

Introduction to Oticon RemoteCare

ABSTRACT

This whitepaper introduces Oticon RemoteCare - a solution that enables hearing care professionals to connect to their clients in real-time via audio and video communication, and remotely fine-tune their hearing aids. The whitepaper provides a description of the development of eHealth within audiology, a description of Oticon RemoteCare as an eHealth solution, and an example of how to integrate the Oticon RemoteCare solution into daily practice.

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Introduction

According to the World Health Organization (WHO), 466 million individuals worldwide live with disabling hearing loss¹ (WHO, 2019).

Hearing loss treatment

The principal treatment for mild-to-severe hearing loss is hearing aids (Wilson, Tucci, Merson, & O'Donoghue, 2017). However, only 30% of older American adults with hearing impairment own a hearing aid (Abrams, 2015). Seeking hearing healthcare is often delayed because hearing loss is often associated with stigma, ageing, low intelligence, and loneliness (Wilson et al., 2017). Another important phenomenon is that up to 24% of hearing aids are never used (Hartley, Rochtchina, Newall, Golding, & Mitchell, 2010). When taking into account all the negative societal and health conditions associated with untreated hearing loss such as depression, social isolation, dementia, and unemployment (Davis et al., 2016; Harrison Bush, Lister, Lin, Betz, & Edwards, 2015; Livingston et al., 2017; Mahmoudi et al., 2019; WHO, 2019), it is vital that seeking hearing healthcare is not delayed nor treatment abandoned, making it essential that clients' needs are addressed and met.

According to the most recent MarkeTrak report, sound quality is one of the most significant drivers of hearing aid satisfaction (Hearing Industries Association, 2019). Adaptation to the sound from hearing aids can be difficult for new hearing aid users, as there is often a mismatch between the expectation and experience of amplified sounds. Consequently, the critical adaptation period after the first hearing aid fitting may pose challenges for the client. These challenges are also affected by the fact that clients forget between 40% and 80% of the information they receive during doctors' appointments (Kessels, 2003).

Technological developments have made it possible to link healthcare providers with the client. They provide a potential means for connecting the hearing care professional (HCP) with the client who needs particular care at the right time, thus placing the client at the centre of holistic care (Gladden, Beck, & Chandler, 2015).

Advances in technology

During recent years, great advances in technology have made mobile communications faster and more affordable, with the result that more of the world's population is connected. By 2025, there will be 5.8 billion smartphones worldwide, a growth of more than 700 million from the end of 2018 (GSMA, 2019). One opportunity that arises from this technological advancement is that information and communication technologies can now be used for healthcare services (hereafter referred to as eHealth).

eHealth

eHealth services have existed for many years and have been used within a wide range of healthcare fields, e.g. Cardiology, Psychiatry, Dermatology and Radiology (Krumm, 2016). In recent years, eHealth services have grown within the audiological field, mostly due to the opportunities presented by the advances in telecommunication technology. Examples of these services are hearing screening, hearing rehabilitation, and support services using eHealth as the delivery model (Krumm, 2016). Within audiology, eHealth has mainly been used to provide 1) education and information and 2) rehabilitation (Paglialonga, Cleveland Nielse, Ingo, Barr, & Laplante-Lévesque, 2018).

The benefits of eHealth solutions

Research investigating clinicians' and clients' attitudes towards eHealth services has shown that both groups seem to be generally positive about them and interested in using them (Irwin, 2015). In an international survey of 269 audiologists' attitudes towards eHealth, almost all respondents had experience of using PC-based video conferencing and held positive attitudes towards the use of these technologies (Eikelboom & Swanepoel, 2016). In a review of current and emerging eHealth initiatives, Gladden et al. (2015) argue that the introduction of eHealth allows healthcare to move away from being a disease-focused, fragmented, provider-centred care system towards a client-centred, outcome-based engagement with clients (Gladden et al., 2015).

In a systematic review by Bush and colleagues (2016), their collection of studies showed that remote programming of cochlear implants and hearing aids could be performed effectively and efficiently in a small number of subjects.

When implementing eHealth in the field of audiology,

¹ In adults, disabling hearing loss refers to hearing loss greater than 40 decibels (dB) in the better ear (WHO, 2019)

it is important to consider where in the client journey it takes place. A combination of in-person and online services used throughout the client journey was used in a hybrid model by Ratanjee-Vanmali and colleagues (2019). They found that Internet-based opportunities may open up new pathways for online hearing screening, assessment of readiness, and rehabilitation (Ratanjee-Vanmali, Swanepoel & Laplante-Lévesque, 2019). Research within the field of hearing aid rehabilitation using eHealth for adults with hearing loss has grown as the number of publications has increased in this area (Paglialonga, Cleveland Nielsen, Ingo, Barr, & Laplante-Lévesque, 2018).

In a recent review that investigated Internet based audiological interventions, this delivery model showed benefits in terms of outcomes and accessibility (Beukes & Manchaiah, 2019). One main finding in a systematic review of eHealth was that for this area of audiology, most studies indicate a benefit in terms of access to care (Molini-Avejonas, Rondon-Melo, Higuera Amato & Giannella Samelli, 2015).

Oticon's vision for eHealth

In a world that is changing and digitizing, so are the needs of clients seeking hearing healthcare. Oticon innovates to provide HCPs with the best possible tools to cater for the changing needs and expectations of today's clients. Oticon is also dedicated to ensuring that HCPs have the tools available to become audiologists of the future.

With the new Oticon RemoteCare solution, we are taking the first major step towards enabling the HCP to provide follow-up sessions with their clients remotely. This includes communicating with and adjusting their clients' hearing aids in the clients' environments in real-time. This is Oticon's first technological solution to bring hearing healthcare to the client by giving the HCP a comprehensive adjustment capability from the

fitting software, Oticon Genie 2. By allowing the HCP to make hearing aid adjustments in the situation where the biggest needs arise, we anticipate that Oticon RemoteCare will result in more satisfied hearing aid users, consequently minimizing the impact of untreated hearing loss.

Oticon RemoteCare: A complement to services, providing an alternative to traditional follow-up sessions

Oticon RemoteCare is a tool in Oticon Genie 2 that enables HCPs to provide remote follow-up appointments and fine-tuning of their clients' hearing aids in real-time*. After the hearing aid fitting in the clinic, the HCPs can schedule remote appointments with their clients instead of traditional, in-person follow-up appointments. By connecting the fitting software, Oticon Genie 2, to an app on the client's smartphone or tablet**, the HCP and the client can communicate via a high-quality video link and text messaging. The HCP can adjust the client's hearing aids remotely as the client's hearing aids are connected to their Bluetooth-enabled smartphone (Figure 1).

Benefits

Oticon RemoteCare is a new and important step for hearing healthcare, as it moves the accessibility of hearing healthcare from the controlled environment of the clinic to the client's real environment.

From the HCP's point of view, Oticon RemoteCare allows the clinician to provide more personalized and valuable support to the client in the environments where the potential challenges and questions arise. The HCP can receive real-time feedback to provide in-situational support. With its high security (HIPAA - Health Insurance Portability and Accountability Act compliant), Oticon RemoteCare enables HCPs to administer on-demand support and care to the client in a controlled manner, by ensuring that intimacy and trust can be

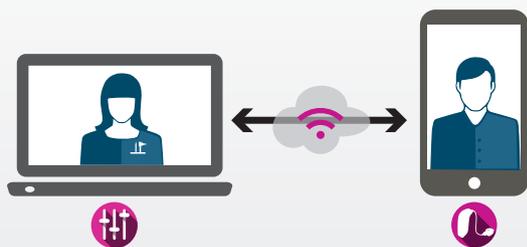


Figure 1: HCP and client connect in real-time using a secure cloud connection

* The Oticon RemoteCare solution can be used with all Oticon hearing aids with 2.4 GHz Bluetooth low energy.

** The Oticon RemoteCare App is compatible with selected smartphones and tablets from apple iOS 12 and later and Android OS 12 and later. Visit www.oticon.global/compatibility for the updated list.

preserved during the interaction. As such, it is a complement to the service that the HCP provides and an additional tool to provide client-centered care. Since scheduling and starting appointments remains the responsibility of the clinic and the HCP, HCPs remain in control and can provide the service in a way that suits them.

From the client's point of view, Oticon RemoteCare saves the client the potential time and effort of travelling to the clinic. Instead, the client can access the HCP from wherever it is convenient. Via the real-time video support, the client can communicate directly with their HCP and thereby describe any potential issues just like in an in-person appointment.

Additionally, Oticon RemoteCare may provide an opportunity to include family members in the eHealth experience.

By making the follow-up period more flexible and convenient for the client, it is more likely that the client will receive the right support at the right time (Gladden et al., 2015). Oticon RemoteCare delivers an opportunity to provide real-time feedback for in-situational support. Consequently, Oticon RemoteCare may contribute as a key tool in reducing the number of hearing aids left in the drawer, making the adaptation period a success.

As the world around us changes, the needs of society also evolves. The advances in technology will allow clients to connect to their hearing care provider, making this a new service delivery option for those who can take advantage of it.

Imagine the following scenarios:

	<p>Name: Mary</p> <p>Age: 72 years old</p> <p>Status: Retired Lives alone and requires her son to transport her to her medical appointments.</p> <p>Reports: Own voice and environment sounds are uncomfortable</p>	<p>Mary is a 72-year-old, first-time hearing aid user who was very recently fitted with hearing aids by her HCP. After having tried the hearing aids for two weeks, she finds that her own voice is uncomfortable and the sounds in her home are too sharp, especially running water and her granddaughter's voice. Mary calls her HCP and arranges a time for them to connect remotely.</p> <p>With Oticon RemoteCare, Mary does not have to rely on her son to bring her to the clinic for an appointment. Oticon RemoteCare enables her HCP to address her concerns remotely, in the specific environments where the issues have arisen. If her granddaughter is present, it is even possible to check that the new adjustments solve her specific issues.</p>
	<p>Name: Andrew</p> <p>Age: 56 years old</p> <p>Status: Employed Busy schedule, unable to make physical appointments.</p> <p>Reports: Does not find the hearing aids loud enough (currently in adaptation manager step 1)</p>	<p>Andrew is 56 years old and a senior executive with a demanding travel itinerary, making it difficult for him to attend follow-up visits. With Oticon RemoteCare, Andrew can schedule follow-up appointments with his HCP into his busy schedule. He does not have to wait a long time to see his HCP in the critical adaptation period when questions and issues may arise.</p>

Figure 2: A case study of Mary & Andrew

Integrating Oticon RemoteCare into daily practice

Figure 3 illustrates a proposal for how to integrate Oticon RemoteCare into the workflow of HCPs.

After the physical hearing evaluation and first hearing aid fitting in the clinic, the HCP uses their clinical judgement to assess whether the client is a candidate for Oticon RemoteCare. This includes considering willingness to use such a service and the potential help the client can receive from their loved ones. The Oticon RemoteCare Candidacy Scoring Sheet allows the HCP to assess the technical requirements. If the client is a candidate, the HCP assists them with pairing their hearing aids with their smartphone or tablet* and setting up the Oticon RemoteCare App. The HCP and the client then schedule a follow-up appointment to take place via Oticon RemoteCare instead of a traditional, in-clinic follow-up appointment. The HCP has the potential to incorporate Oticon RemoteCare in a manner that suits

them, making this solution a flexible part of the client journey. The modern audiologist is able to personalize the solution to meet the patient's needs, e.g. Involvement of professional and support staff can be implemented to support the Oticon RemoteCare flow. When implementing eHealth solutions, there are potential barriers/complications to be aware of arising from local legislation regarding licensure and reimbursement (Bush et al 2016).

During the Oticon RemoteCare session, the client and the HCP can communicate via video, audio, and chat functions, and the HCP can change the client's hearing aid settings instantly, just like in an in-person appointment. After all the necessary have been made, the HCP saves the settings to the hearing aids and both parties can exit the appointment when the session is complete. These new settings are saved both in the client's hearing aids and in Oticon Genie 2.

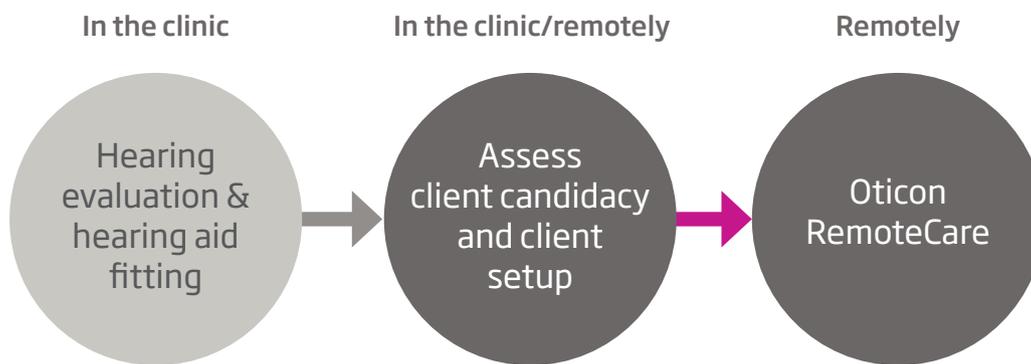


Figure 3: The Oticon RemoteCare flow

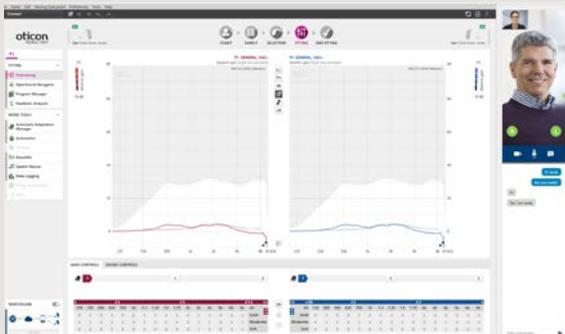
HCP	Client
<p>At the time of the appointment, the HCP logs on to Oticon Genie 2 to initiate the RemoteCare session. In Oticon Genie 2 the HCP connects to the client by entering the client's email address in the Oticon RemoteCare communicator window.</p>	<p>The client opens the Oticon RemoteCare App on their smartphone at the time of the appointment and connects to their HCP.</p>
	

Figure 4: Oticon Genie 2 - HCP interface (left) and Oticon RemoteCare mobile application - client interface (right)

An 'if the cap fits' strategy

Not all clients are good candidates for the Oticon RemoteCare solution. Some clients may not have the technical capability, skills, or tools that would make for a successful remote session. Other clients with more complex clinical profiles, or clients who experience additional challenges may require a traditional

in-person appointment with the HCP. Finally, clients may not find the remote hearing session convenient. It is therefore an important part of the HCP's decision-making process to screen clients accordingly when considering the offering. In this way, clients who use Oticon RemoteCare are most likely to be satisfied with it.

Conclusion

We believe that eHealth tools will help HCPs offer an alternative option to their clients after the crucial in-person counselling and hearing aid fitting appointment/session. With Oticon RemoteCare, professionals can reach out more often and faster than before, which may result in higher client satisfaction.

Smartphone and tablet owners have a powerful healthcare tool in their pocket. Within the audiology profession, Oticon has introduced the new Oticon RemoteCare solution, which utilizes the opportunities provided by technological advances and connectivity. By creating more flexibility, accessibility and convenience, as well as placing the client at the centre of care, we believe that Oticon RemoteCare provides the HCP with a tool which can increase the value of the fitting to the client, and consequently, result in fewer hearing aids being left in the drawer. Oticon RemoteCare opens up the opportunity to provide hybrid delivery models that combine traditional face-to-face services with remote services. Join us as we continue on this exciting journey using the opportunities of the digitized world to shape the future of modern hearing healthcare.

References

- Abrams HB, K. J. (2015). An Introduction to MarkeTrak IX: A New Baseline for the Hearing Aid Market. *Hearing Review*, 22(6), 16. Retrieved from <http://www.hearingreview.com/2015/05/introduction-marketrak-ix-new-baseline-hearing-aid-market/>
- Beukes E.W and Manchaiah, V. (2019). Internet-based Audiological Interventions: An update for clinicians. *Perspectives of the ASHA Special Interest Groups*, 4(542-222).
- Davis, A., McMahon, C. M., Pichora-Fuller, K. M., Russ, S., Lin, F., Olusanya, B. O., ... Tremblay, K. L. (2016). Aging and Hearing Health: The Life-course Approach. *The Gerontologist*, 56(2), 256–267.
- Eikelboom, R. H., & Swanepoel, D. W. (2016). International Survey of Audiologists' Attitudes Toward Telehealth. *American Journal of Audiology*, 25(3S), 295.
- Gladden, C., Beck, L., & Chandler, D. (2015). Tele-audiology: Expanding Access to Hearing Care and Enhancing Patient Connectivity. *Journal of the American Academy of Audiology*, 26(9), 792–799.
- GSMA. (2019). *The Mobile Economy 2019*. Retrieved from <https://www.gsma.com/mobileeconomy/>
- Harrison Bush, A. L., Lister, J. J., Lin, F. R., Betz, J., & Edwards, J. D. (2015). Peripheral Hearing and Cognition: Evidence From the Staying Keen in Later Life (SKILL) Study. *Ear and Hearing*, 36(4), 395–407.
- Hartley, D., Rochtchina, E., Newall, P., Golding, M., & Mitchell, P. (2010). Use of Hearing Aids and Assistive Listening Devices in an Older Australian Population. *Journal of the American Academy of Audiology*, 21(10), 642–653.
- Hearing Industries Association (2019). *MarkeTrak X: Hearing Aids in an Era of Disruption and DTC/OTC Devices*. Retrieved from <https://www.hearing.org/marketrak/marketrak-publications/>
- Irwin, K. (2015). Patient Interest in Adopting Telemedicine. *IndustryView*. Retrieved from <https://www.softwareadvice.com/medical/industryview/telemedicine-report-2015/>
- Kessels, R. P. C. (2003). Patients' Memory for Medical Information. *Journal of the Royal Society of Medicine*, 96(5), 219–222.
- Krumm, M. (2016). A review of contemporary tele-audiology. *Journal of Hearing Science*, 6(3), 9–21.
- Livingston, G., Sommerlad, A., Orgeta, V., Costafreda, S. G., Huntley, J., Ames, D., ... Mukadam, N. (2017). Dementia prevention, intervention, and care. *The Lancet*, 390(10113), 2673–2734.
- Loughrey D.G, Kelly ME, Kelley GA, Brennan S, Lawlor BA. Association of Age-Related Hearing Loss With Cognitive Function, Cognitive Impairment, and Dementia: A Systematic Review and Meta-analysis. *JAMA Otolaryngol Head Neck Surg*. 2018;144(2):115-126.
- Mahmoudi, E., Basu, T., Langa, K., McKee, M.M., Zazove, P., Alexander, N., & Kamdar, N. (2019). Can Hearing Aids Delay Time to Diagnosis of Dementia, Depression, or Falls in Older Adults? *Journal of the American Geriatrics Society*, 67(11), 2362–2369.
- Molini-Avejonas, D.R., Rondon-Melo, D., Higuera Amato C, A. & Giannella Samelli, A. (2015). A systematic review of the use of telehealth in speech, language and hearing sciences. *Journal of Telemedicine and Telecare*. 21(7). 367-376.
- Paglialonga A, Cleveland Nielsen A, Ingo E, Barr C, & Laplante-Lévesque A. 2018. eHealth and the hearing aid adult patient journey: a state-of-the-art review. *BioMedical Engineering online*. 17(101).
- Ratanjee-Vanmali, Swanepoel & Laplante-Lévesque. (2019). Characteristics, behaviors and readiness of persons seeking hearing healthcare online. *International Journal of Audiology*, 58:2, 107-115
- WHO. (2019). Deafness and hearing loss. Fact sheet.
- Wilson, B. S., Tucci, D. L., Merson, M. H., & O'Donoghue, G. M. (2017). Global hearing healthcare: new findings and perspectives. *The Lancet*.



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