Clinic overview

- Providing care for 2,500 ears of 1,600 adult and child cochlear implant recipients.

- Six full-time equivalent audiologists and one audiological assistant.

- Patients are offered up to six programming appointments in the first year after surgery and optional annual reviews as part of long-term care.

Clinic challenges

- Increasing patient load, with approximatively 100 new patients per year.

- Large catchment area resulting in some patients travelling for up to three hours to attend a 90-minute appointment.

Case study: Nottingham Auditory Implant Programme, United Kingdom

Delivering patient-led cochlear implant aftercare with Remote Check

Kim Veekmans, Clinical Scientist*
Susan Johnson, Audiology Lead and Deputy Head of Service*

* at Nottingham Auditory Implant Programme

Overview

The Nottingham Auditory Implant Programme (NAIP) manages an increasing volume of cochlear implant (CI) patients who require lifelong clinical support to maintain their hearing performance. To provide more varied aftercare to CI patients', NAIP sought to include an option that would enable patients to complete hearing assessments from their own home as an alternative to attending in-clinic appointments.

In 2019, NAIP introduced Cochlear™ Remote Check, an app based remote monitoring solution. Remote Check allows cochlear implant recipients to complete a hearing health check at a convenient time and place, without visiting the clinic. During the COVID-19 pandemic, the scope of Remote Check implementation significantly expanded due to the change in requirements for service delivery.

As of early 2022, NAIP have invited over 400 patients to complete a Remote Check.

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Background

NAIP has a CI patient load of more than 1,600 adults and children, with that number increasing by approximately 100 patients a year. Current staff consists of six full-time equivalent audiologists and one audiological assistant.

In the first year after CI surgery, patients attend up to six programming appointments. Patients then transition to annual appointments for two years (adults) or five years (children), after which they are offered optional annual reviews as part of life-long care. For some patients and carers, attending these appointments may mean taking time off from work or study to travel to the clinic. Since NAIP serves a large catchment area, some patients can travel for up to three hours to attend a 90-minute appointment.

NAIP aims to offer flexible, patient-led appointments. In 2013, a system was introduced that gave CI patients the option to book their own annual review appointment (optional booking). To further expand access to services, NAIP piloted the use of Remote Check to offer annual monitoring reviews remotely. During the pandemic, video appointments were also introduced for audiological reviews (these had already been used by the listening and communication support team for a while).

Implementation

Remote Check was first introduced at NAIP in April 2019, providing the opportunity to assess CI performance without a clinic visit. Offering patients remote assessments and support first involved training audiologists in the various aspects of Remote Check, such as accessing the myCochlear™ Professional portal, interpreting results, recording clinical notes and providing feedback to patients. The next step was to screen eligible existing patients using criteria such as having the correct internal and external device, having the ability to use the technology, and having no visual impairment or dexterity issues. The invitation to participate in Remote Check was sent via email or post, or offered during in-clinic visits.

During the COVID-19 pandemic, adoption of Remote Check accelerated when NAIP limited in-clinic visits and patients were reluctant to come into hospital. At the same time, Remote Check modularisation allowed clinicians to disable tests and customise Remote Check for each patient. This meant Remote Check could be offered to a broader range of patients, including younger patients.

As a result of more targeted recruitment during the pandemic and Remote Check modularisation, as well as increased experience using Remote Check, patient response to Remote Check invitations increased from 43% to 71%.

In implementing Remote Check, several protocols were developed and iterated, as described in Table 1.

Table 1: Protocol developed to implement Remote Check

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Inclusion and exclusion criteria	• Identify patients eligible to use Remote Check based on criteria such as internal and external device compatibility, smartphone compatibility[*], and absence of visual impairment or dexterity issues

Invitation to participate	• Create templates for email communications and a booking system for entry into patient database.
	• Create a Remote Check waiting list
	• Categorise CI recipients approached as:
	  • interested and have technology
	  • interested but do not have technology
	  • not currently interested
	  • no response

Follow-up to participate	• Create template email to inform about enrolment • Set up patient account • Provide instructions, including those for parent or carer

Service impact

As of early 2022, NAIP have invited over 400 patients to complete their most recent appointment via Remote Check and the uptake has been just over 40%. At present, around six Remote Checks are completed per week.

For NAIP, Remote Check offers a new pathway for monitoring CI patients remotely. It provides an option to complete appointments for those who are unable to attend a clinic appointment in person due to health reasons, travel issues, work constraints, or family commitments. Patients who complete a Remote Check can receive the following support:

- Reassurance from a clinician that their hearing performance and/or device is stable
- Identification of suboptimal hearing performance for further address
- Identification of scar or implant site issues
- Monitoring of implant (or specific programme/settings) usage
- Detection of internal or external device fault
- Advice from a clinician for a problem or query they raised in the Remote Check

Experience at NAIP has shown that Remote Check can be used at various stages in the postoperative pathway, from as early as three months after surgery (Figure 1). However, this is dependent on the progress of the patient and stability of their maps and supplemental face-to-face counselling is warranted while patients adjust their expectations. Experience has also shown that Remote Check can be used with patients of all ages (Figure 2) as well as those with complex needs. Ultimately, a Remote Check can be completed by most patients or their parent or carer if they have a compatible sound processor and supporting technology.
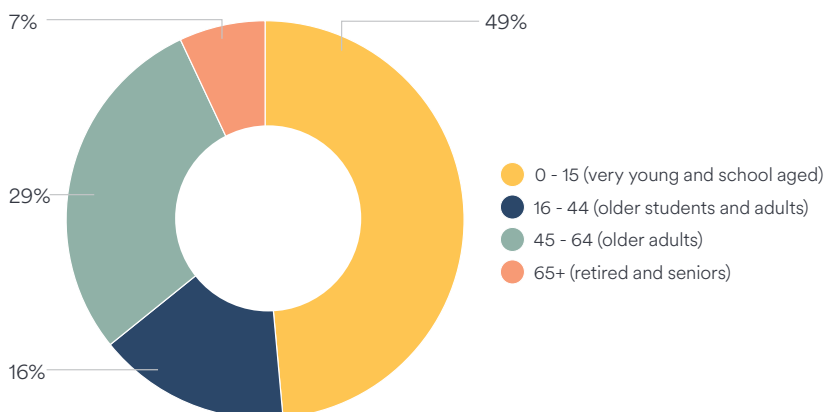
Figure 1: Remote Check appointments in the postoperative pathway (n=243)
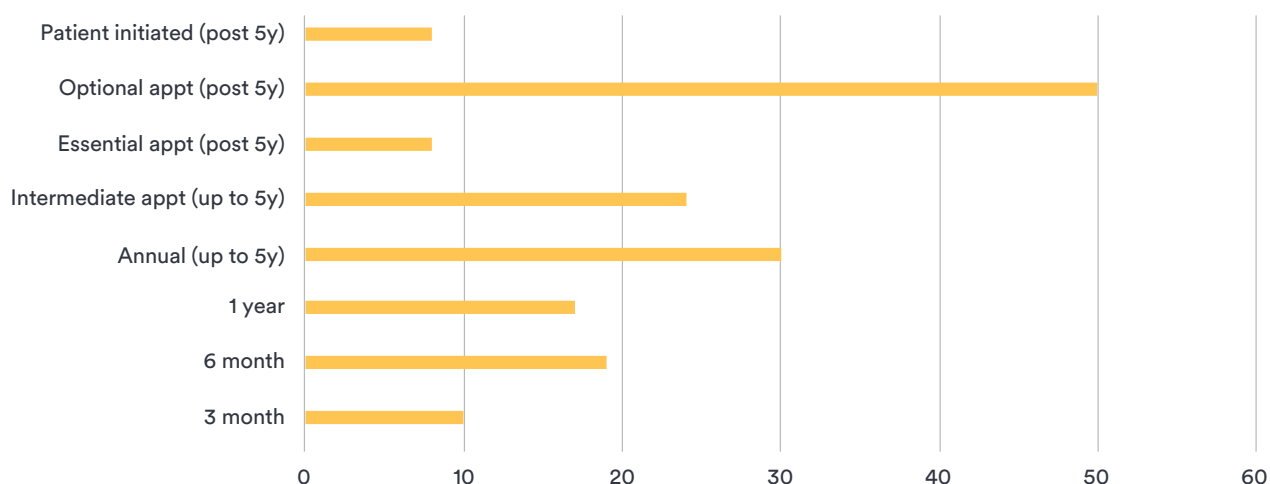
Remote Check has also served as a triage appointment to address urgent issues and make emergency appointments when needed. Patients gain direct advice from a clinician for any problem or query that was raised during the Remote Check.

Those who need to be seen in-clinic for further programming or troubleshooting can be identified through Remote Check, as well as providing access to help and reassurance for patients who can then move on to their next assessment.

Figure 2: Age range of eligible patients who completed Remote Check appointments (n=243)

- 0 - 15 (very young and school aged)
- 16 - 44 (older students and adults)
- 45 - 64 (older adults)
- 65+ (retired and seniors)

By incorporating Remote Check into the postoperative CI pathway (Table 2), NAIP was able to maintain their appointment schedule and level of care during the height of the COVID-19 pandemic, despite reduced staff and limited physical access to the clinic. Offering a combination of face-to-face, video and Remote Check appointments also allowed the clinic to align the appointment format to the patient's individual needs and abilities.

Table 2: The CI pathway at NAIP during and post COVID-19 pandemic

Post-surgical appointment	During COVID-19 pandemic		Post COVID-19 pandemic	
	First option	**Second option**	**First option**	**Second option**
0-3 months	Clinic	----	Clinic	----
3-6 months	Remote Check	Clinic	Clinic	Remote Check*
1 year	Clinic	Remote Check	Clinic	----
2 years	Remote Check	Clinic or virtual appointment**	Remote Check	Clinic**
Essential review (clinician requested)	Remote Check	Virtual appointment	Clinic	----
Optional review (offered appointment)	Defer appointment to next year*** or Remote Check	Virtual appointment	Defer appointment to next year*** or Remote Check	Clinic**
Emergency (patient requested)	Remote Check*	Clinic	Remote Check*	Clinic

Key: * Remote Check provided only if all criteria is fulfilled; ** Appointment provided only if needed or if the first option is not possible; ***Appointment deferred if patient reports no problems or does not respond to Remote Check invitation

Conclusion

Going forward, NAIP will offer a blended, hybrid pathway combining Remote Check, video appointments and face-to-face appointments to suit patient needs at various stages of their cochlear implant journey. Through Remote Check, patients have appreciated being able to check their implants from the comfort of their own home as well as being able to get feedback from a clinician for routine as well as emergency follow up.