From Colorado To Guam: *Teleaudiology For Infant Diagnostic Evaluations

Deborah Hayes, Ph.D.[1], Sue Dreith, Au.D.[1], Elaine Eclavea, M. Ed.[2], Bereket Habte, R. EEG Tech[1]
[1]Children's Hospital Colorado, Anschutz Medical Campus, Colorado and [2]University of Guam – CEDDERS; Guam EHDI Program

Children's Hospital Colorado
Affiliated with School of Medicine
UNIVERSITY OF COLORADO ANSCHUTZ MEDICAL CAMPUS

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"Hafa Adai!" Guam: A Few Facts

- U.S. Territory acquired in 1898 following the Spanish-American War
- Native people are Chamorro from Asian Pacific region
- Japanese occupation during World War II; re-captured by the U.S. in 1944
- U.S. military presence with Naval and Air Force Bases
- Semi-tropical island about 30 miles x 8 miles in size
- Civilian population of 170,000
- Birthrate for 3,500 infants/year

"Fiber Optic Flower" on a Beachfront Tree

Guam EHDI Program

- Newborn hearing screening program
  - Inpatient screening/rescreening during birth admission (Otoacoustic emissions)
  - Outpatient rescreening for infants who refer on birth admission screenings (automated auditory brainstem response)
- Infant diagnostic audiological evaluations (DAE)
  - Inconsistent availability of on-island infant DAE services
    - Delayed identification of infants who were deaf or hard-of-hearing and delayed audiological intervention
- Early intervention services (Guam Early Intervention Services: GEIS) available for infants who refer on screenings
  - Delayed audiological diagnosis affects provision of optimum services
    - Hearing aids cannot be fitted and family cannot select preferred communication mode without audiological diagnosis

Teleaudiology for Infant DAE

- The concept of providing infant DAEs over the internet to babies in Guam emerged from a presentation and subsequent discussion with EHDI coordinators from the Pacific Rim including Guam, Palau, Federated States of Micronesia, Saipan, Commonwealth of Northern Mariana Islands
- Guam was selected as the pilot site because
  - Sufficient birthrate to ensure enough babies to test the concept
  - Availability of organized screening and early intervention programs
  - Adequacy of internet and travel services to facilitate communication and interaction

Steps in the Project

- Developing of a Memorandum of Understanding outlining each party's responsibilities
- Visiting site of proposed teleaudiology services in Guam by Children's Colorado audiologists
  - Evaluate test environment and equipment
  - Train Guam-based technicians
  - Develop procedures jointly
- Acquiring Guam audiology licensure
- Identifying HIPAA-compliant software for remote control of Guam diagnostic audiometric equipment and videoconferencing
- Testing/retesting software solutions
- Ensuring a successful first teleaudiology test
  - Scheduling a Children's Colorado audiologist on Guam for "Go Live"

Technology for Teleaudiology

- In Guam:
  - Bio-logic® Navigator® PRO (NavPRO) for auditory brainstem response, otoacoustic emissions, auditory steady state response
  - GSI TympStar and Interacoustics Titan for tympanometry and middle ear muscle reflexes
  - Laptop for videoconferencing
- In Colorado:
  - Desktop PC for remote control operation of NavPRO
  - Laptop for videoconferencing

Software for Teleaudiology

- Netop Remote Control software for audiologist in Colorado to "take control" of Guam NavPRO
  - Colorado is "guest" and logs into Guam NavPRO through public IP address
  - Guam is "host" and allows Colorado to take control of NavPRO
  - No infant identifying information is transmitted during testing
- Nefsis videoconferencing software
  - Guam holds Nefsis videoconferencing license
  - Colorado connects to videoconference established by Guam via secure website

Teleaudiology Results to Date

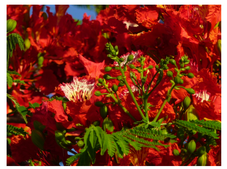
- 4 test sessions completed to date (March 5 2012)
  - All infants received complete diagnostic assessment
    - Otoscopy (by Guam technician)
    - Tympanometry
    - Otoacoustic emissions
    - Auditory brainstem response (air and bone conduction as needed)
    - Auditory steady state response (air and bone conduction as needed)
  - Diagnosis and recommendations provided to family by testing audiologist
  - Formal report generated by testing audiologist for family and primary medical provider
  - Audiological diagnosis facilitated referral for medical services for two infants
  - 3 more infants scheduled for mid-March 2012

Challenges to Teleaudiology

- Identifying an appropriate test environment
- Identifying and training support personnel
- Scheduling appointments across time zones (17 hour difference between Colorado and Guam)
- Interruption of internet services during testing
- Measuring effectiveness of family counseling delivered by videoconferencing
- Integrating infant DAE services into full EHDI program to attain quality outcomes
- Sustaining services beyond pilot phase

What we have Learned

- Infant diagnostic audiological evaluations can be effectively provided over the internet
- Site visit(s) is/are critical to success of teleaudiology
- Software solutions must meet contemporary standards for infant and family privacy and confidentiality
- Teleaudiology is optimally delivered within the context of comprehensive services for the infant or patient and family
- Teleaudiology can be a successful approach for providing services in rural and remote communities



Blossoms on the "Flame Tree" I n Guam