Remote Assessment

Telemedicine Applications in an Early Hearing Loss Detection and Intervention Program

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Remote Assessment
Issues in EHDI

- Loss to Follow Up
- Training and support of EHDI professionals
- Second opinion/difficult diagnosis
- Waiting list for service
- Quality assurance
Loss to Follow Up

- Infants missed at hospital before discharge.
- Infants who refer at Stage I and do not return for Stage II
- Infants who refer from Stage II and do not return for assessment.
Loss to Follow Up

- Stage I to Diagnostic
- Post Diagnostic to Intervention
- Intervention
Probability of HL

- Prevalence in General Population
- Prevalence in WBN refer population
- Prevalence in NICU refer population
Distance

- Ontario = 416,000 sq. miles
- Texas = 269,000 sq. miles
First Nation Communities by Public Health Unit, Northwestern Ontario

Source: Location of First Nation Communities based on Statistics Canada 1996 Census Subdivisions, with current community names as of October 2002, provided by FNIHB-ON. Public Health Unit boundaries from Statistics Canada, 2000.
Travel
Funding
Family

- Babysitting
- Work commitments
And........
Training and Support
Caseloads

- Large waiting lists = delays in identification.
- Mt. Sinai = 200 infants annually, nearly one per day.
- US programs such as California see huge numbers of clients annually in larger centers.
Quality Assurance/Standards

- Program standardization is key
- Deviation from evidence base means errors!
- Remember, it is the babies that we are trying to help!
- Early ID is critical (Sharma, 2007; Rubel, 2008)
Necessity is the mother.....
Evidence Base

- Using a Telehealth Medium for Objective Hearing Testing: Implications for Supporting Rural Universal Newborn Hearing Screening Programs. Krumm, M; Ribera, J; Schmiedge, J., 2005

- The Reliability of Click Evoked and Frequency Specific Auditory Brainstem Response Testing Using Telehealth Technology. Towers, A; Pisa, J; Froelich, T; Krumm, M., 2005

- Ethical and Legal Issues Related to Telepractice. Denton, D. and Gladstone, V., 2005
Some History

- Seminars in Hearing
  - Audiology Telepractice
  - Volume 26, #1, February 2005
Terms and Definitions

- **Host site:** the clinic or office from which testing is performed.
- **Remote site:** the location of the infant being tested.
- **Bandwidth:** the ability of a connection between host and remote equipment to transfer data.
- **Application Sharing Software:** the software program used to control one computer from another. VNC is a proprietary name in this instance.
- **VPN:** Virtual Private Network. Any secure connection between 2 computers sharing data.
Remote Assessment

Laptop → Headbox

USB

Electrodes
Ear probe

[Image of a baby head]
Remote Assessment

Remote Laptop → Headbox

USB

Electrodes

Ear probe

Host Laptop

OTN Connection
Early steps

Regional Health Unit audiologists attempt to deliver services via videoconference.

Issues:
- Technology/Software
- Network/Systems
Question #1

- Will it work?
- Early tests involving AABR and OAE software over a “vanilla” IP port indicated that the system would work.
Question #2

- Can we get a Windows-based diagnostic system?
- Fortunately, yes. A Windows based system was released in 2006.
Question #3

- Can we access a telemedicine network?
- The Ontario Telemedicine Network (OTN) 2006
  - merger between 3 large networks in Ontario.
- OTN provides province wide access, technical support and education.
- www.otn.ca
OTN

- Access to sites across Ontario
- Central sites used as “host” sites
- OTN coordinators at each site.
Question #4

- Inter-agency cooperation
  - Network security
  - Client privacy
  - Regional concerns
  - Site specific issues
Ready to Roll Out

- What seemed a simple task took nearly 2 years to bring to fruition!
- Protocol development and research
- Systems development
- Equipment and software
How we arrived

- **2005:**
  - Idea of using videoconference system to test infants put forward.

- **August 2006**
  - OTN develops a strategic plan for software testing and “live” pilot

- **December 2006**
  - Full functionality testing at OTN tech offices in Toronto

- **March 2007**
  - Demo of remote diagnostics to program consultants and funding agencies
February 2007: Test of the system with adult subject.
Baby Steps

- February 2008: First system test with infant
Current Status

- Performing regular tests on infants from Thunder Bay to northern sites
- Looking at adding host sites (2)
- Addition of remote sites across the province (2009/10)
Equipment

- Diagnostic ABR
- “Host” PC
  - Laptop or desktop
- Application sharing software
  - RealVNC
    - www.realvnc.com
- Videoconference equipment
  - Tandberg Intern
Equipment

- Host site, portable or fixed.
- Host site, portable or fixed.
Remote Site Criteria

- Video conference equipment.
- Ambient noise levels.
- Scheduling and accessibility.
Privacy

- Client confidentiality is of primary concern.
- Coded data.
- Data entry performed by region “owning” the infant.
- Host site tracks tests performed, without client information.
Staff Resources

- Host Audiologist
  - Proficient in infant diagnostics
- Remote site technician
  - Proficient in AABR screening
- Administrative support
  - Trained in videoconference practices
Advantages to Remote Ax

- Reduced travel for families
- Reduced costs for families/funding agencies
- Ability to initiate funding and supports for identified infants
Training and Data Review

Remote Diagnostics Test
Jan. 30, 2008
Thunder Bay to Sioux Lookout
Potential

- Training
- Second Opinion
- Consultation
- Quality Assurance
- Research
- Behavioural
- Hearing Aid Programming
Questions?