

Eliminate the Most Common Challenges in Audiometric Testing

A Case for Tablet Audiometry in Occupational Hearing Conservation

AUDIOMETRIC TESTING

Audiometric testing is simply put, a “hearing test”. It is performed using a highly precise medical device called an audiometer which is used to evaluate an individual’s ability to hear sounds at varying tones and intensities.

SETTING A BASELINE

As part of a company’s occupational hearing conservation program, audiometric testing typically begins with a baseline audiogram. A baseline is not intended to identify whether or not an employee has any hearing loss, but rather, to determine their level of hearing at the start of employment.

Once a baseline has been established, the employee must be re-tested on an annual basis to determine if any shift in hearing levels as compared to that initial baseline have occurred. If a shift is detected, particularly as a result of workplace conditions, there are prescribed “next steps” that must be followed to help protect the hearing health of the employee, and the safety of their colleagues

TYPICAL CHALLENGES IN AUDIOMETRIC TESTING

For those who run hearing conservation programs in-house, are service providers who perform audiometric testing on behalf of clients, or are considering adding audiometric testing to the services currently offered, you are likely faced with one or more of these common challenges:

SCHEDULING

Whether you service 10’s or 100’s of employees or clients, scheduling can pose a logistical nightmare – especially when attempting to schedule everyone’s annual exam over a short period of time once per year. It is not uncommon in large organizations

for those who manage the hearing conservation program to spend in excess of 2 full weeks on scheduling alone. Admittedly, not a highly efficient use of time for skilled professionals.

Also consider pre-employment screenings. We know how important it is for that baseline audiogram to be performed at – or very near – to a new hire’s start date. But what happens when your annual round of testing isn’t slated for another 10 months and when your new hire’s first baseline is performed it indicates some hearing loss? Did that employee join your firm with that level of hearing, or was the loss brought on by noise at work? This can be difficult to determine if testing is regimented to only once per year.

And, after weeks of planning and booking the calendars of every employee – often in organizations that operate 24-hour shifts – inevitably there will be a group of people who will miss their test and need to be rescheduled. Such is life. But now what? More scheduling, paid time off work to visit an off-site clinic, transportation costs to and from appointments, clinic fees, and more.

COST

It will come as no surprise to anyone reading this paper that traditional audiometric equipment is expensive to purchase, expensive to maintain and calibrate, and requires a lot of real estate.

If you are a service provider then you most likely maintain one or more mobile clinics – trucks outfitted with 4-6 sound booths, audiometers, and a desk-top computer that serves as a central control for the testing stations. These trucks are driven around the country and brought on-site to client locations where employees sit in the booths to take their hearing tests.

The benefit of a traditional mobile clinic is that multiple employees can be tested at the same time allowing for a higher volume of throughput. And of course, the truck offers a quiet, controlled environment to administer the tests. But the cost of gas, insurance, maintenance, calibration of the booths and testing equipment, not to mention the full-time staff member required to drive and operate the clinic is high and continually climbing.

Let’s come back to scheduling for a moment. What happens when employees miss their scheduled test? Is the mobile clinic expected to be driven back to the client site to

test only a handful of people? What if your client has a large main facility and a handful of small satellite locations? It is not cost efficient for the mobile clinic to drive to several locations where only a small number of tests may be required, nor is it reasonable to expect the client to have employees travel to the main facility for their annual tests.

OUTDATED EQUIPMENT

For both service providers and in-house programs, traditional audiometers and sound booths have remained relatively unchanged in more than 30 years. Equipment is bulky, only minimally portable, and manually operated, which requires that testing only be performed by technicians who have been certified by the Council for Accreditation in Occupational Hearing Conservation (CAOHC).

Although there are options to move and store the data produced by these devices in a digital format, the process is rarely seamless. And see the point above – cost. This is usually a for-fee service offered by another service provider. For those who opt not to pay for this type of service, there will be a great deal of paperwork. Records that needs to be filed and archived for long periods of time.

To summarize, audiometric testing as part of an occupational hearing conservation program – whether done in house or provided as a service – presents logistical challenges, is expensive, and current processes and workflows are fairly antiquated.

THE CASE FOR TABLET AUDIOMETRY – INTRODUCING SHOEBOX

SHOEBOX Audiometry is the first clinically validated iPad audiometer, and a total solution for occupational hearing conservation programs. It is comprised of two main components. First is the testing equipment; an iPad-based audiometer, software, and a set of calibrated high-attenuating transducers. Second is a web-based data management system.

TESTING EQUIPMENT

The SHOEBOX audiometer is equipped with our smart background noise monitoring functionality, making it is optimized for use outside of a sound booth. The iPad's built-in microphone is controlled by the software and actively monitored to ensure background noise levels in the room are appropriate when testing is performed. SHOEBOX also comes pre-installed with OSHA and ANSI test parameters for volume limits, frequencies, and Maximum Permissible Ambient Noise Levels (MPANLs). Based on the standard you select for your testing, the system will notify both you and the employee if the MPANL has been exceeded, and prompts them to “pause” until levels

have returned to an acceptable level. All of this is designed to help you meet your OSHA compliance requirements even if testing is performed outside of a sound booth.

SHOEBOX Audiometry also offers the option to perform testing in either automated or manual modes. In **automated** mode, the system uses a modified Hughson-Westlake protocol (step-up/step-down methodology). After instruction (with an option to watch a short instructional video), the employee self-tests by completing a simple drag-and-drop sorting game based on whether or not they hear sounds presented at various frequencies and intensities. The output is a threshold seeking, clinically valid audiogram. Even the results interpretation is automated which means that almost anyone can administer a valid hearing testing. And that administrator does not need to be CAOHC certified.

SHOEBOX in **manual** mode offers a full range of clinical audiometric capabilities and is often the system of choice for audiologists, physicians, and CAOHC-certified hearing conservationists. It offers advanced functionality including Extended High Frequency (EHF) testing, bone conduction testing, speech discrimination testing, and more. To use SHOEBOX Audiometry in manual mode, CAOHC certification is required as all results interpretation is performed manually.

DATA MANAGEMENT

SHOEBOX Data Management – the second component of the system – is a simple, easy-to-use, web-based portal designed for moving data off of the iPad and storing, accessing, and managing employee data and test results from any web browser. Data syncs automatically whenever you are in a connected environment. It is even possible to upload historical information and audiometric data that was captured using a different hearing testing system. We offer templates to facilitate this import or we can perform the import for you as a service.

SHOEBOX Data management is also used to easily set baselines and automate the process of detecting any shifts against that baseline. You can even group your employees into “teams” for group-based reports. For service providers, this makes it easy to organize data by client and for in-house programs, to organize data by locations, test dates, or departments for example.

It is also used to generate both individual and group reports for OSHA compliance purposes. Our out-of-the-box reports include:

- *Individual Summary Report:* This is a complete summary of an individual employee's hearing test results. It provides not only their most recent audiogram, but also a summary of any shifts in their hearing levels. It also provides space for both the employee and test administrator to date and sign the reports.
- *Roster Report:* This is a high-level overview of test results for any given group within a specific date range. For in-house hearing conservation programs, this report can be useful for identifying trends in your workplace environment. For example, if you see shifts against a baseline for a group of people who work in a common area, it could be an indication that additional measures need to be taken to protect employees in that location, or on that shift. For service providers, this report will provide your clients a summary of all the employees you tested on a specific day.
- *Shift Report:* Similar to the roster report that it provides results for multiple people on one page, a Shift Report will summarize results for only those employees tested whose results indicate a shift in their level of hearing against their baseline audiogram.

This report is essential for identifying everyone who needs to be referred out to an audiologist for subsequent testing.

Finally, for those who already use an EMR or other data management system, SHOEBOX Data Management can be used to export data as a .csv file or in PDF format that can then be saved elsewhere.

ELIMINATE THE MOST COMMON CHALLENGES

Now, let's contemplate how a system like SHOEBOX Audiometry could be used to eliminate the most common challenges that hearing conservationists face; scheduling, costs, and outdated equipment

TEST ANY TIME

If you manage your program in-house, tablet audiometry can easily enable testing on a regular basis – such as daily or weekly -- eliminating the need to schedule everyone over only a few days. You might opt to test entire departments or shifts over the course of a month, then move on to the next one. If your business operates on 24-

hour shifts, you can perform testing overnight, ensuring minimal downtime for employees and making testing that much more convenient for them.

You might even use it as a backup system to your service provider. If you still opt to have them come on site annually to perform testing, you could manage the employees who miss their test yourself. This will help you keep your program on track and eliminate the need to attempt to book testing at an outside clinic.

And all new employees can have their baseline audiogram performed at their time of hire, not when the next round of annual testing was scheduled. This will let you know for certain, from day one, what that employees baseline results are so that there can be no question if or when a shift occurs.

AUGEMENT EXPENSIVE MOBILE CLINICS

We may never completely replace the mobile clinics. As mentioned, they provide a good controlled environment to test multiple people simultaneously. But there are several valid considerations for augmenting your mobile clinic with tablet audiometry.

First and foremost, it lets you eliminate the need for a sound booth, which can cost upwards of \$15,000. Even if you still want to outfit a mobile clinic with multiple testing stations, you can do so without this added expense. All you need to do is keep that space reasonably quiet and SHOEBBOX will monitor to ensure testing remains in accordance to the OSHA or ANSI MPANL that you selected.

And if your mobile clinic is already outfitted with multiple sound booths, it is still very expensive to bring the truck back to a client site – or even to a small satellite location – to test small numbers of employees who may have missed the originally scheduled test data. In this case, it would be more efficient for you and for your customer to “parachute” into these locations with a single test administrator hand carrying one or more iPads. Remember, SHOEBBOX offers automated testing functionality that enables almost anyone to administer a valid hearing test. So, while your CAOHC-certified hearing conservationist(s) drive the truck on to your next client’s location, you can fly a non-CAOCH certified technician in to help administer the rescheduled tests.

Another advantage of the highly portable iPad is that it means you can set up testing in locations very near to where employees work, minimizing the amount of time they are away from their work station for the hearing test. It would not be uncommon in a large facility for the parking lot that could accommodate a mobile clinic to be a mile or more

away from where employees spend their days. One of the key benefits we hear over and over about SHOEBOX Audiometry is that it lets you bring testing right to where the people are rather than requiring them to travel to the test.

IMPROVE EFFICIENCY AND WORKFLOWS WITH MODERN, MOBILE TECHNOLOGY
Finally, there is no denying that tablet technology is state-of-the-art. The advantage of a software-based system is that it is continually being developed. You won't spend money on a system that will remain unchanged for 10 or more years, or until it is time to purchase your next audiometer. Rather, it will continue to evolve to meet the needs of your program today and years into the future.

These systems are digital by design, eliminating the need for paper all together. Our web-based data management platform is unmatched in its ability to administer employee demographic data and test results, offering advanced filtering and reporting capabilities to help you adhere to OSHA compliance requirements. It enables an environment where you can organize and view information in meaningful ways, automate processes like baseline setting and shift detections, and generate the reports you need for your specific program.

And the automated capabilities offered by SHOEBOX Audiometry – from the test itself, to results analysis, and even baseline setting and shift detection – is changing the nature of audiometric testing. Now, it is possible for almost anyone to administer an audiometric test in any reasonably quiet location.

CONCLUSION

To summarize, SHOEBOX Audiometry is a complete system for audiometric testing as part of an occupational hearing conservation program. The iPad-based audiometer is ultra-lightweight and portable making it easy to move it between locations and conduct testing anytime and anywhere it's needed. This is especially useful as part of new-hire onboarding, when employees need to have an annual test rescheduled, and even for those who are considering bringing their entire program in house. It is optimized and validated for use outside of a sound booth making it possible to conduct testing in any reasonably quiet location. Its automated functionality means that almost anyone – including non-CAOHC certified technicians can administer a diagnostic hearing test. And it offers OSHA and ANSI pre-set configurations to help you meet your specific compliance reporting requirements.



If you would like to learn more about how to use SHOEBOX Audiometry in your in-house hearing conservation program or in the services you provide, contact us at:

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