ACAE Update and Best Practices in Diagnostic Audiology Today

James W. Hall III

Chair
Accreditation Commission for Audiology Education (ACAE)

Professor
Salus University and University of Hawaii

Visiting Professor
American University of Beirut (Lebanon)

Extraordinary Professor
University of Pretoria (South Africa)

jwhall3phd@gmail.com  www.acaeaccred.org
ACAE Update and Best Practices in Diagnostic Audiology Today

- ACAE Update
  - Mission and purpose of ACAE
  - Key advantages
  - 2016 standards
  - Survey of stakeholders

- Best Practices in Audiology Today
  - Historical perspective
  - Definition and rationale
  - Clinical practice guidelines
  - Concept of value added tests
  - Instilling best practices in AuD student education
ACAE Update

Accreditation Commission for Audiology Education

1718 M Street, N.W., #297
Washington, D.C. 20036
202.986.9600
info@acaeaccred.org

Collaboration: one of our principles.
Mission of ACAE

To serve the public by establishing, maintaining and applying standards to ensure the academic quality and continuous improvement of audiology education, reflecting the evolving practice of audiology.
Purpose of ACAE

- To establish rigorous standards for full scope of practice for doctoral level audiologists
- To monitor and evaluate programs for high quality outcomes, so consistency prevails in every curriculum
- To empower audiologists to practice their chosen profession autonomously and responsibly
- To prove outcomes that ensure we are providing the highest level of audiologic care to the public
- To demonstrate readiness for limited license practitioner status in the US
ACAPE’S Key Advantages

- Expertise in accreditation domestically and globally
- Continually abreast of trends in standards and higher education
- Extensive experience and commitment in the profession and accreditation
- Entire team of audiologists and support staff working for program improvement and successful outcomes
- ACAE is entirely of, by, and for audiologists.
Aacea: 2016 Standards

- Enhanced competences including but not limited to:
  - Pharmacology
  - Genetics
  - Business/personnel management
  - Self-advocacy skills for patients and families

- Programs demonstrate how students possess a working knowledge of all competencies as well as the ability to incorporate them into practice.

- Recipients of AuD degrees will have sound knowledge and professional skills enabling them to function as autonomous direct care providers.
ACALE: 2016 Standards

- Additional standards areas including “Health and Safety Standards, e.g.,
  - Technical standards
  - Immunizations
  - Communicable and/or infectious disease policy
  - Liability insurance
  - Equipment policies
  - Emergency action plan
ACALE: 2016 Standards

Timeline for ACAE standards

- ACAE Board of Directors approved standards March 2016
- Were available at American Academy of Audiology Convention in April 2016
- Effective 2017
  - Programs had 1 year before 2016 standards took effect
  - New programs had the option to be accredited under the new standards prior to March 2017
  - The 2016 standards must be met by programs currently in process of applying for ACAE accreditation
High Educational Standards:  
*Foundation of the Profession*

- Academic Education  
  *(The Foundation)*
- Clinical Training
- Practice
ACAE Update

- Mission and Purpose of ACAE
- Key Advantages
- New 2016 Standards
- New Developments

Clinical Simulation in Audiology Education

- Acknowledgements
- Definition and rationale
- Clinical practice guidelines
- Concept of value added tests
- Instilling best practices in AuD student education
ACALE Update:
2018 Board of Directors

- James W. Hall III (Chair)
- Martha R. Mundy (Vice-Chair)
- Scott Griffiths (Secretary)
- Jeff Browne (Public Member)
- Samuel Atcherson
- Erica B. Friedland
- Hui Shing Andy Lau
- Paul Pessis
- Meggan Olek (Director)
ACAE Update:
3rd Annual Clinical Education Forum
Readying Students for Clinical Practice

8 am – 12 noon
Saturday April 21, 2018
American Academy of Audiology Convention
Nashville, Tennessee
(Co-hosted by ACAE and CAPCSD)

Panel Presentations and Discussion:
Perspectives on Student Readiness for Clinical Practice

Working Group Discussions on Focused Issues

Working Group Reports and Recommendations
A C A E U p d a t e a n d
B e s t P r a c t i c e s i n D i a g n o s t i c A u d i o l o g y T o d a y

- ACAE Update
- Best Practices in Audiology Today
  - Historical perspective
  - Definition and rationale
  - Clinical practice guidelines
  - Concept of value added tests
  - Instilling best practices in AuD student education
Origins of Audiology in the USA
Demand for Hearing Services During and After WW II
Audiology Test Battery: 70+ years Ago

- Test battery at the beginning of our profession, in order of test administration
  - Air-conduction pure tone audiometry
  - Bone-conduction pure tone audiometry
  - Speech reception thresholds
  - Word recognition (PB word lists)
  - Uncomfortable loudness level (UCL), i.e., loudness discomfort level (LDL)

Audiology Equipment in the 1950s and 1960s: *Doesn’t it look a little dated?*

GSI 162
Speech Audiometer

GSI E800
Bekesy Audiometer

Early Maico Audiometer
## Audiologic Test Battery: 
**An Update is Long Overdue**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>% Performing Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pure tone audiometry: air conduction</td>
<td>100%</td>
</tr>
<tr>
<td>Pure tone audiometry: bone conduction</td>
<td>100%</td>
</tr>
<tr>
<td>Word recognition</td>
<td>95%</td>
</tr>
<tr>
<td>Speech reception threshold</td>
<td>91%</td>
</tr>
<tr>
<td>UCL (LDL) for speech</td>
<td>83%</td>
</tr>
<tr>
<td>Tympanometry</td>
<td>45%</td>
</tr>
<tr>
<td>UCL (LDL) for tones</td>
<td>45%</td>
</tr>
<tr>
<td>Acoustic reflexes</td>
<td>20%</td>
</tr>
<tr>
<td>Otoacoustic emissions (OAEs)</td>
<td>4%</td>
</tr>
</tbody>
</table>

*Source: The Hearing Journal, December, 2002*
AACA Update and
Best Practices in Diagnostic Audiology Today

- ACAE Update
- Best Practices in Audiology Today
  - Historical perspective
  - Definition and rationale
  - Clinical practice guidelines
  - Concept of value added tests
  - Instilling best practices in AuD student education
"Those who fall in love with practice without science are like a sailor who steers a ship without a rudder or compass, and who can never be certain whither he is going."

"The noblest pleasure is the joy of understanding."

Leonardo Da Vinci
(April 15, 1452 - May 2, 1519)
Sackett’s definition of evidence-based medicine adapted to audiology:

… the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients with hearing loss and related disorders. The practice of evidence based audiology means integrating individual clinical expertise with the best available external clinical evidence from systematic research.”
Evidence-Based Practice ... Introduced in 1992

David L. Sackett, MD
Best Practice is Evidence or Research Based Practice

- Evidence-based practice is “the integration of best research evidence with clinical expertise and patient values” (Sackett et al, Evidence-Based Medicine: How to practice and teach EBM. London: Churchill, 2000, p. 1)

- EBP is a five step process
  - Focused clinical question
  - Evidence is sought to answer the question
  - Clinician evaluates the quality of evidence
  - Clinician must integrate the evidence with the patient’s clinical findings and preferred outcome to develop intervention plan
  - Document outcome and identify ways to improve it
Evidence-Based Practice:
Categories of Research Evidence
(ASHA, 2004)

1a: Well-designed meta-analysis of randomized controlled trials
1b: Well-designed randomized controlled trials
2a: Well-designed controlled studies without randomization
2b: Well-designed quasi-experimental studies
3: Well-designed non-experimental studies, i.e., correlational and case studies
4: Expert committee reports, consensus conferences and clinical experience
Best Practices in Diagnostic Audiology Today
The Literature is Now Easily Accessible
(www.nlm.nih.gov/PubMed)

PubMed

Search results
Items: 1 to 20 of 5399

1. Varying acoustic-phonemic ambiguity reveals that talker normalization is obligatory in speech processing.
   Choi JY, Hu ER, Perrachione TK.
   PMID: 29417449

2. Neuropsychological performance in patients with asymptomatic HIV-1 infection.
   Martinez-Banfi M, Vélez JI, Perea MV, García R, Puentes-Rozo PJ, Mebarak Chams M, Ladera V.
   PMID: 29411628

3. Influence of non-contextual auditory stimuli on navigation in a virtual reality context involving executive functions among patients after stroke.
   Cogné M, Violeau MH, Klinger E, Joseph PA.
Evidence-Based Practice is Standard of Care: Definitions of Standard of Care

- Consistent with local, regional or national clinical practice
- Follows guidelines or recommendations on clinical practice approved by national multi-disciplinary professional committees or panels, e.g., Joint Committee on Infant Hearing
- Follows guidelines on clinical practice approved by national professional organizations, e.g., AAA or ASHA
- Is consistent with statements of
  - Scope of Practice
  - Code of Ethics
- Is in compliance with Federal guidelines for clinical practice and services, e.g., Joint Committee on Accreditation of Healthcare Organizations (JCAHO)
ACAE Update and
Best Practices in Diagnostic Audiology Today

- ACAE Update
- Best Practices in Audiology Today
  - Historical perspective
  - Definition and rationale
  - Clinical practice guidelines
  - Concept of value added tests
  - Instilling best practices in AuD student education
The Clinical Practice Guidelines Development Process

The Clinical Practice Guidelines Development Process

July 2006

Clinical practice guidelines (CPG) advance the mission of the American Academy of Audiology (Academy) by providing a framework of clinical recommendations to audiologists for the express purpose of providing state-of-the-art care for individuals with hearing and balance disorders. CPG have been defined as "systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances" (Committee to Advise the Public Health Service on Clinical Practice Guidelines, Institute of Medicine, 1990). More specifically, well-developed guidelines have the potential to (1) enhance current, appropriate clinical practice; (2) improve the quality of audiological diagnostic assessment and treatment; (3) result in better patient outcomes; (4) improve cost-effectiveness of the care; and (5) identify areas requiring further investigation. These recommendations should be provided in a manner that affords the practitioner a more complete understanding of the topical evidence available for each condition, procedure, and treatment option presented.
Best Practices in Diagnostic Audiology Today
Examples of Clinical Practice Guidelines in the USA
(audiology.org)

American Academy of Audiology
Position Statement and
Clinical Practice Guidelines
Ototoxicity Monitoring
October 2009

American Academy of Audiology
Clinical Practice Guidelines
Diagnosis, Treatment
and Management of Children
and Adults with Central Auditory
Processing Disorder
August 2010
Best Practices in Diagnostic Audiology Today

More Examples of Clinical Practice Guidelines in the USA (audiology.org)

American Academy of Audiology
Clinical Practice Guidelines

Pediatric Amplification

June 2013

Guidelines for
Identification and Management
of Infants and Young Children
with Auditory Neuropathy Spectrum Disorder

The Children’s Hospital
Bill Daniels Center for Children’s Hearing
Guidelines Development Conference
at NHS 2008, Como, Italy
Examples of Current Practice Guidelines in Audiology: UK

Recommended Procedure
Tympanometry

Date: August 2013

Recommended Procedure
Pure-tone air-conduction and bone-conduction threshold audiometry with and without masking

Date: September 2011  [Minor amendments: February 2012, and December 2015]

Position Statement
Auditory Processing Disorder (APD)

Date of this version: March 2011
Examples of Current Practice Guidelines in Audiology:

UK

**Recommended Procedure**

**Taking an aural impression**

Date: February 2013

**Recommended Procedure (Supplement)**

**Taking an aural impression: children under 5 years of age**

Date: February 2013
Examples of Current Practice Guidelines in Audiology: UK

NEWBORN HEARING SCREENING AND ASSESSMENT

Guidance for Auditory Brainstem Response testing in babies

Version 2.1
March 2013

NHSP Clinical Group
Graham Sutton¹, Guy Lightfoot² (Co-editors)
Contributors: John Stevens³, Rachel Booth⁴, Siobhan Brennan⁵, Rachel Feirn⁶,
Rhue Maradith⁷

Guidelines for the Assessment and Management of Auditory Neuropathy Spectrum Disorder in Young Infants

Version 2.2
August 2013

NHSP Clinical Group
Rachel Feirn¹ (Editor), Graham Sutton², Glynnis Parker³, Tony Sirimanna⁴, Guy Lightfoot⁵, Sally Wood⁷
Examples of Current Practice Guidelines in Audiology: UK

Tinnitus in Children
Practice Guidance

Recommended Procedure

Cortical Auditory Evoked Potential (CAEP) Testing

Date: May 2016
Examples of Some ASHA Audiology Guidelines
(www.asha.org)

- Guidelines for Audiologic Screening (1997)
- Guidelines for Audiology Service Delivery in Nursing Homes (1997)
- Guidelines for Audiology Service Provision in and for Schools (2002)
- Clinical Practice Guidelines: Cerumen Impaction (2008)
- Guidelines for Audiologists Providing Informational and Adjustment Counseling (2008)
ACALE Update and
Best Practices in Diagnostic Audiology Today

- ACAE Update
- Best Practices in Audiology Today
  - Historical perspective
  - Definition and rationale
  - Clinical practice guidelines
  - Concept of value added tests
  - Instilling best practices in AuD student education
The Concept of Value Added Tests (VATs): Rationale for Inclusion in a Test Battery

- Procedure adds value to the description of auditory status for the patient, including information that is:
  - Not available from other procedures and/or
  - Obtained quicker than with another procedure and/or
  - Poses less risk than an alternative procedure and/or
  - Costs less than a comparable procedure
  - Findings are more reliable or valid than an alternative test
  - Highly sensitive to auditory dysfunction
  - Provides site-specific information on auditory dysfunction
  - Contributes to more accurate diagnosis
  - Useful in managing the patient and/or
  - Information leads to better outcome for the patient
Test Times for Administering Traditional Behavioral Tests: Cooperative Children > 6 – 14 Years Old
(Time Date from Basar & Canbaz, J Int Adv Otol, 11, 42-47, 2015)

- Speech recognition threshold (SRT)
  - Mean both ears = 4.7 mins
  - Range = 1-10 mins

- Bone conduction pure tone audiometry
  - Mean both ears = 5.6 mins
  - Range = 1-10 mins

- Word recognition performance
  - Mean both ears = 5.3 mins
  - Range = 1-10 mins

**NOTE:** Total average time for SRT and BC = > 10.3 mins. Routine use adds to health care costs annually with no clinical value.
The Concept of Value Added Tests: 
Selective Use of Speech Reception Threshold 
(Roscher & Hall, 2005)

- Little or no value for
  - Adult patients age 20 to 65 years
  - Patients with normal hearing thresholds
  - Consistent findings available before pure tone audiometry
    - Normal tympanograms bilaterally
    - Acoustic reflex thresholds at expected normal levels
    - Otoacoustic emission amplitudes within normal limits

- Speech reception threshold measurement in such patients will
  - Wastes valuable test time
  - Not add value to the diagnosis
  - Not add value to referral or management decisions
  - Not lead to improved patient outcome
The Concept of Value Added Tests (VATs): A Critical Look at Three Traditional Procedures

Bone Conduction Pure Tone Audiometry Only As Indicated


Only 36% of patients had conductive component to hearing loss
The Concept of Value Added Tests:
Selective Use of Bone Conduction Pure Tone Audiometry

- No value in many patients, e.g., older children and adults with
  - No history of middle ear disease
  - Pattern of findings available before pure tone audiometry
    - Normal tympanograms bilaterally
    - Acoustic reflex thresholds at expected normal levels
    - Normal OAE amplitudes for low frequency stimuli
  - Air conduction pure tone audiometry showing sloping high frequency hearing loss plus any of the above

- Bone conduction pure tone audiometry in such patients will
  - Waste valuable test time
  - Not add value to the diagnosis
  - Not add value to referral or management decisions
  - Not lead to improved patient outcome
Assessment of Word Recognition with PB Words: A Long Tradition Since the 1920s, 1930s & 1940s

Harvey Fletcher (1884-1981)

Ira Hirsh (1922 - 2010)
The Concept of Value Added Tests (VATs): Selective Use of Word Recognition in Quiet

- Patient is an adult with the chief complaint of difficulty hearing in noisy settings
- Patient converses easily in the clinic without visual cues
- Pure tone audiometry findings are entirely normal
- Word recognition in quiet will ...
  - Waste valuable test time
  - Not add value to the diagnosis
  - Not add value to management
  - Not lead to improved patient outcome

- Instead
  - Perform a test of speech perception in noise
  - Consider other tests of auditory processing
## The Concept of Value Added Tests (VATs):
### Rationale for Inclusion of Aural Immittance Measures in Routine Diagnostic Test Battery (1)

- **Contributes to understanding of patient’s auditory status**
  - Yes ... hundreds of published studies

- **Provides information not available from other procedures**
  - Yes ... only direct measure of middle ear function

- **Information obtained quicker than another procedure**
  - Yes ... test time of ~ 4 minute for both ears

- **Poses less risk than an alternative procedure**
  - No risk

- **Costs less than a comparable procedure**
  - Yes
    - Can be administered by non-audiology personnel
The Concept of Value Added Tests (VATs): Rationale for Inclusion of Aural Immittance Measures in Routine Diagnostic Test Battery (2)

- Findings are more reliable or valid than an alternative test
  - Reliable and valid in patients of all ages
  - Not influenced by listener variables
- Highly sensitive to auditory dysfunction
  - Most sensitive measure of middle ear function
- Provides site-specific information on auditory dysfunction
  - Information on structures from middle ear to brainstem
- Contributes to more accurate diagnosis
  - Findings permit diagnosis of type of hearing loss
- Provides information useful in managing the patient and/or
  - Findings directly impact medical and audiologic management
- Information leads to better outcome for the patient
  - Yes
The Concept of Value Added Tests (VATs):
**Rationale for Inclusion of OAEs in Routine Diagnostic Test Battery (1)**

- **Contributes to understanding of patient’s auditory status**
  - Yes ... hundreds of published studies

- **Provides information not available from other procedures**
  - Yes ... only direct measure of outer hair cell function

- **Information obtained quicker than another procedure**
  - Yes ... test time of ~ 30 secs - 3 minutes per ear

- **Poses less risk than an alternative procedure**
  - No risk

- **Costs less than a comparable procedure**
  - No comparable procedure but reasonable cost
  - Can be administered by non-audiology personnel
Findings are more reliable or valid than an alternative test

- Reliable and valid in patients of all ages
- Not influenced by listener variables

Highly sensitive to auditory dysfunction

- *Most* sensitive measure of cochlear (outer hair cell) status

Provides site-specific information on auditory dysfunction

- Highly site specific to outer hair cells

Contributes to more accurate diagnosis

- Yes ... Findings permit very specific diagnosis (e.g., ANSD)

Provides information useful in managing the patient and/or

- Findings directly impact medical and audiologic management

Information leads to better outcome for the patient

- Yes
Times for Administering Behavioral and Objective Tests: Cooperative Children > 6 Years Old

- Behavioral Tests = > 25 minutes
  - Speech recognition threshold (SRT) = ~ 5 mins
  - Pure tone audiometry: AC = ~ 7.5 minutes
  - Pure tone audiometry: BC = ~ 6 mins
  - Word recognition = ~ 5 – 6 mins

- Objective Tests = < 11.5 minutes
  - Tympanometry and acoustic reflexes = ~ 4.5 mins
  - DPOAEs = < 7 minutes
Proposal for a Modern Diagnostic Test Battery

In the order of testing for new patients. Test time ~ 30 - 45 minutes.

- Objective measures
  - Otoacoustic emissions (OAEs)
    - DPOAEs 500 to 8000 Hz
    - Analysis: “Normal” versus “present but abnormal” versus “absent”
  - Aural immittance measures
    - Tympanometry
    - Acoustic reflexes (crossed vs. uncrossed conditions)

- Behavioral measures
  - Pure tone audiometry (automated technique as appropriate)
    - Inter-octave frequencies (e.g., 3000 and 6000 Hz)
    - High frequency (> 8000 Hz) audiometry as indicated
    - Bone conduction measurement only as indicated
  - Speech audiometry
    - SRT as indicated
    - Word recognition (recorded material) 10 most difficult words first
    - Screen auditory processing as indicated
ACAE Update and
Best Practices in Diagnostic Audiology Today

- ACAE Update
- Best Practices in Audiology Today
  - Historical perspective
  - Definition and rationale
  - Clinical practice guidelines
  - Concept of value added tests
  - Instilling best practices in AuD student education
“… students must be critical consumers of research and be able to apply this knowledge in evidence based practice (ACAE Accreditation Standards for the Doctor of Audiology Program, p. 9).
What Is Evidence-Based Audiology?

By James W. Hall III

The classic 1976 Jerger and Hayes article on the cross-check principle is perhaps the best example of highly efficient implementation of research findings into clinical practice.

To expand on this theme, let’s look at the ACAE/NASBA accreditation standards for the Doctor of Audiology Program, 2018.

Educating AuD Students for the Practice of Evidence-Based Audiology

By James W. Hall III

This article is the second in a two-part series on evidence-based audiology and the education of audiologists. In the first article, we explored the principles of evidence-based audiology and their application in clinical practice.

There are six core components of evidence-based audiology: 1) identifying the question or problem; 2) gathering clinical evidence (systematic reviews, randomized controlled trials, etc.); 3) integrating evidence to make a decision; 4) implementing the decision; 5) evaluating the outcome; and 6) reflecting on the process.

Best Practices in Diagnostic Audiology Today

Instilling Best Practices in AuD Student Education
1. Establish an evidence based clinical culture: All academic and clinical faculty members in AuD programs must be fully committed to preaching and practicing evidence based audiology. Clear and strong statements in support of evidence based audiology should be prominent in the descriptions of the mission and curriculum of AuD programs. Systems should be in place to verify consistent evidence based practice in clinical settings, ranging from routine clinic chart chart audits to regular review of clinical policies and protocols to ensure compliance with current clinical practice guidelines.
2. A required course devoted exclusively to evidence based audiology: Scheduled within the year of the program, the course is perhaps best co-taught by one AUD-level faculty member with extensive clinical experience and duties along with another PhD-level faculty member with research expertise. Logical subject matter in the course would include:

- Introduction to research methodology/experimental design
- Lectures on best practices, standard of care, and professional liability
- Preparation of a research proposal suitable for an Institutional Review Board (IRB)
- Systematic review of clinical practice guidelines in audiology.
3. Hold weekly audiology grand rounds patient conferences to reinforce evidence based principles and practices: This traditional clinical learning forum in health professions provides students with a weekly reminder of the importance of evidence based audiology. Attendance is mandatory for students and faculty alike. Typically, the one-hour grand rounds format begins with a student giving a case study presentation, including a relevant literature review, followed by faculty led questions and comments, plus a group discussion with student participation. AuD programs lacking large and diverse clinical patient populations might consider participating via tele-conferencing in audiology grand rounds conferences available at other universities or teaching medical centers.
4. Conduct regular journal article reviews. This is another time-honored fixture the education of health professionals. Perhaps once or twice every month, a student is assigned the responsibility of selecting one or more peer-reviewed articles for review. Although all students (and faculty) are expected to read the article(s), the designated student presents a critical review of the article before opening up the session to questions, comments, and discussion. Academic and clinical faculty members actively participate in these journal article review sessions.
AACA Update and Best Practices in Diagnostic Audiology Today

THANK YOU!

QUESTIONS?