Sound Advice: A Consumer's Perspective on Navigating the World of Over-the-Counter Hearing Aids

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ABSTRACT

This article describes the breadth of experiences associated with pursuing commercially available over-the-counter hearing aids (OTC-HAs). Dr. Katz behaved as a consumer pursuing various OTC-HAs. This activity was part of a larger project aimed at identifying overarching consumer listening goals, creating metrics to assess consumer-identified desired usability, features, and performance, and designing a consumer-friendly web-based application to support thoughtful hearing self-care. Additionally, we provide a review of the aims of the larger project to set the context for this work.

KEYWORDS: over-the-counter hearing aids, amplification, natural language processing, artificial intelligence, large language model

Think about how many times a patient or their significant other has walked into your office with complaints about needing to raise the volume on the television or having difficulty hearing and understanding conversation in groups of people, especially in restaurants and parties, religious services, or the theater. Now imagine how many people have the same difficulty, but you never see them in your office. Over-the-counter hearing aids (OTC-HAs) are intended to attract the attention of these individuals who typically do not seek professional hearing care or are not satisfied with their current hearing solution.[1,2]

Market penetration related to prescription hearing aids has remained steady for decades, without an increase in hearing aid usage relative to the severity of the hearing loss.[3] The uptake of OTC-HAs is hard to judge at this time because the Hearing Instrument Association

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(HIA) data are just a subset of the total data of OTC-HAs, many of which are being produced by consumer electronics manufacturers/distributors.[4] Pumford reported that, thus far, OTC-HA sales are having minimal to no effect on prescription hearing aid sales.[4] Because the OTC-HA market may be attracting a different consumer and is being supported by different suppliers, we need to reassess the market to gain a new perspective. Edwards provided insight into analyzing market segmentation into five categories based on individuals who self-identified as having a hearing problem or not, whether they had a confirmed audiometric hearing loss and whether they had a hearing aid solution or not in determining potential solutions to address their hearing needs.[5]

There are many reasons why an individual seeks an OTC-HA and price is not the only factor that influences this decision. Other considerations include the following[6–8]:

1. Accessibility and convenience for fitting and adjustments with a hearing healthcare (HHC) professional which may be limited, especially in rural areas.
2. Perception of the need for those individuals who do not feel their hearing loss is severe enough to warrant the purchase of a prescription hearing aid.
3. Doubt that there is enough value in a prescription hearing aid to justify the investment.
4. Privacy for those individuals who prefer to keep their hearing loss and the use of hearing aids confidential and discreet. These individuals may mistrust the healthcare system.
5. A temporary solution until a comprehensive hearing evaluation and recommendation can take place.
6. Desire to remain autonomous and independent in health decisions.
7. Device marketing that boasts the latest technological advancements, innovative features, and solutions to their hearing challenges.
8. User-friendly, intuitive, and convenient products.
9. Encouragement from other family members or friends who had a disappointing or unsatisfactory experience with prescription hearing aids.

Lin reported that only one in seven people uses a hearing aid when looking at the 27 million Americans aged 50 and older.[9] Simpson et al reported that, on average, a person can delay seeking treatment for hearing loss following hearing aid candidacy up to 8.9 years.[10] Typically, a person either independently researches and gathers information to better understand a medical condition and solution options or discusses their hearing difficulties and potential solution(s) with other people. These individuals can be family members or friends; someone who wears hearing aids; their primary care physician (PCP); an ear, nose, and throat (ENT) physician; audiologist; hearing instrument specialist; or possibly their pharmacist as indicated by Berenbrok et al.[11] Fig. 1 illustrates the consumer journey from a diagnosed or perceived mild-to-moderate hearing loss to the decision to purchase an OTC-HA.

In today's marketplace, consumers have many choices when purchasing OTC-HAs. They can choose to purchase their devices in person, online, or a combination of both (Fig. 2). Online examples may include websites from an OTC-HA company or manufacturer, a consumer-centric online retailer (Amazon), big-box store which includes both general merchandise or specialty stores (e.g., Walmart, Target, or Best Buy), as well as a pharmacy. In-person options could include an audiologist, big-box store, hearing instrument specialist, and a pharmacy which also may have an online purchase option to order directly from a hearing aid company. A combination of both pathways can occur with the consumer discussing the hearing solution in person but deciding to purchase online, or conversely, a person may start their journey online but be overwhelmed by too many options or be risk-averse and decide to pursue the in-person route. Both pathways, in person and online, require that decisions must be made regarding style, pre-set versus self-fit approach, Bluetooth connectivity, streaming, price, rechargeability, etc., before purchasing the hearing aids.

The consumers' journey continues, as illustrated in Fig. 3, to a treatment route involving self-care once the consumer receives and opens the hearing aid package. The pre-set and self-fit (requires a hearing test/screening measurement

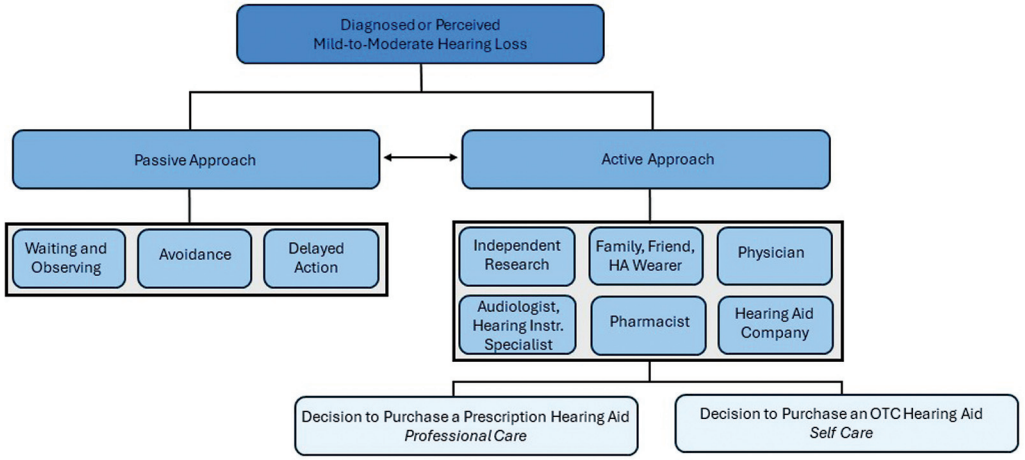

Figure 1 The consumer journey from a diagnosed or perceived mild-to-moderate hearing loss to the purchase decision.

prior to use; this is typically available online and/or through an app) device pathways and the various feature programming options are outlined. The consumer's path advances with possible post-hearing aid purchase communication options, to and from the OTC-HA company or point of sale, that may be available to the consumer, as shown in Fig. 4.

The motivation for a consumer to purchase an OTC-HA online or in-person can be broken down into two archetypes—explorer or entruster, as reported by Singh and Dhar.[12] Although the description of these archetypes differs on three main characteristics—(1) highly independent versus heavily relies on others, (2) comfort buying online versus low comfort buying online, and (3) verifies sources versus does not check multiple sources, these groups preferred (84%) in-person HHC. This may reflect an explorer's discomfort in purchasing online regarding healthcare due to the lack of OTC-HA knowledge.[12]

These data are consistent with a poll conducted by the American Speech-Language and Hearing Association (ASHA) that found that there was a low adoption rate for OTC-HAs from 2,228 respondents, with only 2% of respondents aged 40 years and older having purchased OTC-HAs and 4% reporting they are likely to purchase OTC-HAs. They

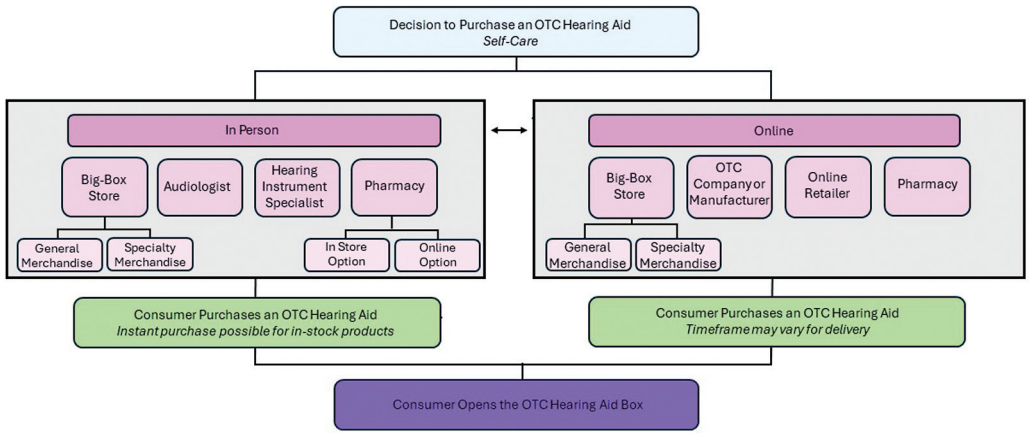

Figure 2 Consumer options for online versus in-person over-the-counter (OTC) hearing aid purchase modes.

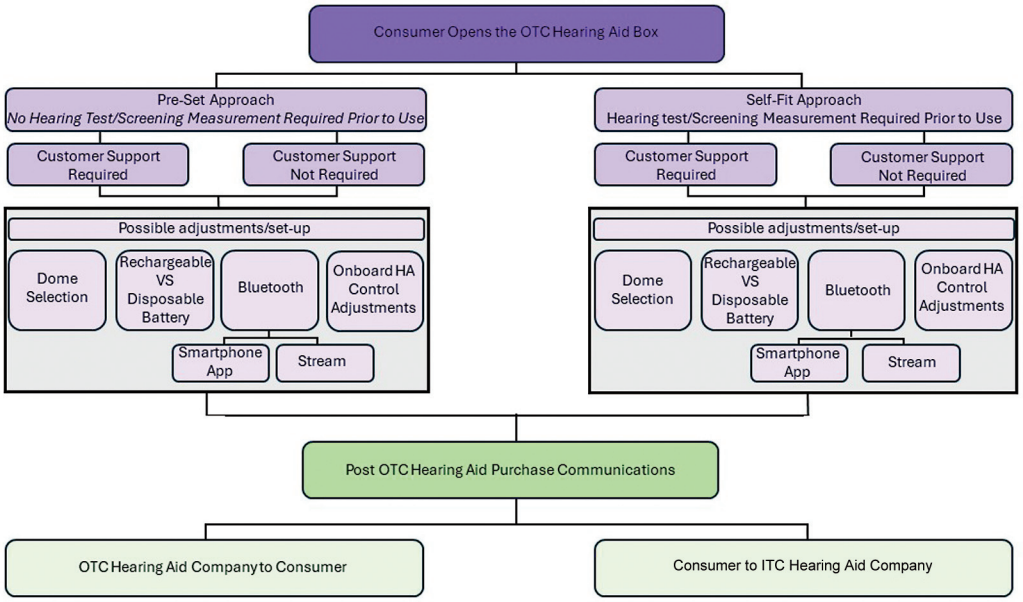

Figure 3 Potential post-purchase scenarios for over-the-counter (OTC) hearing aid setup and support.

concluded that more OTC-HA education is needed, with 56% of respondents reporting hearing challenges, only 8% receiving treatment, 48% reporting untreated hearing difficulty for more than 2 years, and 30% indicating an adverse effect on the quality of life. Only 16% of respondents could identify that OTC-HAs were for adults 18 years and older.[13]

Griffin reported that market trends reveal that younger individuals are starting their HHC journey earlier and that caretakers are becoming more active in assisting with hearing aid purchases, which has led to an uptick in prescription hearing aids.[14] The opportunities in the OTC-HA marketplace are evolving with design, Bluetooth (BT) connectivity, smartphone apps, streaming capabilities, and increased awareness and accessibility. The author asserted that ongoing education is still needed to support the consumer in starting their HHC journey earlier.[14]

Once a consumer makes the decision to purchase an OTC-HA, not only are they faced with numerous options of where and how they can purchase the hearing aid(s), but they must also consider what hearing aid features will best be suited for their hearing, communication, and lifestyle requirements while fitting into

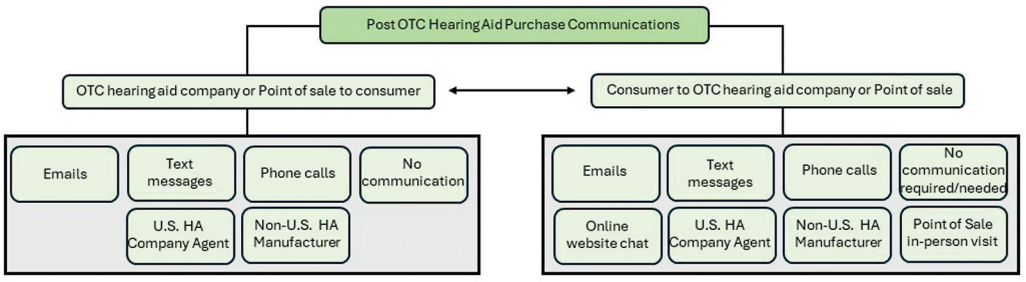

Figure 4 Post-purchase customer support communication scenarios.

financial resources. This process can be overwhelming for many individuals, which could possibly lead to indecision due to overthinking, and they may refrain from deciding on purchasing hearing aids to avoid the risk of choosing incorrectly.

Our research team at the University of Pittsburgh is working toward supporting consumers who want to pursue self-care and, at the same time, using data from this pathway to identify ideal candidates for self-care, which will further assist consumers with this initial choice. The six-member research team consists of audiologists, hearing scientists, an industry expert, a health informatics expert, and an expert in stakeholder engagement. Our funding for the CLEARdashboard project (Consumer Led Evidence—Amplification Resource Dashboard) is not tied to any manufacturer or distributor of devices. Our approach is novel in several areas starting with dependence on consumer input to identify what consumers expect from OTC-HAs (see top portion of Fig. 5). Consumer-led evidence comes from published accounts (e.g., MarkeTrak)[15], direct stakeholder input from our panel of 10 stakeholders, and Large Language Modeling (LLM) using natural language processing to scour consumer OTC HA reviews. This project involves a 10-member consumer advisory panel that comprised individuals with diverse backgrounds and life experiences with hearing loss, hearing aids, and perceived hearing difficulties.

The use of large language modeling to perform natural language processing on consumer reviews is a novel approach to reverse engineer a view of what consumers find to be important about devices and care pathways. Reviews are typically used to inform a consumer about whether a particular product will be appropriate or attractive to them. In this case, the reviews are used to identify positive and negative themes that shed light on what is important to consumers relative to OTC-HAs. This includes information about usability, features, and function (middle of Fig. 5).

These three consumer sources have directly informed the key elements to highlight and include regarding OTC-HA technology, features, and pricing that consumers wanted and needed to know to better understand OTC-HAs. The information provided is presented at a reading level suitable for the majority of the U.S. population, which was one of the conclusions that Shah et al noticed was not available in most of the online information regarding OTC-HAs.[16]

Usability and features that have been identified as important to consumers can be gleaned from product websites and from having groups of would-be consumers interacting with the devices in person (e.g., how long does it take to set up the device, sound quality, and ease of use). Performance goals identified by our consumer sources have to be measured and present a unique challenge in that laboratory

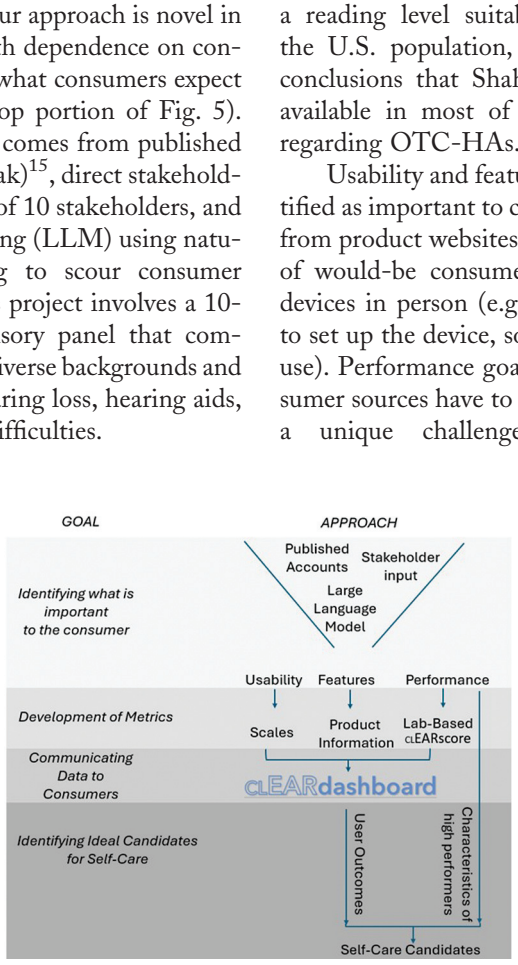

Figure 5 Goals and approaches of the CLEARdashboard project.

measurements are required for efficiency (as opposed to sending people out of the laboratory with devices). Now that specific performance requirements have been identified by our consumer panel and other resources, the research team is designing a laboratory-based set of measurements that assess the desired function and, importantly, seek to predict real-world function based on recent advances in our understanding of suprathreshold sound perception.[17–22] Another consumer-centric strategy is being used to support this work. The team is engaging consumers who perceive that they have a mild-to-moderate hearing loss, which was substantiated by an audiological evaluation, to undergo laboratory testing with OTC HAs. These individuals will complete laboratory testing designed to predict real-world performance while using OTC HAs. The results of this testing will be combined to create the CLEARscore (function data), which will complement the usability and feature data to assist consumers in selecting the most appropriate OTC-HA for their communication and lifestyle needs.

Finally, function data from the large group of individuals with mild-to-moderate hearing loss will be used along with user outcomes collected from individuals using the CLEAR-dashboard (bottom of Fig. 5) and will be analyzed to predict who the ideal candidates are to pursue a self-care pathway for hearing care. These data could be used to help consumers realistically identify whether a self-care pathway is likely to be successful for them or alternatively recommend more appropriate pathways matched to their needs and characteristics.

To complete this work, every known OTC-HA must be obtained so that it can go through the process described in Fig. 5. Of course, even the process of obtaining the OTC-HA provides further consumer information (e.g., ease of purchase and assistance in the process). To provide further insight into the consumer journey related to OTC-HA, this project replicated the online and in-person consumer experience by acquiring 10 of these devices in the same manner that is available to consumers: online, through big-box stores, and pharmacies. Over time, all OTC-HA devices will be purchased to support the larger project, but these 10 experiences were used for this report.

The devices selected represented a wide range of products that varied in hearing aid style, price, technology level, smartphone integration, and streaming functionality, all based on hearing aid features rated to be essential by our consumer advisory panel. Fig. 6 reveals that

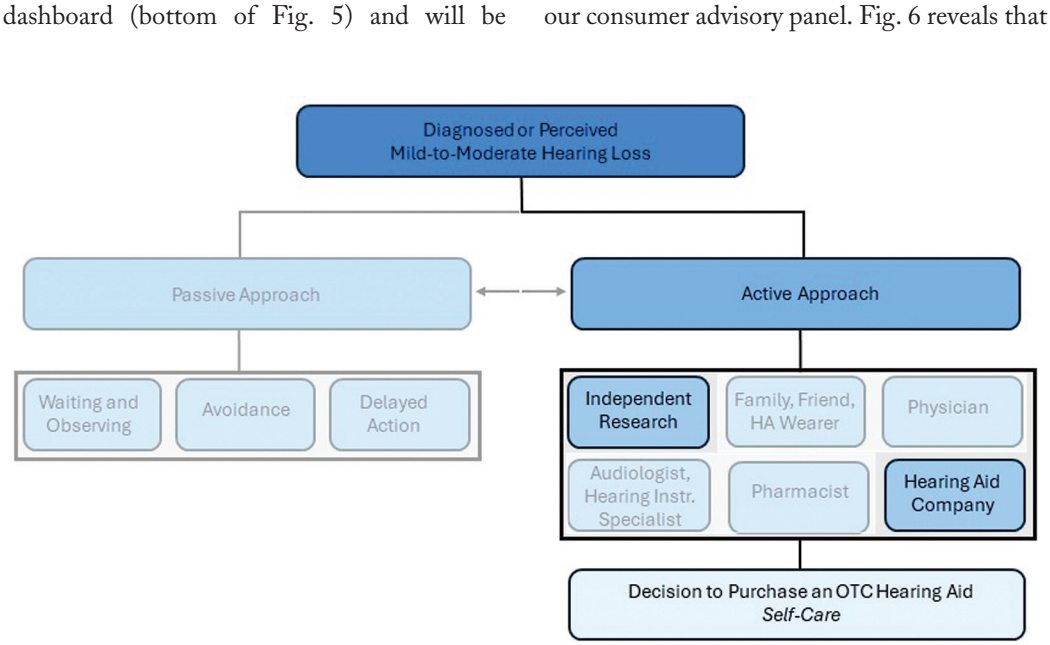

Figure 6 Active approach to over-the-counter (OTC) hearing aid selection process.

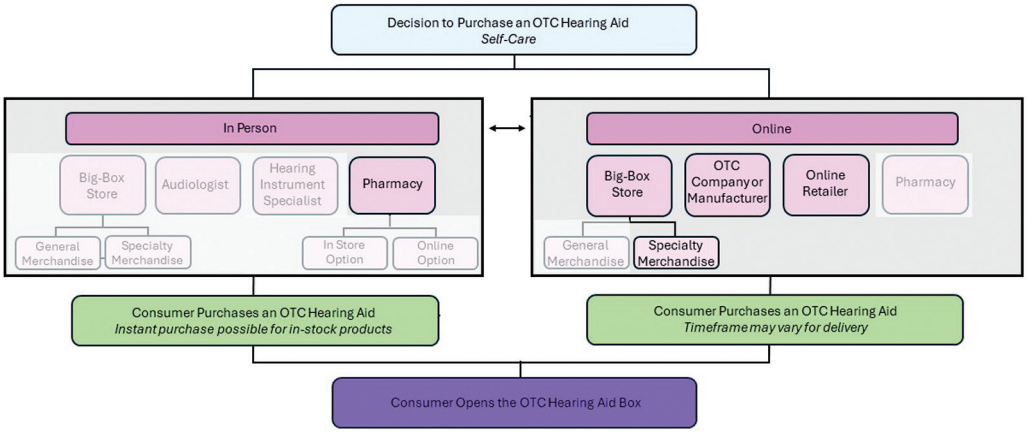

Figure 7 Paths chosen for buying the 10 over-the-counter (OTC) hearing aids with and without Bluetooth smartphone features and/or streaming capabilities in the CLEARdashboard project.

for this report, an active approach for self-care was taken referencing independent research and hearing aid company websites to guide the product selection process. Fig. 7 depicts the sequence for buying the 10 OTC-HAs with and without Bluetooth smartphone features and/or streaming capabilities either directly from the hearing aid manufacturer or hearing aid company, big-box store, and online retailer. It is important to highlight that an in-person route was taken with a pharmacy, but the decision to purchase the same hearing aid manufacturer/model was made with a big-box store (specialty merchandise) since that pharmacy did not have the devices in stock.

All the hearing aids were relatively simple to acquire and arrived within a few days of ordering online. The ease of setting up the devices varied—from easy and straightforward to more involved, which required some technological competence and familiarity with smartphone settings and functionality.

Fig. 8 represents the process for the six preset OTC-HAs that were purchased for the project. Customer service was not required during the setup process, and Bluetooth and streaming functionality were either unavailable on the product or included, depending on the hearing aid model.

The OTC-HA pathway for the four self-fit devices is shown in Fig. 9. Customer support was required for one pair of instruments when the smartphone app would not connect to the hearing aids due to the wrong information provided in three of the included instructional materials in the hearing aid box—user manual, app manual, and quick-start guide.

The diagram in Fig. 10 demonstrates the post hearing aid communication process between the company or point of sale and the hearing aid buyer. The method of communication varied for each device and ranged from no communication to constant communication in the form of emails, text messages, and phone calls which may be a reflection on how the device was purchased—directly from the manufacturer or hearing aid company versus an online retailer or big box store as well as the sophistication of the technology and whether any problems occurred with the hearing aids. Examples of post hearing aid communication consisted of programming assistance, providing insight into the hearing aid adjustment and adaptation process, inquiries of use and acceptance of the devices, reminders about cleaning and replacing ear tips to marketing campaigns, and new product introductions.

In contrast, Fig. 11 represents post-hearing aid communication from the consumer to the OTC-HA company and big-box store (specialty merchandise) required for one pair of hearing aids. This example includes no response to numerous emails, website chats, and phone call messages to the hearing aid company regarding incorrect smartphone app information and instructions on the user manual,

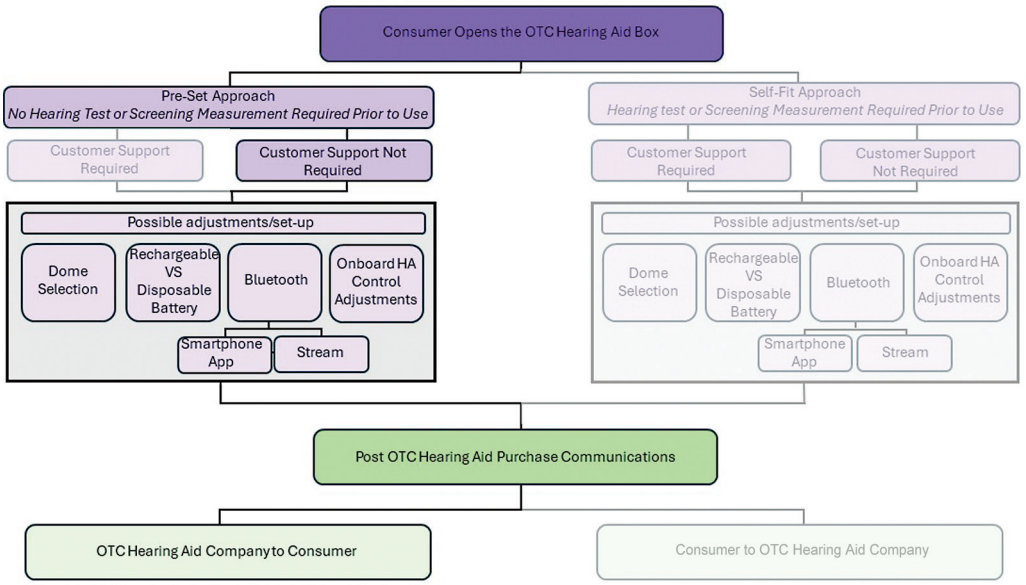

Figure 8 Process for the six pre-set over-the-counter (OTC) hearing aids that were purchased for the project.

smartphone app manual, and quick-start guide. There also was no reply to any correspondence from the same hearing aid company when the rechargeable battery in one of the devices failed to maintain a charge after a few months, but still within the 1-year repair warranty of the device. Further attempts to seek repair assistance (not a return for credit) by website online chat, phone calls to customer service representatives, as well as in-person visits to three locations of the big-

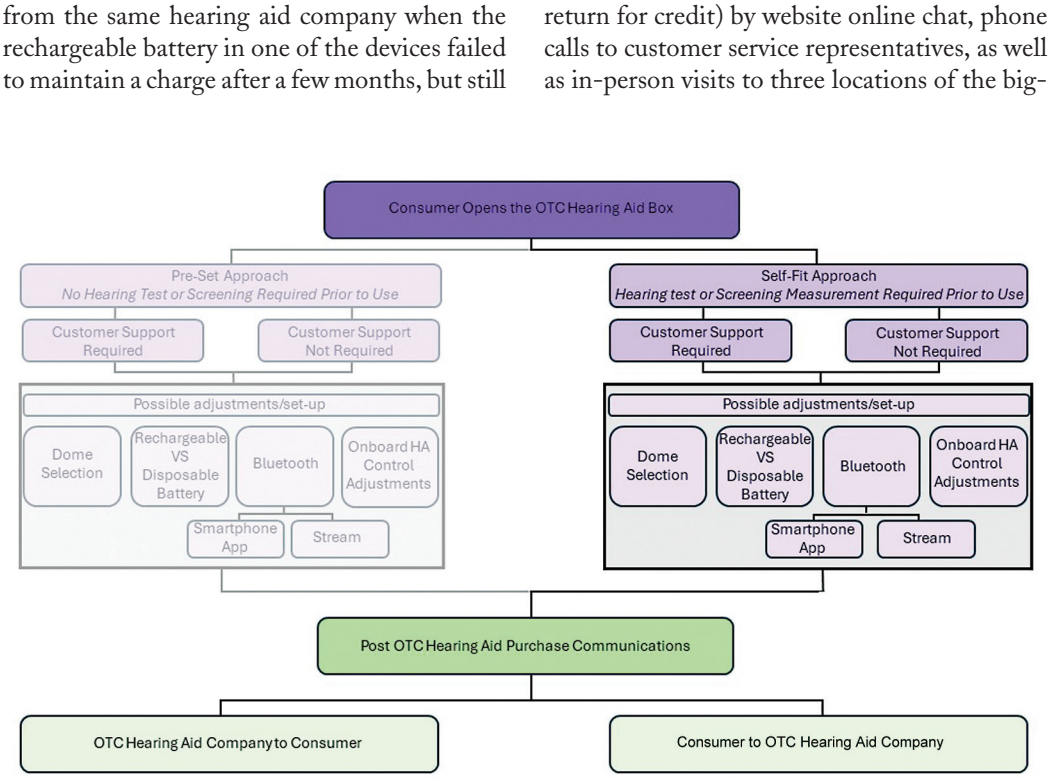

Figure 9 Over-the-counter (OTC) hearing aid purchase pathway for the four self-fit devices used in the project.

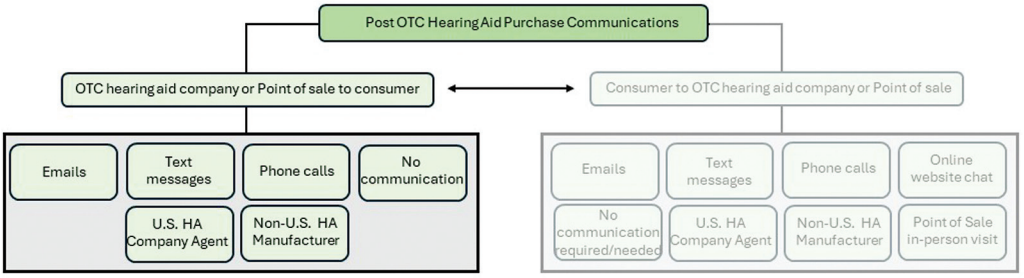

Figure 10 Post-hearing aid communication process between the company or point of sale and the project hearing aid buyer across various devices.

box specialty merchandise retailer, where the devices were purchased, proved to be futile since their 15-day return period had ended and an extended warranty was not purchased when the devices were ordered online even though the hearing aids were under the hearing aid company's 1-year repair warranty.

Since no resolution to the above problems could be obtained through typical methods that a consumer would have at their disposal, additional effort was made to contact the non-U.S. hearing aid manufacturer and their U.S. hearing aid agent directly with information obtained from the Food and Drug Administration's (FDA's) Website. This additional correspondence by phone calls to the U.S. agent representing the non-U.S. hearing aid company proved to be unproductive, yielding no results. Emails directly to the non-U.S. hearing aid company revealed that they denied repair liability due to their severed business relationship with the U.S. distributor even though their non-U.S. hearing aid company name and branding was on the mobile application software. This detailed consumer journey is highlighted in Figs. 12 to 15. It should be noted that a rechargeable battery malfunction is not a unique issue to OTC-HA, since this challenge also can occur with prescription hearing aids. However, it is the company's response or lack of response to the problem that is the cause for concern and may contribute to the skepticism or apprehension to pursuing OTC-HAs. It also should be noted that this hearing aid company distributor, which has ceased all U.S. operations, has devices that can still be purchased in pharmacies, big-box stores, and online retailers.

Lack of OTC device knowledge and purchasing process was one of the reported reasons consumers have not embraced this new category of hearing aids.[11] While Singh and Dhar agreed with this perspective, they also suggested focused public health messaging to boost consumer confidence in the DTC HHC model.[23] ASHA noted that there is a strong consumer

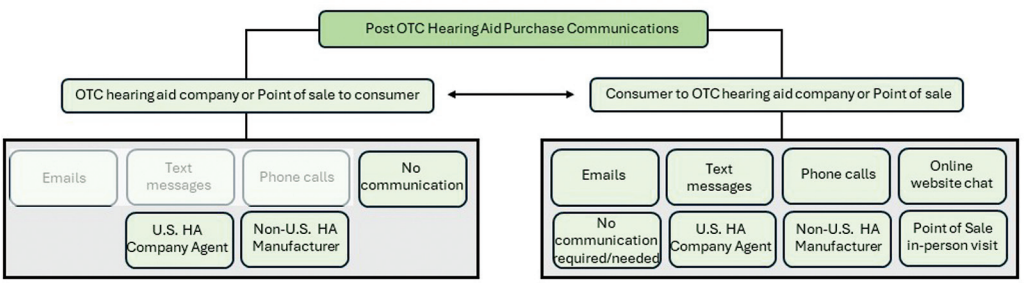

Figure 11 Post-purchase communication process from the project hearing aid buyer to the over-the-counter (OTC) hearing aid company and big-box store required for one pair of hearing aids.

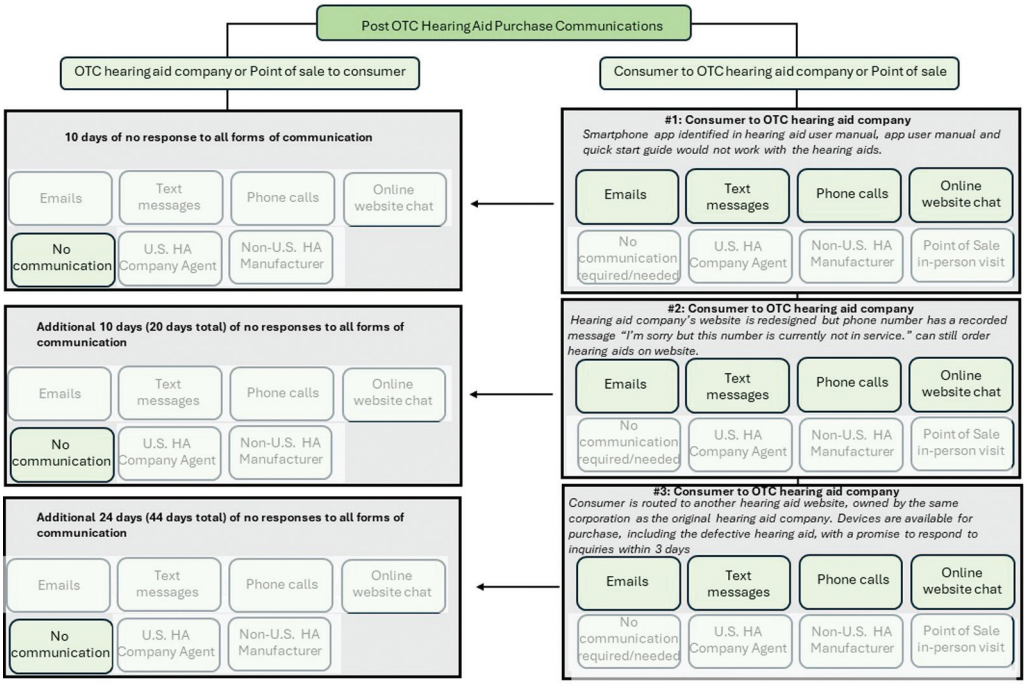

Figure 12 The buyer's post-hearing aid purchase communication journey for one pair of over-the-counter (OTC) hearing aids (days 1–44).

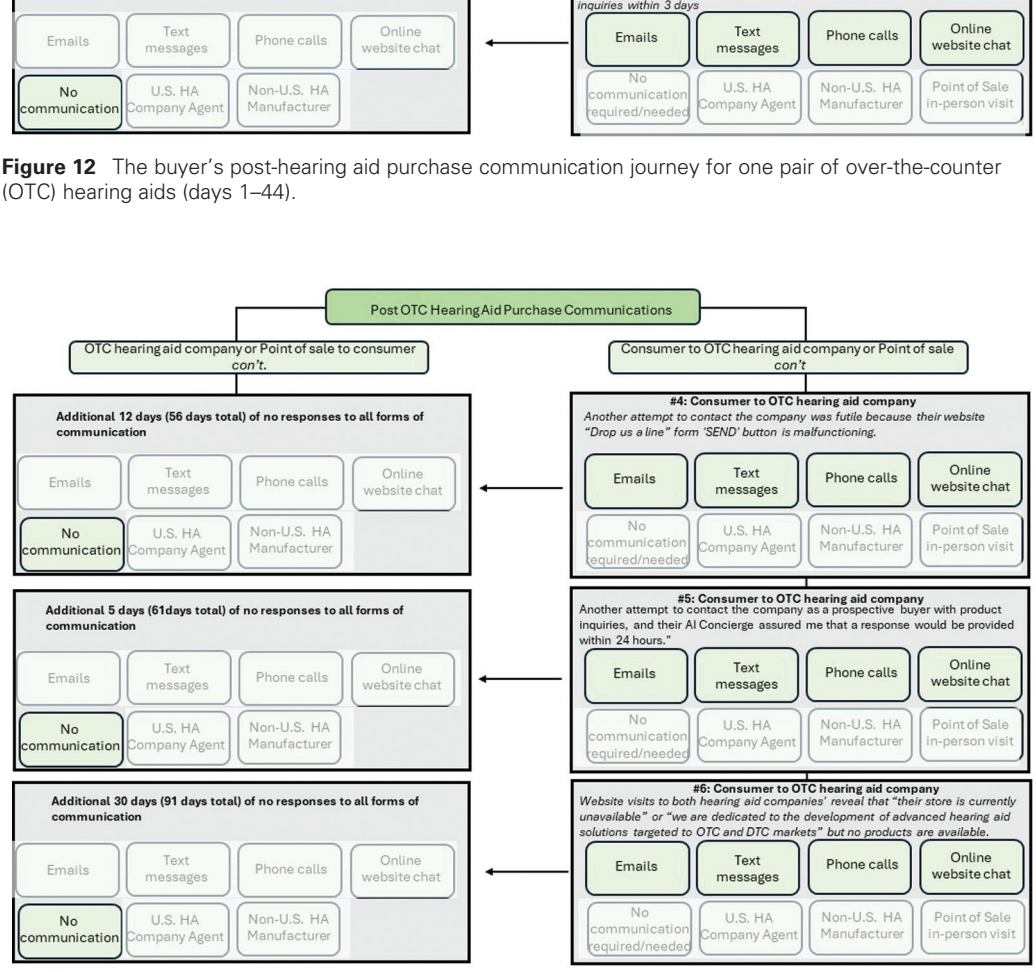

Figure 13 The buyer's post-hearing aid purchase communication journey for one pair of over-the-counter (OTC) hearing aids (days 45–91).

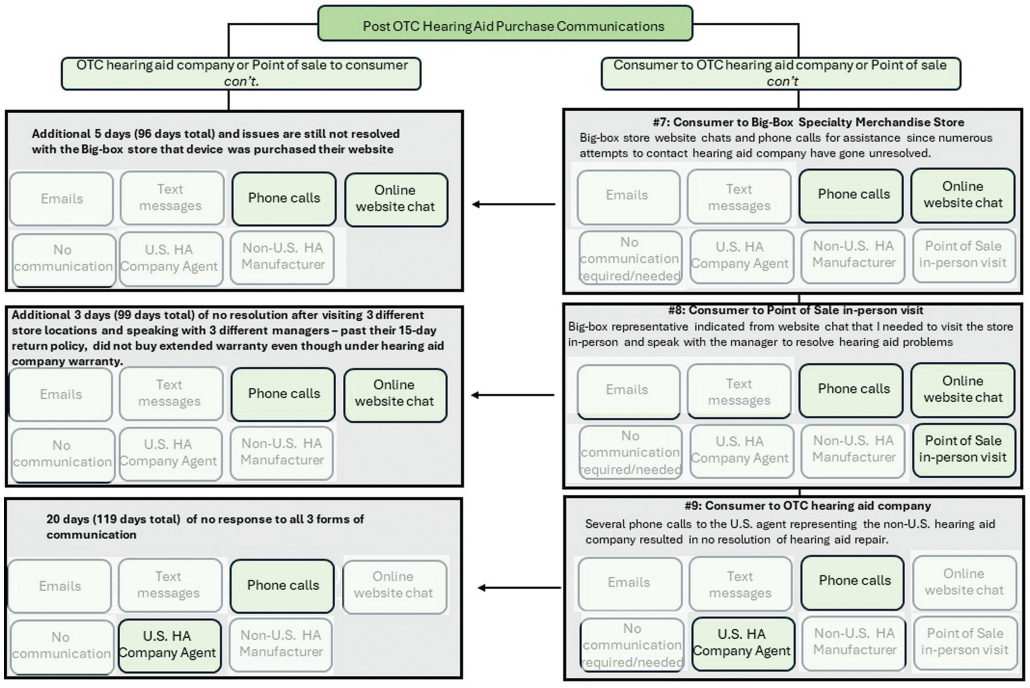

Figure 14 The buyer's post-hearing aid purchase communication journey for one pair of over-the-counter (OTC) hearing aids (days 92–119).

preference to seek guidance from health care professionals versus self-care management which could contribute to the lack of comfort with the direct-to-consumer (DTC) model when accessing HHC. In addition, older adults may be cautious about pursuing the DTC model due to restricted financial resources and the absence of hearing aid insurance coverage.[13]

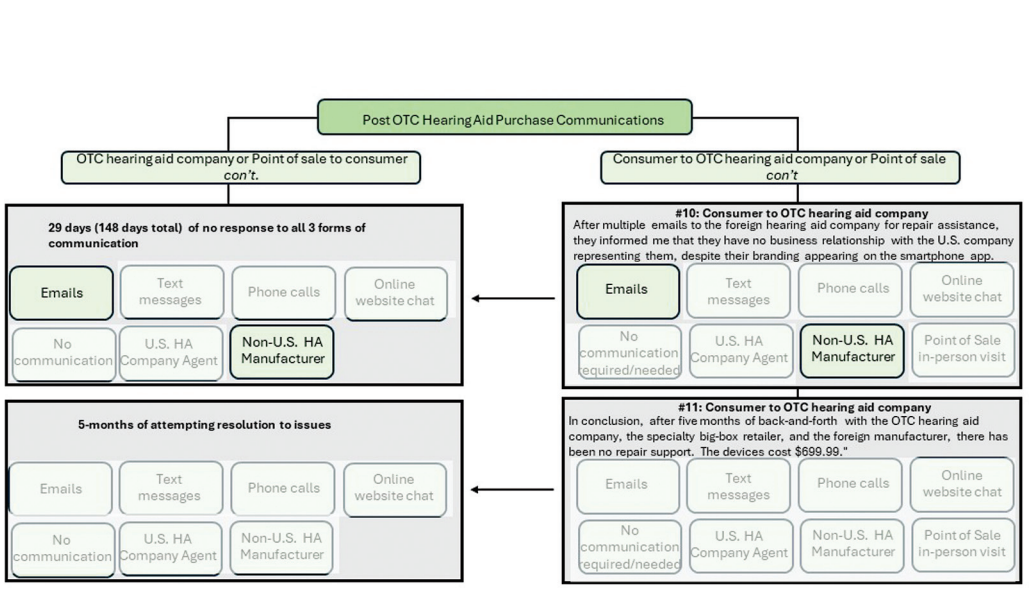

Figure 15 The buyer's post-hearing aid purchase communication journey for one pair of over-the-counter (OTC) hearing aids (day 120 to 5 months).

Barriers remain in HHC that OTC HAs do not directly address. Knoetze et al reported that the largest barriers for individuals seeking hearing aid help for both prescription and OTC devices were price and lack of assistance from medical insurance.[24] Palmer and Zitelli reported lack of awareness of gradual hearing loss, cost of treatment, and a complicated pathway to care as reasons for the lack of accessing HHC.[25] Barnett et al noted that cultural beliefs and support might affect whether an individual decides to pursue help for their hearing challenges.[26] Malcolm et al cited that socioeconomic position can have an influence on whether a person uses hearing aids and accesses hearing care.[27] Singh and Dhar noted that adults with limited income and hearing aid insurance coverage and who had a positive outcome with DTC health care were the most likely to pursue these pathways.[23] While Desai et al indicated that although there was a strong level of satisfaction with overall hearing aid performance regarding improved communication and sound detection, some barriers still existed due to the cost of the devices, professional competency, and understanding their particular needs, as well as speech clarity in noisy background situations.[28] Lin reported some of the hearing aid myths that prevent people from seeking hearing aid help, which includes the individual does not think that their hearing is that bad, the perception of wearing hearing aids means old age, the cosmetic appeal of hearing aids, and that hearing aids are difficult to use.[9]

In summary, although numerous barriers remain regarding access to HHC, a DTC pathway that includes OTC-HAs may support some individuals. The challenge is identifying which individuals are the ideal candidates to pursue this self-care pathway and what information (and in what format) will support their self-care journey. The CLEARdashboard project is systematically addressing this pathway to care through a consumer-led, evidence-based approach.

CONFLICT OF INTEREST
None declared.

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