GSI AMTAS: Pro vs AMTAS Flex Operation and Integration

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Learning Outcomes

- Describe the differences between tests available in AMTAS Flex and AMTAS Pro.
- Explain how to transfer to both the AMTAS Pro and Flex into GSI Suite.
- Define 2 scenarios for AMTAS Pro and 2 scenarios for AMTAS Flex.

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Agenda

- Review of AMTAS
- Introduction of AMTAS Pro and AMTAS Flex
- Compare and Contrast AMTAS Pro and AMTAS Flex Operation
- Compare and Contrast AMTAS Pro and AMTAS Flex Integration
- Summary and Wrap up
- Discussion

3

Significant Audiology Changes Predicted

The Crisis Coming in Audiology. Barry Freeman, Audiology Today Nov/Dec 2009

"A shortfall in the number of audiologists is predicted to occur in the not-so-distant future. If we do not address this impending crisis, any gaps in care will be filled by alternatives outside the profession."

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Incidence of Hearing Loss

- World Health Organization, March 2015
  - 360 million people
    - 328 million Adults and 32 million children
  - 1/3 of people over 65 have hearing loss
- US Department of Health and Human Services
  - About 2 to 3 out of every 1,000 children
  - 30 million aged 12 years or older has hearing loss

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Flat Profession vs Growing Need

"Demand for Audiology Services: 30 Year Projection and Impact on Academic Programs" I. Windmill & B. Freeman, JAA 2013; 24, 407-413

- About 16,000 licensed audiologists
  - 20 % do not impact/participate in patient care.
  - Of the remaining 12,800, only 11,200 practice full time
  - About 600 Audiologist graduate each year (estimated that 40% never enter the field)
  - 400 retire each year
- Solution for demand
  - Number of audiologists must be increased
  - Increase productivity and efficiency.

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Other Factors influencing change in Audiology

- Telehealth
- PSAPs
- Over the Counter Hearing Aids
- Demands for efficiency
- Hearing aid delivery models changing
- Big box stores selling hearing aids

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Addressing the changing climate in Audiology.

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amtas™

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GSI AMTAS - Overview

- **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
    - AudioStar Pro
    - Pello
  - Connected to a tablet
- Self administered automated test for obtaining a diagnostic or screening audiogram
- Patented algorithms ensure quality and reliability of evaluation.

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AMTAS Pro and AMTAS Flex

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amtas pro™

- Clinical Use:
  - Masked air and bone conduction thresholds
  - Masked SRT and WRS speech audiometry
- Required:
  - GSI Audiometer (AudioStar Pro or Pello with AMTAS License)
  - PC with AMTAS Software
- Optional:
  - Touch screen computer/monitor

amtas pro™

- Telehealth:
  - Masked air and bone conduction thresholds
  - Masked SRT and WRS speech audiometry
- Required:
  - GSI Audiometer (AudioStar Pro or Pello with AMTAS License)
  - PC with AMTAS Software and telehealth software
  - Telehealth camera with otoscope attachment
  - Quiet Testing Area

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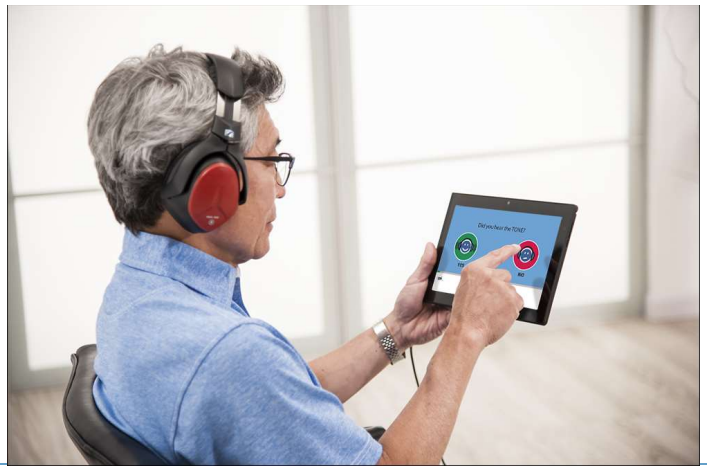
amtas flex™

- Screening Mode:
  - Pure tone screening – 4 frequencies
  - Adjustable level (limited)
- Required:
  - Windows Tablet with AMTAS Software
  - Calibrated Headphones
  - Quiet room



amtas flex™

- Threshold Mode:
  - Pure tone air conduction thresholds
  - Masking
- Required:
  - Windows Tablet with AMTAS Software
  - Calibrated Headphones
  - Quiet room

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Key Differences between AMTAS Pro and Flex

AMTAS PRO

- Must be used with an audiometer
  - AudioStar Pro
  - Pello
- Diagnoses Hearing Loss
  - Site of lesion
  - Configuration
- Air/Bone/Speech

AMTAS Flex

- Used with a tablet
- Portable
- Air Conduction ONLY
  - Screening
  - Threshold
- Does not Diagnose Hearing Loss

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Amtas Pro and Flex

Operation

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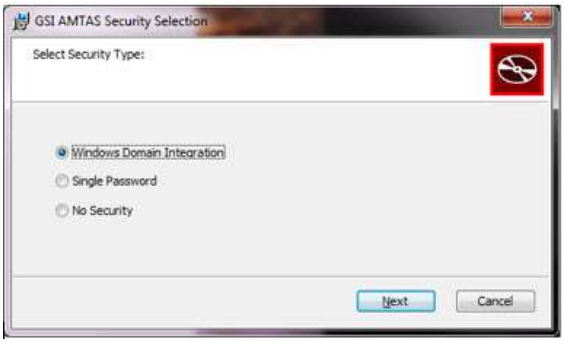
Amtas General information

- Release version – 1.3
- Security options
  - **Windows Domain Integration**—No changes
  - **Single Password**—One admin account. Not connected to Windows
  - **No Security**—No passwords required; no restrictions
- Config App



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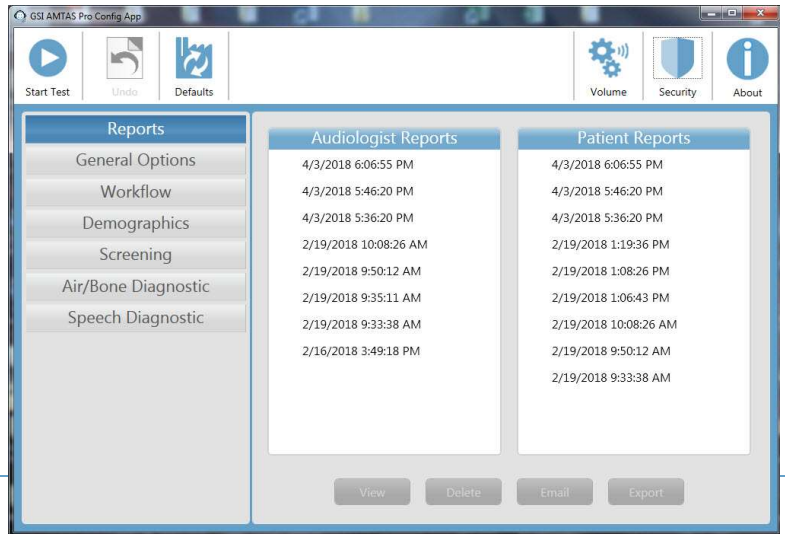
AMTAS Pro Config App



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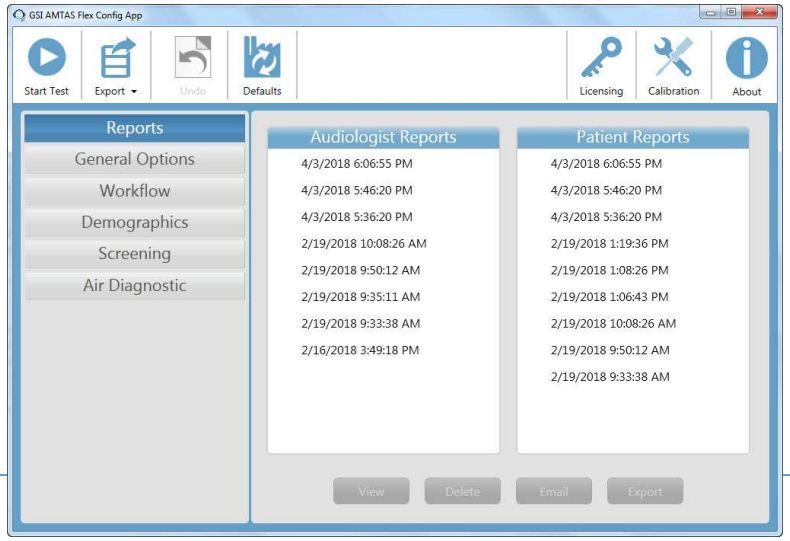
AMTAS Flex Config App



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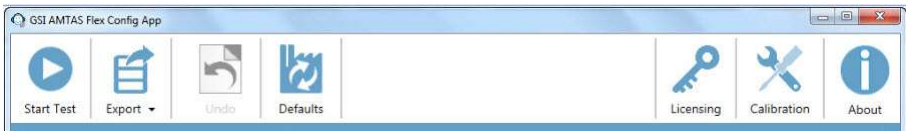
Menu Bar: Flex Export



Data can be imported into GSI Suite 2.5.

Selecting Export from Menu bar performs the Batch export.

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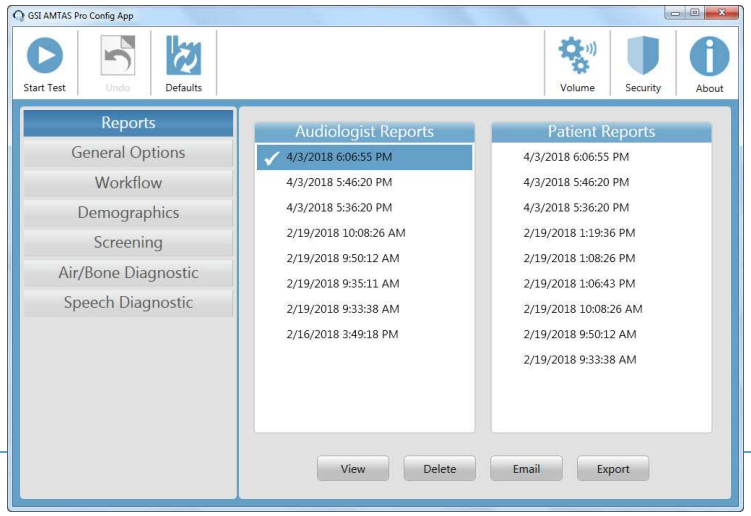
Reports: Flex and Pro



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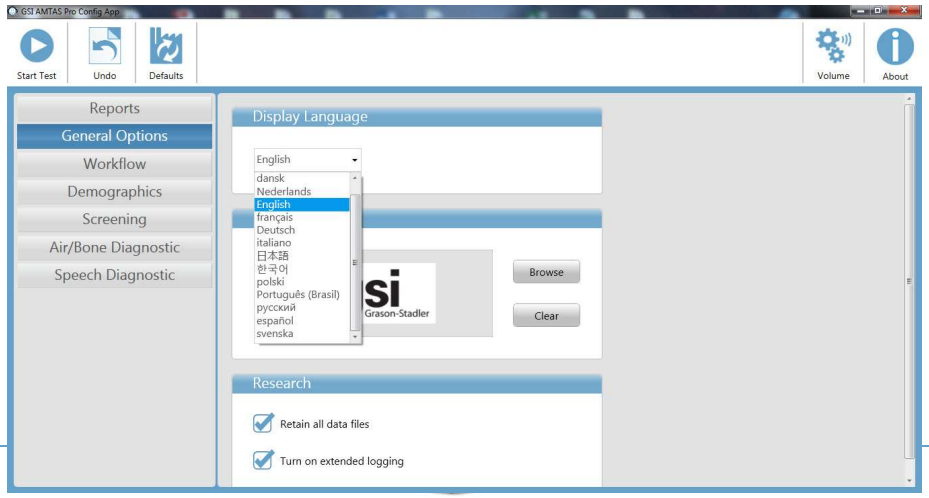
General Options: Flex and Pro



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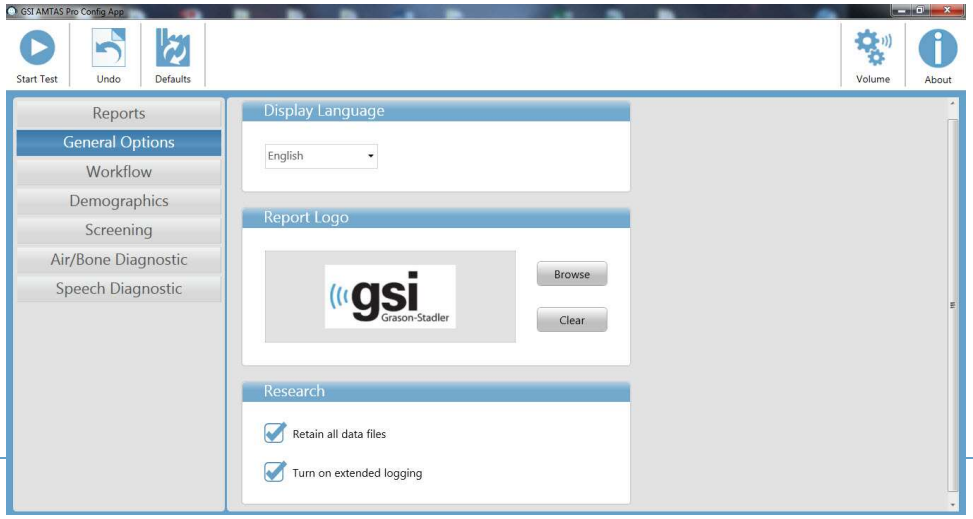
General Options-Flex and Pro



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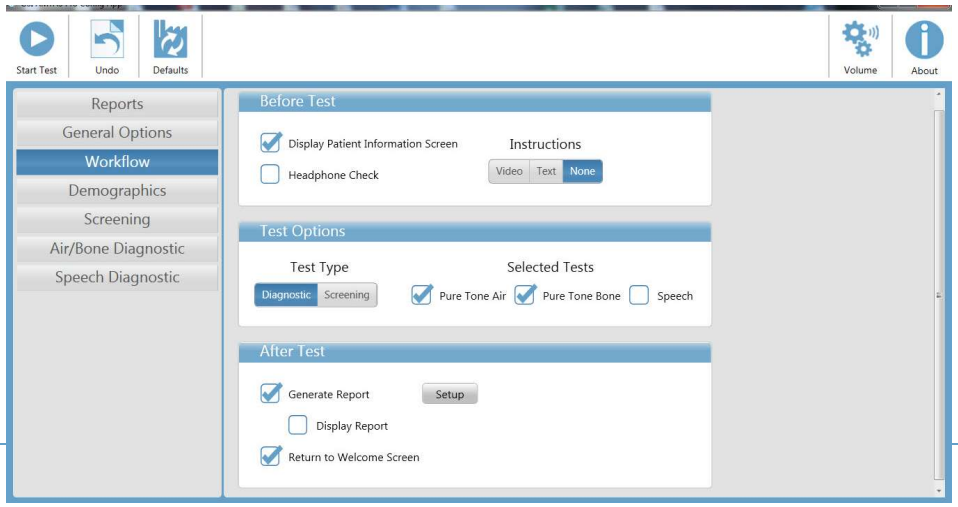
Workflow: Flex and Pro



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Workflow: Before Test

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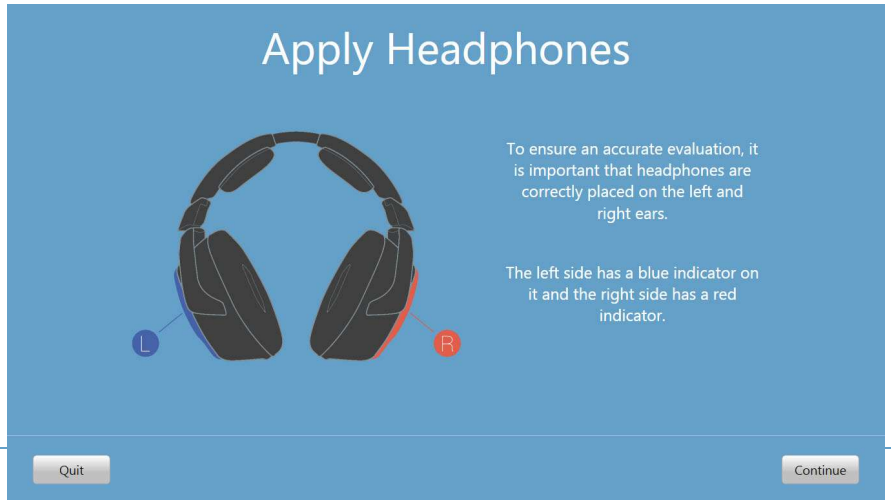
Workflow: Headphone Check



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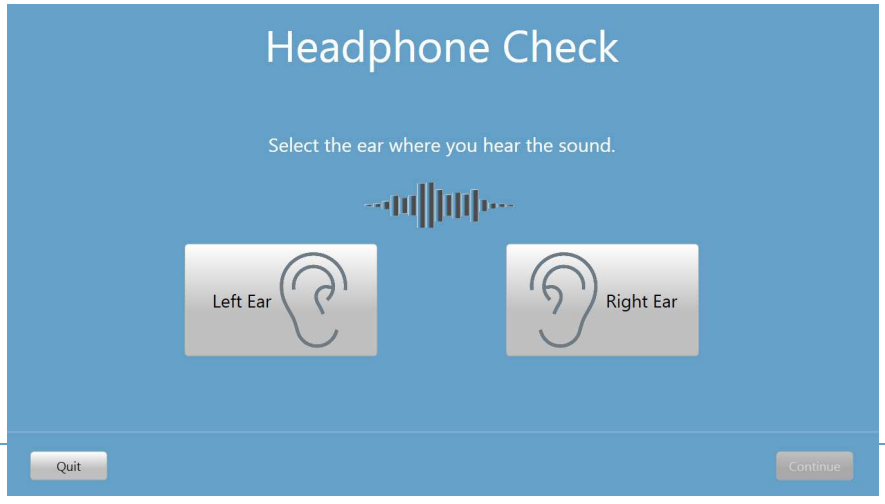
Workflow: Headphone Check



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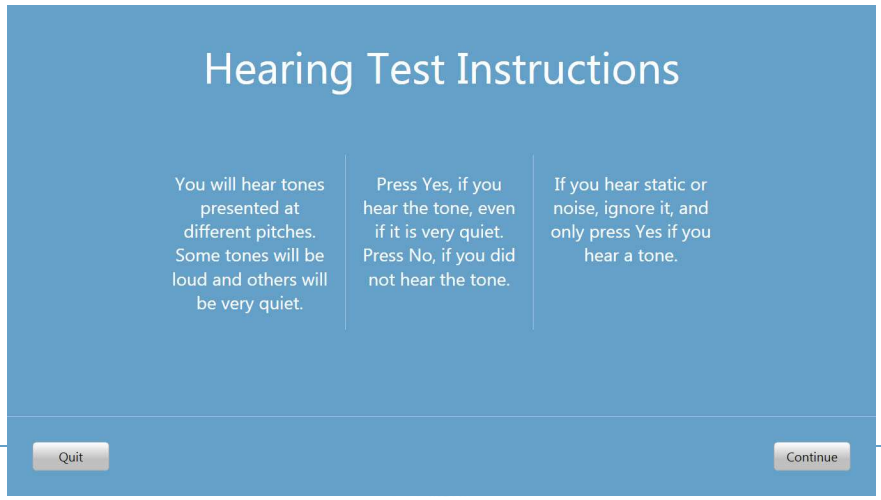
Workflow: Text Instructions



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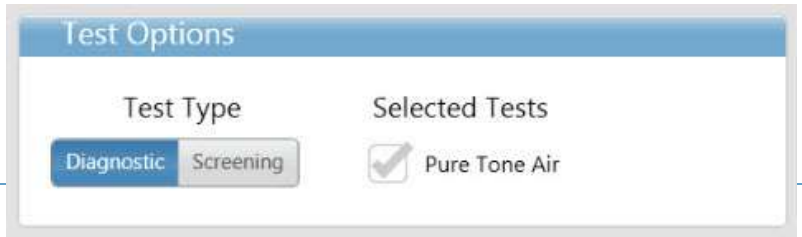
Workflow: Test Options



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Workflow: After Test

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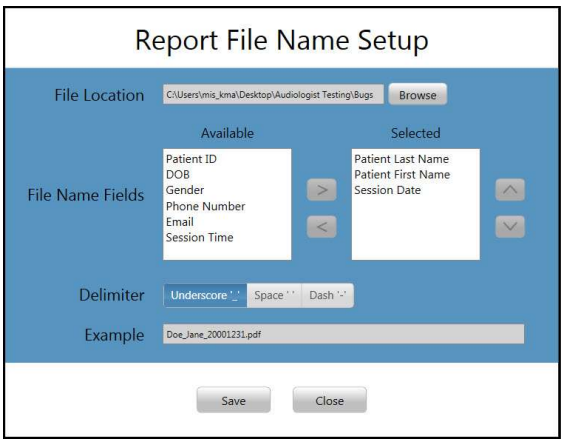
Workflow: Generate Report

Allows user to name Report



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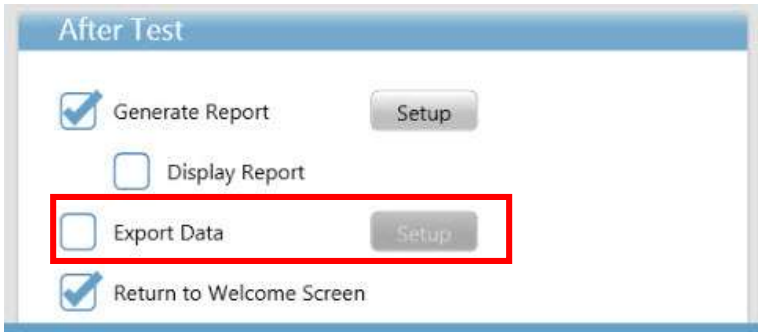
Workflow: After Test **Flex** Only



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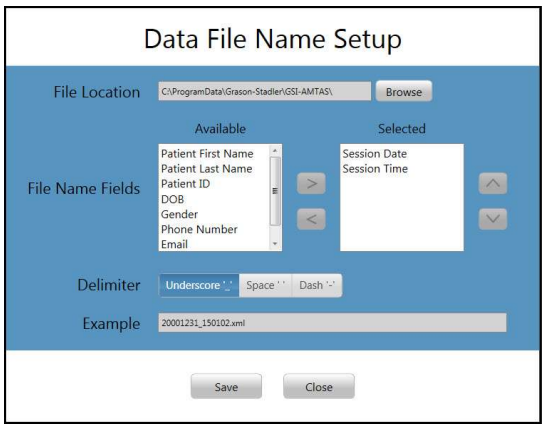
Workflow: After Test Flex Export (EMR)



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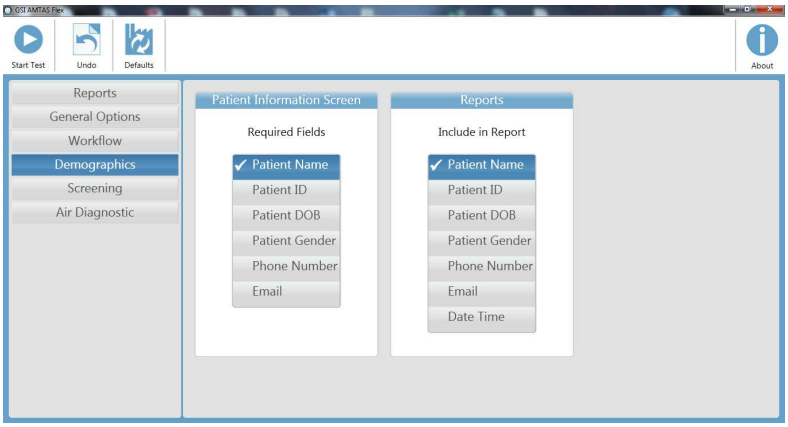
Demographics: Flex and Pro



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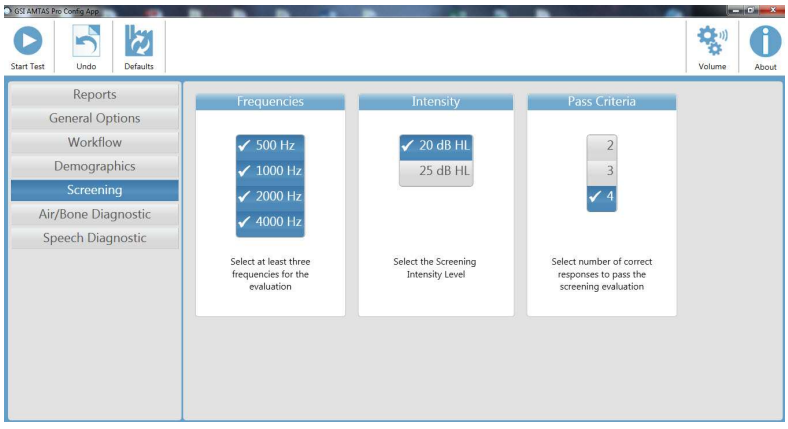
Screening: Flex and Pro



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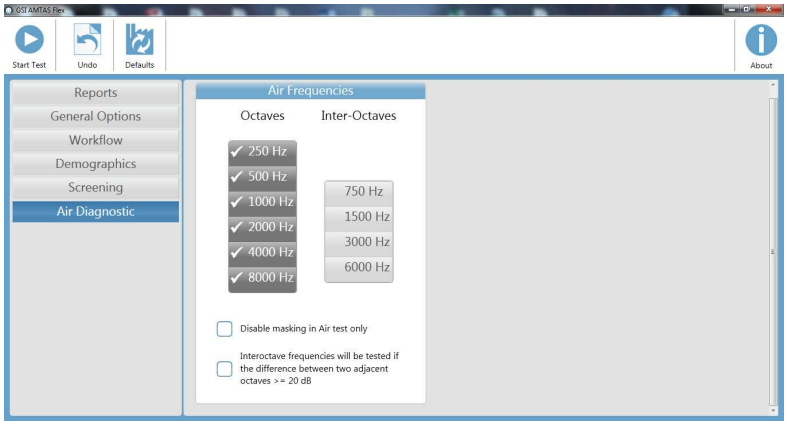
Air Diagnostic Flex



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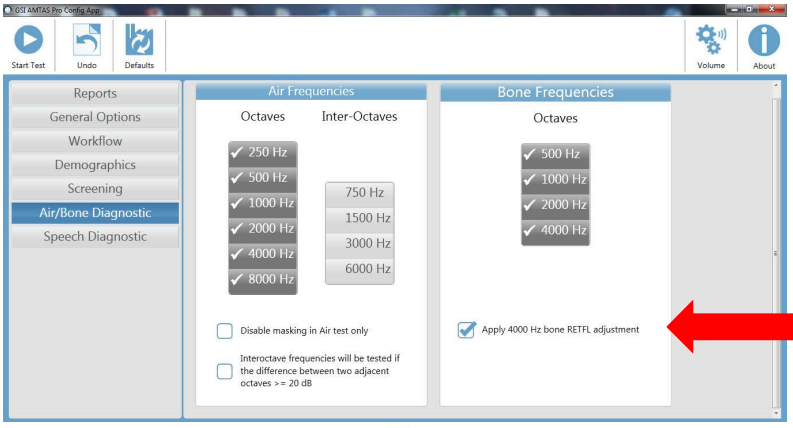
Air/Bone Diagnostic: Pro



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Apply 4000 Hz bone RETSPL adjustment

Adds 15 dB to the 4000 Hz bone conduction threshold

This adjustment is provided to eliminate the air-bone gap at 4 kHz that has been reported in the literature.

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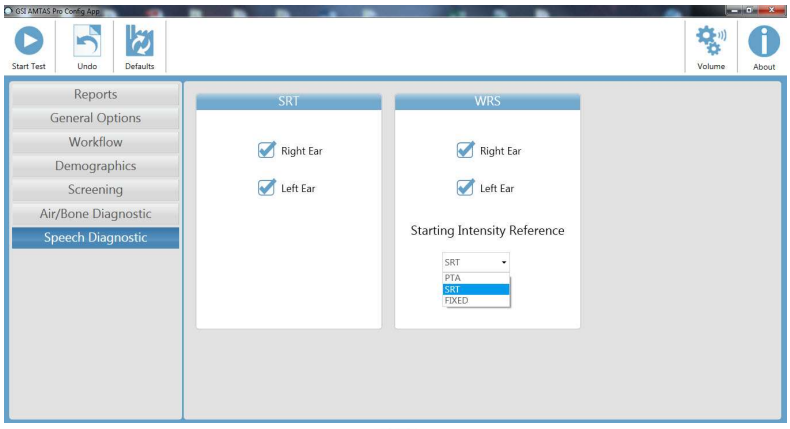
Speech Diagnostic: AMTAS Pro



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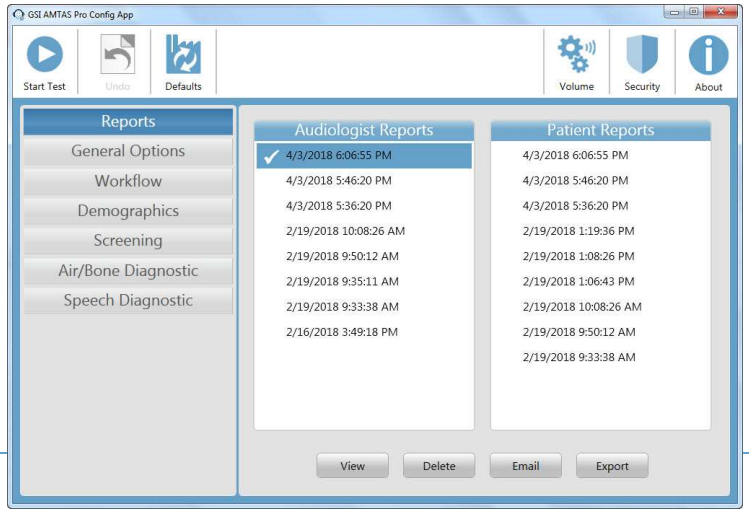
Config App vs Settings



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Patient Set Up

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Patient Set Up – Pro Only

- Bone Oscillator Placement
  - Forehead placement
  - AMBAND

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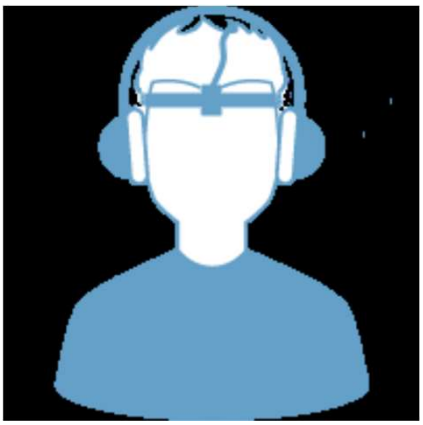
Patient Set Up – Flex and Pro

- Headphone Placement
  - DD450 -Circumaural headphones



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Welcome to
GSI AMTAS ™
Self Administered Automated Audiogram
Get Started
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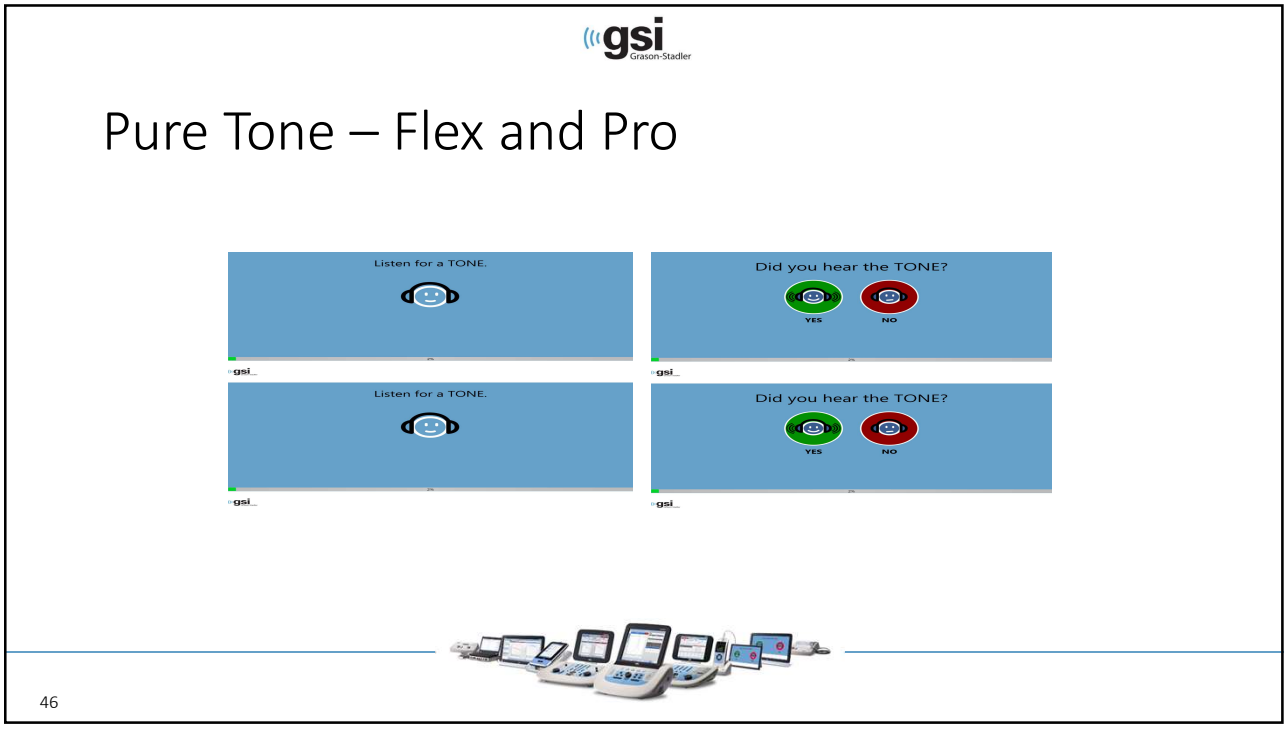
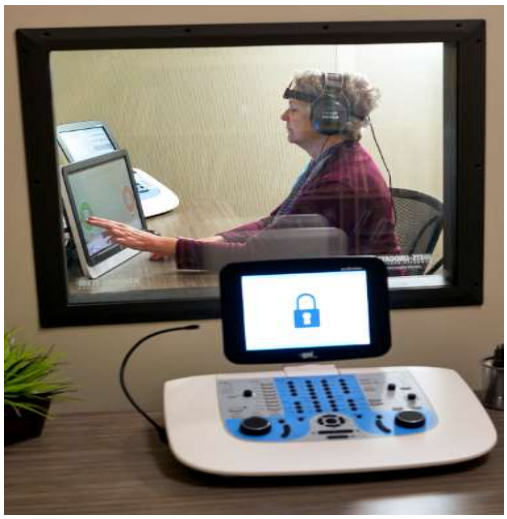
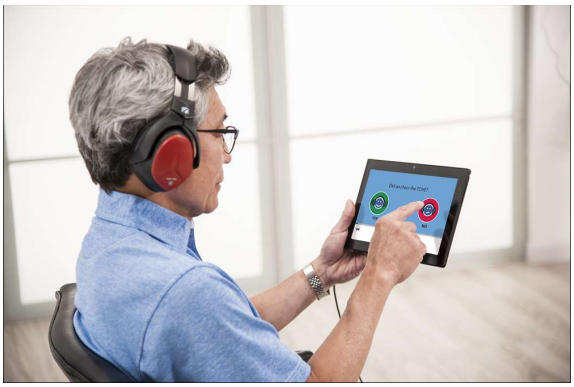

gsi
Grason-Stadler
Pure Tone – Flex and Pro
Listen for a TONE.
Did you hear the TONE?
YES
NO
Listen for a TONE.
Did you hear the TONE?
YES
NO
46





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Speech - Pro Only

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Thank you for completing the test.
Press the button below to conclude the test

Finish

* Contact your administrator

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Amtas Pro and Flex

Integration

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Automated Report

- Patient Information
- Audiogram
- Audiogram Symbol Legend
- Masking Level Table
- Quality Assessment Table
- Audiogram Classification Table
- Speech Recognition Table
- Comments

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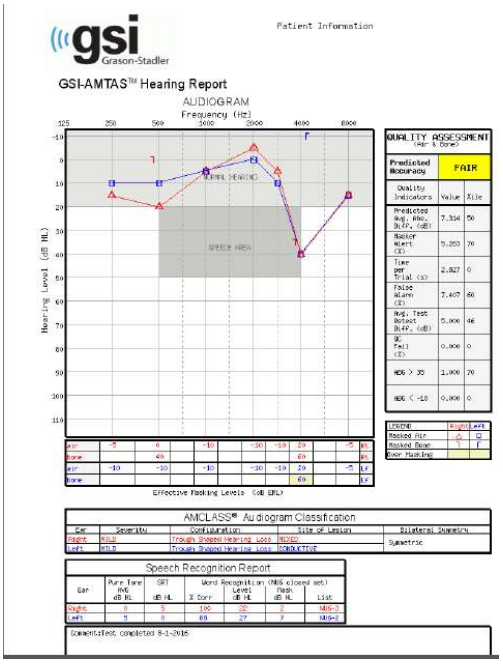

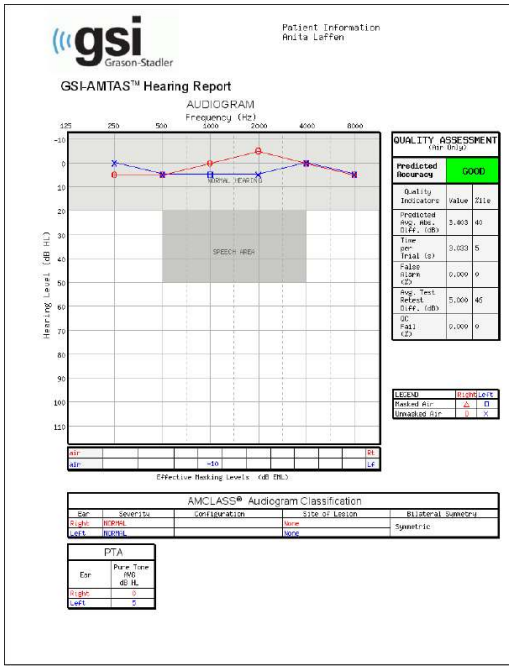

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GSI AMTAS™ Hearing Screening Report

Results:

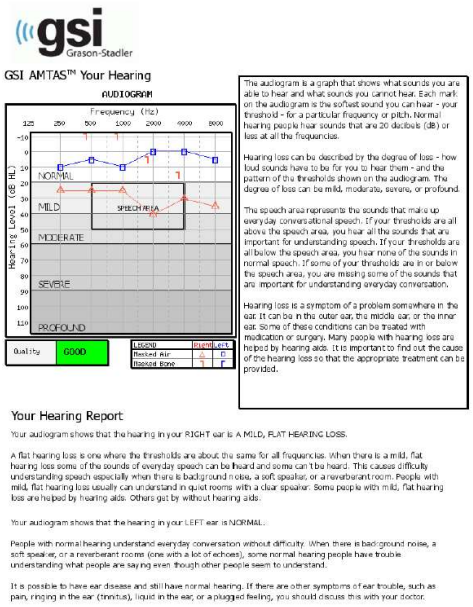
Frequency	Right	Left
1000 Hz	Yes	Yes
2000 Hz	Yes	Yes
4000 Hz	Yes	Yes
500 Hz	No	No
	Pass	Pass

Level: 25
Pass Criterion: At least 2 Yes responses
Predicted Accuracy: Poor

Interpretation:

Your Right Ear is within the normal hearing range.
Your Left Ear is within the normal hearing range.

This is a screening test.
If you have questions or concerns
contact an audiologist or a physician.



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GSI AMTAS™ Your Hearing

AUDIOGRAM

Frequency (Hz)

125 250 500 1000 2000 4000 8000

Hearing Level (dB HL)

NORMAL
MILD
SPEECH AREA
MODERATE
SEVERE
PROFOUND

Quality GOOD

Legend: Right Left
Masked Air
Masked Bone

The audiogram is a graph that shows what sounds you are able to hear and what sounds you cannot hear. Each mark on the audiogram is the softest sound you can hear - your threshold - for a particular frequency or pitch. Normal hearing people hear sounds that are 20 decibels (dB) or less at all the frequencies.

Hearing loss can be described by the degree of loss - how loud sounds have to be for you to hear them - and the pattern of the thresholds shown on the audiogram. The degree of loss can be mild, moderate, severe, or profound.

The speech area represents the sounds that make up everyday conversational speech. If your thresholds are all above the speech area, you hear all the sounds that are important for understanding speech. If your thresholds are all below the speech area, you hear none of the sounds in normal speech. If some of your thresholds are in or below the speech area, you are missing some of the sounds that are important for understanding everyday conversation.

Hearing loss is a symptom of a problem somewhere in the ear. It can be in the outer ear, the middle ear, or the inner ear. Some of these conditions can be treated with medication or surgery. Many people with hearing loss are helped by hearing aids. It is important to find out the cause of the hearing loss so that the appropriate treatment can be provided.

Your Hearing Report

Your audiogram shows that the hearing in your RIGHT ear is A MILD, FLAT HEARING LOSS.

A flat hearing loss is one where the thresholds are about the same for all frequencies. When there is a mild, flat hearing loss some of the sounds of everyday speech can be heard and some can't be heard. This causes difficulty understanding speech especially when there is background noise, a soft speaker, or a reverberant room. People with mild, flat hearing loss usually can understand in quiet rooms with a clear speaker. Some people with mild, flat hearing loss are helped by hearing aids. Others get by without hearing aids.

Your audiogram shows that the hearing in your LEFT ear is NORMAL.

People with normal hearing understand everyday conversation without difficulty. When there is background noise, a soft speaker, or a reverberant rooms (one with a lot of echoes), some normal hearing people have trouble understanding what people are saying even though other people seem to understand.

It is possible to have ear disease and still have normal hearing. If there are other symptoms of ear trouble, such as pain, ringing in the ear (tinnitus), liquid in the ear, or a plugged feeling, you should discuss this with your doctor.

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Qualind: Interpretation

- Patented method for determining the accuracy of a test results
- Data was collected at three sites from a wide range of settings, patient demographics, and hearing loss characteristics.
- Large subject sample (n = 120), a strong relationship was found between predicted and measured accuracy.
- Method may be useful for automated test procedures to provide quality assurance.

Qualind™: A Method for Assessing the Accuracy of Automated Tests. Margolis, et al,2007, JAAA, 18: 78-89.

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Quality Assessment Table (Qualind)

- **Predicted Accuracy** (Overall Quality -Good, Fair, Poor)
- **Predicted Average Absolute Difference** –Difference between automated and manual thresholds
- **Masker Alerts**-thresholds where masking may have been too high or low
- **Time per Trial** - average time from stimulus to patient response
- **False Alarm Rate** – number of times patient responded with no stimulus presented divided by number of trials when no stim present
- **Average Test-Retest Difference** – average difference between 1 KHz test and retest in right and left hear
- **Quality Check Fail Rate** – number of times patient did not respond to stimulus above threshold divided by the number of measured thresholds
- **Number of Air / Bone Gap > 35 dB** – number of air bone gaps that exceed 35 dB
- **Number of Air / Bone Gap < -10 dB** – number of air bone gaps that are less than 10db

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AMTAS Pro ONLY

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Audiogram Classification Table (AMCLASS)

- The air- and bone-conduction thresholds are analyzed and the audiogram is given three descriptive categories based on configuration, severity, and site of lesion.
- In addition, the audiogram is analyzed for interaural asymmetry.
- 376 Billion unique audiograms

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Configuration

- Normal Hearing
- Flat Hearing Loss
- Sloping Hearing Loss
- Rising Hearing Loss
- Trough-shaped Hearing
- Peaked Hearing Loss
- Other

Severity

- Normal
- Mild
- Moderate
- Severe
- Profound

Site of Lesion

- Conductive
- Sensorineural
- Mixed

Bilateral Symmetry

- Symmetric
- Asymmetric.

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Additional Data Management

GSI Suite/Noah

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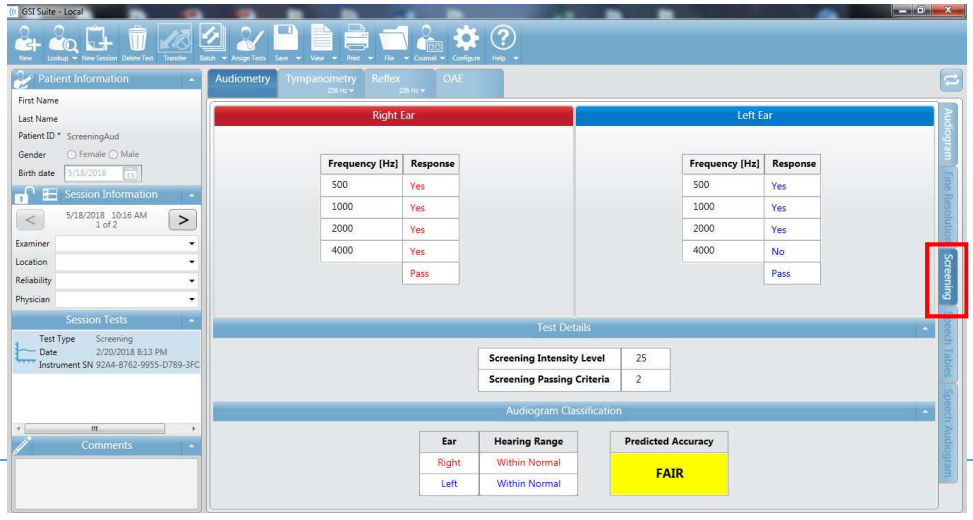
Screening Audiometry – Flex and Pro



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Flex Data Transfer Options

1. **Local**→Available if Flex is on the same PC as GSI Suite
2. **Import**→Used to import data from a USB drive
3. **Wireless**→Used to transfer data from the Flex tablet to Suite PC via Bluetooth

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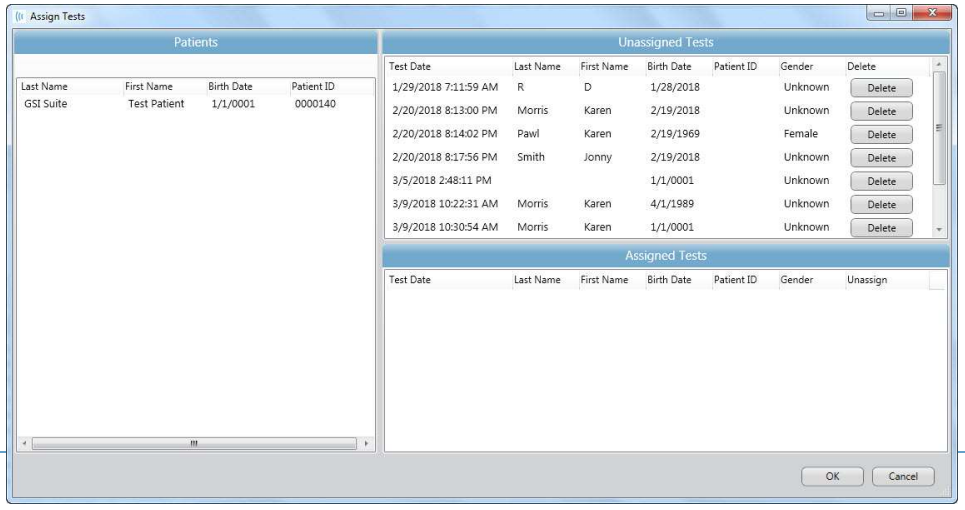
Batch Transfer – Flex



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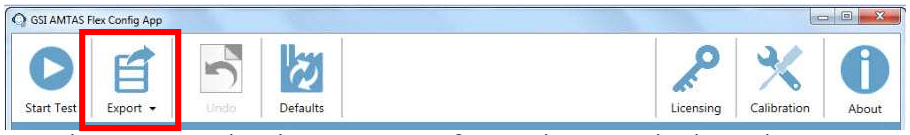
Import

1. Export Data from AMTAS Flex to USB drive



2. Launch Suite and select **Import** from the Batch dropdown
3. Locate the USB drive and import
4. Locate or Create GSI Suite patients
5. Assign tests to the appropriate patient

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Wireless Transfer

1. Test patients with AMTAS Flex
2. Launch Suite and select **Wireless** from the Batch drop down menu
3. Imported data appears in the Assign Test dialog
4. Locate or Create GSI Suite Patient
5. Assign tests to the appropriate patient

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After Flex Export

- Data that has be exported will be deleted from the Flex PC at the next export.
- Submenu: will restore the most recently exported test data.

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Transferring AMTAS *Pro* Data

1. Locate or create a patient in GSI Suite
2. Select the Patient button on the audiometer.
3. Select the Transfer Session menu option.
4. Select the AMTAS Pro data session for transfer. (Pro data is listed in the Session List with an “A”_Name_Date Time”)

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Patient
Transfer Sessions
Session List
Current Session
D_No name-03-May-2018 12:37:47
D_No name-03-May-2018 12:26:25
A_No name-03-May-2018 8:43:34
A_No name-03-May-2018 8:38:55
A_Conductive-Loss-03-April-2018 17:
A_Karen-Morris-03-April-2018 17:38:
A_Karen-Morris-03-April-2018 17:36:
D_No name-02-March-2018 15:21:16
Close
First Name
Last Name
ID
Gender
DOB
New Session
Examiners
Patient Information
Patient List
Transfer Sessions
Delete Sessions
12:43 PM
5/18/2018

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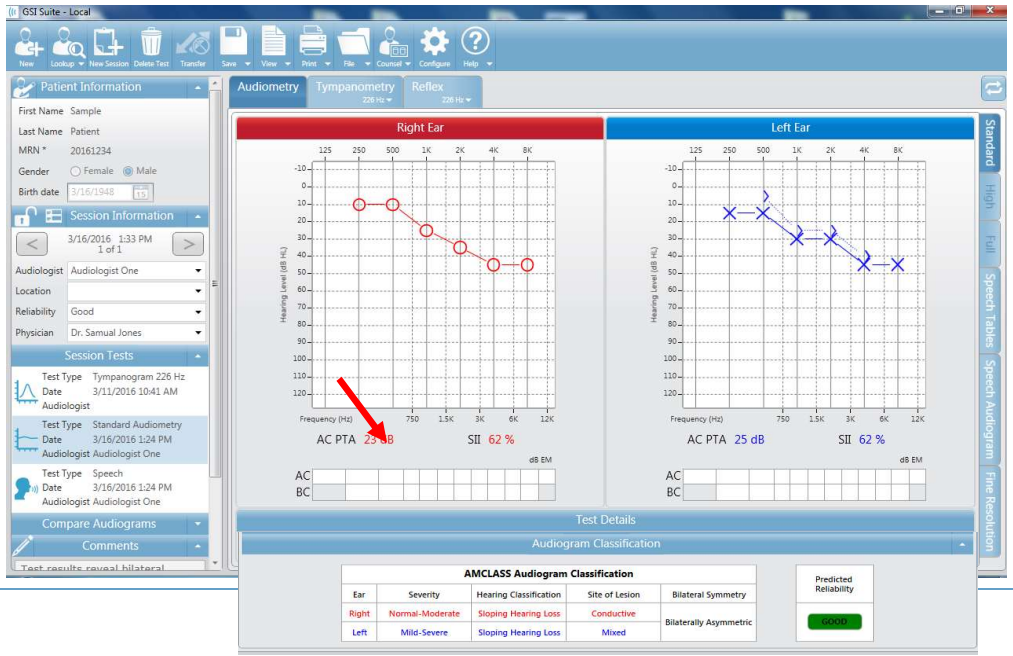
GSI Suite - Local
Patient Information
First Name Sample
Last Name Patient
MRN * 20161234
Gender Female Male
Birth date 3/16/1948
Session Information
3/16/2016 1:33 PM
1 of 1
Audiologist Audiologist One
Location
Reliability Good
Physician Dr. Samual Jones
Session Tests
Test Type Tympanogram 226 Hz
Date 3/11/2016 10:41 AM
Audiologist
Test Type Standard Audiometry
Date 3/16/2016 1:24 PM
Audiologist Audiologist One
Test Type Speech
Date 3/16/2016 1:24 PM
Audiologist Audiologist One
Compare Audiograms
Comments
Audiometry
Tympanometry
Reflex
Right Ear
Left Ear
AC PTA 25 dB
SII 62 %
AC PTA 25 dB
SII 62 %
AC
BC
Test Details
Audiogram Classification
AMCLASS Audiogram Classification
Ear
Severity
Hearing Classification
Site of Lesion
Bilateral Symmetry
Right
Normal-Moderate
Sloping Hearing Loss
Conductive
Left
Mild-Severe
Sloping Hearing Loss
Mixed
Bilaterally Asymmetric
Predicted Reliability
GOOD
Standard
High
Full
Speech Tables
Speech Audiogram
Fine Resolution

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How does AMTAS fit with current practice?

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Does AMTAS replace Audiologist?

NO!!

AMTAS is only a hearing test.

Audiologist counsels, fits hearing aids, performs other necessary tests like Tympanometry and OAE, re-tests the patient that is inconsistent, masking dilemmas, makes recommendations and more.

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Amtas Implementation

AMTAS Pro

- Basic Diagnostics at ENT
- Basic Diagnostics at satellite office
- Annual Evaluation
- Other?

AMTAS Flex

- Screen – hearing aid retail to get referrals
- Threshold – before patient moves to the booth for further testing
- Other?

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Advantages of Automation

- Optimize use of audiologists' time
- Standardization
- Quantitative quality assessment
- Decrease errors
- Decrease cost
- Increase access
- Telemedicine

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What patients would Benefit?

- Originally designed for Veterans Administration (VA)
- Busy audiology departments
- Busy ENT practices with limited staff
- School systems
- Satellite clinics
- Community outreach

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AMTAS Publications

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- 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.
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gsi Grason-Stadler

Questions?

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