediate)	08-Feb-2022	08-Mar-2022 NH2	C
example C	3333333	Active - Follow-up (Immediate)	06-Feb-2022	12-Mar-2022 NH2	
example D	44444444	Active - Follow-up (Immediate)	04-Feb-2022	03-Mar-2022 F OFF	C!
example E	5555555	Active - Follow-up (Immediate)	03-Feb-2022	10-Mar-2022 F OFF	

Search 9: Screen referrals awaiting assessment

This search will list all records where the **screening outcome** is one of the following:

- no clear response - unilateral referral
- no clear response - bilateral referral
- incomplete - baby/equipment reason (historic records)
- incomplete - screening contraindicated
- incomplete - baby unsettled
- incomplete - equipment not available
- incomplete - equipment malfunction
- incomplete - lack of service capacity

AND the **follow-up status** is 'pending',

AND the **patient status** is 'active follow-up – immediate' OR 'active follow-up – targeted'.

The NH2 due date will show in green when in the future, amber if near breach, and red if breached, once an audiology appointment has been booked the appointment will show in blue if booked within the KPI2 due date and red/bold if the NH2 due date will breach (see screenshot above)

Search 10a: Children requiring targeted follow up – not yet seen by audiology

This search will list all patients who are awaiting a targeted assessment and uses the following search criteria:

Patient Follow-up Status = Pending

AND

Patient Status = Active Follow-up – (targeted)

AND

Exclude Deceased Babies

It will include all babies who:

- have a clear response with targeted follow up outcome at screen
- who are set to Active - Follow-up (targeted) because they have not attended the immediate referral from the no clear response at screen

to action these records, **see section 2.3**

Search 10b: Children with risk factors that require targeted follow up after attending immediate follow up

This search will produce a cumulative list of patients who have satisfactory hearing following an immediate referral but have a risk factor requiring further follow up. This will use the following criteria:

Patient Follow-up Status = In Process OR Complete - Hearing Satisfactory

AND

At Least One of the following Risk Factor set to Yes (Congenital Infection, Cranio-Facial Anomalies, Syndrome, NICU with NCR at AOAE and CR at AABR)

AND

Exclude Babies with a PCHI Bilateral or Unilateral Flag OR a Mild PCHI Bilateral or Unilateral Flag

AND

Exclude Deceased Babies

Local services should review the list regularly to identify those babies who are awaiting a targeted follow up (in addition to those identified by predefined search 10a and 10c). Targeted follow up assessment data only needs to be added for the first attended appointment and if a PCHI is ruled out or a hearing loss is not yet determined, they DNA/WNB the record can be deactivated.

To identify records for babies that are now over 7-9 months old and need to be seen, use the following steps to categorise and prioritise the records for action:

IF:

1a. the last appointment was attended more than 7-9 months after baby's DOB

AND

1b. the record has an 'inactive' or 'complete hearing satisfactory' patient follow up status

THEN

1c. the targeted follow up appointment data should be showing

        THEREFORE

1d. **No action is required**

OR

2a. the record has an active follow up (immediate or targeted) patient status

        AND

2b. the last appointment was attended more than 7-9 months after baby's DOB

        THEN

2c. **review the record and deactivate, where appropriate, because they should have attended an assessment and targeted follow up data should have been added**

OR

3a. there is no last appointment that was attended/DNA(WNB) more than 7-9 months after baby's DOB

        THEREFORE

3c. **review the record and deactivate, where appropriate, because the appointments data has not been added**

Guidance on how and when to update the babies record can be found in section 2. There is also a national export, that can be used to manipulate this data in Excel to assist this categorise and prioritisation task. It can be found in saved exports and is named: **Audiology predefined search 10b export**.

Search 10c. Children awaiting targeted follow up – not yet determined at immediate audiology assessment

This search will list all patients whose hearing loss type is set to: 'Not Yet Determined' at their immediate follow up and therefore require a further follow up at 7-9 months. This will use the following criteria:

    a. Patient Follow-up Status = In Process
       AND
    b. Patient Status = Active - Follow-up (Immediate)
    c. OR Active - Follow-up (Targeted)
       AND
    d. Type of hearing loss in most recent Attended Audiology Assessment is Not Yet Determined in one or both ears
       AND
    e. Exclude Deceased Babies

Each record on this search return should be reviewed and where further audiology data has been obtained the record updated. As soon as a PCHI has been ruled out the record should be deactivated.

Please note: Records with a hearing loss type: **Not Yet Determined** who are later identified as a PCHI will only count towards the service's yield at the point the hearing loss summary is changed, and the flag is added.

Search 11: Mild PCHI search

This search will list all records where the last attended audiology appointment showed a mild PCHI in the worse ear and the **calculated estimate of hearing loss/override value** is between 21-39 dBHL.

> **Please note***: Records with a mild PCHI in one ear and a moderate PCHI in the other ear will appear on the PCHI Register Search **ONLY**.

Search 12. PCHI register search

This search will list all records where the last attended audiology appointment resulted in the patient meeting the existing criteria for inclusion on the PCHI register.

8.1. Audiology search results screen

The search results are displayed in the same format as the search results from other searches within S4H.

The breadcrumb navigation at the top of the page can be used to navigate back to the Audiology Predefined Searches page. If patient record is selected from this search results table, the breadcrumb navigation can also be used to navigate back to these results.
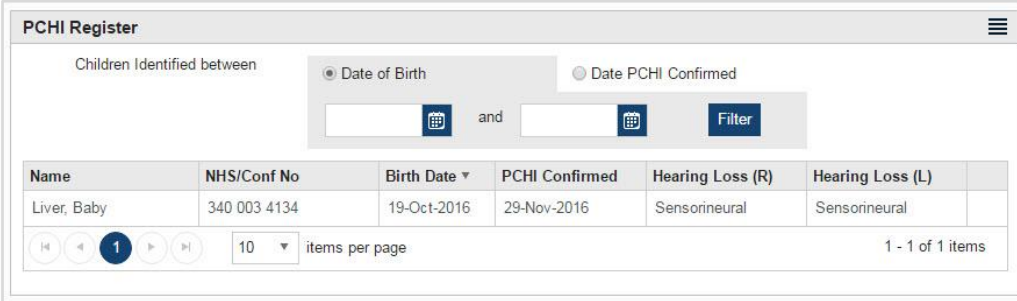
The **predefined search results** can show either **demographics** information or **audiology** information. Change between these by clicking the button.

The data from each search result screen can be exported using the usual S4H export page. **See section 11 of the S4H advanced guide.**

9.   PCHI register access only

A user can have access to the **PCHI register** only.

Once logged in a user will see the **audiology tile** on the dashboard and the left side toolbar. Access the **PCHI register** by hovering the mouse pointer over the **audiology** button in the left-side toolbar and select **PCHI register** from the drop-down menu.

The register can be searched by **date of birth** or by **date PCHI confirmed** by selecting a radio button and the date range for the search type. If the **date PCHI confirmed** search is used, any records with a missing date of confirmation will not be included.

The list is initially sorted by birth date order but can be re-sorted by selecting any of the column header.
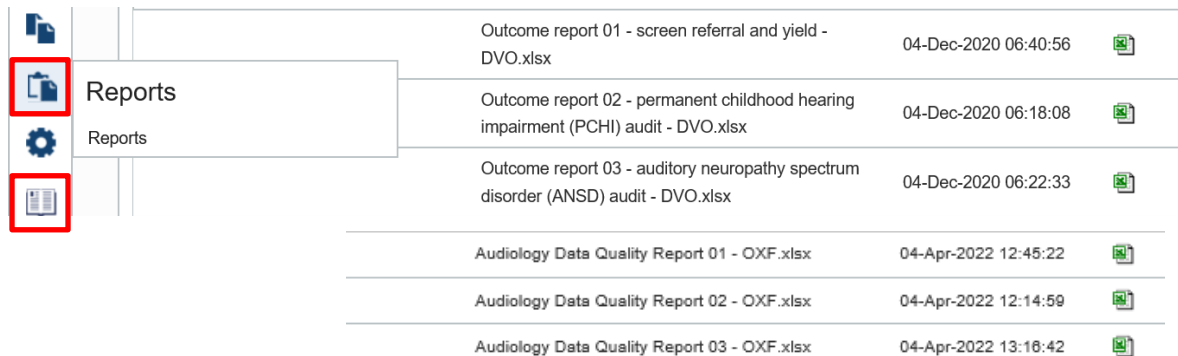
Clicking on the record in the table displays the **summary** information for the selected record.

A list can be exported showing all records on the register or a subset identified by a search. There is a custom export configuration called **standard PCHI export** which can be loaded. Additional fields to be included in the export file can be added as required.

To ensure that the national data for PCHI's is accurate, the audiologist should check that the **PCHI register** reflects the number of deaf children on their audiology caseload

10.   National reports for audiology

Monthly **outcome** and **audiology data quality reports** are generated and can be found on the reports tile within S4H.

Outcome report 01 - screen referral and yield - DVO.xlsx	04-Dec-2020 06:40:56	
Outcome report 02 - permanent childhood hearing impairment (PCHI) audit - DVO.xlsx	04-Dec-2020 06:18:08	
Outcome report 03 - auditory neuropathy spectrum disorder (ANSD) audit - DVO.xlsx	04-Dec-2020 06:22:33	
Audiology Data Quality Report 01 - OXF.xlsx	04-Apr-2022 12:45:22	
Audiology Data Quality Report 02 - OXF.xlsx	04-Apr-2022 12:14:59	
Audiology Data Quality Report 03 - OXF.xlsx	04-Apr-2022 13:16:42	

Audiology and the NHSP local manager need to establish a process for downloading, saving and actioning these reports to make sure all audiology records are accurate and deactivated when appropriate in S4H.

There are 6 audiology reports that should be used to quality assure the audiology data that is held in S4H.

There is a national reports summary on the NHSP operational guidance pages of GOV.UK, all the available audiology reports are listed at the bottom of the second page

Detailed **S4H reports guidance** is also available on the resource tile in S4H.

Please note: Accurate completion of follow up audiology data is essential for the ongoing assessment of screening programme performance. Records that remain unresolved will be reported to the QA team.

11. Audiology training

A training webinar presented by the national NHSP team and hosted by BAA is available by ctrl clicking on the link below.

Audiology data and the newborn hearing screening (NHSP) IT system

APPENDIX - Formula for estimate of hearing levels calculations

1.   Calculated estimate of threshold data

Applies to all tables with calculated threshold data as follows:

- ABR tone pip
- ABR chirp
- ASSR
- VRA
- distraction
- soundfield play audiometry

Note: Formula is only required to be implemented in data entry tables only, data view and proforma read directly from the stored data.

a) ABR tone pip results: calculated estimate of threshold formula

Step 1 - Calculate the corrected age of the baby using the following formula:

IF GESTATIONAL AGE IS SPECIFIED

CORRECTED AGE = (ACTUAL AGE AT DATE OF TEST **IN DAYS** + GESTATIONAL AGE **EXPRESSED IN DAYS**

IF THE GESTATIONAL AGE IS NOT SPECIFIED

CORRECTED AGE = ACTUAL AGE AT DATE OF TEST **EXPRESSED IN DAYS**

Step 1a - If the corrected age of the baby is **(<=84 days)**, create initial adjustment values by adding the following factors *(note: reference scale for ABR tone pip is always dBnHL)*:

Reference scale is dBnHL						
Values (frequency)	**0.5**	**1**	**2**	**3**	**4**	**Click**
Type insert Convert by adding the following values	5	5	5	10	10	10
Type headphone Convert by adding the following values	0	0	0	0	0	0
Type BC Convert by adding the following values	25	20	5	10	10	*see below*

Step 1b - If the corrected age of the baby is **(<=84 days)** and type BC click is present *(marked as 'see below' in table above)*, derive the adjustment factor using the calculated corrected age of the baby from the following table. This value should then be used as the initial adjustment value in Step 1a.

Corrected age factors (days)										
Corrected age	<= -28	>=-27 <=-21	>=-20 <=-14	>=-13 <=-7	>=-6 <=0	>=1 <=7	>=8 <=14	>=15 <=21	>=22 <=28	>=29 <=35
Correction factor to use	12	11	10	9	9	8	7	7	6	6

Corrected age factors (days)							
Corrected age	>=36 <=42	>=43 <=49	>=50 <=56	>=57 <=63	>=64 <=70	>=71 <=77	>=78 <=84
Correction factor to use	5	5	4	4	4	3	3

Step 1c - If the corrected age of the baby is **(>84 days and <=168 days)**, create initial adjustment values by adding the following factors *(note: reference scale for ABR tone pip is always dBnHL)*:

Reference scale is dBnHL						
Values (frequency)	0.5	1	2	3	4	click
Type insert Convert by adding the following values	0	0	0	5	5	5
Type headphone Convert by adding the following values	0	0	0	0	0	0
Type BC Convert by adding the following values	20	15	0	5	5	0

Step 1d - If the corrected age of the baby is **(>168 days and <=730 days)**, create initial adjustment values by adding the following factors *(note: reference scale for ABR tone pip is always dBnHL)*:

Reference Scale is dBnHL						
Values (frequency)	0.5	1	2	3	4	click
Type insert Convert by adding the following values	0	0	0	0	0	0
Type headphone	0	0	0	0	0	0

Convert by adding the following values						
Type BC Convert by adding the following values	15	10	0	0	0	0

Step 2 - If the corrected age of the baby is **(<=730 days)**, create secondary adjustment values by adding the following factors to those already generated in step 1. If the baby is **(>730 days)**, create adjustment values by adding the following factors to the raw data *(note: reference scale for ABR tone pip is always dBnHL)*:

Reference scale is dBnHL						
Values (frequency)	**0.5**	**1**	**2**	**3**	**4**	**click**
Type insert Convert by adding the following values	-20	-15	-10	-10	-10	-5
Type Headphone Convert by adding the following values	-20	-15	-10	-10	-10	-5
Type BC Convert by adding the following values	-20	-15	-10	-10	-10	-5

Step 3 - Reference scale value is always converted to dBHL irrespective of original value.

b) ABR chirp results: calculated estimate of threshold formula

Step 1 - Calculate the corrected age of the baby using the following formula:

IF GESTATIONAL AGE IS SPECIFIED

CORRECTED AGE = (ACTUAL AGE AT DATE OF TEST **IN DAYS** + GESTATIONAL AGE **EXPRESSED IN DAYS**

IF THE GESTATIONAL AGE IS NOT SPECIFIED

CORRECTED AGE = ACTUAL AGE AT DATE OF TEST **EXPRESSED IN DAYS**

Step 1a - If the corrected age of the baby is **(<=84 days)**, create initial adjustment values by adding the following factors *(note: reference scale for ABR chirp is always dBnHL)*:

Reference scale is dBnHL					
Values (frequency)	**0.5**	**1**	**2**	**3**	**4**

Type insert Convert by adding the following values	5	5	5	10	10
Type headphone Convert by adding the following values	0	0	0	0	0
Type BC Convert by adding the following values	25	20	5	10	10

Step 1b - If the corrected age of the baby is **(>84 days and <=168 days)**, create initial adjustment values by adding the following factors *(note: reference scale for ABR chirp is always dBnHL)*:

Reference Scale is dBnHL					
Values (frequency)	**0.5**	**1**	**2**	**3**	**4**
Type insert Convert by adding the following values	0	0	0	5	5
Type headphone Convert by adding the following values	0	0	0	0	0
Type BC Convert by adding the following values	20	15	0	5	5

Step 1c - If the corrected age of the baby is **(>168 days and <=730 days)**, create initial adjustment values by adding the following factors *(note: reference scale for ABR chirp is always dBnHL)*:

Reference scale is dBnHL					
Values (frequency)	**0.5**	**1**	**2**	**3**	**4**
Type insert Convert by adding the following values	0	0	0	0	0
Type headphone Convert by adding the following values	0	0	0	0	0

Type BC Convert by adding the following values	15	10	0	0	0

Step 2 - If the corrected age of the baby is **(<=730 days)**, create secondary adjustment values by adding the following factors to those already generated in step 1. If the baby is **(>730 days)**, create adjustment values by adding the following factors to the raw data *(note: reference scale for ABR chirp is always dBnHL)*:

Reference scale is dBnHL					
Values (frequency)	**0.5**	**1**	**2**	**3**	**4**
Type insert Convert by adding the following values	-15	-10	-5	-5	-5
Type headphone Convert by adding the following values	-15	-10	-5	-5	-5
Type BC Convert by adding the following values	-15	-10	-5	-5	-5

Step 3 - Reference scale value is always converted to dBHL irrespective of original value.

c) ASSR results: calculated estimate of threshold formula

Step 1 - EHL values are manually entered by the user and are not subject to any automatic adjustments. The entered values must be in the range:

Maximum Value: Raw Data Value

Minimum Value: (Raw Data Value - 30) or -10, whichever is greater

Reference scale is dBnHL					
Values (frequency)	**0.5**	**1**	**2**	**3**	**4**
Type insert Convert by adding the following values	Manually entered value	Manually entered value	Manually entered value	Manually entered value	Manually entered value
Type headphone Convert by adding the following values	Manually entered value	Manually entered value	Manually entered value	Manually entered value	Manually entered value

 Step 2 - Reference Scale value is always converted to dBeHL irrespective of original value.

d) VRA results: calculated estimate of threshold formula

Step 1 - If type is insert, headphone or BC, use raw values with no adjustment.

Step 2 - If type is soundfield and reference scale is dBsPL adjust values by adding the following factors:

Reference scale is dBsPL								
Soundfield values (frequency)	**0.5**	**1**	**2**	**3**	**4**	**6**	**8**	**speech/ broadband**
Convert by adding the following values	-5	0	0	5	5	0	-5	0

Step 3 - If type is soundfield and reference scale is dBA adjust values by adding the following factors:

Reference scale is dBA								
Soundfield values (frequency)	**0.5**	**1**	**2**	**3**	**4**	**6**	**8**	**speech/ broadband**
Convert by adding the following values	0	0	0	5	5	0	-5	0

Step 4 - If type is soundfield and reference scale is dBHL or dBnHL use raw values with no adjustment.

Step 5 - Reference scale value is always converted to dBHL irrespective of original value.

e) Distraction results: calculated estimate of threshold formula

Step 1 - If reference scale is dBsPL adjust values by adding the following factors:

Reference scale is dBsPL					
Warble tone values (frequency)	**0.5**	**1**	**2**	**3**	**4**
Convert by adding the following values	-5	0	0	5	5
Other values	**low**	**mid**	**high**	**speech/broadband**	
Convert by adding the following values	-5	0	5	0	

Step 2 - If reference scale is dBA adjust values by adding the following factors:

Reference scale is dBA					
Warble tone values (frequency)	**0.5**	**1**	**2**	**3**	**4**
Convert by adding the following values	0	0	0	5	5

Other values	low	mid	high	speech/broadband
Convert by adding the following values	0	0	5	0

Step 3 - If reference scale is dBHL or dBnHL use raw values with no adjustment.

Step 4 - Reference scale value is always converted to dBHL irrespective of original value.

f) Soundfield play audiometry results: calculated estimate of threshold formula

Step 1 - If reference scale is dBsPL adjust values by adding the following factors:

Reference scale is dBsPL					
Warble tone values (frequency)	**0.5**	**1**	**2**	**3**	**4**
Convert by adding the following values	-5	0	0	5	5
Other values	**low**	**mid**	**high**	**speech/broadband**	
Convert by adding the following values	-5	0	5	0	

Step 2 - If reference scale is dBA adjust values by adding the following factors:

Reference scale is dBA					
Warble tone values (frequency)	**0.5**	**1**	**2**	**3**	**4**
Convert by adding the following values	0	0	0	5	5
Other values	**low**	**mid**	**high**	**speech/broadband**	
Convert by adding the following values	0	0	5	0	

Step 3 - If reference scale is dBHL or dBnHL use raw values with no adjustment.

Step 4 - Reference scale value is always converted to dBHL irrespective of original value.

2.   Calculated estimate of hearing levels

Applies to calculated estimate of hearing loss fields within the audiology appointment summary screen (section 1.2.6).

Please note: Calculated estimate of hearing loss fields are also present on audiological overview screen but are read directly from the stored data on this screen.

Step 1 - If ABR tone pip data is present, derive ABR tone pip left and right averages as follows:

Step 1a - If any data is present for right and left insert, extract the values from the calculated estimate of threshold table (NOT the raw data tables) at frequencies (0.5, 1, 2, 4 and click) and add the following factors to each:

ABR tone pip conversions			
Values (qualifier)	**<=**	**>**	**=**
Convert by adding the following values	-10	+10	0

Obtain an average value for the resulting values for right and left Insert.

Step 1b - If any data is present for Right and Left Headphone, extract the values from the calculated estimate of threshold table (NOT the raw data tables) at frequencies (0.5, 1, 2, 4 and click) and add the same factors as above for Insert. Obtain an average value for the resulting values for right and left headphone.

Step 1c - If data has only been entered for one type within the test, use the averages calculated above as the overall averages for ABR tone pip. If data has been entered for both types (insert and headphone), obtain averages of the two readings to produce a single pair of average values for Left and right ABR tone pip.

(Note: left and right BC values are not used in the calculation)

Step 2 - If ABR chirp data is present, derive ABR chirp left and right averages as follows:

Step 2a - If any data is present for right and left insert, extract the values from the calculated estimate of threshold table (NOT the raw data tables) at frequencies (0.5, 1, 2, 4) and add the following factors to each:

ABR chirp conversions			
Values (qualifier)	**<=**	**>**	**=**
Convert by adding the following values	-10	+10	0

Obtain an average value for the resulting values for right and left insert.

Step 2b - If any data is present for right and left headphone, extract the values from the calculated estimate of threshold table (NOT the raw data tables) at frequencies (0.5, 1, 2, 4) and add the same factors as above for Insert. Obtain an average value for the resulting values for right and left headphone.

Step 2c - If data has only been entered for one type within the test, use the averages calculated above as the overall averages for ABR chirp. If data has been entered for both types (insert and headphone), obtain averages of the two readings to produce a single pair of average values for left and right ABR chirp.

(Note: left and right BC values are not used in the calculation)

Step 3 - If ASSR data is present, derive ASSR left and right average values as follows:

Step 3a - If any data is present for right and left insert, extract the values from the calculated estimate of threshold table (NOT the raw data tables) at frequencies (0.5, 1, 2, 4) and add the following factors to each:

ASSR conversions			
Values (qualifier)	**<=**	**>**	**=**
Convert by adding the following values	-10	+10	0

 Obtain an average value for the resulting values for right and left insert.

Step 3b - If any data is present for right and left headphone, extract the values from the calculated estimate of threshold table (NOT the raw data tables) at frequencies (0.5, 1, 2, 4 and Click) and add the same factors as above for insert. Obtain an average value for the resulting values for right and left headphone.

Step 3c - If data has only been entered for one type within the test, use the averages calculated above as the overall averages for ABR. If data has been entered for both types (insert and headphone), obtain averages of the two readings to produce a single pair of average values for left and right ABR.

Step 4 - If VRA data is present, derive VRA left and right average values as follows:

Step 4a - If any data is present for right and left insert, extract the values from the calculated estimate of threshold table (NOT the raw data tables) at frequencies (0.5, 1, 2 and 4) and add the following factors to each:

VRA conversions			
Values (qualifier)	**<=**	**>**	**=**
Convert by adding the following values	-10	+10	0

Obtain an average value for the resulting values for right and left insert.

Step 4b - If any data is present for right and left headphone, extract the values from the calculated estimate of threshold table (NOT the raw data tables) at frequencies (0.5, 1, 2 and 4) and add the same factors as above for insert. Obtain an average value for the resulting values for right and left headphone.

Step 4c - If any data is present for right and left soundfield, extract the values from the calculated estimate of threshold table (NOT the raw data tables) at frequencies (0.5, 1, 2 and 4) and add the same factors as above for Insert. Obtain an average value for the resulting values for right and left soundfield.

(Note: Front soundfield data is not used)

Step 4d - If data has only been entered for one type within the test, use the averages calculated above as the overall averages for VRA. If data has been entered for more than one type (insert, headphone or soundfield), obtain averages of the two or three readings to produce a single pair of average values for left and right VRA.

(Note: Left and right BC values are not used in the calculation)

Step 5 - If distraction data is present, derive distraction left and right averages as follows:

Step 5a - If any data is present for right and left warble tone, extract the values from the calculated estimate of threshold table (NOT the raw data tables) at frequencies (0.5, 1, 2 and 4) and add the following factors to each:

Distraction conversions			
Values (qualifier)	**<=**	**>**	**=**
Convert by adding the following values	-10	+10	0

Obtain an average value for the resulting values for right and left warble tone.

Step 5b - Two readings for right and left warble tone become the average values for left and right distraction as no other data is used.

(Note: Left and right other values are not used in the calculation)

Step 6 - If soundfield play audiometry data is present, derive soundfield play audiometry left and right averages as follows:

Step 6a - If any data is present for right and left warble tone, extract the values from the calculated estimate of threshold table (NOT the raw data tables) at frequencies (0.5, 1, 2 and 4) and add the following factors to each:

Soundfield play audiometry conversions			
Values (qualifier)	**<=**	**>**	**=**

Convert by adding the following values	-10	+10	0

Obtain an average value for the resulting values for right and left warble tone.

(Note: Front warble tone data is not used)

Step 6b - Two readings for right and left warble tone become the average values for left and right soundfield play audiometry as no other data is used.

(Note: Left, right and front other values are not used in the calculation)

Step 7 - If pure tone data is present, derive pure tone left and right averages as follows:

Step 7a - If any data is present for right and left insert, extract the values from the raw data table (there is no calculated estimate of threshold table for pure tone) at frequencies (0.5, 1, 2 and 4) and add the following factors to each:

Pure tone conversions			
Values (qualifier)	**<=**	**>**	**=**
Convert by adding the following values	-10	+10	0

Obtain an average value for the resulting values for right and left insert.

Step 7b - If any data is present for right and left headphone, extract the values from the raw data table (there is no calculated estimate of threshold table for pure tone) at frequencies (0.5, 1, 2 and 4) and add the same factors as above for insert. Obtain an average value for the resulting values for right and left headphone.

Step 7c - If data has only been entered for one type within the test, use the averages calculated above as the overall averages for pure tone. If data has been entered for both types (insert and headphone), obtain averages of the two readings to produce a single pair of average values for left and right pure tone.

(Note: left and right BC values are not used in the calculation)

Step 8 - Obtain all average values pairs (left and right) obtained in the steps above for different data types and average these values to give a single pair of values for left and right calculated estimate of hearing loss.