Telemedicine continues to gain momentum, particularly for technology players, healthcare delivery systems, employers and health plans. Although many physicians and audiologists still prefer traditional in-office visits, remote clinical service delivery models cannot be overlooked as more patients seek convenient and cost-effective alternatives. In fact, the American Well 2015 Telehealth Survey found that 64% of American consumers surveyed would have a video visit with a doctor. (Infographic: www.americanwell.com/information/telehealth-index-2015-consumer-survey)

With the hearing health care industry dabbling in telemedicine for years now, from the VA leading the introduction over 30 years ago, manufacturers providing remote hearing aid programming features, to the impact of technology and connectivity in the face of issues around access, convenience, quality and cost-effectiveness, many ENT and audiology practices are beginning to consider telehealth opportunities. Specifically, many ENT and larger audiology practices continue to debate the best approach to meeting patient testing and consultative needs while balancing costs associated with staffing these satellite locations.

Considering Tele-Audiology
Ear, Nose & Throat of South Florida is investigating the equipment and clinical process requirements involved with staffing a satellite clinic location for tele-audiology. This process is currently being supported with a medical assistant while the audiologist performing the testing is located at the full-time clinic location.

What aspects of tele-audiology are being used in the satellite offices?
We are investigating the use of tele-audiology in real-time, or synchronous tele-audiology, where the audiologist, medical or audiology assistant, and patient are simultaneously engaging in information exchange in two separate locations. Diagnostic assessments by an audiologist are executed while remotely controlling a computer-operated audiometer that is connected by the medical or audiology assistant via the internet.

These tele-audiology services typically utilize non-specialist personnel to enable the testing that links the hearing care provider and the patient. These personnel are often nurses, medical or audiology assistants in the ENT clinic. The assistant team does not review test results, make diagnoses or even review the audiologist’s interpretations but merely to facilitate the process exchange for the specific tele-audiology encounter.

What equipment is being used?
During this investigation, the innovative audiometer and video otoscope used are part of the Primus fitting system, manufactured by Auditdata.

What equipment is needed?
- Primus Audiometer (in the ENT office)
- Primus Video Otoscope (in the ENT office)
• Primus Insert Transducers or TDH 39’s (in the ENT office)
• Computers (in the Remote Testing Center and the ENT office)
• Broadband Internet (in the Remote Testing Center and the ENT office)
• TeamViewer (on the computers in both the Remote Testing Center and ENT office)

Who is involved in the process?
• Audiologist from remote testing center
• Medical or audiology assistant who is qualified to perform otoscopy and place transducers in patient’s ears. This occurs in the ENT office.
• Patient (in the ENT office)

How is remote testing established?
• The remote testing center is equipped with the Primus Audiometer and Windows based laptop, which contains the TeamViewer software. The remote testing center has an audiologist on site, who will conduct the Audiometry testing, as well as to view and assess Otoscopy results.
• The ENT satellite office contains a Windows based computer, which contains the TeamViewer software. This office should have a sound booth for the patient to sit in during tele-audiometry testing. This is the location that will service patients.
• Medical or audiology assistant in ENT office takes patient into testing room.
• Medical or audiology assistant explains testing process with patient and obtains connection with audiologist at testing center (using TeamViewer).
• Audiology assistant conducts video otoscopy, using Primus Otoscope, while the audiologist from remote testing center looks at live streaming video of ear anatomy to check for obstructions, cerumen, and tympanic membrane health.
• If the audiologist from the testing center feels that otoscopy was unremarkable, they will then instruct the medical or audiology assistant to place the patient in the sound booth and to place either the TDH 39 or insert headphones in the patient’s ears.
• Once the desired transducers are placed on the patient’s ears, audiometric testing can commence.
• The audiologist from the testing center will conduct Air, Bone and Speech Audiometry, using the Primus Audiometer. The audiologist will direct and guide the medical or audiology assistant to switch transducers as needed.
• If the audiologist determines that masking is needed, they will instruct the audiology assistant which headphones to use and how to instruct the patient.
• At the conclusion of testing, the Audiologist will determine next steps for the patient, including a hearing aid evaluation or further testing.

Final Thoughts:
What used to be a concept for the future is now quickly becoming an imminent consideration to meet patient needs for access and convenience and the business demands for productivity and profitability. This tele-audiology operational investigation will continue within this practice to carve out more modern opportunities for remote care beyond diagnostic testing.

About the Authors

Patricia Ramos, Au.D.
Director of Audiology and Rehabilitative Services for ENT Associates of South Florida
As Director of one of the largest ENT/Audiology practices in the United States, Dr. Ramos has been working for over 30 years to strengthen the delivery of audiology services within the ENT arena. She earned her Doctorate from the University of Florida and her Master’s and Bachelor’s degrees at East Carolina University.

Joy Glen, M.A.
Vice President of Sales and Audiology with Audidata
As VP of Sales for Auditdata, an audiometric equipment company providing innovative solutions for hearing care professionals, Joy brings with her a wealth of experience. Prior to this position, she had most recently been a Managing Director for Starkey’s All American Hearing, where she managed more than 75 hearing practices. Joy Glen earned both her Master’s and Bachelor’s degrees at the University of Cincinnati.
**Primus Audiometer and Primus Otoscope**

*To learn more about equipment specifics, see below or visit www.auditdata.com*

**Tell us about the Primus Audiometer and Primus Otoscope:**

- The Primus Pro is a 2-channel, PC-based audiometer that meets the needs of tele-audiology and diagnostic audiometry. As a software based audiometer, it is capable of downloading upgrades for both the software and the firmware from the internet. The Primus Audiometer includes pure tone, bone conduction, and speech audiometry, with the option of using high-frequency testing. The Primus works with both inserts or headphones and is compatible with NOAH and certified office management systems.
- The Primus Video Otoscope is fully integrated with the Primus software and works seamlessly with the synchronous diagnostic audiometry process. The Primus Otoscope utilizes precise optics and bright LED illumination, also allowing you to share real time ear canal images across your internet connection.

**What Operating System is needed to use Primus for Tele-Audiometry?**

- Windows XP Professional SP2 (32 bit & 64 bit), Windows 7 (32 bit and 64 bit), including Home Premium Professional and Ultimate, Windows 8 and 8.1 (32 bit and 64 bit) and Windows 10.

**What Remote Access System did you use for Tele-Audiology?**

- We used TeamViewer, software used for Internet-based remote access and support. TeamViewer software can connect to any PC or server, so the Audiologist can remote control the audiology assistant's PC as if they were sitting right in front of it. To connect to another computer, TeamViewer has to be running on both machines. When TeamViewer is opened on a computer, it generates a partner ID and password (user-defined passwords are also supported). To establish a connection between the Audiologist and audiology assistant, a TeamViewer generated ID and password are required. The Audiologist requires the audiology assistant's password to gain control over computer that is in the ENT office.

**About Auditdata**

Auditdata was founded in 1992 by Claus Bak Petersen. Our initial goal - to streamline the workflow at audiology clinics - is still very much our guiding light. We launched our AuditBase clinic management system for hospital-based audiology clinics in 1993. In 1999 we followed suit with Mirage, a similar system for private clinics in Germany. In 2010 we acquired Real Ear and started our adventure into hardware production as well. A couple of years later we launched Strato - a cloud-based clinic management system for private hearing care clinics. Recently, we acquired the US-based company Otovation and all the assets in the Swedish audiometer manufacturer Entomed. Our goal is to become your preferred partner in audiology solutions.