**Supplementary file 1- Description of the Audiology first point of contact retrocochlear clinic model and protocols**

The Retrocochlear Clinic was one of four clinics set up to help alleviate the long wait times for ENT specialist services at the study site, with the other three services including a speech pathology FPOC dysphonia/dysphagia clinic12, a physiotherapy FPOC vestibular clinic, and an audiology FPOC paediatric clinic10. The Retrocochlear Clinic was developed as an alternative service referral pathway for patients who were referred to ENT with symptoms of asymmetrical sensorineural hearing loss, unilateral tinnitus and/or dizziness. The key goal of the Retrocochlear Clinic is to exclude retrocochlear pathology as the cause of their symptoms. This alternate, audiologist FPOC model was intended to assess patients without increasing demand on ENT specialists in the context of specialist shortages and limited public health funding. Safety was central to the design and implementation of this clinic model, supported through extensive training of the clinic audiologists, strict inclusion criteria, evidence-based assessment protocol, and active ENT engagement. The Retrocochlear Clinic was co-located and ran concurrently, but independently, within the ENT outpatient department. This co-location was an important component of the efficiency of this model, as it enabled the audiologist to promptly seek ENT input when required for more complex cases, allowing the service to streamline patient management to be within a single visit for the majority of patients.

The ENT outpatient waiting list received referrals primarily from general practitioners (GPs) for adult and paediatric patients with signs and symptoms of ear, nose and/or throat pathology, and/or hearing, balance and breathing difficulties, though referrals also came from other medical specialists. All ENT outpatient referrals are first triaged by the ENT specialist and prioritised as urgent (Category 1 – see within 30 days), semi-urgent (Category 2 – within 90 days) or routine (Category 3 – within 365 days) according to Queensland Health clinically recommended timeframes25. The ENT specialist then uses pre-determined eligibility criteria to determine if the patient is to be redirected to the audiology FPOC Retrocochlear Clinic, to one of the other AHP FPOC clinics, or into ENT services. Criteria for redirection to the Retrocochlear Clinic included semi-urgent or routine referrals listing symptoms of exclusively asymmetrical hearing loss and/or tinnitus. Referrals which also indicated a deterioration in dizziness which had been previously investigated by an ENT and/or neurologist with no known cause were also included, although due to the restrictiveness of this criteria these were uncommon. Referrals which listed additional ear, nose and/or throat related issues were excluded from the Retrocochlear Clinic and remained on the ENT outpatient waiting list. The clinic was scheduled once or twice per week with an average of 4 patients seen each week. The clinic day, frequency and number of patients varied over the 6-year period in order to meet clinical demand. The remainder of the clinician’s work hours were filled with alternate caseloads.

The Retrocochlear Clinic was staffed by audiologists who had completed advanced practice training in retrocochlear assessment, provided through a locally developed competency program. These audiologists each held a Master’s degree in Audiology, and had between 5-10 years equivalent full-time clinical experience as diagnostic clinicians prior to this advanced scope of practice role. The training program was created with input from the audiology, ENT and medical imaging departments and involved clinical observation and theoretical and practical assessment under an audiologist credentialled in the Retrocochlear Clinic, involving at least 32 adult retrocochlear cases and approximately 70 direct contact hours. Overall clinical governance and supervision were provided by the senior ENT specialist (>30 years professional experience). The specific area of advanced clinical skill for these audiologists is in the clinical decision-making process to refer or otherwise for MRI. For this reason, the training included a particular focus on medical imaging, contraindication for referrals, and an in-service with the medical imaging department. At the completion of the above training, each clinician completed a final competency assessment evaluated by the ENT specialist. This involved an in-room direct observation of a clinical appointment and case presentation of the patient’s clinical results with proposed management plan. Following this, the audiologists were credentialed through a district wide medical credentialing committee. A total of 4 audiologists obtained this advanced scope of practice credentialing from the health service between 2013 and 2019.

The assessment protocol for the Retrocochlear Clinic included a comprehensive case history, immittance testing (226Hz tympanometry and acoustic reflex testing) and standard pure-tone audiometry (air conduction testing at 0.25 – 8kHz including 3kHz inter-octave frequency; bone conduction testing 0.5 – 4 kHz). Additional testing could be performed at the audiologist’s discretion if it would add value to the clinical diagnosis, such as otoacoustic immittance testing and/or speech discrimination testing, however these additional tests were rarely required. ENT specialist opinion was available on-site if required for more complex cases by way of brief case discussion while the patient was in clinic or at a later time in the day.

Following assessment, clinic audiologists refer patients for MRI (IAM) if pre-determined referral criteria are met. These criteria were developed prior to the service implementation and agreed upon by the ENT, audiology and medical imaging departments of this service. Referral criteria include significant asymmetrical sensorineural hearing loss, unilateral tinnitus or a combination of alternate symptoms (eligibility determined following discussion with the ENT specialist). The American Academy of Otolaryngology – Head & Neck Surgery (AAO-HNS) audiometric criterion was used to define significant asymmetrical sensorineural hearing loss as an interaural difference in air conduction thresholds (or bone conduction if an air bone gap is present) of an average of 15dB or greater from 0.5 – 3 kHz on the audiogram26. As noted in Wong and Capper24, many different criteria have been used to define asymmetry, however the AAO-HNS criterion has been shown to provide an optimal balance of sensitivity and specificity for detecting acoustic tumors27. Referrals for MRI (IAM) were countersigned by the ENT Specialist after the patient had departed from the clinic.

Figure 1 outlines the patient journey pathways from referral to the Retrocochlear Clinic, including the three main management pathways based on the results obtained during testing. These include Pathway 1: those who do not meet criteria for MRI (IAM) and have no other ENT symptoms; Pathway 2: those meeting criteria for MRI (IAM); and Pathway 3: those not meeting criteria for MRI (IAM) but who do report other ENT symptoms (Figure 1). A further description of these pathways is below. Following progression through the pathways, patients attending the clinic ultimately ended up in one of two possible outcome groups: (1) patients able to be managed and discharged by the Retrocochlear Clinic, and (2) patients who required further ENT consultation and were returned to the ENT waiting list.

Pathway 1 includes patients who do not require medical imaging and report no other significant ear, nose and throat symptoms (Figure 1). These patients are discharged from the audiology FPOC Retrocochlear Clinic following their initial assessment and returned to the care of their GP. The audiologist is responsible for correspondence with the GP and making other appropriate onward referrals (e.g. to a vestibular physiotherapist).

Pathway 2 includes patients who meet the criteria for MRI investigation and are referred for an MRI (IAM) scan by the audiologist, with the referral co-signed by the ENT specialist (Figure 1). Following scanning, all MRI results are reviewed by the ENT specialist (as a requirement of this health service) who advises whether the patient may be discharged by the audiologist or referred for higher priority ENT consultation due to significant/incidental findings.

Pathway 3 includes patients who do not meet the criteria for further medical imaging, but present with other significant ear, nose or throat symptoms outside of the scope of the Retrocochlear Clinic (e.g. sinus issues, middle ear dysfunction etc.) (Figure 1). These cases are discussed with the ENT specialist and on-referred back to the regular ENT outpatient clinic, either at the same priority as the original ENT referral or with higher priority.