Teleaudiology: The future of audiology?

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Goals for this presentation

- State of the art of teleaudiology
- Implications
- Research needs
Definition: Teleaudiology

Teleaudiology is ‘the delivery of audiology services and information via telecommunications technologies’

IMPORTANT POINT:
Technology is used as the means to an end.
Telemedicine/teleaudiology is not a separate subspecialty

*American Telemedicine Association*
Telemedicine methodologies

- **Store and forward:** Video otoscopy and automated testing for later interpretation (audiometry, immittance, OAE, ABR).

- **Synchronous/Real time:** Hearing tests, hearing aid fittings, audiologist-directed real-ear measures, hearing aid counseling, tinnitus management.

- **Remote monitoring:** Hearing aid data logging, OtoID to monitor hearing sensitivity changes.

- **Mobile health:** Online auditory training programs, tinnitus management apps, hearing test apps, counseling apps.
A couple of successful programs

- Alaska Federal Healthcare Access Network (AFHCAN)
- VA teleaudiology program
Alaska Federal Healthcare Access Network (AFHCAN)

- Established in 1998
- Provides services to 180 Alaska Native community village clinics, 25 subregional clinics, 4 multiphysician health centers, 6 regional hospitals, and the ANMC in Anchorage.

Audiology/ENT practice:
- Video otoscopy
- Audiometry
- Tympaonmetry
- Hearing aid clearance
- Follow-up to surgery (e.g. tubes)
Estimated travel savings in miles from telehealth for ALL Patients

Estimated total savings since 2003 is 12,700,000 miles.

Estimated 2012 savings: 2,850,000 miles.

Travel miles saved

Year

With permission Kokesh (2013)
Estimated travel savings in $$$ from telehealth for ALL Patients

Estimated 2012 savings: $8.3M
Estimated total savings since 2003 is $37.8M

With permission Kokesh (2013)
Telehealth has decreased wait times dramatically

With permission Kokesh (2013), Data courtesy of Phil Hofstetter
Provider satisfaction (36,383 responses)

Feedback 2001-2010

Agreement with statement (%)

Feedback more positive

Feedback more positive

Telemedicine helps me COMMUNICATE with a doctor

Telemedicine will improve the QUALITY OF CARE for this patient

Telemedicine improved PATIENT SATISFACTION

I am SATISFIED with how the EQUIPMENT worked

The telemedicine system played a role in EDUCATING THIS PATIENT

With permission Kokesh (2013)
Patient satisfaction (n=25)  

With permission Kokesh (2013)

How well did the telemedicine technology help you understand your problem?

How satisfied were you with the use of the telemedicine technology?

Would you be willing to have a telemedicine exam for follow-up?

Overall satisfaction with visit
37% enrolled Veterans live in rural areas and 2% live in highly rural areas (22.6M total = 8.6M).

47% rural and 95% highly rural Veterans have travel times >2 hr. to a VA clinic.

Over 1.6M Veterans with auditory disabilities

With permission Gladden (2013)
Ongoing projects

**Automated Audiometry (Audiology, Inc.):** Automated audiometry via clinical video, store and forward, and home telehealth (VA Tennessee Valley HCS).

**Remote Audiometry (RemotEAR, by Otovation):** Remote audiology using a novel clinical video telehealth hub (Greater Los Angeles VA HCS).

**Remote Programming of Cochlear Implants (Cochlear Americas):** Patient-centered cochlear implant programming using semi-automated remote programming software (VA Puget Sound HCS).

**Smartphone Application for Home Programming of Hearing Aids (Phonak):** Feasibility of hearing aid programming via personal smart phones (Cleveland VAMC).

*With permission Gladden (2013)*
VA pilot program: Remote hearing aid programming

- Technician works with patient at the Community Based Outpatient Clinics (CBOC), audiologist is at a remote site.
- Ten rural locations

Are outcomes equivalent for face-to-face and remote programming?

*With permission Gladden (2013)*
IOI-HA outcomes from teleaudiology encounters

With permission Gladden (2013)
What about teleaudiology for individuals not yet in a system?

- For the rest of this presentation I will focus on mobile health - Patient driven (independent of practitioner) use
Technology has made it easier to access a hearing test:

- Online hearing tests

Most major manufacturers

Not for profit organizations
Apps for hearing tests
Telephone hearing screenings using digits presented in noise
Issues to consider

- Are data accurate?
  - False negatives would be a problem.

- Do users understand the results provided?
  - Health literacy
  - This is no different than many patient-clinician interactions except user cannot ask questions.

- Do self-conducted tests motivate behavior change?
Actions taken by individuals who failed a telephone hearing screen

Of 193 individuals failing a telephone-based screening:

- Sought help: n=70 (36%)
- Acquired hearing aid: Of the 26 recommended a HA n=13 (50%)
- Use hearing aid: Of the 13 that acquired HAs, 6 use them > 4hr/day (46%)

Meyer et al., 2011, Ear Hear 32:720-731
However, similar findings are seen with face-to-face screening also:

Of 651 individuals in SAI-WHAT randomized trial who screened positive for HL:

- Sought help: n = 265 (27.6%)
- Acquired hearing aid: Of 154 with correctable HL, n = 65 (42%)

...so the issue isn’t teleaudiology

Solutions?

- Studies to better understand attitudes and beliefs around hearing health behaviors

- Public health messages targeted for different age groups to bring awareness of hearing and hearing loss to the whole population not just those with increased likelihood of HL
Technology has made it easier to acquire hearing assistive technology:

- Alternative distribution systems
Traditional

- Manufacturer
  - Private practice
    - Big Box store/own shops
      - End user
        - Hearing professional involved

Direct distribution

- Manufacturer
  - Big Box store/own shops
    - End user
      - Hearing professional involved

Semi-direct via MD

- Manufacturer
  - ENT/GP
    - Online hearing aid retailer
      - End user
        - Hearing professional involved

Online Retail + local support

- Manufacturer
  - Online hearing aid retailer
    - Audiologist/hearing professional
      - End user
        - Hearing professional involved

Online Retailer only

- Manufacturer
  - Online hearing aid retailer
    - No hearing professional involved

*From Northern, 2013*
Controversial but inevitable
   Especially with increased availability of personal sound amplification systems (PSAPs).

What role do audiologists play?
   The field will need to figure this out.

Conduct systematic studies research to examine outcomes.
Other ways technology has made it easier to acquire hearing assistive technology:

A smart phone can be turned into a ‘hearing aid’

Experimental from University of Essex (free)

Costs $4.99!

Can record and replay conversation

Developed at Northwestern U and U Minnesota
Issues raised

- Many unanswered questions
- Conduct systematic research to examine pros and cons
Technology and tinnitus management

- Apps for tinnitus management
- Telephone tinnitus management
Technology permits home-based auditory training

LACE is a home-based, self-paced adaptive auditory training program designed to improve listening and communication skills.

Read my Quips

START NOW
get your brain going!

brainHQ
Findings are mixed

- Need ways to better identify who will and will not benefit
- There are few downsides to training so if the individual is willing then why not try it?
Technology has spawned online hearing-related counseling programs, support groups, etc.
Little work available - one study showed positive outcomes.

RCT comparing:
Online education by a professional

vs.

Online discussion forum with peers

Results:
Decreased reported hearing handicap and psychosocial benefits among participants in both groups.

More research is needed.

What do patient and clinicians think about teleaudiology?

Data from Singh, Pichora-Fuller, Launer and Boretzki
Clinician willingness to use teleaudiology: 
(n = 202, age mean = 67.1 yr., SD = 15.3)

Singh et al. (submitted)
Patient willingness to use telaudiology (n=224, age: mean = 67.1 yr., SD = 15.3 yr.)
Do attitudes change after engaging in teleaudiology?

Attitudes pre-to-post remote hearing aid fine-tuning

- More positive: 66.7%
- Neutral: 16.7%
- Less positive: 16.7%

Data from 16 patients:
- More positive: 66.7%
- Neutral: 16.7%
- Less positive: 16.7%

Data from 8 audiologists:
- More positive: 66.7%
- Neutral: 16.7%
- Less positive: 16.7%

Data from study collected by Phonak - with permission
Implications

- Attitudes can change
  - Good news for teleaudiology!

- Approach to education of clinicians about teleaudiology is likely critical for good outcome.
Teleaudiology raises a host of other considerations too:

- IT support and **contingency plans**
- Patient privacy
- **Patient expectations**
- Patient health literacy
- Billing
- Licensing (across states)
- Integration of teleaudiology into daily practice
Teleaudiology provides:

- Easier access to hearing healthcare at many levels
- Greater diversity of options for audiological rehabilitation

and it is generally acceptable to patients and clinicians

*It could/should therefore open up hearing healthcare to a broader demographic of individuals*
Major research needs

- Validate data
- Optimize usability & effectiveness
- Understand outcomes
  - Patient
  - Clinician

There remains a need to change hearing health behaviors so that people access the many available options.
To conclude....

The question is not will teleaudiology happen (it will), but how will it happen, and what can we do to ensure it yields positive outcomes for both the patient and the professional?
Thank you for listening
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Portland, Oregon
Australian ‘Do-it-yourself’ self-fitting hearing aid

User responsible for:
- Assembly
- Fitting
- Fine-tuning
- Management

SLM
Automatic application of prescription formula
Hearing aid adjusted
Automatic audiometer

From Hickson, 2013
Can individuals assemble and activate the hearing aid without professional support?

Outcomes from Australia (AUS), S. Africa (SA), Hong Kong (HK)

Health Literacy was a major predictor of outcome

Convery et al. (2013) IJA 52: 385-393