TeleAudiology: Improving Access to Hearing Healthcare

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Agenda

- Review methods of TeleMedicine/TeleAudiology.
- Why TeleAudiology?
  - Crisis in Audiology
  - Types
  - Requirements
  - Research/Validation
- Which TeleAudiology is most appropriate?

Types of TeleMedicine

- Live Video – Face to Face (Congress calls Synchronous)
- Store and Forward (Congress Calls SFT)
- Remote Patient Monitoring (Congress Calls RPM)
- Mobile Health (Congress calls mHealth)

Two Types of TeleAudiology

- **Live Video – Face to Face (Congress calls Synchronous)**
- **Store and Forward (Congress Calls SFT)**
- ~~Remote Patient Monitoring (Congress Calls RPM)~~
- ~~Mobile Health (congress calls mHealth)~~

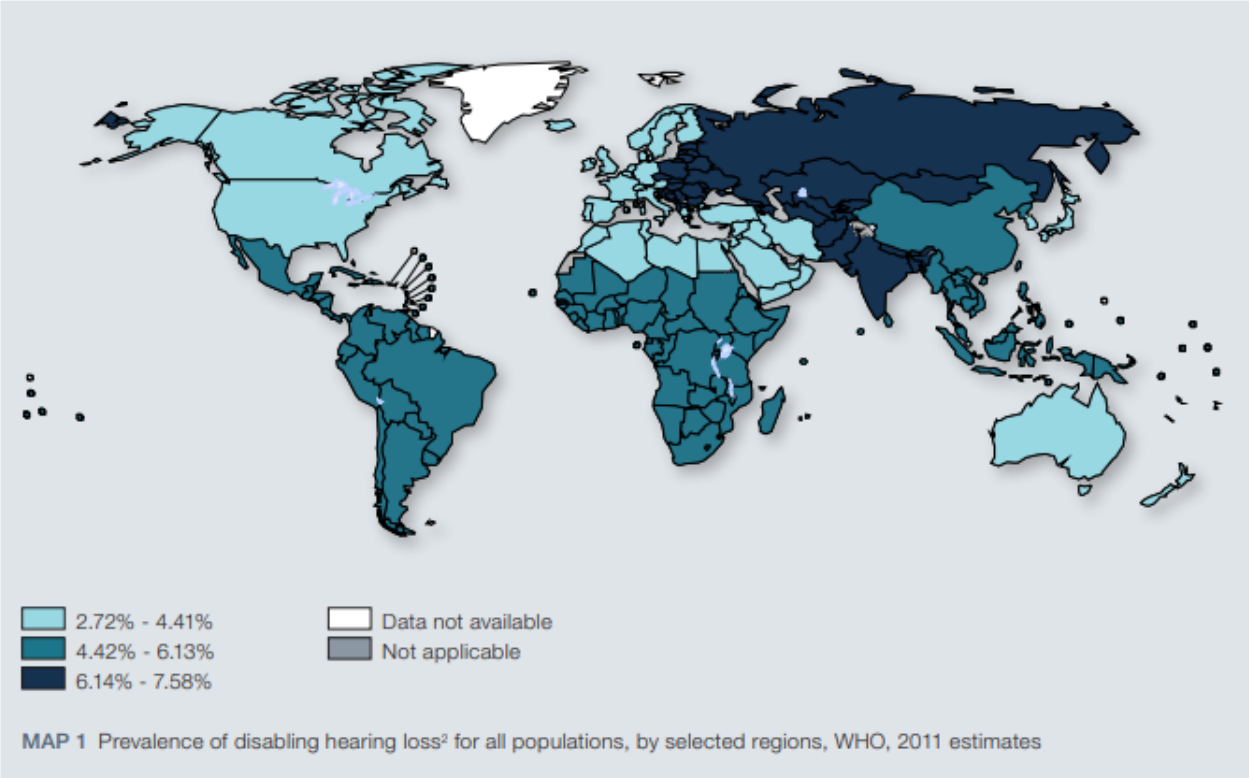
Crisis in Audiology

- Growing need for hearing healthcare
  - Government funded screening programs for adults and children
  - Follow up – screening, self referrals, medical referrals – all ages
  - Ageing population
- Flat or shrinking profession
  - Not enough audiologists to meet the need
  - Underserviced areas globally

Crisis in Audiology

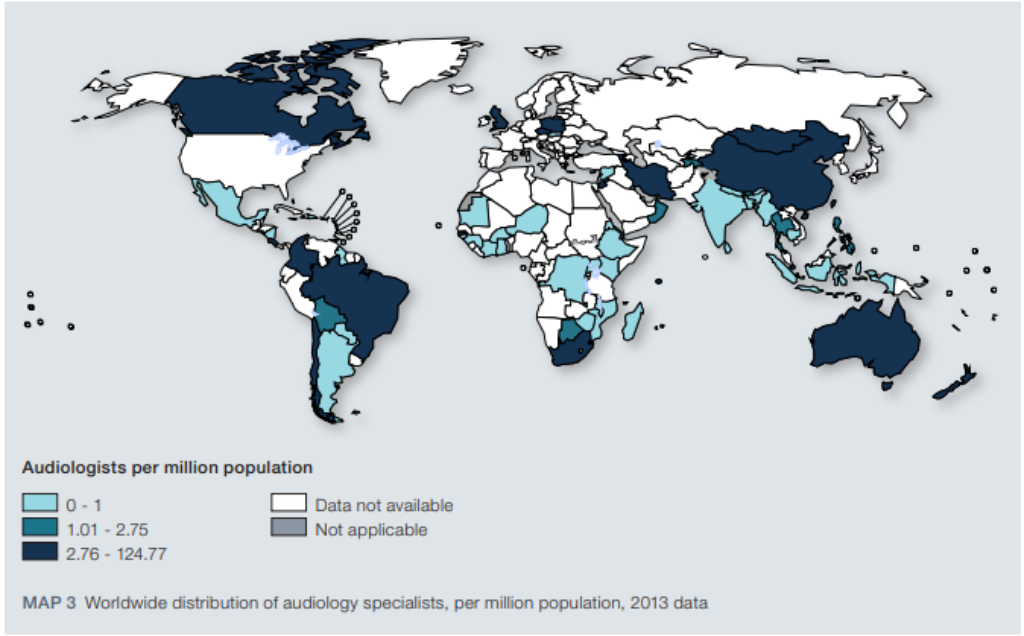
- Barry Freeman. **The Crisis Coming in Audiology**. Audiology Today Nov/Dec 2009
- I. Windmill & B. Freeman. **Demand for Audiology Services: 30 Year Projection and Impact on Academic Programs**, JAA 2013; 24, 407-413
- World Health Organization. **Multi-country assessment of national capacity to provide hearing care.** ISBN 978 92 4 150657 1 (NLM classification: WV 270) © World Health Organization 2013
- Planey, A. **Audiologist availability and supply in the US: A mulit-scale spatial and political economic analysis**. Social Science & Medicine 222 (2019) 216-224

Disabling Hearing Loss



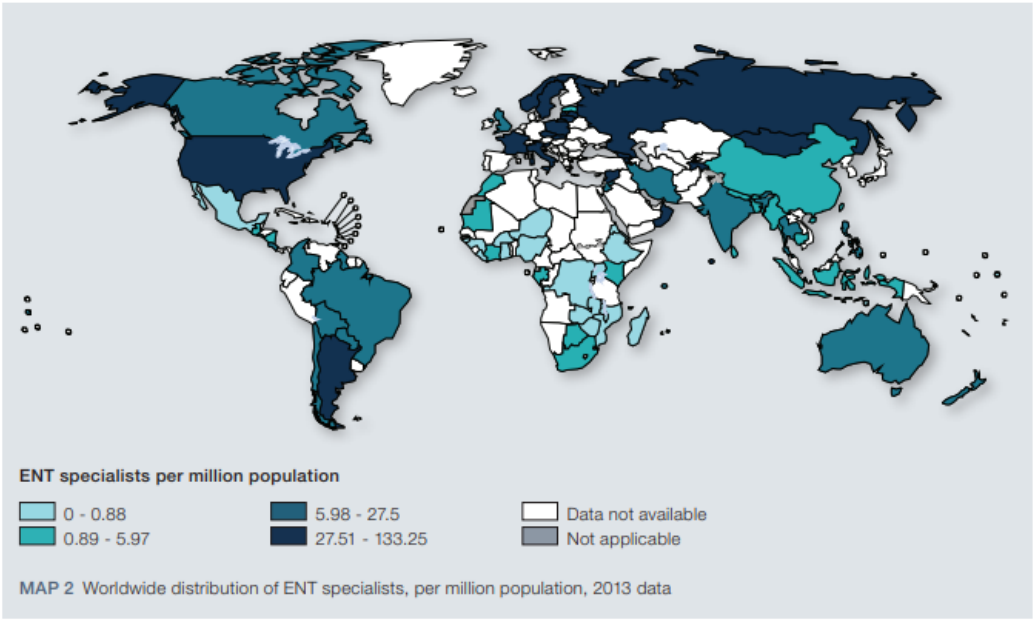
MAP 1 Prevalence of disabling hearing loss[2] for all populations, by selected regions, WHO, 2011 estimates

Audiologists per million



MAP 3 Worldwide distribution of audiology specialists, per million population, 2013 data

ENT per million



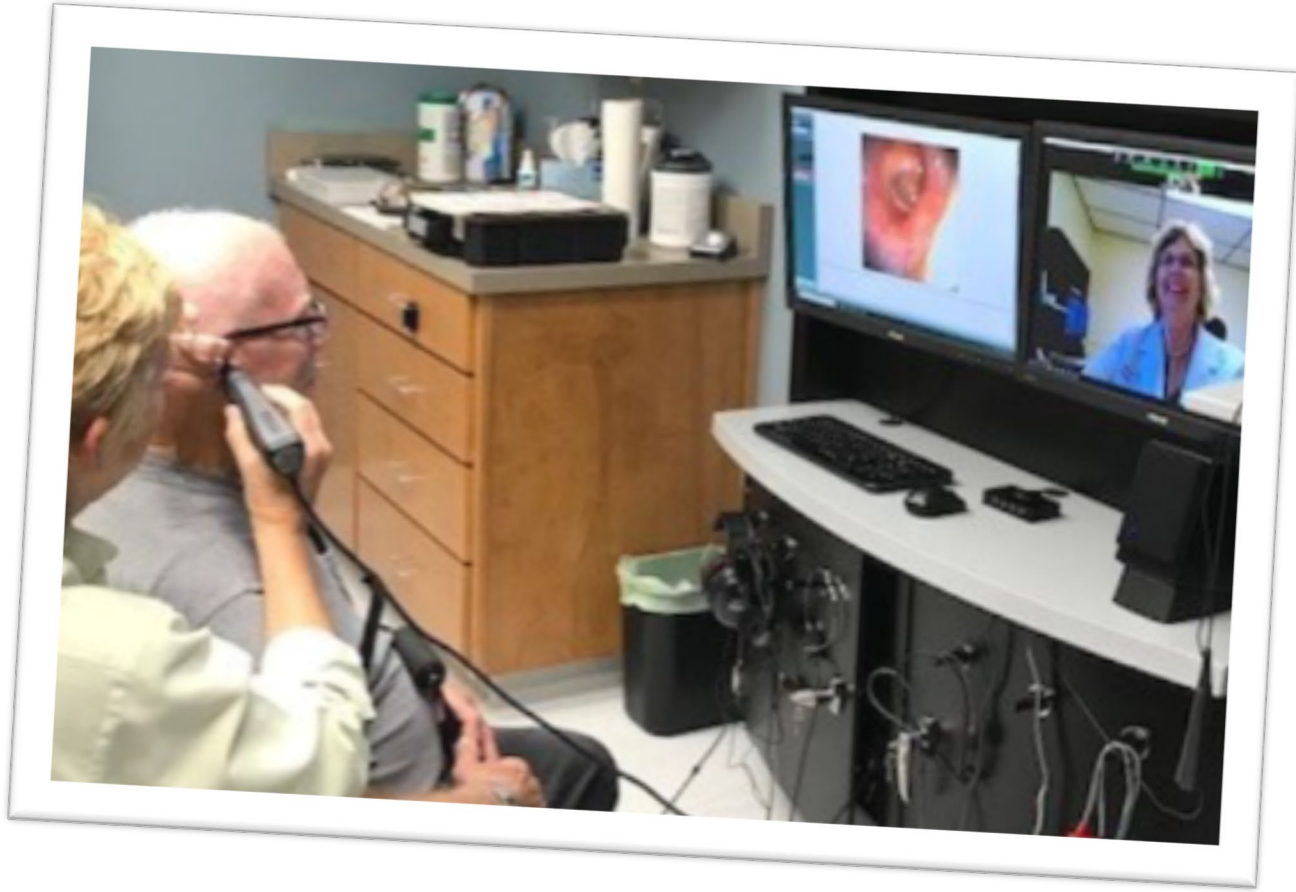
MAP 2 Worldwide distribution of ENT specialists, per million population, 2013 data

World Health Organization. **Multi-country assessment of national capacity to provide hearing care.** ISBN 978 92 4 150657 1 (NLM classification: WV 270)

Provide Quality Care Virtually

High-tech solutions for flexibility, quality, and convenient care

- Expand Geographical Reach
- Overcome Staffing Challenges
- Maximize Schedule Effectiveness
- Increase Patient Access to Care

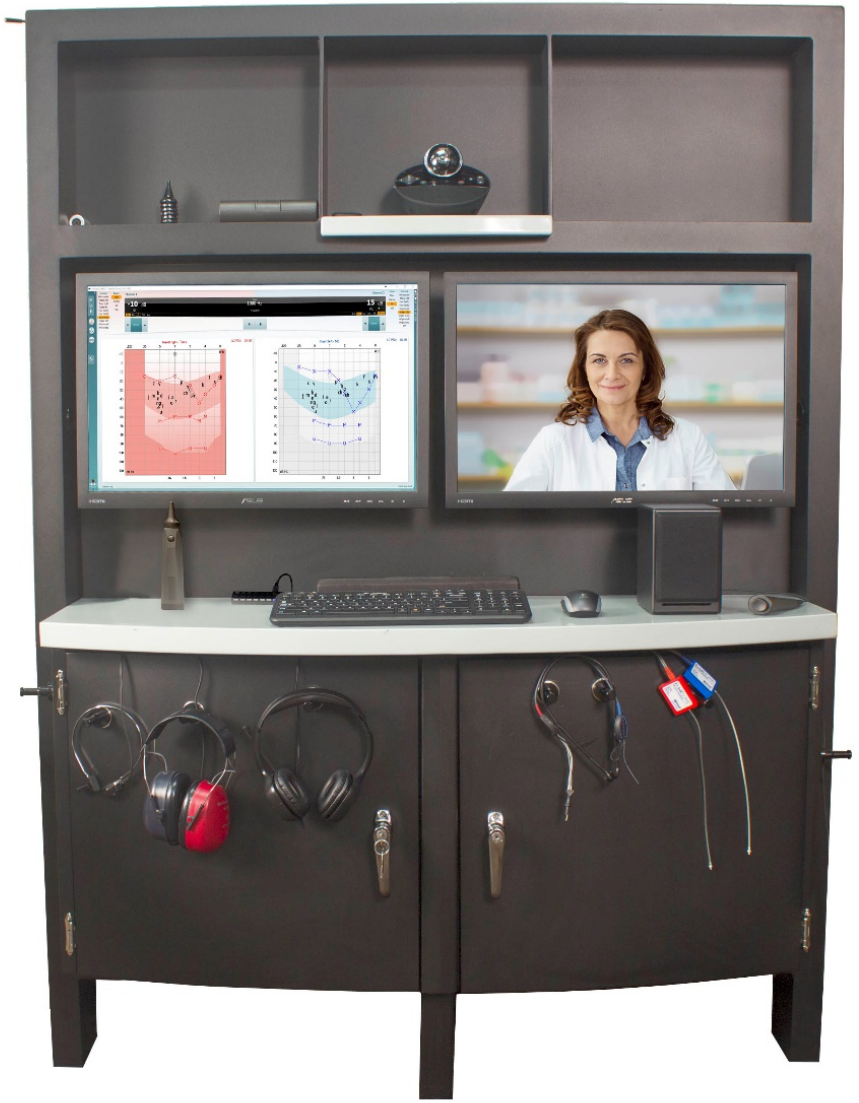


Live Video – Face to Face

- Personnel Requirements
  - Live Audiologist in one office
  - Trained technician in other office
    - Otoscopy
    - Transducer placement
    - Facilitate video conference call
- Technology Requirements
  - Internet connection to support video conference
  - Reliable power for equipment

Live Video – Face to Face

- Traditional “live” appointment
- Equipment:
  - PC Based audiometer, Video Otocope, Room Monitor, REM, Hearing aid programming software
- Research/Validation:
  - Proven tests and equipment
  - Patient surveys indicate appointments are effective and convenient
  - Requires audiologist to be present at appointment



Store and Forward - GSI AMTAS

- **A**utomated **M**ethod for **T**esting **A**uditory **S**ensitivity
- Software program – works with GSI audiometers or Microsoft Tablets
  - ***Software*** is loaded on a PC or tablet
  - Connected to a GSI Audiometer
  - Connected to a tablet
- Self administered automated test for obtaining a diagnostic or screening audiogram
- Patented algorithms ensure quality and reliability of evaluation.

Store & Forward - GSI AMTAS Pro

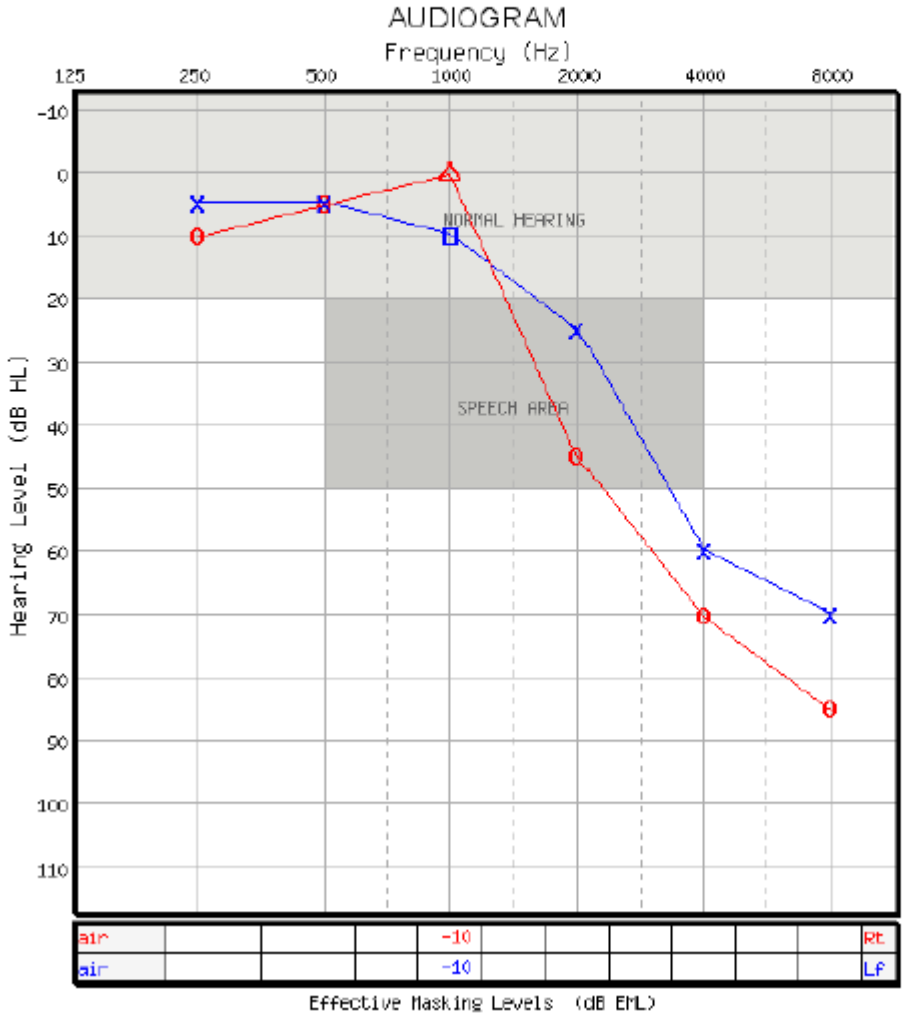
- Personnel Requirements
  - Technician to place transducers and email results
  - Audiologist to interpret results on his/her own time
- Telehealth:
  - Masked air and bone conduction thresholds
  - Masked SRT and WRS speech audiometry
- Equipment Required:
  - GSI Audiometer (AudioStar Pro or Pello with AMTAS License)
  - PC with AMTAS Software
  - Quiet Testing Area

Store and Forward - GSI AMTAS Flex

- Personnel Requirements
  - Technician to place transducers and email results
  - Audiologist to interpret results on his/her own time
- Threshold Mode:
  - Pure tone air conduction thresholds
  - Masking
- Required:
  - Windows Tablet with AMTAS Software
  - Calibrated Headphones
  - Quiet room

Patient Information
Gene Bartsch

GSI-AMTAS™ Hearing Report



QUALITY ASSESSMENT (Air Only)		
Predicted Accuracy	GOOD	
Quality Indicators	Value	%ile
Predicted Avg. Abs. Diff. (dB)	3.593	45
Time per Trial (s)	3.544	40
False Alarm (%)	11.11	70
Avg. Test Retest Diff. (dB)	2.500	23
QC Fail (%)	0.000	0

LEGEND	Right	Left
Masked Air	△	□
Unmasked Air	O	X

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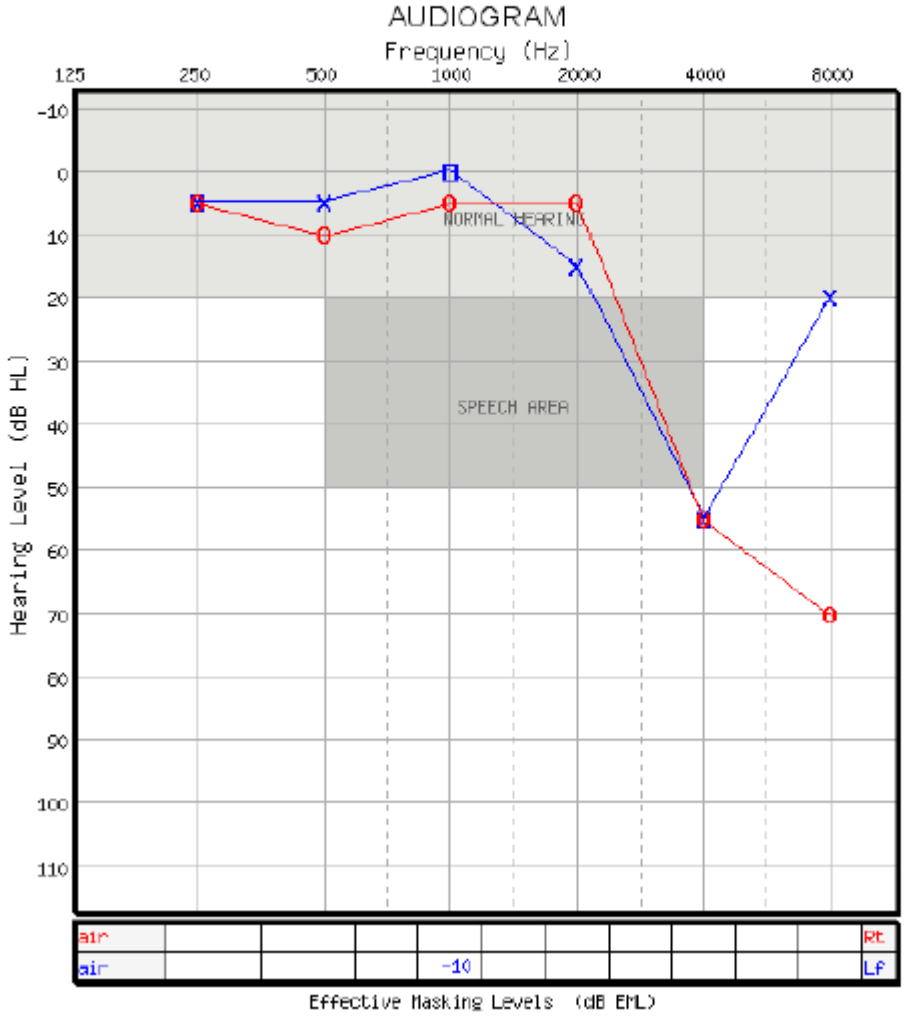
GSI-AMTAS™ Hearing Report



QUALITY ASSESSMENT (Air Only)		
Predicted Accuracy	**POOR**	
Quality Indicators	Value	%ile
Predicted Avg. Abs. Diff. (dB)	11.68	90
Time per Trial (s)	3.313	25
False Alarm (%)	30.43	95
Avg. Test Retest Diff. (dB)	12.50	100
QC Fail (%)	7.143	90

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AMTAS Publications

- Margolis, R.H. Automated Audiometry – Progress or Pariah? Audiology Online (www.audiologyonline.com). January 17, 2005.
- Margolis, R.H. Automated Audiometry: Progress or Pariah. Audiology Today 17:21, 2005.
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- Margolis, R.H., Saly, G.S. Toward a standard description of hearing loss. Int. J. Audiology 46, 746-758, 2007.
- Margolis, R.H., Morgan, D.E. The Value of Automated Audiometry. Insights in Practice for Clinical Audiology, January 2008.
- Margolis, R.H., Saly, G.L. Prevalence of hearing loss types in a clinical population. Ear and Hearing, 29, 524-532, 2008.
- Margolis, R.H., Saly, G.L. Toward a standard description of hearing loss. Int. J. Audiology, 46, 746-758, 2007.
- Margolis, R.H., Saly, G.L. Asymmetrical Hearing Loss: Definition, Validation, Prevalence. Otology & Neurotology, 29, 422-431, 2008.
- Margolis, R.H., Morgan D.E. Automated Pure-Tone Audiometry – An Analysis of Capacity, Need, and Benefit. Amer. J. of Audiology, 17, 109-113, 2008.
- Margolis, R.H., Glasberg, B.R., Creeke, S., Moore, B.C.J. AMTAS – Automated Method for Testing Auditory Sensitivity: Validation Studies. Int. J. Audiology,49, 185-194, 2010.
- Margolis, R.H., Frisina, R., Walton, J.P. (2011). Automated method for testing auditory sensitivity: II. Air Conduction Audiograms in Children and Adults. *Int J Audiology,* 50, 434-439, 2011.
- Margolis, R.H., Moore, B.C.J. Automated method for testing auditory sensitivity: III. Sensorineural hearing loss and air-bone gaps. *Int J Audiology,* 50, 440-447, 2011.
- Margolis, R.H., Eikelboom, R.H., Johnson, C., Ginter, S.M., Swanepoel, D.W., Moore, B.C.J. False Air-Bone Gaps at 4 kHz in Listeners with Normal Hearing and Sensorineural Hearing Loss. *Int. J. Audiology* 52:526-532, 2013.

Which TeleAudiology?

Live Video

- Basic Audiometry
- Hearing Aid Fittings/Adjusting
- Counseling
- Follow up care

Store and Forward

- Basic Air/Bone/Speech Diagnostic Evaluation
- Adults and older children

Discussion