

# Teleaudiology: Providing Hearing Assessments to Infants and Children Living in Remote and Rural Communities.



Presented by: Alison Collins  
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# Healthy Hearing Program Queensland

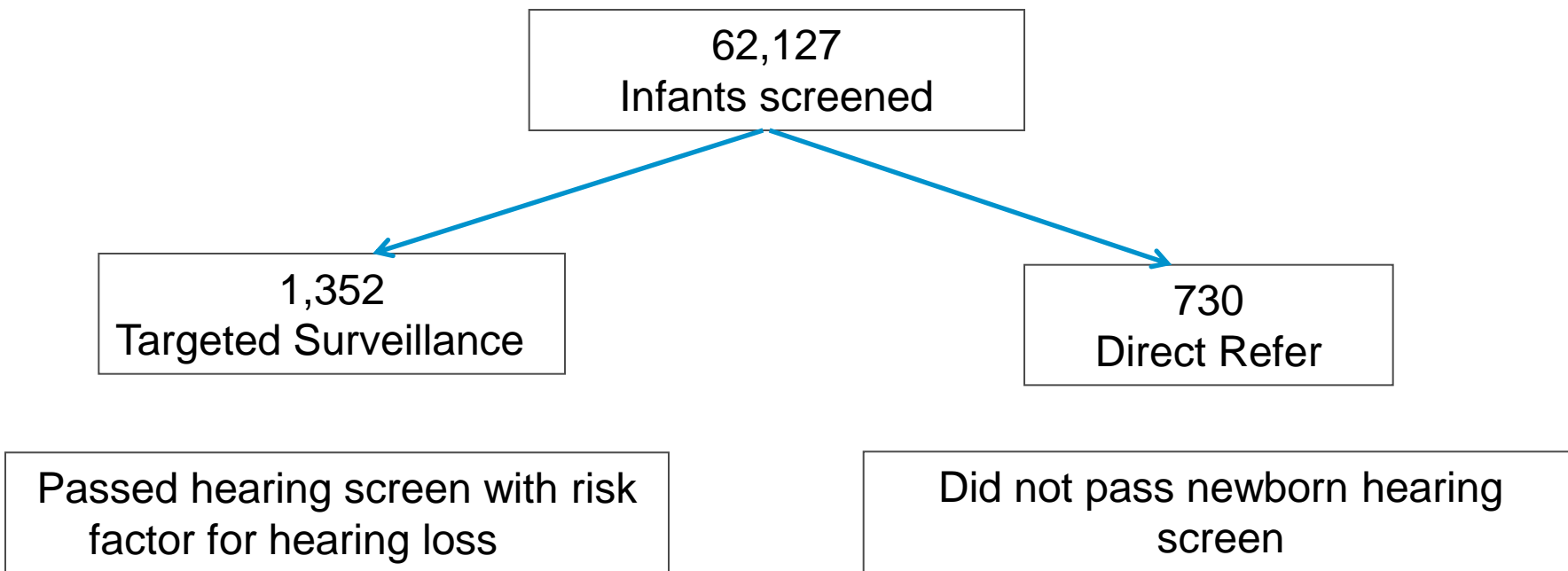


Offers newborn hearing screening to all babies born in Queensland birthing hospitals (public & private).

Two referral categories:

1. **Direct Refer:** Babies who do not pass hearing screens - First appointment within the first few months of life.
2. **Targeted Surveillance:** Babies who pass newborn hearing screen but are identified with a high risk factor for late onset or progressive hearing loss – First appointment at 9-12 months.

# Healthy Hearing Referrals 2013



## Direct Refer Infants

- Bilateral Refer – appointment required within 2 weeks.
- Unilateral Refer / Early Targeted Surveillance – appointment within 6 weeks.
- Available at 11 sites across QLD.



## Direct Refer appointments

- Assessment lasts 1.5 – 2 hours.
- Baby must be asleep.
- Assessment includes: Auditory Brainstem Response (ABR)  
High Frequency Tympanometry  
Otoacoustic Emissions (OAEs)  
Auditory Steady State Response (ASSR).
- Up to 3 appointments to confirm or deny hearing loss.



# Targeted Surveillance

- Passed hearing screen with risk factor for hearing loss.
- First appointment required at 9-12 months
- 12 sites across QLD



# Targeted Surveillance Appointments

- Initial appointment: Transient Evoked Otoacoustic Emissions (TEOAE)  
Tympanometry
- Subsequent assessments include Visual Reinforcement Audiometry (VRA).
- Can be seen for multiple appointments.
- Final assessment at approx. 3.5 years.

# Why do we need Teleaudiology?

- Some families have to travel a great distance to attend appointment (up to 1000km).
- Financial burden on families.
- Availability of transport.
- Testing state.
- Longer/more appointments to obtain a complete set of results.
- Care for siblings.
- Time off work.
- Parental stress.
- Cost of patient transport.





# Distance Travelled for Healthy Hearing Referrals (2013).

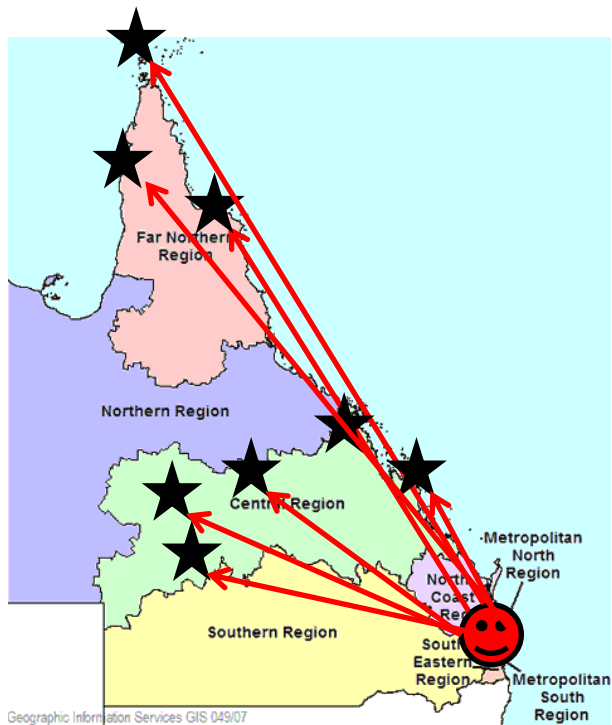
## Direct Referrals

- 5 out of the 11 clinics >50% of referrals travel over 50km for appointment.

## Targeted Surveillance

- 3 out of the 12 clinics >50% of referrals travel over 50km for appointment.

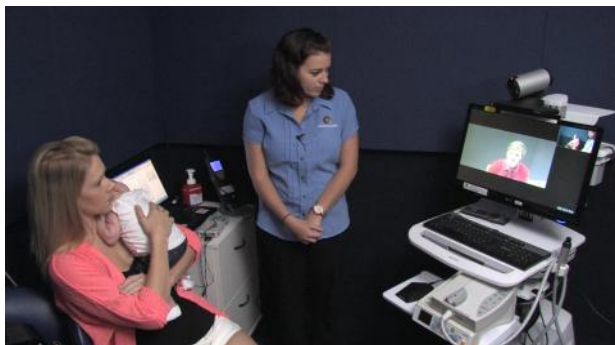
# Benefits of Teleaudiology



- Equitable access to audiology service.
- Reduction of economic burden.
- Potential to reduce Failure to Attend (FTA) rates.
- Potential to reduce appointment numbers.
- Timely access to audiology services.

# What is Teleaudiology?

- Provision of diagnostic hearing assessment to infants and children via Telehealth.
- Assessment is provided by Video Conferencing (VC) and remote connection to testing equipment.
- Appointment is conducted at a Health centre close to home.



# Application of Teleaudiology

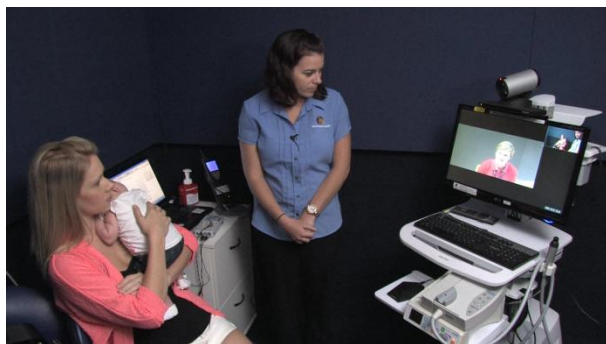
## Remote location

- VC
- Testing Equipment



## Metro location

- VC
- Laptop



→  
**VC and Remote  
application software**  
←



# Project Aim

- To investigate whether TeleAudiology is a reliable, replicable and feasible method of assessment for infants and children requiring diagnostic audiology.
  - Phase 1 (feasibility) - (January 2012 – September 2013).
  - Phase 2 (service provision) - (September 2013 – Current).
- Parental/carer satisfaction with TeleAudiology appointments.

# Phase 1: Research Design

## January 2012 – September 2013:

- Assessment was conducted via Telehealth then repeated by the remote Audiologist.
- Tests included:
  - Auditory Brainstem Response
  - Transient Evoked Otoacoustic Emissions (TEOAEs)
  - High Frequency Tympanometry



# Phase 1

- 61 subjects (36 males, 25 females)
- 23 direct refer (infants)
- 38 targeted surveillance

## Locations

- Hervey Bay
- Maryborough
- Mackay



# Parental/Carer Satisfaction

- “Were you satisfied with the service?”
- “Did you receive adequate attention throughout this appointment?”
- “I would use this service again”





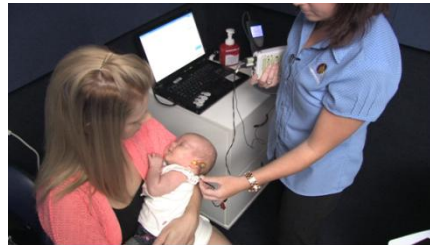
## Phase 1: Satisfaction with the service

- >85% of parent/carers “strongly agreed” that teleaudiology provided better access to services and saved travel costs.
- Very high satisfaction with the service provided.
- Preference to use the service again



## Phase 1: Results

- **Teleaudiology is a feasible method of diagnostic paediatric assessment.**
- **Families are highly satisfied with the service and show a preference to use TeleAudiology for future assessments.**



# Phase 2: Research Design

September 2013 – current

- Audiologist and trained health care worker.
- Assessment conducted via TeleAudiology.
- Tests included: Auditory Brainstem Response (ABR)  
Transient Evoked Otoacoustic Emissions (TEOAEs)  
High Frequency Tympanometry
- Parental perception analysis



# Locations

Hervey Bay/ Maryborough (1-2 days per month)

Mackay (1 day per month)

Tambo

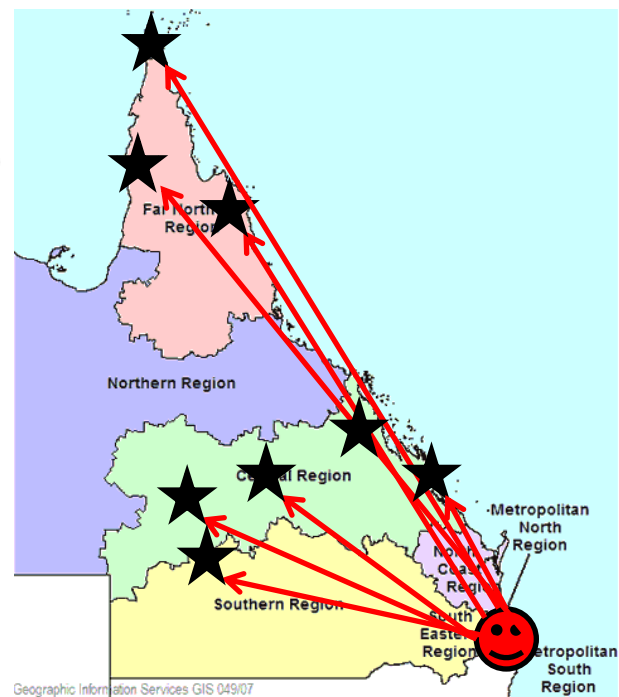
Middlemount

Longreach

Cooktown

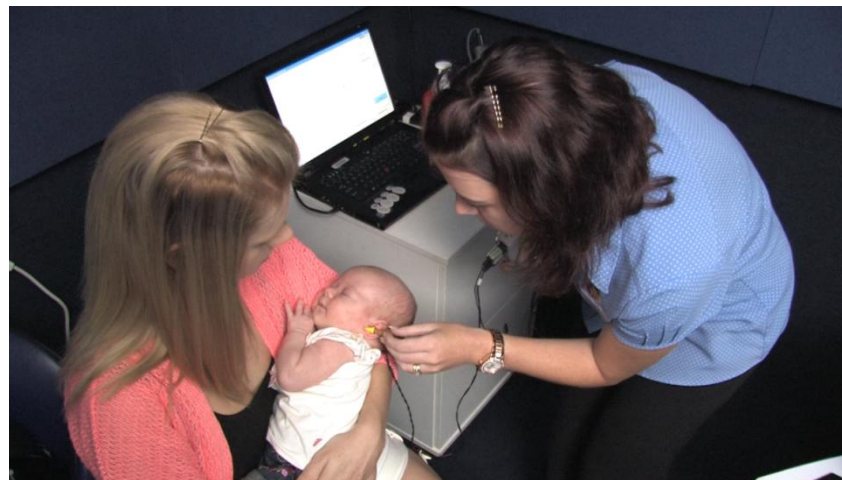
Thursday Island

Weipa



## Phase 2 - progress so far

- 68 subjects (34 males, 34 females)
- 41 infants
- 27 targeted surveillance



# Phase 2 - progress so far

## Audiology Assessment

- Very high satisfaction with Teleaudiology service from families/carers.
- Increase in the number of referrals.

## Training of Health Care Workers

- Training provided via VC.
- Detailed training manuals.
- Positive feedback from remote health care workers.
- Establishment of permanent clinics.
- Requests from remote health care centres for TeleAudiology services.

# Hearing Loss via TeleHealth

- **Phase 1:** 28 infants and children diagnosed with a hearing Loss (including conductive hearing loss).
- **Phase 2:** 33 infants and children diagnosed with a hearing Loss (including conductive hearing loss).
- Parental satisfaction has been consistently high when a hearing loss was indicated.

## Phase 2 – future analysis

- How do these results compare to those obtained in a clinic?
- Is Teleaudiology more or less likely to obtain complete results?
- Does Teleaudiology reduce parental stress?
- Does Teleaudiology provide earlier access to intervention services?
- Cost analysis.
- Comparison of Failure to Attend (FTA) Rates for travelling families.
- Parental Satisfaction with TeleAudiology service.



## Future Directions

- Provision of all audiology assessments via Telehealth (PTA, VRA?).
- Provision of Ear Nose and Throat services via Telehealth within the context of a newborn hearing screening program.
- Joint projects with Deadly Ears to work within Aboriginal and Torres Strait Islander paediatric populations.
- Provide training and clinical supervision of new graduate audiologist via Telehealth.

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