

OAE Screening in Healthcare Settings: A Pilot Project

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Why screen in healthcare settings?



- Up to 50% lost to follow up rates
- Late onset or progressive hearing

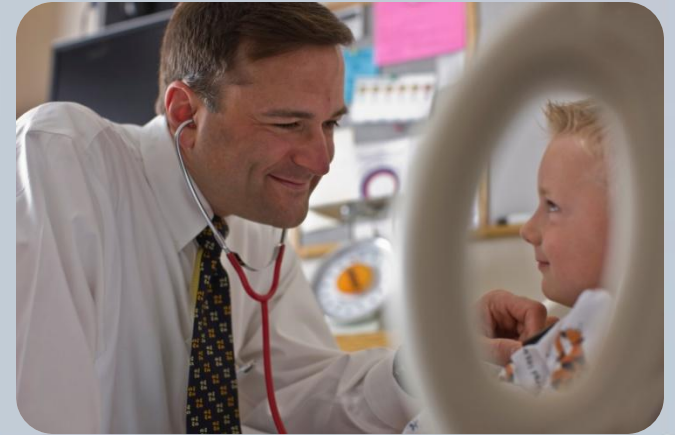
Methods

- One community health center and two school based primary care health centers
- Training provided by consulting audiologist
- 4 trained screeners (medical assistants)
- Screening sequence during visits
- Data collected over 10 month period



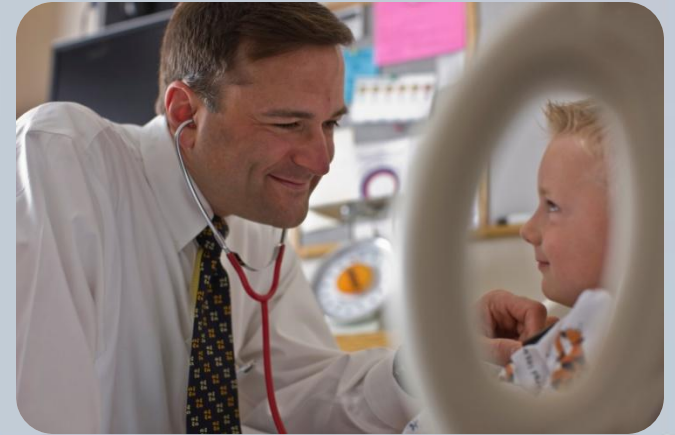
Demographics

- 846 children screened
- Initial project focus age 0 – 3, clinics expanded to include children up to 60 months and those with parental or provider concern
- Clinics primarily serve children whose families are 150% or less of the US federal poverty level
- 63% identified Hispanic ethnicity



Demographics

- 714 (84%) physicals/immunizations/well child exams
- 71 (8%) visited the clinic for specific ear/hearing related concerns, primarily otitis media
- 46 (5%) visited the clinic due to not ear related illnesses.
- 15 (2%) undocumented reason for visit



Initial Pass/Refer Rates

Well Child Subjects

- 86% Pass
- 10% Refer
- 4% Could not test

Illness Visit Subjects

- 74% Pass
- 13% Refer
- 13% Could not test

Ear/Hearing Visit Subjects

- 6% Pass
- 85% Refer
- 9% Could not test



Final Outcomes

- 3 (.4%) permanent hearing loss
- 688 (81% Initial pass rate
- 810 (96%) Overall pass rate
- 23 (3%) follow result still unknown
- 4% Could not test



Cases of Permanent Hearing Loss

Case #1: Bilateral mild/moderate hearing loss

- 5 years old
- Newborn hearing screening result unknown
- Parent concern
- Screened during well child visit (pre-K)

Case #3: Bilateral moderate hearing loss

- 38 months old
- Confirmed pass newborn screening
- Parent concern and request for hearing test
- Screened during well child visit

Case #2: Bilateral moderate hearing loss

- 9 years old
- Newborn hearing screening result unknown (born out of country)
- Parent concern
- In speech therapy at school
- Younger sibling screened as well child check, child screened by parent request

What worked well

- *Team planning and assessment*
- *Hands on practice at initial training*
- *Support in clinic setting*
- *High rate of completion of follow up screenings*
- *Standardized training materials in print and video – including education, steps to screening, screening protocols and forms*



Challenges

- *Determining when to screen during visit*
- *Affecting patient flow*
- *Time for follow up screens*
- *Reimbursement issues*

Implications

- Ensuring all children in the practice are screened periodically
- Expand to additional primary care sites
- Gather reimbursement data (rapidly changing)



Follow up questions:

- *Can OAE screening be used effectively in healthcare settings?*
- *Can OAE be used effectively to screen children beyond 0-3?*
- *Should OAE be used in screening children older than 3?*

Should OAE be used in screening children older than 3?

- *We really hear with our brain*
- *Clinically, hearing evaluation is not complete unless it includes procedures for evaluating how the brain processes relatively sophisticated sounds such as speech*
- *ABR and OAE are audiologic tests that evaluate the function of the ear and are important in the diagnosis of hearing loss.*
- *Pure tone testing does test further along the process of hearing and provides an observation behavioral response to sound*

Thoughts on utilizing OAE Screening in children over 3:

“Pure tone hearing screening utilizing an audiometer is associated with multiple practical problems, particularly in pre-school and young school age (e.g. kindergarten) children. Unacceptably high refer rates for pure tone hearing screening, up to 70% in the preschool population (Hall & Swanepoel, 2010) may result from a combination of factors that sometimes preclude a valid screening outcome.”

Thoughts on utilizing OAE Screening in children over 3:

“Over all refer rates (either or both ears) are lower for distortion product OAE’s are lower (12.5%) than for pure tone audiometry (17%) reducing the number of children who require rescreening or medical referral. OAE’s are very sensitive to both middle and inner ear disorders, yest not affected by the child’s ability to understand instructions or to attend to sounds. “

(Hall and Swanepoel, 2010)

Is there other work being done looking at using OAE to screening children older than 3?

- *OAE screening programs for children 3-5 in Florida*
(Jay Hall)
- *AAA Editorial – ‘OAE: The New Gold Standard’*
(James Jerger)
- *Use of Otoacoustic Emissions in Elementary Schools* (Michele Cramer, Beverly Ray, and Thierry Morlet
Kresge Hearing Research Laboratory, LSUHSC)



Responding to the question

Can OAE be used effectively with older children (3-5) ?

What is being discussed:

- Do you lose something from not doing pure tone audiometry?
- Do you gain something by doing OAE?

Hearing Screening - Definition

Definition:

To identify from apparently healthy persons, those individuals for whom there is a greater probability of having a disease or condition, so they may be referred for further evaluation. (ASHA Technical Report on Audiologic Screening,)

Screening does not diagnose a hearing loss – it simply identifies those children who need further evaluation

Early Childhood Community Based Hearing Screening Programs:

- 1. Are post hospital based newborn screening activities/programs*
- 2. Are community based (early childhood settings, preschool, primary care medical provider based)*
- 3. Train and utilized lay screeners (screening is not provided by professionals)*
- 4. Are the settings and context out of which the question arose*

OAE/Pure Tone Considerations

OAE

Physiological measure of outer hair cell function

Has other auditory pathway implications

May miss cases of Auditory Neuropathy (AN)

Pure Tone

Provides information about the entire auditory system, indicator of the child's ability to listen and respond

Considered a "true" hearing test

May identify AN with children who are developmentally appropriate for testing

OAE/Pure Tone Considerations

OAE

No task for child to learn

No developmental or cognitive restrictions

No issue with language barriers

Results not interpreted by lay screener

Objective physiological measure

Can be completed in relatively noisy environment

Research and studies published supporting use as first line hearing screening

Pure Tone

Must learn task and cooperate

Must be developmentally and cognitively able to participate

Language barriers may be issue

Results interpreted by screener - skill of the screener to accurately interpret response may be an issue

Subjective judgment by examiner

Need a quiet environment (,meet ANSI standards (ANSI 1977)

Long held as the gold standard in hearing screening

OAE/Pure Tone Considerations

OAE

Average test time is fast (7 seconds to 3 minutes average)

Pass/fail result provided by machine for lay screeners

Is being used in many early childhood settings

One piece of equipment can test all ages

Cost of equipment may be more expensive

Pure Tone

Average test time longer (7 minutes)

Pass/fail determined by screener observation

Cannot screen children who due to age, cognitive and/or developmental level are unable to cooperate and learn task

Portable audiometers are relatively inexpensive and fairly uncomplicated

OAE/Pure Tone Considerations

OAE

Has spread significantly to many early childhood settings (see ECHO project data and papers)

Increasing numbers of early childhood, preschool and healthcare provider settings have OAE equipment

Pure Tone

Has been the standard for many years but has not reached “critical mass” in screening to date

Most early childhood, healthcare provider settings do not have pure-tone audiometry