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A Review of the Provision of Hearing Healthcare Through Humanitarian Efforts

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A REVIEW OF THE PROVISION OF HEARING HEALTHCARE THROUGH HUMANITARIAN EFFORTS

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ABSTRACT

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In an effort to make hearing health care more widely available throughout the world, a variety of healthcare professionals have selflessly worked to create audiologic infrastructures throughout developing and developed regions. These infrastructural changes address the need for hearing screenings, comprehensive hearing evaluations, hearing aids and cochlear implants, consistent follow-ups, and local education on the causes, prevention, and treatments of hearing loss. The literature review sought to evaluate the means in which audiologic services are provided in a range of regions. Through the analysis of case studies and articles written by those who had first-hand experience, interviews with professionals at the forefront of humanitarian audiology, and personal experiences, trends in the most important aspects of the creation of humanitarian audiology were determined. At the forefront was the necessity that humanitarian initiatives have the goal of becoming self-sustaining. This was achieved through intercultural partnerships, support from the local community, training programs for community members, volunteer audiologists, secured funding, streamlined and multi-functional diagnostic equipment, accessible amplification, supply chain creation, clear and detailed planning, and the education of the local region on hearing loss. Through these building blocks, a strong and sustainable foundation could be built on which true infrastructural change could be achieved for the over 466 million people throughout the world experiencing a disabling hearing loss (Davis & Hoffman, 2019).

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REVIEW OF THE LITERATURE

Introduction

Humanitarianism is a complex action born out of the intention of helping the greater good of the world. The reason for this complex nature lies in the ethics behind doing what is truly good. The World Health Organization's (WHO, 2008) *Glossary of Humanitarian Terms* lists humanity, neutrality, and impartiality as the three humanitarian principles necessary in providing humanitarian assistance. The assistance must be provided to the largest areas of needs, for those community members who need it most, must be provided without taking any sides within the community, and must be provided without discrimination. These factors culminated in the definition of humanitarianism as "delivering life-saving assistance to those in need, without any adverse distinction" (European Civil Protection and Humanitarian Aid Operations, n.d., para. 3). While this definition paralleled those from other sources and has remained consistent throughout the years, the evaluation of what delivering assistance should look like continues to evolve.

Long-term analyses of previous humanitarian initiatives have given insight into factors necessary for success. However, this highlighted the question of how success is defined. Boston and Horlbeck (2015) described the success of a humanitarian initiative as being based on the completion of previously determined objectives. The objectives should be clear and measurable and should be based on a core structure from a governing medical organization. Success should also be measured by evaluating the outcomes of those who received a good or service from the initiative. Pettit and Beresford (2009) determined a set of critical success factors regarding

humanitarian supply chains through their review of previous humanitarian aid initiatives and published research. These factors included strategic planning, management of information, continued improvement, and supplier relations. Azmat and Kummer (2019) distributed a questionnaire to several nongovernmental organizations (NGOs) to determine key success factors in humanitarian supply chains. The authors found the collaboration and shared information and resources between NGOs and even the partnership of these organizations were required to create a successful supply chain. Overall, the difficulty in clearly defining what makes an initiative successful and the factors that go into it creates the need for every humanitarian initiative to be evaluated on an individualized basis.

Types of Humanitarianism

Humanitarianism is constantly evolving due to the changing needs of the world and the increased understanding of what it means to truly "help" people. Hilhorst (2018) explained two different types of humanitarianism: classical and resilience. Classical humanitarianism first began in the 1860s during the initial Geneva Conventions and was primarily focused on being non-political and needs-based. These humanitarian principles were then more solidified in the 1990s by the United Nations. Classical humanitarianism was largely limited to events that fit the strict description of a natural disaster or a conflict; the focus of such efforts was a short-term solution to reduce overall destruction and deaths (Hilhorst, 2018). These brief periods of assistance could often lead to mistrust of humanitarian organizations as regions with long, drawn-out conflicts might see short periods of time with humanitarian intervention. Along with this, these periods of assistance often had a lack of partnership between the developed and developing areas and a view of recipients as victims took away any power the community members had. The Westernized view that community members of developing regions do not

have the ability to assist themselves results in a negative power-shift in which a savior and victim relationship is formed. This often resulted in not only mistrust but also a lack of long-term, positive impact in the developing area. In the mid-1990s, there was a shift toward local community members becoming the first responders that arose (Hilhorst, 2018).

Resilience humanitarianism is a self-reflective type of aid that has slowly become more prominent as a response to the shortcomings of classical humanitarianism (Hilhorst, 2018). An increased number of disasters resulting from climate change have led to a step back from many international organizations and a higher emphasis put on assisting and empowering local forces in affected areas so they can assist themselves in the future. Many crises are long-term events or might even be the new normal for a region, which requires a very different humanitarian initiative. The emphasis is often focused more heavily on working with communities to find a new normal and assist them (if needed) to self-persevere. This type of aid is often seen in refugee camps in which long-term solutions and an emphasis on the refugee's ability to adapt and overcome have been more impactful than a brief stint of international humanitarian aid would have been. A reemphasis of the importance of governmental and local participation has accompanied the rise of resilience humanitarianism. Hilhorst (2018) referred to classic humanitarianism as a "humanitarian system" and resilience humanitarianism as a "humanitarian ecosystem" (p. 23).

Medical Humanitarianism

The foundation for humanitarian aid lies in a need, whether it is born out of a natural disaster, conflict, or a lack of infrastructure. A large and expanding area of humanitarianism worldwide is focused on healthcare initiatives. A large number of medical humanitarian organizations and endeavors throughout the world have assisted in addressing the large

disparities between medical needs and what is available in many developing countries. Berger et al. (2018) stated that of the world's population, the 35% that live in developing areas, spend less than $100 USD on health care a year. There is a great disproportion in the number of surgeries conducted in developing countries as well, about 3.5% of the annual 234 million surgeries worldwide (Berger et al., 2018). This left a large gap medical doctors and professionals often sought to fill. Médecins sans Frontières (Doctors Without Borders) is one of the most recognizable organizations trying to fill this need, which as of 2006, had 13,000 staff and had aided 83 countries (Redfield, 2006).

Mulvaney and McBeth (2009) detailed their previous medical humanitarian operations, organized with the help of the U.S. Armed Forces, and what they learned from them. Both authors served in the U.S. military as a lieutenant colonel and a major, respectively. Within two years, Mulvaney and McBeth headed up 10 humanitarian projects, each serving 200 to over 2,000 community members in Trans-Saharan Africa. Most humanitarian projects needed to be connected to a sponsoring agency and working with the U.S. Armed Forces allowed the authors to be connected to an outside sponsoring agency more easily. It was also pointed out that while sponsoring agencies could assist financially, the cost of travel, room, and board was oftentimes the responsibility of the volunteers and workers, which could be considered a financial barrier to those wanting to get involved. Through their experiences, Mulvaney and McBeth developed five recommendations for all medical humanitarian projects: having goals, planning adequately, being flexible, having a thoroughly prepared group, and enforcing security measures. Goals set clear expectations for the endeavor while also allowing the organization to ensure it was partnering up and working in a community that truly needed and would benefit from what the organization was aiming to do. Assisting children was often the goal of medical humanitarian

programs because children are normally set to benefit more from the treatments and recover and thrive better than older patients. Planning for a program required research to determine a region's needs, their medical infrastructure, the political situation, and beyond. Coordinating with the U.S. Agency for International Development, which is under the Department of the State, allowed the opportunity to meet with a medical officer who specialized in the region being considered. This also provided the opportunity to connect with local hospitals and learn more in-depth about the region in order to serve it more successfully. This was also a good way to learn what the requirements were for incoming medical professionals to practice in the region. Flexibility was the next important aspect in recognizing the local infrastructure, the successes they have had, and finding a way to weave within that to benefit the community members without overstepping on or dismantling their current systems. Assembling a strong and adequately prepared team is essential in the success of the program. The team should consist of members who are excited and willing to participate, have all their necessary vaccines and medications, and are thoroughly educated on the culture and needs of the region they are visiting. These members should include medical professionals, assistants, interpreters (if necessary), local partners, and other professionals specific to the service or good being provided. There should also be clear plans in place in case any team member or the overall team need to be evacuated for any reason (injury, political unrest, emergency).

It is important to remember that these workers must not only be motivated to help but must also have the ability to cope with what they would experience. Turner et al. (2021) evaluated 63 humanitarian workers and their self-efficacy levels in a questionnaire. Workers could oftentimes see traumatic things in developing regions and it was important they were given the skills to not only cope with the things they might see but to stay resilient in their role during

the initiative. It was determined that the more self-efficacy a worker showed, the more resilience they had. Turner et al. determined that the use of hostile environment awareness training and coping skills education prior to humanitarian initiatives were beneficial all-around and resulted in better resilience and less burn-out.

Mulvaney and McBeth (2009) also emphasized the importance of security in medical initiatives. Crowd control was a necessity as providing something that there usually was no access to could result in large crowds with a sense of urgency. Under-estimating the amount of people who would be able to receive the treatment and communicating this with a community leader could set clear expectations and allow the organization to over-deliver as a best-case scenario. It was also important not to give out anything for free including water and snacks as this could create panic among a crowd. As a takeaway, Mulvaney and McBeth emphasized that not only had they been able to help a great deal of people but their world-view had changed and their passion for medicine had grown, which was often a motivating factor for healthcare professionals to get involved in the first place.

Retrospective analyses of humanitarian healthcare initiatives were helpful to determine successes and challenges. Oehme et al. (2018) participated in 13 medical short-term trips to Nigeria that were part of a larger initiative that helped over 1,600 patients, which allowed the authors to analyze the sustainability of the initiative long-term. They focused on hernias, a treatable condition that could cause a life-long disability if not resolved or operated on. Since there was no global fund to pull from for these operations, all workers and materials were paid through donations of time and money by individuals and companies. The initiative partnered with St. Mary's Hospital, which is located in Okpoga, Benue State Nigeria. Through slow training and transition of responsibilities to local medical professionals and community

members, the analysis of the initiative demonstrated a successful start to transitioning from Swedish medical professionals to community members. It was important that these initiatives were revisited until they could be successfully continued without the help of the returning humanitarians. Initially, 31% of the operations were performed by Nigerians with no surgeries fully done by only Nigerians. These numbers increased to 55% of the operations performed by Nigerians and 18% performed without any outside assistance (Oehme et al., 2018). The authors found that in Ghana alone, there was a backlog of around 1 million hernias that needed reparative surgery; the authors were able to determine the most necessary roles and items on which community health professionals required the most training.

Humanitarianism in Conflict Zones

A large branch of medical humanitarianism looked at identifying the most needed medical assistance in conflict zones. Martin (2019) wrote about how conflicts in developing regions often ended up injuring civilians more than anyone else, creating an ethical need for the implementation of a medical infrastructure, oftentimes by humanitarian organizations. These infrastructures must be flexible, as conflict zones are ever-changing, and need to be adaptable based on the conflict and the region. These are often challenging due to the need for funding and a high-level of organization that are difficult to procure in dangerous and changing situations. Zarka et al. (2018) described the conflict that started with the Syrian Civil War and was still ongoing as of 2022, which created a need for a medical infrastructure in Syria as many civilians sustained injuries resulting from the conflict. As of 2018, more than two million people had been injured in the conflict and over 500,000 people had been killed. At the same time, over 70% of the medical professionals had fled due to the targeting of medical institutions and professionals. In February 2013, the creation of a new medical humanitarian infrastructure was put into motion

with the arrival of seven injured Syrians to the Israel border, asking for medical help. As of 2016, over 2,800 Syrians had received medical help from Israel at the Ziv Medical Center (Zarka et al., 2018). The Israel Defense Force Medical Corps team and the civilian medical centers partnered to provide assistance to any Syrian who came requesting medical assistance, followed by measures post-treatment to ensure they were taken home safely with health documents that had no indication they were treated in Israel (Zarka et al., 2018).

The Geneva Conventions of 1949 established the basic principles of international humanitarian law: are humanity, neutrality, impartiality, and independence. Zarka et al. (2018) analyzed the Israel humanitarian acts through this lens. Humanity was achieved through the decision to help those who were most vulnerable instead of closing the border to those who needed help. Impartiality was achieved through choosing to assist people from Syria, Israel's "sworn enemy" (Zarka et al., 2018, p. 4). However, some difficult discussions arose due to Israel's requirement that its people pay for their health insurance. Should Syrian refugees be prioritized above those who are paying to have access to the health care? It was determined that all patients who needed medical care would be on a level playing field and treated based on the severity of their needs. However, it did become clear that Syrian patients often occupied a hospital bed for nearly a month longer than Israel patients, leading to funding difficulties as Syrian patients kept arriving. Neutrality showed in the Israelis' impartiality to which side of the conflict a person was on if the person needed medical attention. Lastly, independence was given to the Syrians by bringing in interpreters, translating important documents, and giving them the autonomy to make their own medical decisions. One dilemma that arose was Syrians were in enemy territory and even with Arabic-speaking professionals, many people did not feel comfortable giving their full or true medical history, leading to the inability to treat patients to

the best of the Israeli hospitals' abilities. This example highlighted the difficulties that came with humanitarian aid and the instinctual motivation of humans to assist those in need.

Introduction to Humanitarian Audiology

The prevalence of hearing loss is increasing worldwide. According to Davis and Hoffman (2019), the worldwide prevalence of moderate to profound hearing loss has increased from 42 million people in 1985 to 466 million people in 2018. The reasons for these dramatic increases have been inferred to include increased child survival rates, longer life expectancies, a lack of public hearing education, increased cases of middle ear infections, lack of vaccine availability for preventable infections that could cause hearing loss (such as measles), and high noise exposures (Davis & Hoffman, 2019). The WHO (2020) estimated that 1.1 billion people between the ages of 12 and 35 throughout the world are at risk for noise-induced hearing loss. Additionally, in places such as sub-Saharan Africa, the WHO estimated that one-third of people over 65 years old were experiencing a disabling hearing loss (which is considered to be a moderate or worse hearing loss). A need for amplification exists; however, only 17% of people worldwide who are good candidates have access to or use hearing aids (WHO, 2020). Lack of accessibility to testing and technology was the reason many non-profit organizations and manufacturers were setting out to provide access to hearing healthcare around the world.

A lack of hearing health care is not just a difficulty experienced in developing countries, it is also something seen in the United States. In the United States, it is estimated by the National Institute on Deafness and Other Communication Disorders (2021) that about 28.8 million adults could benefit from hearing aids. However, despite a large need for amplification, only 30% of adults with hearing loss older than 70 and 16% of adults with hearing loss 20 to 69 have ever used hearing aids (National Institute on Deafness and Other Communication Disorders, 2021).

According to Coyan and Mormer (2020), it is estimated about 1 in 10 Americans do not have access to basic health care, which does not take into consideration any noncitizens who also do not have access to health care. Kamarck and Stenglein (2020) listed the number of undocumented immigrants in 2017 as 10.5 million according to a report from the Department of Homeland Security. With regard to U.S. citizens, connections have been drawn between low income, low education level, unemployment, and hearing loss (Coyan & Mormer, 2020). In their research, Coyan and Mormer found that in California 16.4% of the population were below the poverty level, 17.3% were uninsured, and an estimated 10,581,000 immigrants were residing there. Even with access to health care, insurance providers like Medicare rarely cover hearing aids, which could cost anywhere from $1,000 to more than $6,000 per hearing aid (Mroz, 2021). A breakdown in the accessibility of health care within the United States itself leaves millions at a disadvantaged position to pursue needed amplification.

Basic Structuring of Medical Humanitarianism

Humanitarian initiatives have varying structures based on what is being provided, what the goals are, and how these goals are approached. Saunders et al. (2019) highlighted the main structures of humanitarianism including outreach trips, vertical initiatives, work with umbrella organizations, and long-term self-sustaining initiatives. Outreach trips that are recurring are often the most basic type of humanitarianism and might lead to other efforts. A vertical initiative is an often-brief initiative that might work to establish a foundation for future initiatives or to build connections. Other humanitarians might work with existing umbrella organizations that coordinate activities with many other institutions from the specific region as they often have previously established connections and a clear understanding of the community being served. Long-term self-sustaining initiatives are often considered the gold standard and work to create an

infrastructure in the region that could be maintained by the community members long after the humanitarians have left. It is important to note that these programs are not necessarily isolated types of structuring but could often be the chronologic steps needed for creating a relationship with an umbrella organization or a long-term self-sustaining initiative (J. Saunders, personal communication, November 26, 2021).

The structuring of any humanitarian initiative takes large amounts of region-specific planning, from setting goals all the way through the closing of the project. Ethical decisions are paramount every step of the way. Abdelmagid et al. (2019) reviewed eight published articles to determine the appropriateness of humanitarian initiatives. Oxford Dictionaries (as cited in Abdelmagid et al., 2019) defined appropriateness as "the quality of being suitable or proper in the circumstances" (p. 1). The authors found a large amount of variability in the justification of how humanitarian interventions were provided. The appropriateness of an initiative was based on a variety of factors such as the scale of the needed response, who was being helped, how welcomed the humanitarian initiative was, and what the overall goals of the initiative were. Based on their review, Abdelmagid et al. established new guidelines for "appropriateness" of humanitarian efforts. First, the services must address a true need of the community. Secondly, the service provided must benefit, be accepted by, and be sustainable in the community. Lastly, there must be a defined population receiving the assistance. This definition could be summed up by looking at what was being provided, how it would be provided, and for whom. Sufficient planning and execution using the basis of appropriateness could help humanitarian initiatives to avoid the inconsistencies often seen in humanitarianism. Inconsistencies of humanitarian initiatives often might arise due to funding sources, politics, and the underlying goals of partnering organizations (Abdelmagid et al., 2019).

Humanitarian Partnerships

A few vital considerations are necessary in most humanitarian initiatives after the appropriateness of the initiative has been established including partnerships and supply chains. Ekzayez (2020) utilized personal experiences with Syrian health research to emphasize the importance of partnering with local organizations in a variety of ways before, during, and after humanitarian initiatives. Partnerships could arise in a variety of facets throughout the duration of the initiative. Ekzayez discussed the necessity for medical assistance due to the targeting of Syrian health facilities and professionals while an estimated 11.3 million Syrians were in need of urgent medical access. Some partnerships born out of this crisis included the partnering between NGOs and the communities, partnerships for research, and partnerships in refugee areas. The John Hopkins' Bloomberg School of Public Health partnered with the Syrian American Medical Society to research the current state of Syria and what medical assistance was needed. Turkey allowed around 3.5 million Syrian refugees in under the Temporary Protection Policy while Gaziantep University gave about 60,000 refugees access to education (Ekzayez, 2020).

Supply Chains

Haavisto and Kovacs (2014) evaluated the sustainability of supply chains by analyzing previous published humanitarian annual reports from a variety of organization including United Nations agencies and international organizations. Supply chains are vital to the success of most industries as they determine who produces a product and how it is then provided to the consumers. On an overarching scale, supply chains are often found to not benefit the local economy as they often lack sustainability, fairness, and awareness of the community being helped. However, supply chains also hold the opportunity to grow the economy on a micro or macro level depending on their execution. Several supply chain stakeholders include suppliers,

donors, service providers, and those benefitting from the chain. These participants and the chain overall must be flexible as oftentimes there might be some instability in the region. This flexibility provides the humanitarian organization the opportunity to not only assist in the current state but to help the region to develop a bit more in a targeted area. Opportunities within this process put a focus on the sustainability of the supply chain through the local sourcing of goods, services, and labor.

Closing Initiatives

While the structure of initiatives might vary, most initiatives required some form of closing regardless of length. The way in which an initiative is closed is important. Pal et al. (2019) and Hunt et al. (2020) both evaluated how humanitarian initiatives should be closed in ethical and sustainable ways. Through reviewing literature and conducting interviews with nine experienced humanitarians, Hunt et al. established the importance of sustainability when closing projects through a transitory process. Most of those interviewed felt strongly that closing should be an important pillar in the planning of an initiative as sustainability was only achievable in medical humanitarianism if accessibility was not fully negated with the closing of the initiative. Anticipating the closing could help ensure that local partnerships are in place and longevity of the initiative is possible. However, not all initiative closings can be planned for as some will be initiated by a sudden lack of funding, change of support from local governments, or a change in the level of safety. Pal et al. described several types of closing procedures including phase down (services are reduced, however there is still a presence), phase out (services are reduced without a remaining presence), phase over (services are handed over to a local partner), and abruptly close (services are stopped without any lasting presence or handing over). The authors discussed the ethical considerations necessary when closing a project. While projects are usually closed for

a few reasons (such as the achievement of goals, ending of emergency, lack of funding, or change in agreement with local agencies and government), the decision to close down a project should have seven key points to maximize the chance for success: ethical planning, local partnerships, flexibility, clear communication and expectations with local partners, the minimization of possible harm to the community, sustainability, and equity (Pal et al., 2019).

Hunt et al. (2020) detailed a few examples in which closing was done unsuccessfully. In Angola, there was disappointment in communities after a humanitarian initiative suddenly closed and left the community members confused and unprepared. In Chad, there was no clear exit plan put in place by a major medical humanitarian organization, which left the community members without medical access and medical professionals. These situations, in which the positive effects of the program were not sustainable, require further consideration in order to ensure sustainability in future efforts.

Common Barriers of Medical Humanitarianism

Encountering barriers and challenges is inevitable when travelling to a new region: for workers, the organization, community members, and those being helped. A question that often arises with the discussion of humanitarian endeavors in developing regions is if it is safe for volunteers and workers. Solheim (2010) described the possible challenges based on his experiences owning and operating a medical humanitarian organization and travelling to developing regions more than 40 times. The important steps to minimize risks were listed by Solheim and included pre-planning, self-care, and research of the region. Planning before a included learning the requirements (locating embassies, forms), health-related necessities (clean drinking water, vaccines), and figuring out the local area (culture, needs, politics). Using the State Department site allows an in-depth look at possible risks in different countries as well as

the opportunity to register where volunteers are going in case they were to need assistance from the embassy there (Solheim, 2010). Self-care is important in ensuring that volunteers have access to drinking water, clean and safe hotels, and are aware of any vaccines they might need prior to travel. Research of the region is also very necessary, both from the workers' side and the organization's side. It is important to learn about the culture, laws, and potential political risks that might occur such as terrorism, riots, and other unrest. It is also important to learn about the culture and laws of the area. This could help to not only provide a better service or good but to also minimize risks to the workers. Solheim discussed some examples of unique cultural beliefs including the belief that taking someone's picture could steal their soul in Bolivia or wearing a sleeveless shirt as a woman could be seen as provocative in Kenya. Understanding cultural expectations and beliefs could help humanitarian volunteers and organizations stay out of trouble and connect to the community members they are helping on a much deeper level (Solheim, 2010).

Analyzing barriers and challenges from previous humanitarian initiatives presents the opportunity to prepare for future initiatives. Broussard et al. (2019) reviewed 66 studies that discussed humanitarianism in conflict settings to determine the most common challenges. The authors dove into the challenges with both ethical obligations and humanitarian obligations, and how the two relate. Ethical obligations are factors dictating what workers and organizations should do based on the ethics of the situation (impartiality) while humanitarian obligations drive efforts based on what is most likely to assist the community for the greater good (such as local partnership and finding those with the most need). While the two sound similar, they do not always align. The most frequently mentioned ethical challenges were providing the best quality of care possible, protecting the workers, and minimizing unintentional harm to the community.

The most common humanitarian challenge was neutrality. Looking at the provision of best practices and the best quality care, difficulties often arise in having enough personnel, acquiring medicines and other goods, and access to the necessary facilities. There was also the recurring barrier of low-quality or counterfeit medications and supplies. Even then, the determination of if the care was high-quality could only be done post-program.

Next, the protection of workers is important in not only getting workers onboard for the project but also in retaining workers for future projects. Being educated on the risks of the region and the International Humanitarian Law (a set of rules established by the European Union with regards to humanitarian aid during conflict) is vital in knowing workers' rights and expectations. It is also important in determining if a region is safe for humanitarians. A somewhat controversial practice of "risk transfers" has arisen in which high-risk roles (such as working in dangerous environments or in targeted positions) were given to community members to take the possible danger away from the visiting workers (Broussard et al., 2019). Broussard et al. (2019) stated there was a lack of exploration into the ethics of "risk transfers" that must be done before it continued to be used in future projects. When an organization is in the planning stage, it is important to avoid harming the local community, even unintentionally. Training community members adequately is also important in providing the best care possible and creating sustainability for the service or good being provided. If a country has a preexisting healthcare infrastructure, it is important to ensure that incoming healthcare aid does not disrupt or destabilize the current infrastructure, which could lead to a gap in the needed area when the humanitarian project closes and therefore mistrust within the community (Broussard et al., 2019). Without trust in the organization, the community is much less likely to benefit from the program. An example of this barrier sometimes arises out of inadequate partnering with local

organizations or if the humanitarian organization does not ensure that local organizations or community members are removed from any conflicts or on a definite side. Many times, those on one side or another of a conflict might actively seek a partnership with humanitarians in order to legitimize themselves to the community; however, this could lead to a program being viewed as political and not trusted by some community members. Examples of this have happened in Afghanistan, South Central Somalia, South Sudan, and Syria, according to Broussard et al., in which partnerships became political or ended up in propaganda films. This mistrust could also stem from the use of humanitarian aid as a front by political or religious organizations. Neutrality must be maintained by humanitarian organizations to truly assist in regions where the help is needed as well as to maintain support. Therefore, educating workers on the importance of neutrality and planning to uphold neutrality in the distribution of the aid is vital (Broussard et al., 2019).

A relatively new but significant barrier was the start of the spread of COVID-19 in 2019. Travel was put on hold and interactions between people were limited, resulting in a near-halt of humanitarian programs, both national and international. Gokcen and Turner conducted a survey with 19 physicians with humanitarian experience in 2020. At the time, 79% of the respondents thought travel for initiatives would resume by June 2021, while 74% said they would wait for government clearance to resume travel. Of these physicians, 79% would also take into consideration the breadth of COVID-19 in the destination region before travelling there. Other important aspects also lay in the state of the organizations in the pandemic with 11% saying they would need to see their own practice economically stabilize before they would consider humanitarian work again (Gokcen & Turner, 2020). These results all reflected those of the healthcare professionals in developed countries; however, the opinions of those in the developing

country were also vital. William Heob detailed a personal experience in which one of his friends returned to a humanitarian facility in Guatemala to assist and was essentially chased out due to the community members fearing him bringing COVID-19 (C. Runge & W. Heob, personal communication, November 18, 2021). The pandemic is an example of the ever-evolving landscape of the world and illustrates the importance of identifying all barriers and possible barriers to ensure a humanitarian initiative is truly valuable to the developing community.

Ethical Considerations

Healthcare-focused humanitarian initiatives could be structured in a variety of ways, all of which would provide differing benefits, problems, and ethical questions. Doctors Without Borders (n.d.) provide medical services all over the world in a range of formats. Doctors Without Borders listed their forms of humanitarian services as emergency responses, specialists working full-time in headquarters worldwide, volunteers providing health care, working to implement basic healthcare structures, advocating for better healthcare access, advancing research, and mobile teams that move their services around. The structure of services was often dependent on what was needed in a region and could vary between different humanitarian organizations. It is important to understand the wide variety of forms and structures humanitarian initiatives could take to ensure when planning an initiative that the developing countries would benefit from the efforts. A term gained momentum as initiatives did: the white-savior ideal. Raypole (2021) defined the white-savior ideal or white saviorism as the superiority feeling that Black, indigenous, and people of color around the world needed the assistance of white saviors for a variety of community or personal developments. Moyd (2016) addressed the white-savior ideal, noting that a region must be studied to observe their attitudes, spiritual or religious beliefs, social welfare ideals, and their overall disposition toward possible humanitarian efforts. If these steps

are not taken, then it cannot be clear if an effort would truly benefit those it was intended to (Moyd, 2016). Welling et al. (2010) addressed similar issues in medical humanitarianism. From lacking planned follow-up services to going for the "wrong reasons," Welling et al. found several factors that could change a positive initiative into a damaging situation, no matter the intent. An example was the death of two children and further injury to others following surgery with Operation Smile, a humanitarian effort that set out to treat cleft lips and palates in developing countries. Best practices were not always exercised as cases were sometimes taken that were too difficult and the initiative often lacked the support of local healthcare providers. Despite the overwhelming support and publicity of Operation Smile in the United States, the surgeries often did not have patient safety as the top priority and in some cases seemed to take advantage of locals in the developing regions (Welling et al., 2010). Initiatives that left a mess for the region to clean, brought advanced and unsustainable technology, lack of cooperation with locals, or were unaware of the true needs of the region often did more damage than good. Some reports in the literature focused on ethics of medical humanitarianism. Asgary and Junck (2013) and Robertson et al. (2002) addressed several ethical issues. In their research, Asgary and Junck determined that "medical aid is increasingly being viewed in a rights-based approach, specifically that it is our moral duty as global citizens to alleviate the suffering of others and to address the right to health and protection" (p. 629). Asgary and Junck heavily emphasized the importance of understanding the community itself and, in the rise of short-term humanitarianism, highlighted the necessity of initiatives to be moral, full of humility, sustainable, and based in long-term partnerships. This was necessary to ensure the humanitarian effort was benefitting and not hurting the developing region. Robertson et al. explained the necessity for evidence-based medical humanitarian initiatives. The term evidence-based, in this specific context, was

described as analyzing not only an established need for the service and goods but also the likely outcomes and cost-effectiveness of the humanitarian initiative. A humanitarian initiative needs to be a deeply researched project—through the analysis of data such as cost estimates, documentation of the problem, planned attempts to fix it, and qualitative reports in a means of establishing evidence. It is also important to note that the evidence for every humanitarian initiative needs to be evaluated through the lens of that initiative and region.

Along with other medical initiatives, humanitarian audiology requires a true understanding of the region as well as the type of efforts most likely to be successful and sustainable there. Clark (2020) detailed ethical considerations regarding humanitarian audiology specifically. The word "voluntourism" is one that defines an often-damaging type of humanitarianism where a professional enters a developing region, often with the best intentions, but benefits more than those who are supposedly being helped. An example of this was mentioned previously in which Operation Smile received notoriety and praise while some chosen children found their condition worsened post-surgery or even died (Welling et al., 2010). This is an issue in every sector of humanitarianism. Clark defined ethical practice as incorporating the use of nonmaleficence, beneficence, autonomy, and "justice.

Nonmaleficence

Acting with nonmaleficence means causing no harm to the developing region. However, Clark (2020) highlighted the importance of defining harm with respect to humanitarian efforts. Harm does not only refer to personal injury or damage caused but also negative effects on the entire region, their environment, their government, their economics, their local businesses, or their existence. The provision of a hearing aid to a child with a hearing loss in a developing region might not seem harmful in any way; however, the providers' consideration of the impact

on any local hearing healthcare providers, the view of the local government on this action, the sustainability of ethical care when the humanitarian organization leaves, or the benefit of the child, is paramount. A lack of partnership with the local hearing healthcare provider could take money from the local economy, ignore what devices might be the most successful locally, and leave the local providers to have to service this unsupported device in the future.

Beneficence

Beneficence refers to who is benefitting from this initiative. In the case of voluntourism, it is often the provider who benefits more than the recipient. These benefits could include the satisfaction that comes with helping and receiving praise. While not inherently negative outcomes, it is vital that the recipient's benefits outweigh those of the provider.

Autonomy

Autonomy refers to the ability of patients to truly make their own health decisions (Clark, 2020). In the case of voluntourism, many providers might enter the situation with a sense of ethnocentrism and feeling they know what is best. Providing what is best through a Western medicine view could lack consideration of the values of a different culture and an individual's wants and needs. It is of huge importance that interpreters are used who not only have training but also fully understand the patient, their dialect, their culture, and their beliefs in order to ensure the translation is accurate and clear. A weak translator or translation might not give the patient the opportunity to make their own decision regarding their hearing health as clear understanding is imperative to making a choice on both the provider and patient's ends.

Justice

Lastly, Clark (2020) detailed justice and the importance the services provided are equitable in the region in which they are being provided. Clark's analysis of humanitarian audiology examples looked at the of evolution of voluntourists into humanitarians and showed the complexity that lined every step of a humanitarian initiative. Clark highlighted that while the need for humanitarians was great, this need was layered with the need for humanitarian efforts to be incredibly thought out and ethically-based in their planning with great care in ensuring every step benefitted and truly helped those in the developing region.

Intercultural Considerations

Humanitarian work in developing nations often provides the opportunity and challenge for workers and volunteers to explore intercultural communication and partnership. Western medicine working alongside developing infrastructures, traditional healers, or community members with a variety of cultures, languages, religions, and beliefs creates a complex situation. Hart et al. (2019) found 10 international NGOs that worked in a multitude of regions and had volunteers and workers from all over the world. These NGOs included Médecins sans Frontières, Oxfam, International Medical Corps, International Committee of the Red Cross, and Lutheran World Relief. Hart et al. sent an email to each organization inquiring about cultural awareness training for employees and volunteers. Of the 10 organizations, six responded to the researchers. One said it worked to employ local community members, thereby alleviating the need for cultural training. Of the other nine, none had accessible awareness training for its workers and none of the 10 had any cultural resources available on their website. This indicated a large oversight in medical humanitarianism. Cultural awareness was defined by Hart et al. as "an understanding of one's own heritage and culture, and how that affects perceptions of self and

how one interacts with others" (p. 486). The authors added that a person's sociopolitical beliefs also framed the way they interacted with other individuals and groups. Individuals have their own heritage and culture, which are the lens through which they view people and the world. These lenses are inherent and unavoidable; however, they could be acknowledged and explored, allowing for more rich and successful intercultural partnerships. Hart et al. also discussed the intergroup contact theory, which is the belief that interactions and communications with people of differing cultures could decrease intolerance and help individuals understand each other better. It is imperative that NGOs focus their efforts on educating their workers on the intercultural differences that are a part of the initiatives. The communication among partners, beneficiaries, local governments, and local healthcare workers stand to benefit from training programs that help the workers of the NGOs to recognize their own biases and cultures in order to better partner with and serve people of another culture. An example of this was detailed by Hart et al. when in 2004, thousands of humanitarians went to assist following the Indian Ocean tsunami. Many mental health professionals went to Sri Lanka to assist with what they expected to be a mental health crisis following the natural disaster. They went prepared to work with post-traumatic stress disorder, anxiety, and depression. However, upon arrival they found a lack of need for their services and no increase in the rate of suicides. These medical professionals had gone to a country that was foreign to them, expecting the community members to react the same way the people in Western countries they were coming from did. This was a prime example of a lack of research and understanding of a different culture prior to initiating a humanitarian program.

Sanchez et al. (2015) evaluated medical humanitarian initiatives from the beneficiary perspective. With focus groups and informants, the authors analyzed opinions on humanitarian

healthcare providers in four remote riverine communities in the Peruvian Amazon. This area dealt with a higher number of health difficulties while also having the least access to health care in all of Peru. Many governmental agencies and NGOs began working to try to better the conditions in this region through treating mainly children for nutritional deficiencies, parasites, and fungal skin diseases. One of the main organizations to send people was the U.S. Department of Defense through its program, Medical Readiness Training Exercise. In this program, active-duty members were sent to developing regions to learn about medical provision in developing regions. This program was developed to try to eliminate the recurrent concern that humanitarians provided inconsistent and unsustainable care in these communities (Sanchez et al., 2015). They did this through repeatedly serving four selected regions. A series of interviews conducted with community members following services from humanitarian healthcare providers found all the communities felt positively about the assistance and felt confident in the medications that had been provided. The community members felt strongly that the incoming humanitarians should speak Spanish, work alongside community members, and communicate clearly with the communities being helped (Sanchez et al., 2015).

Research on initiatives in Sri Lanka found that beneficiaries often felt like the humanitarian initiatives did not achieve what they had promised and were not honest about their intentions, which was very indicative of a lack of local partnerships, transparency, and an ethical closing plan (Sanchez et al., 2015). However, research on initiatives in the Democratic Republic of Congo and some of the Peruvian villages found overall positive opinions on the relations with humanitarians. Many beneficiaries stated they did not feel threatened by the humanitarians but instead saw them as providing better care than they otherwise had access to. However, those in the smaller towns were sometimes more wary of strangers coming into their communities. This

qualitative analysis indicated the importance intercultural partnerships and of humanitarians' awareness of the community members' relations with their local healthcare professionals to ensure that something as seemingly small as distributing Western medicines did not corrupt the current relationship (Sanchez et al., 2015). A deep understanding by workers and organizations of their own cultures and the cultures they are entering is vital in the long-term success of medical humanitarian initiatives.

Summary

Through a review of the published literature, the complexity of medical humanitarianism became clear. There are many different types of humanitarianism, with resilience humanitarianism becoming more widely practiced (Hilhorst, 2018). A wide variety of medical initiatives have been conducted including ones to address common diseases, childhood ailments, and injuries from crises. These have varied structures based upon the region being assisted, the goals of the assistance, established partnerships, supply chains, the true needs of the region, intercultural considerations, funding, and safety. These variables could often become barriers to initiatives and need to be addressed thoroughly in the planning stages. New barriers are ever-arising such as the COVID-19 pandemic. An overarching takeaway from reviewing humanitarian literature was the constant need for humanitarian assistance and the need for the assistance to be ethical, sustainable, and based in intercultural partnership. These same factors are vital in developing and implementing successful humanitarian audiology initiatives.

CHAPTER II

APPLICATION TO THE FIELD OF AUDIOLOGY

Humanitarian Audiology

The prevalence of hearing loss worldwide is increasing with an escalation from 42 million people in 1985 to 466 million people in 2018 (Davis & Hoffman, 2019). This is a rise from about 1% of the world's population to 6.1%. This problem has left a large number of people with a need for audiologic care but not all with access to it. The WHO (2013) estimated that only 10% of the worldwide needs were met by the amount of hearing aids being produced with less than 3% of the people who needed amplification in developing countries having access to it. Humanitarianism is a growing branch of audiology that operates under the idea of providing audiologic services and goods to help those without access to it. Humanitarian efforts could occur globally as well as locally. These initiatives could take a wide range of formats including vertical initiatives, working with umbrella organizations, recurring humanitarian trips, and the creation of self-sustaining infrastructures (Saunders et al., 2019). The creation of self-sustaining infrastructures involves professionals or an organization with a long-term initiative, creating a healthcare infrastructure in an area that did not previously have access. Several factors, planning, and partnerships are necessary to create a hearing health infrastructure that could be locally maintained far after the initiative has ended. Emerson et al. (2013) detailed the six-week training of community members in India regarding the provision of amplification and found positive outcomes; 80% of the patients were wearing the hearing aids regularly after the community members had fit them. Carkeet et al. (2014) wrote an evaluation on a self-sustaining hearing

center that was created in the Dominican Republic. As of 2014, the center was 12 years old and had become fully self-sustainable. They were able to successfully address barriers such as costs, equipment, repairs, and training. The development of these infrastructures is an idea that deserves more exploration as well as intercultural communications that are integral to their success. The different factors that go into a successful humanitarian initiative hinge on the humanitarian's ability to interact with people from different cultures; however, this often seems to be a part of the initiatives that is not described. Pillay and Serooe (2019) detailed the division of traditional healers and audiologists in South Africa and described how this division could be a hinderance in providing the best care for the patient. Hitziger et al. (2019) described the partnership between Mayan healers and biomedicine practitioners in working to treat cancer in Guatemala. This successful partnership shed light on the possible relationships that could be formed and often need to be in the creation of a self-sustaining audiologic infrastructure.

Humanitarianism is an important aspect of the audiology field. With WHO (2020) tracking increases in the prevalence of hearing loss throughout the decades, making amplification technology available to those who need it within developing countries has become an ever-increasing goal. Saunders et al. (2019) broke down the main types of humanitarianism with a focus on audiology, into vertical initiatives, existing umbrella organizations, recurring outreach trips, and integrated long-term community-based programs. Vertical initiatives are often the basis for future humanitarian efforts, where connections are made, and needs are analyzed in a region. In working with umbrella organizations, humanitarians partner to supply a specific service. Outreach trips are recurring in the same region to provide consistent support. Lastly, the idea of long-term community-based programs are programs that work with locals to build a self-sustaining infrastructure (Saunders et al., 2019). Many companies and organizations have the

objective of providing access to amplification as the focus of their humanitarian initiative. Ricketts et al. (2019) detailed the main benefits of using hearing aids (HAs) including the ability to pursue economic independence, foster relationships, maintain mental and physical health, as well as participate socially. Hearing aids could be utilized to treat hearing losses that are a range of severities, they are noninvasive, and they can often be programmed to provide benefit to the specific patient (Ricketts et al., 2019). These are a few of the reasons humanitarian audiology efforts usually involve the provision of HAs.

A population-based survey was conducted by He et al. (2018) in all four provinces of China. A total of 45,052 participants answered a questionnaire in addition to undergoing an otology examination and pure tone testing. The questionnaire asked participants if they had amplification and if not, why they did not. The results of 1,503 adults who were over 64 years old from all four Chinese provinces found only 6.5% of older adults who needed hearing aids had them. In the United States, the percentage is 14.2% and in India, it is1.47%. The authors determined that the three main reasons the majority of the older adults who needed amplification did not pursue it were not seeing it as necessary, did not understanding what a hearing aid was, and were not able to afford it. Fuentes-López et al. (2019) looked at a differing issue—the discontinuation of use of hearing aids in Chile that had been fit at a public hospital. If someone 65 years or older used the public healthcare system in Chile, they were provided at least one hearing aid that was anywhere from 20% of the original price of the device to free. Within 30 months of the beginning of hearing aid usage, 21.7% of the older adults had discontinued their use; the most common reasons included no perceived benefit, difficulties using the hearing aids, loss of the hearing aids, and hearing aid malfunction (Fuentes-López et al., 2019). This could be compared to a rate of 17% hearing aid users being unsatisfied with their hearing aids in the

United States (Powers & Carr, 2022). Fuentes-López et al. also analyzed the sociodemographic correlates to the discontinuation of use and found self-perceived hearing loss, satisfaction, and income level all affected the usage of HAs. A variety of these issues could be addressed in education and follow-up appointments; however, Fuentes-López et al. found 30.1% of the older adults attended none or only one follow-up. McPherson (2011) analyzed a variety of humanitarian audiology efforts in low- and middle-income countries with a focus on hearing aids. McPherson described the three barriers to the efforts they found: the need for the services provided to be affordable and evidence-based, to be sustainable on a local-basis, and for more public education on hearing loss and amplification. These barriers could be overcome with the utilization of a local self-sustaining infrastructure.

Local Humanitarian Audiology

Local humanitarian initiatives often differ from international initiatives in many areas including fewer cultural and language differences between providers and patients, similar medicinal views between providers, availability and access to technology, and the presence of an established hearing healthcare infrastructure. However, local and international initiatives both might maintain similar ethical and cultural considerations while also facing many of the same monetary inhibitors. Approaches to local humanitarian initiatives were detailed by Viana (2018), Whitley (2018), Scott (2013), and Lawrence (2012). In the United States, only 20 states required insurance to cover hearing aids for pediatric patients (Viana, 2018). Viana detailed three cases in Georgia in which three children ages 18 months, 2 years, and 10 years did not have access to hearing aids due to monetary reasons. The Georgia Lions Lighthouse Foundation was described as a humanitarian organization that worked with local providers and companies to provide not only two hearing aids to a child but also earmolds and nine audiology appointments, all on a

sliding scale that allowed the families to contribute whatever they were able to. At the time of publication, 30 children had received services from the Georgia Lions Lighthouse Foundation (Viana, 2018). The need for more volunteers and more funding to allow more children to be helped in the future was emphasized. Whitley alluded to the financial barriers many humanitarian efforts faced in the brief description of their initiative. Hearing Charities of America's *Hearing Aid Project* took donated hearing aids and refurbished them, and then fit these hearing aids to new, low-income patients. The project had fit 55 sets of donated hearing aids on patients of varying ages at the time of publication. Looking forward, the Hearing Charities of America listed three vital aspects to the continuity of the program including the referral of low-income patients, the donation of amplification and money, and the assistance of audiologists in the United States (Whitley, 2018).

Both of the aforementioned cases did not address the need of those living in rural or inaccessible areas. Scott (2013) analyzed the need of hearing healthcare in a remote area of Ontario, Canada. About 1,900 residents live in Attawapiskat, which is only accessible by planes, boats, or the use of the river as an ice road in the winter months. In order to create a hearing healthcare infrastructure, not only did the sustainability of the program have to be planned and analyzed but the Cree culture had to be appreciated and involved in the provision of health care. A five-year plan was implemented and, in that time, screening programs were put into place, education on noise exposure, hearing assessments, and an overall basis for hearing health care (Scott, 2013). Lawrence (2012) detailed a similar situation in Australia's Outback. The HEARing Cooperative Research Center was working to find ways to train and supervise audiology graduates in rural areas, map cochlear implants remotely, and provide full audiologic assessments remotely. Telepractice was highlighted as a strong tool in providing hearing health

care in remote areas (Lawrence, 2012). All of the previously mentioned local initiatives showed different ways in which this humanitarianism was needed and could be used locally. From financial barriers and ensuring in-need patients were aware of what was available to them, to the need of finding audiologists willing to help, all the way to implementing a new infrastructure and utilizing telepractice, local humanitarian audiology initiatives were often just as complex, cross-cultural, and essential as those abroad.

Cochlear Implant Humanitarianism

Cochlear implants are devices in which access to sound can be restored to individuals with significant sensorineural hearing losses through the use of an electrode array within the cochlea. Cochlear implants are indicated for those who receive minimal benefit from hearing aids and need further assistance. The process of cochlear implantation is lengthy and could be complicated—from candidacy criteria to surgical implantation to activation and follow-ups. The process of obtaining a cochlear implant requires a team of professionals and a great deal of follow-up care, making it especially difficult in a humanitarian setting. Bhutta (2019) stated that there were programs in "South Africa, Nigeria, Kenya, Brazil, Colombia, Ecuador, Guatemala, Paraguay and Venezuela" (p. 42); however, written descriptions of these programs were difficult to find. Following a literature search, a few articles were found that focused of the provision of cochlear implant technology in Uganda, Pakistan, and Nicaragua.

Byaruhanga et al. (2015) documented the first successful cochlear implantation to take place in Uganda. The first Ugandan to receive a cochlear implant was a 23-year-old male who had a bilateral profound sensorineural hearing loss. The hearing loss became profound while he was still in high school. Through a computerized tomography scan, the patient was found to have a normal inner ear on both sides and the right ear was chosen to be implanted. The activation of

the cochlear implant was done via telepractice with a team of professionals at the New York University Cochlear Implant Center the day after the surgery. This patient was considered successful for a variety of reasons including good audiometric results six years post-activation, better reported hearing in quiet, familial support, and local speech therapist support (Byaruhanga et al., 2015).

While Byaruhanga and colleagues (2015) reported on a case that involved telepractice in Uganda, Khan et al. (2007) described efforts to start a sustainable cochlear implant program in Pakistan. It is important to note that this program was not meant as a humanitarian effort; rather, the purpose was to bring the technology to the country for those who were able to afford it. With the help of an implant team from the University of Manchester, a program was set up in 2000. In the first five years of the program, 52 patients received a cochlear implant (two received bilateral cochlear implants). The largest factor contributing to self-sustainability was the mandatory self-financing of the cochlear implant and all maintenance and rehabilitation afterwards. Before candidates were even evaluated, they had to be able to show they had the resources to finance the surgery and follow-up services. This eliminated any funding issues that might have been faced. However, this still did not address the barrier associated with lack of financial resources for others who might benefit from an implant. Those 52 patients receiving implants were also likely the ones who could have flown to North America or Europe to receive cochlear implants in the absence of a local program.

Saunders et al. (2015) focused specifically on the cost effectiveness of providing cochlear implants to children in Nicaragua. In a series of cost estimations including the device, the surgical costs, device maintenance and upkeep, and rehabilitative services post-implantation, the authors estimated the entire cochlear implant process to cost $40,417 (in 2012 USD) in

Nicaragua. In comparison, they found 10 years of deaf education in Nicaragua to cost about $32,121. The authors were able to establish that both costs were below the WHO (2014) criteria of cost effectiveness in a developing country, which was calculated through a complex analysis of the country, the goods provided, average wages, health benefits, and much more. The WHO CHOICE (WHO's CHOosing Interventions that are Cost-Effective) looked at local economics, hearing loss burden, and the healthcare system already in place to determine how cost-effective interventions ware at a level that was region-specific. Wilson et al. (1998) suggested the manufacturing of inexpensive cochlear implants for low-resource regions. These authors were able to build a prototype of a less expensive cochlear implant that had positive results in one subject including "excellent" results in open-set speech recognition testing. The cochlear implant consisted of a monopolar electrode array and a passive coil-coupled transcutaneous interface. It utilized a four-channel speech processor and continuous interweaved sampling. The cost for this device alone was estimated to be between $600 and $3600. The benefit of this cochlear implant was in not only its overall price but also in the possibility of manufacturing it in a developing region. The costs of the surgery and maintenance of the device were not discussed. There was a clear gap in more recent research into an inexpensive cochlear implant, although the authors suggested creating such a device might be possible. Cochlear implant humanitarian efforts are not yet widespread enough to validate the large-scale manufacturing of such cochlear implants. Regarding minimizing the financial burden, Saunders et al. (2015) also explored the possibility of telepractice in developing countries; however, there was no definitive research as to whether it truly was more cost effective than the traditional means.

Humanitarian Audiology Structures

International Humanitarian Initiative Structures

A group from the Idaho State University Audiology Program often conducts humanitarian initiatives and, therefore, they learned a great deal about the sustainability of such initiatives. Holst et al. (2020) described several initiatives and their ability (or lack of) to achieve sustainability. In two examples of unsuccessful initiatives to Uganda and Ecuador, the importance of truly researching and getting to know the area as well as working alongside local government was stated. On a trip to Kampala, Uganda, which was intended to be a one-time trip for hearing evaluations at an orphanage, it was not realized that educational exams were occurring at the same time, making students very resistant to leaving class for hearing testing. The follow-up trip that was scheduled to return to the orphanage at a time not during exams was cancelled due to governmental instability (Holst et al., 2020). A one-time trip to Ambato, Ecuador occurred in which 135 hearing evaluations were conducted and 48 hearing aids were fit on locals (Holst et al., 2020). There was no detail on the steps taken to ensure sustainability on the first trip but the team planned a second trip to Ambato with the goal of creating a more sustainable program. However, the government did not allow the humanitarians to return for a second trip (Holst et al., 2020). Both initiatives, initially planned as one-time trips, were examples of how a disruption of partnership with the local government and healthcare providers could result in an inability to create a sustainable project. In 2016, the Idaho State University Audiology Program teamed up with Idaho Condor Humanitarian group to provide audiology services in Peru (Holst et al., 2020). The Idaho Condor Humanitarian group had been going to Cusco, Peru and surrounding villages for over 10 years to provide an array of medical services. This group partnered with Peruvian physicians who then spread the word and knowledge about

the humanitarian groups to the local mayors in neighboring villages. The Idaho Condor Humanitarian group was structured so that on their annual visits to Peru, they traveled to Cusco as well as the villages surrounding it in order to provide different medical services to as many of the remote villages as possible (Holst et al., 2020). Through this partnership, the Idaho State University group was able to return four times at the time of publication, achieving the goals of providing amplification and hearing testing. In order to make the initiative more successful, however, Idaho State University professionals determined the need for annual trips back to certain villages along with a working relationship with a local hearing care professional. In a successful initiative in Antigua, Guatemala, Idaho State University made annual visits to provide a variety of audiology services combined with the training of onsite staff to schedule appointments for locals, identify those in need of hearing care, and troubleshoot amplification, which proved to be sustainable and successful in this region (Holst et al., 2020). This training of local professionals helped to create self-sustaining infrastructures.

Saunders et al. (2019) described integrated long-term community-based programs as humanitarian efforts where infrastructures are built by training local personnel and acquiring a physical location. These types of self-sustaining infrastructures were present in case studies detailed by Emerson et al. (2013) and Carkeet et al. (2014). Emerson et al. worked in India to train community members over six weeks on basic hearing care provision. This project was structured with a hospital as a base for the program while a great deal of the testing, fittings, and follow-ups were performed in the field. The trainings provided to the locals included hearing aid fittings as well as giving the Abbreviated Profile of Hearing Aid Benefit prior to the fitting; two weeks, one month, three months, and six months post-fitting; to gauge the success of the hearing testing and fittings. It was found that of the 111 patients fit with hearing aids by the trained

community members, 80% used their hearing aids regularly and, overall, most saw significant improvements in their communication, especially in high background noise. Similarly, Carkeet et al. (2014) set up a self-sustaining hearing center in the Dominican Republic. This clinic was located within the Dr Elias Santana Hospital. The 35-year-old hospital was founded by the Medical Ministry International, which contacted EARS Inc. to discuss the development of an audiology program there. This clinic was made self-sustaining through a variety of ways including training programs for community members, acquisition of equipment, establishment of community programs, creation of supply chains (for technology, accessories, and materials), instant earmold capabilities, the ability to provide repair services, and through networking with other healthcare professionals in the community (Carkeet et al., 2014). The center was deemed a success through its 12-year longevity and because it was run by a full-time staff comprised of community members. The authors used this experience to create a list of the components of the program they felt were essential in its success, which included everything from training and creating supply chains, to building relationships with other local healthcare providers. Based on the aforementioned research, a basis for the structuring of international humanitarian audiology could be formed. Commonalities between the structures helped to piece together what was integral in these initiatives and their sustainability.

Local Humanitarian Initiative Structures

Humanitarian structuring looks very different at the local level. In developed countries such as the United States, it is not the development of a hearing healthcare infrastructure that is the challenge, it is getting people access to that infrastructure. Many individuals have limited access to health care including hearing health care in the United States. This includes those who do not have access to health insurance, those who are immigrants, or those whose health

insurance does not provide the necessary monetary assistance to pursue testing and amplification. Hearing Education and Resources for Underserved Populations is a humanitarian initiative founded by an audiology graduate student with the assistance of the Pittsburgh Schweitzer Fellows program to provide hearing evaluations, counseling, and amplification to those in need (Coyan & Mormer, 2020). Hearing Education and Resources for Underserved Populations was held once a month at no cost to those who were immigrants, homeless, and financially struggling. Donations allowed for the purchase of testing equipment and hearing aids at a cheaper rate (in association with a hearing aid manufacturer) and testing equipment. The testing was mostly run by students being overseen by licensed audiologists. To ensure timeliness, any patients who were found to need amplification were fit the day of the audiologic testing and all patients received the same types of hearing aids. The percentage of patients who returned for their follow-up appointments the next month was nearly 100%; however, the no-show rate increased to around 30% by the six-month follow-up (Coyan & Mormer, 2020). In one year, Hearing Education and Resources for Underserved Populations had appointments with 19 patients and dispensed nine sets of hearing aids (Coyan & Mormer, 2020).

Purchasing equipment and amplification with donations, which could then be utilized to provide hearing healthcare to people who are unable to purchase it at an event, is a common trend in humanitarian initiatives in developed countries. In Hearing the Call-Colorado, donated hearing aids were sent away for salvage credit or refurbished to later be donated to patients. Some hearing aid manufacturers even donated hearing aids to humanitarian initiatives. Other successful initiatives included the Georgia Lions Lighthouse Foundation (Viana, 2018) and the Hearing Aid Project by Hearing Charities of America (Whitley, 2018). These shed light on the difference in structuring between local and international humanitarianism due to the presence or

lack of a hearing healthcare infrastructure. However, both could largely benefit from donations of amplification and equipment. The sustainability of running on donations might differ between the two settings, however.

Determining Structuring Barriers and Necessities Through Experience

Through a series of interviews with audiologists and physicians in the humanitarian realm (see Table 1), trends in common barriers and necessities were found. The importance of in-person experience in determining what would make humanitarian initiatives most successful in specific regions was gleaned. The most often mentioned barriers within the interviews included difficulties surrounding making connections with community members, cultural differences, securing funding, finding and maintaining volunteers, and establishing supply chains and access to technology.

Table 1

List of Those Interviewed as Well as Their Titles

Interviewee	Credentials and Ties to Humanitarian Audiology
Nimet Adam, Au.D.	Audiologist and President of Hearing Partners of South Florida, Entheos Audiology Cooperative Board of Directors
William G. Heob, M.S.	Audiologist, Entheos Audiology Cooperative – Student Initiative and Special Projects
Natalie Phillips, Au.D.	Audiologist and Owner at Audiology Center of Northern Colorado, CEO/Founder of Connect4Excellence, Author of ACT Now
Cheryl A. Runge, M.S.	Audiologist, Hearing the Call Board Member
James Saunders, M.D.	Medical Doctor of Otology and Audiology, Professor of Surgery at Geisel School of Medicine (Dartmouth)
Ashley Stumpf, Au.D.	Audiologist, Hearing Conservation Initiative Published Author
De Wet Swanepoel, Ph.D.	Audiologist, Founder and Scientific Advisor for HearX Group, Editor in Chief of the International Journal of Audiology, Professor at the University of Pretoria

Cheryl Runge and William Heob of Entheos Audiology Cooperative detailed how seven separate Entheos humanitarian initiatives all over the world were dealing with these different barriers (C. Runge & W. Heob, personal communication, November 18, 2021). Partnerships were imperative to the sustaining of these initiatives so not only did humanitarians need to establish clear relationships with community members and local healthcare workers but they also needed to work towards training local community members. In Guatemala, Entheos Audiology Cooperative was able to train a community member who had received hearing aids from that same initiative and to provide cleaning and care while the humanitarians were not there. However, they faced challenges related to cultural differences when the community member decided to become a housekeeper. In this situation, being a housekeeper not only provided more consistent income but was also culturally considered to be a superior profession to an audiology assistant. When working with community members, many factors, cultural and economic, needed to be considered to ensure best practices and successful employment. These are highly region-specific, as described by Nimet Adam (personal communication, December 1, 2021), a member of the Board of Directors of Entheos Audiology Cooperative. Adam shared that in Mozambique, they were able to leave behind batteries and trained audiology assistants. This was much more difficult in Jordan where the bulk of the locals being assisted were refugees and therefore not always stationary (N. Adam, personal communication, December 1, 2021). When it came to volunteers who traveled to the developing region, Runge and Heob (personal communication, November 18, 2021) described the importance of maintaining relationships to ensure a solid group of professionals who are dedicated, motivated, and available to partake in different initiatives. Natalie Phillips (personal communication, December 3, 2021) also highlighted the necessity of connection to other professionals as connection was often the

foundation that endeavors could be built on. This is vital in humanitarian organizations as it is important in not only continuing relationships with those professionals who volunteer but in having the largest impact possible on those patients being helped.

Adam (personal communication, December 1, 2021) also discussed the financial barriers Entheos Audiology Cooperative had faced in its humanitarian initiatives. A large focus had been placed on raising money for equipment that could be left in the developing regions as a means of ensuring best practices as well as thorough testing and follow-up. In terms of sustainability, providing diagnostic equipment is imperative versus fundraising with the sole intent of purchasing HAs. An example was Entheos Audiology Cooperative partnering with the University of Jordan to work toward starting a training program at the college with equipment that allowed for hearing loss diagnosis. This idea of creating a hearing healthcare infrastructure versus a dependence on international humanitarians was a consistent idea that is the basis of creating sustainable programs. Adam also mentioned the possible value of over-the-counter hearing aids in providing access to sound for community members in developing regions.

James E. Saunders (personal communication, November 26, 2021) discussed barriers he had seen in his own humanitarian experiences. Similar to Runge and Heob (personal communication, November 18, 2021) and Adam (personal communication, December 1, 2021), Saunders emphasized the importance of working toward local independence through building a sustainable program in developing regions. This could be worked toward through starting and maintaining local connections, portable and accessible hearing technology (such as hearing screeners on smartphones), and local education and awareness. Saunders also mentioned the importance of determining the source of funding. While funding could be done in developed

countries, it was also important to note that funding could be done through community members and local government as well.

Adam (personal communication, December 1, 2021) also detailed two different experiences in which Entheos Audiology Cooperative faced hearing loss that was culturally influenced. In Jordan, a large number of the community members coming for assistance had severe to profound hearing losses. After more inspection, it was found that intermarriage over decades had resulted in a genetic hearing loss impacting a large portion of the hard-of-hearing population. Knowing this, Entheos Audiology Cooperative was able to return prepared with behind-the-ear hearing aids to properly assist with the severe to profound hearing losses. When Entheos Audiology Cooperative humanitarians went to Mozambique, they noticed a high incidence of reverse-slope hearing losses. This uncommon loss could be attributed to the malaria medication being provided by the government. Adam and others went to the government and were able to propose a different medication that would be less ototoxic and result in less healthcare costs and lost wages. The importance of education on the symptoms of malaria to avoid the need for anti-malarials entirely in some cases was also emphasized. This example highlighted the possibility of finding cultural occurrences that might have a negative effect on hearing and taking the initiative to make structural changes to positively impact the developing region (N. Adam, personal communication, December 1, 2021).

Ashley Stumpf (personal communication, December 12, 2021) discussed previous humanitarian efforts she experienced while she was in graduate school focused on hearing loss prevention, an area that often seemed overlooked in humanitarian audiology initiatives. In their published article on this topic, Stumpf et al. (2019) stated the most recent updates to noise exposure regulation in Guatemala were in 2014 when legislation required hearing protection be

provided to any workers whose noise exposure exceeded 85dBA. This was largely comparable to the regulations put in place by the U.S. National Institute of Occupational Safety and Health. The sugar industry is one of Guatemala's largest, which prompted Stumpf et al. to plan a humanitarian effort alongside a variety of other professionals to evaluate the noise levels in a sugar mill that had been constructed prior to the noise regulations had been set into motion. Noise dosimeters were utilized to analyze typical noise levels over the course of two days. Of the 51 samples, 48 exceeded the permissible exposure limit set forth by the Guatemalan government (Stumpf et al., 2019). This indicated the need for this factory and, therefore, many others to have a hearing conservation program for their workers that included hearing protection and workplace noise reduction. While hearing conservation programs are enforced for the majority of at-risk employees in the United States, this was not the case in many developing countries. This highlighted a clear need that preceded the need for access to amplification. Stumpf (personal communication, December 12, 2021) stated that she highly recommended participating in humanitarianism, even as a student, as it was not only a rewarding experience but could truly help those in the developing regions.

De Wet Swanepoel (personal communication, November 22, 2021) was based in South Africa, a country that had far fewer audiologists and therefore needed more creative solutions to address hearing loss in the country. In a field that is highly technology-dependent, it was a clear bridge for Swanepoel to find a way to utilize widespread technology (such as smartphones) as a service and technology delivery model. Through a partnership with WHO and the creation of his company HearX, Swanepoel has taken an integral part of audiology and turned it into a widespread, accessible service that, as of 2021, had screened the hearing of over 250,000 people

worldwide. This is a clear example of what might have been a barrier (lack of access to hearing screenings) being turned into a massive tool to advance the field of audiology.

Through all the detailed barriers, one common necessity or goal of humanitarian initiatives became clear. Sustainability is imperative. At the basis of the need for humanitarian audiology is a lack of hearing healthcare infrastructure and hearing loss prevention in a large number of developing regions. These barriers must be addressed and overcome to provide not only short-term assistance but long-term change.

Telepractice in Audiology

Telepractice and Hearing Aids

Telepractice is rising to the forefront of hearing aid fitting and adjustments. Through the use of just a smartphone app, adjustments can sometimes be made by the manufacturer or the patient's audiologist. The use of telepractice in developed countries could lay the foundation to use this technology in more complex situations in developing countries. However, a variety of possible difficulties, such as access to internet, trained audiology counterparts, and ensuring best practices must be considered when analyzing the use of telepractice in humanitarian initiatives.

Convery et al. (2020) evaluated the outcomes of using ReSound Assist to adjust hearing aids remotely. Thirty adults were fit with bilateral hearing aids and half were told to use the app for any fine tuning or issues, while the other half met with their audiologist face-to-face. Six weeks after the fittings, questionnaires revealed no significant difference in satisfaction between the two groups, although only about half of the problems that arose could be solved remotely. While telepractice worked in the short-term, long-term outcomes were not evaluated. Jedlicka (2021) also analyzed the use of a telepractice hearing aid fitting with a single Veteran participant. The patient was fit with demo hearing aids initially, which were finetuned to their specific

hearing loss before sending them home. When the actual hearing aids were received from the manufacturer, they input all the same settings as the patient's demos. Electroacoustic analysis of the hearing aids output was done to ensure everything was identical to the demos prior to mailing them. Two follow-up appointments were done using the Phonak app. At these appointments, the audiologists were able to make programming adjustments and analyze data logging. At one of the follow-ups, the patient said the hearing aids were not charging. A video chat feature on the Phonak app allowed the visualization by the audiologist of the issue and the resolution with more counseling. At the end, overall outcomes were not determined because the author was unable to stay in contact with the patient. However, up until that point, it seemed as though the telepractice fitting had been successful.

Another type of telepractice that could be used with hearing aids is fitting over distance. Penteado et al. (2012) detailed the use of telepractice in Brazil to connect an experienced audiologist to an unexperienced audiologist who was with the patient. A remote unit of audiologists entered the patient's audiometric information into adaptEASY (the fitting software for Florianópolis hearing aids) where the specialized unit of audiologists could make programming adjustments from a different location. The audiologists from the two units were able to talk with one another throughout the appointment, which also gave the specialized audiologist the ability to coach and assist with the fitting despite not being present. This was done with three patients who were fit unilaterally. One of the immediate issues to arise was the Wi-Fi connection needed for the appointments, which required temporarily shutting down firewalls on the computers being used. However, the larger issue that became apparent was the need for local products and supply chains in the area of the patient being fit. It did not matter that an experienced audiologist could assist with a fitting when the patient then needed follow-up

adjustments, cleanings, and replacement parts and no longer had access to the experienced audiologist or their stock.

Clark and Swanepoel (2014) analyzed the future of telepractice in audiology. In their literature review, it became clear the future of telepractice for audiology lay in web-based applications and integrated test equipment, personal computers (such as smartphones), and globalization. The authors estimated the market value of telepractice overall to be worth $240 million (Clark & Swanepoel, 2014). The telepractice market is expected to exceed $300 billion by 2028 with a huge portion being attributed to smartphone-based applications (Research and Markets, 2022). There is a clear shortage of audiologists worldwide, leading to the importance of self-fit hearing aids and telepractice options. Self-fit hearing aids come with their own possible issues such as the need for hearing evaluations prior, counseling on hearing aid use, and the evaluation of any medical contraindications (Clark & Swanepoel, 2014). Physical cleanings and troubleshooting were other examples of hearing aid services that could not be done through an app.

Telepractice and Cochlear Implants

Telepractice could be used to remotely interact with cochlear implant recipients. These remote appointments could include cochlear implant activations, programming adjustments, and other types of patient follow-up. Many cochlear implant manufacturers even provide the opportunity for providers to check the status of the devices as well as make programming adjustments remotely if the patient has access to a smartphone and the manufacturer app. An example of this is the Cochlear Link, which is a cloud-based system that uploads patient's cochlear implant programming details so both Cochlear and other audiologists have access to it in times of need. If a patient were to lose or damage their processor, Cochlear could upload the

settings from the Cochlear Link onto a new device to send to the patient. Telepractice and humanitarian efforts seem to complement one another as more research is being done in this area with ever-advancing technology. Hughes et al. (2018) evaluated the use of telepractice with pediatric cochlear implant patients in Nebraska. With cochlear implant patients requiring a great deal of follow-up (at least 6 to 10 visits in the first year), the use of telepractice could assist with barriers such as distance and finances (Hughes et al., 2018). Through a variety of comparisons between in-person and remote follow-ups, it was determined there were no significant differences between the delivery methods in behavioral measures of hearing ability results and appointment time difference. Hughes et al. mentioned that training an assistant who would be with the patient was possible even without any previous knowledge (assistants watched videos and received detailed guidance from audiologists). The ease of training others in assisting with telepractice was applicable to its use in humanitarian efforts. Then again, the authors also noted that both the audiologist and patient were located within the same building and therefore on the same network. Streaming internationally could introduce a variety of difficulties such as a delay in the video and other challenges based on the stability of local internet. Ultimately, Hughes et al. determined teleaudiology or remote cochlear implant programming to be a valid follow-up (post-initial activation) despite minor issues that came with the use of technology.

On a broader spectrum, Skarzynski et al. (2018) detailed the Institute of Physiology and Pathology of Hearing's National Network of Teleaudiology (NNT) in Poland. The NNT worked with tele-diagnostics, programming, telerehabilitation, and more. In the article, fitting specialists telefitted 316 experienced cochlear implant users and then surveyed their feelings toward the process. The telefitting was done through the connection of the speech processor to a local NNT clinic's computer. The fitting specialist connected to this from their computer at a different site

and communicated with the patient and the professional accompanying them (often a speech therapist) via an online video system. The programming included a structured interview, psychoacoustic and auditory testing, consultation with a speech-language pathologist, and the programming of the cochlear implant (Skarzynski et al., 2018). Overall, 96.2% were satisfied or extremely satisfied with the programming, and 94.9% agreed or strongly agreed the telepractice could be an alternative for standard services. Skarzynski et al. did not include validation of the fittings; therefore, the success of the fittings beyond the patients' perceptions was unknown. The authors mentioned that remote programming was more appropriate for adults versus pediatric patients. However, it was important to note that oftentimes, children were the target of humanitarian audiology trips and teleaudiology was deemed by both Hughes et al. (2018) and Skarzynski et al. (2018) to not be appropriate for activation and programming for pediatric cochlear implant patients.

This opinion was mirrored by survey results in research by Singh et al. (2014) with responses showing high reluctance for using teleaudiology with children ages 0-12 years. Singh et al. surveyed 202 practitioners, 152 audiologists, and 49 hearing instrument specialists to determine trends in their attitudes toward teleaudiology. Responses varied greatly due to the opinion-based nature of the questions; however, the responses showed willingness to use teleaudiology for communication and counseling/aural rehabilitation and unwillingness to use teleaudiology in the areas of programming, screenings, and first-fits. There was also much more willingness to use teleaudiology with patients who lived far away, had already been fit, were good with technology, and more. Telepractice applications were used in the activation of a cochlear implant in Uganda from New York in a case study by Byaruhanga et al. (2015). In this research, activation and programming were done remotely. However, follow-up was not

discussed although positive outcomes were reported overall but only broadly. The question remained whether self-sustaining infrastructures utilizing telepractice could successfully exist and if one led to better results than the other. Specific developing regions might benefit differently from the two approaches to humanitarian audiology.

Telepractice and Humanitarian Audiology

Telepractice provides a unique opportunity in which humanitarians might be able to provide hearing healthcare services and follow-ups more consistently without leaving their office. In 2016, the hearZA app was released in South Africa in which the first three hearing tests (which included a self-administered digits-in-noise and speech in noise testing) were free (Swanepoel, 2017). The digits-in-noise test had 95% sensitivity in detecting sensorineural hearing losses that exceeded 25dBHL (Swanepoel, 2017). Through advertisements with the largest mobile provider in South Africa and social media advertising, more than 3,000 people took a hearing test within the first day of its release. The app prompted users to take an annual hearing test and allowed them to monitor their hearing sensitivity over time. The app also offered a support guide for those who did not pass the screening and a list of nearby audiologists. This app tapped into a new area audiology might be able to branch into. However, if a developing region does not have access to smartphones and this technology or does not have local hearing healthcare professionals, it is not a viable option. Swanepoel (2020) also evaluated the partnership of professionals and community health providers with a smartphone. Audiologic tests such as pure tone testing and tympanometry could be run by an in-person trained local while a professional works alongside them from anywhere else in the world—all through apps like hearScreen. These apps could also be used on smartphones with inserts and other equipment to do immittance testing and more. While this model still uses an app or a smartphone, it also

brings professionals into the testing to gain more results beyond pure tone thresholds. In Western Cape, South Africa, four community members were trained in hearing screenings with the use of an array of apps. They went on to conduct hearing screenings for more than 8,000 children ages four to seven; 5.3% of the children were referred based on the screening outcome (Swanepoel, 2020). This screening was determined to be cost-effective as both a vision and hearing screening cost $5.63 per child.

Coco et al. (2021) analyzed the process and outcomes of training community healthcare workers to help with telepractice audiology in Arizona. There were three levels of possible training the participants could move through, all based on WHO's *Primary Ear and Hearing Care Training Resource*. The one-hour introductory level included the basics of hearing loss, communication strategies, and telepractice basics. The 1.5-hour intermediate level training included more in-depth telepractice information and content related to patient confidentiality and safety. The 12-hour facilitator training equipped community healthcare workers with the knowledge they needed to assist in telepractice with an audiologist. This included more hands-on examples and experiences with all the participants role-playing different situations. Fourteen health workers participated in the first training, 10 in the second, and three in the final training. The trainings were sequential and participation in the following round was decided by the individual. Unfortunately, the authors did not provide data regarding the outcomes of these trainings—only verbal survey responses in which many participants said it was useful in their daily healthcare jobs. Coco et al. also mentioned this was a direction for their future research as they planned to continue analyzing the work of these community healthcare workers in an audiology setting after their training to determine the success of the training when the skills learned were applied. Coco et al. addressed the possible applications of this model in rural

communities and possibly humanitarian initiatives. A model like this one could be useful in the case of a developing region where there are no audiologists but locals willing to learn how to assist in telepractice.

Intercultural Considerations in Audiology

Hearing loss has different stigmas attached to it across the world. In the United States, one stigma often synonymous with hearing loss is it is a geriatric issue. In understanding this, hearing aid manufacturers have developed products that are often small and come in colors that blend in with the patient's features. This stigma also influences counseling because audiologists know this stigma could stop many people from pursuing or wearing amplification and, therefore, are ready to address it. A large mistake an audiologist could make is assuming this stigma is universal. Different regions, cultures, and religions often view hearing loss in vastly different ways. In humanitarian audiology, it is imperative that these views are researched and used to form a well-rounded plan.

Moyd (2016) addressed the importance of not grouping developing countries together but analyzing each individually to determine if or how services could be implemented. Kaspar et al. (2017) analyzed the beliefs of parents in the Solomon Islands regarding pediatric hearing loss through the interviewing of 153 parents. Kaspar et al. highlighted that while there were still often negative stigmas surrounding hearing loss, there also seemed to be a universal acceptance within the Solomon Islands of intervention among parents of children with hearing loss. In acknowledging the differing views and beliefs surrounding hearing loss, it was also vital to gain a well-rounded idea of the attitudes of locals toward identification and interventions as these were just as much a part of understanding the region. Despite low awareness around different etiologies such as jaundice and otitis media, the majority of the parents were aware of noise

exposure and family history being causes. An important cultural factor that was needed to be kept in mind in a humanitarian initiative to the Solomon Islands was the fact that 56% of the participants agreed that curses could cause hearing loss (Kaspar et al., 2017). This was important knowledge to have as it could impact amplification and counseling. Nevertheless, audiologists could not make assumptions based on these beliefs as 94% of the participants said they would fit their children with hearing aids but only 64% would allow surgery (Kaspar et al., 2017).

Similarly, Olusanya et al. (2005) conducted a survey with 101 mothers who were at community hospitals in Lagos, Nigeria. The mothers did not necessarily have any experience with hearing loss but were surveyed just based on their knowledge of infant hearing loss. The authors found similar results in a range of knowledge on etiologies (high knowledge on measles and ear infections, however low for birth asphyxia and jaundice). Along the same lines as the Solomon Islands, 84% of the mothers were willing to have their child fit with hearing aids and there was an overall acceptance of identification and intervention. It is important to note that this survey was conducted in 2005 and the knowledge on hearing loss today migh be higher.

In another survey, Ravi et al. (2016) analyzed the outlooks of mothers on hearing loss in Karnataka, India. Much like both Kaspar et al. (2017) and Olusanya et al. (2005), Ravi et al. found the majority of the 219 mothers to be knowledgeable on ear infections (54.3%) and noise (70.3%) as etiologies of hearing loss but lacked knowledge on jaundice, measles, drugs, and birth asphyxia. Ravi et al. found that bewitchment was not considered by the majority to be a cause of hearing loss but it was a commonality among some responses. Unlike the two previous articles, only 54.3% of the mothers would let their child have hearing aids despite 84.9% wanting their children to be tested for hearing loss after birth. This might be due to the rarity of hearing aids and lack of knowledge on the root of hearing loss and the treatability of it. Overall, Ravi et al.

found positive responses toward identification and intervention even though there was a lack of education on many aspects of hearing loss. This survey was conducted with mothers who had already elected to have their newborns' hearing screened, which was indicative of results that might not be representative of the population as a whole.

In analyzing these studies, overall trends became clear such as a lack of education and knowledge of various causes of hearing loss including noise exposure and genetic disorders. A lack of hearing education in these three different developing regions highlighted the importance of providing education within humanitarian efforts. Intercultural considerations reach beyond preliminary analyses of cultures, languages, and beliefs. Strong intercultural understandings and partnerships are a necessity when embarking on humanitarian initiatives.

Once an understanding of differing cultural views is established, the larger picture of intercultural relations can be analyzed. In South Africa, there is a wide variety of traditional healers including Indian healers (Islamic and Hindu), Muslim healers (the Moulana, the Hakeem, and the gift healer), Hindu healers (the Brahman, the Sudha Sannyasin, and the Yogi), and Asian healing methods (Pillay & Serooe, 2019). Traditional healing methods range widely and are highly variable such as the use of motor oil or urine within the ear to fix hearing loss (Pillay & Serooe, 2019). With such a deeply rooted and widely diverse history of healers, it was not uncommon for people to go to a traditional healer before a healthcare provider. Therefore, Pillay and Serooe (2019) analyzed the coexistence of the two methods. The authors surveyed 41 audiologists in South Africa regarding their perspectives on traditional healing and how they worked alongside it. The open-ended survey questions immediately revealed that many of the South African audiologists saw traditional healers as non-scientific, non-equal, and sometimes providing harmful services. There was also very little, if any, discussion of traditional healing

between healthcare providers and patients during appointments despite it being a deeply rooted part of the culture in South Africa. The authors found a clear division between the two as there was very little discussion of or referral to one another despite traditional healers often being willing to collaborate with healthcare providers. The authors highlighted that the Western view of medicine, with disease at its center, "negates the humanistic aspects related to the individual's experiences" (Pillay & Serooe, 2019, p. 8). There might be something for both traditional healers and audiologists to learn from one another in these partnerships.

Hitziger et al. (2019) shared a case study in Guatemala in which intercultural communications led to the successful integration of healers and those practicing biomedicine. In this example, ETH Zurich (an impartial party), the Councils of Elders of the Q'eqchi' and the Kaqchikel Maya (healer representatives), and the National Cancer Institute of Guatemala (biomedical representatives) all came together to address the treatment of cancer in Guatemala (Hitziger et al., 2019). Through a mutual respect of one another, the groups were able to break down years of distrust and find validity and value in one another's' practices. In exploring the possibility of hearing health care in developing countries, a knowledge and understanding of differing cultures is a necessity. Despite Western-based medical views, a look into local cultures and medicine creates a more well-rounded view of patients who could have better long-term amplification results. There appeared to be a separation in the literature between the provision of humanitarian services and the analysis of local cultures.

Humanitarianism has and will continue to be an important aspect of audiology as the international need continues to grow. However, a real foundation for these initiatives needs to be established if they intend to not only provide amplification but to assist in the communities realizing and using the power they have to create sustainable audiologic infrastructures. This

would require not only an in-depth analyzation of differing regions and their needs but a true partnership between the humanitarians and the region they intend to help.

CHAPTER III

CRITICAL APPRAISAL OF THE RESEARCH AND FUTURE DIRECTIONS

Gaps in the Literature

Technologic Advances

Large gaps in the humanitarian literature included technologic advances, the evolution and inclusion of telepractice, over-the-counter hearing aids, and effective provision of intercultural training and education. The ever-evolving nature of technology often leaves a gap as research attempts to keep up to date. These advances impact everything from initial visits all the way through amplification types and follow-ups. If humanitarians are able to continually evolve their services and initiatives to include these advances, service provision and technology might become more easily accessible and successful for those who need it.

Hayes (2020) detailed a smartphone app with which community members were able to administer hearing tests. In the research, 511 South Africans were tested via a smartphone-based hearing test. Of those who failed the screening, 75% of the participants sought follow-up testing with an audiologist. The attitudes toward this type of testing were overall positive from both the community care workers and the patients, indicative of a possible telehealth route for hearing screenings in underdeveloped regions.

When it came to analyzing amplification specifically designed for developing regions, there was a lack of published literature. Many developing regions might have varying levels of accessibility to electricity, batteries, and internet, as well as varying climates and humidity levels. This was why it was often not viable to design a one-size-fits-all amplification for

developing regions. Vo et al. (2018) detailed how low-cost ComCare GLW hearing aids were used for pediatric patients in Vietnam. These hearing aids were body-worn (about the size of a pager), water and dirt-proof, and solar-powered. They provided 50dBSPL of gain, making them a lower powered hearing aid compared to what was available from most manufacturers in developed countries. The hearing aids were worn with custom earmolds and the children had follow-ups every four months. While this type of hearing aid was not optimal for pediatric patients, research like this was important in determining what features were most successful in developing regions.

The modality of testing and fittings as well as the amplification itself might become more intertwined and smartphone-based. However, literature has yet to analyze the success of these new technologies in humanitarian situations. De Wet Swanepoel (personal communication, November 22, 2021) is on the Board of Directors for HearX, a company that had partnered with WHO to create a free hearing screening app that could be used globally. This app had been used by 250,000 people in 191 countries as of November 2021, showing the true level of accessibility this hearing screening had. It is important that with hearing screenings, people are aware of what steps they should be taking next based on their results. HearX is developing a way to refer patients post-screening for an audiologic or medical follow-up. When it comes to amplification, HearX has also come out with a hearing aid that works with their platform so one can do screening, evaluations, and amplification fittings all with a smartphone (D. Swanepoel, personal communication, November 22, 2021). Due to the newness of these technologies, there was very little research about them or their success in initiatives. There is likely to be a growing amount of literature about technology and humanitarianism as advances continue and become more integrated in individual initiatives.

Telepractice

Telepractice gives providers the ability to program technology and provide services remotely, whether they are in a different county or country. This new way of service provision is being utilized at a higher rate every year by many medical professionals. The COVID-19 pandemic created a larger need for this modality of service provision as people were quarantining and unable to attend appointments as they had previously. Through a sudden shift in the world's needs, telepractice in audiology was forced to adapt quickly and find new ways to assist patients outside of the traditional routes. Telepractice could be beneficial in many areas of audiology including in humanitarian efforts. However, due to the rapid adoption of telepractice in the previous years, little literature was available on the application of telepractice in developing regions.

In 2011, Nemes discussed the beginnings of what telepractice looked like in humanitarian audiology. Typically, a professional would be connected to a local healthcare worker to coordinate the appointment and make decisions regarding the patient's testing and technology. The local healthcare provider would essentially work as the remote audiologist's hands. Scott and Mars (2015) delved deeper into when not to use telepractice in a developing region. While telepractice is new and cutting-edge, many regions might not stand to gain from telehealth-based humanitarianism. The culture, infrastructure, and partnerships must be analyzed and if telehealth is used, it should be rooted in a structured approach. Telehealth must still be tied in with best-practices and sustainability; therefore, it should likely not be relied on for some initiatives.

In 2015, Walji discussed an established portal that allowed physicians to post de-identified case studies for other doctors to consult on and learn from. This idea is one that could be applied to the field of audiology. Many regions see hearing losses of specific types or

severities and having access to a database that allows audiologists from all over the world to work together could provide clarity on unique cases and stands to benefit the whole profession. Adam (personal communication, December 1, 2021) detailed an experience in Mozambique where a large number of reverse slope configurations of hearing loss were found. This type of hearing loss was much more uncommon, which led the audiologists to begin asking the local healthcare professionals if they were aware of the etiology. The audiologists on this initiative learned that malaria medication was causing this type of hearing loss. A telepractice portal would allow audiologists to make other audiologists aware all over the world of specific cases like this one.

Telepractice provides the field of audiology with a tool that could be applied to a variety of situations. However, as it becomes increasingly utilized, it is vital that the individual patient stands to benefit more from this modality of service. Telepractice might be beneficial when weaved in with a structured and sustainable initiative. However, there is not a large enough body of research to determine the widespread viability of using telepractice in audiologic humanitarian initiatives.

Over-the-Counter Hearing Aids

On August 16, 2022, the U.S. Food and Drug Administration allowed over-the-counter (OTC) hearing aids to be purchased by anyone over the age of 18 years with a perceived mild to moderate hearing loss without having to be tested or fit by an audiologist. This historic ruling is likely to affect the world of audiologists and hearing aids in a multitude of ways. Only time will tell what exactly these effects will be. Due to the recentness of this ruling, there was very little to no experience or published research on how this might play a role in humanitarianism. A large barrier to humanitarian audiology initiatives was often the high cost of the devices needed for the

treatment of hearing loss. This new ruling will likely result in the creation and manufacturing of many new, less-expensive hearing devices. It is estimated that most OTC hearing aids will cost somewhere between hundreds to a few thousand dollars for a pair. The quality and amount of possible benefit will depend on the device. While a goal of hearing aids has often been to advance the technology and add an assortment of features (i.e., Bluetooth capabilities, streaming, listening programs), many OTC hearing aids might be aimed at a more "bare bones" approach. This might coincide well with the levels of technology necessary in developing regions. However, these hearing aids are also only approved for those with mild to moderate hearing losses, which means output is limited and likely not strong enough for those with more severe losses that are often targeted by humanitarian initiatives. Over-the-counter hearing aids are likely to play some role in humanitarian audiology, whether it is the development of an inexpensive yet quality hearing aid or the use of self-fit hearing aids on a wider scale in developing regions.

Intercultural Training and Education

Intercultural communications are foundational in humanitarian initiatives as partnerships with community members, local healthcare providers, and government are vital to its success and sustainability. This is the reason cultural competence training is an important tool for humanitarians. Hart et al. (2019) determined that 10 large international NGOs (including Médecins sans Frontières, International Committee of the Red Cross, and Oxfam) did not have cultural competency trainings available to its volunteers. Shaw (2015) highlighted the importance of having an awareness and understanding of other cultures when completing audiology evaluations and treatments, whether practicing within the United States or in a different country. There are a variety of ways audiologists could grow their cultural competency including familiarizing themselves with local populations they might serve, working within other

organizations to help local communities, and traveling. Some other tools available include Peace Corps Manuals on a variety of countries and cultures as well as the American Speech-Language-Hearing Association cultural competency evaluation that looks at individual clinics and assists them in evaluating their competency (Shaw, 2015). Some states require physicians to take the National Standards for Culturally and Linguistically Appropriate Services in Health Care training; however, there is no equivalent in the field of audiology. Cultural competency training would benefit individual audiologists in any setting as well as the field of audiology as a whole. It is important that audiologists participating in humanitarianism, whether locally or internationally, prioritize intercultural awareness in their initiatives.

Research Challenges

A variety of challenges are present when researching humanitarian audiolog, as these initiatives help a range of differing regions, come in an array of structures, and are undertaken by many different groups of healthcare professionals. For these reasons, it is difficult for research to determine the best structuring for humanitarian initiatives.

When analyzing the different regions helped in audiology initiatives, many different areas are chosen for varying reasons. A developing region might be chosen for its need, healthcare infrastructure, a nearby partner university, a pre-existing initiative, or because it is likely to succeed with a humanitarian initiative. These decisions lie in the motivations and goals of the humanitarians as well as the region itself. This poses a challenge to research as there is no cookie-cutter way in which regions are chosen for humanitarian audiology missions.

The structuring of initiatives is also highly dependent on many variable factors. As mentioned previously, audiology initiatives could be structured in a variety of ways such as umbrella organization partnerships or a long-term self-sustaining initiative (Saunders et al.,

2019). When the overarching type of humanitarian initiative is determined, more specific structural decisions must be made such as supply chains, incorporation of community members, and partnership with local professionals and government. The concept of self-sustaining infrastructures is complex and not always attainable due to the surplus of planning and time that must be dedicated toward it. For these reasons, case studies, although there are a small number published, are of great benefit to advancing this area. Every initiative must be tailored to match the location, culture, and infrastructure, and case studies provide an opportunity to learn from the successes and mistakes of other initiatives.

Lastly, there are many different audiology humanitarian initiatives around the world. These groups have an array of goals, funding, and volunteers. While the research related to humanitarian efforts was largely case study based, if an organization or a healthcare professional is taking the first steps in creating an initiative, case studies published by people in similar situations and with similar goals would provide invaluable assistance.

Proposed Solutions

Humanitarian audiology is becoming more common and has the ability to have a positive impact on the world. After a thorough review of related research, it became clear the success of these initiatives and the true impact on developing regions was rooted in its structuring. Based on the review of literature, the following are proposed solutions to the variability often present in humanitarian audiology initiatives.

Previous case studies and published articles provided a wealth of knowledge for those professionals who are setting out on new initiatives. Analyses of previous initiatives and what was found to be integral and a hindrance to success could assist professionals in determining the foundational aspects on which they want to build their humanitarian initiative. Through research,

a self-sustaining infrastructure was a recurring theme in those initiatives deemed most successful.

A focus by audiologists and hearing aid manufacturers to develop amplification that is designed for use in developing regions would help make humanitarian initiatives more successful. The current hearing aid technology in the United States is born out of the needs of patients in a developed nation with foci on Bluetooth connectivity, app capabilities, and rechargeability. These features are much less necessary in humanitarian initiatives where the main focus must be on the durability and longevity of the hearing aid, its ability to thrive in differing climates, and its ability to hold power without consistent access to electricity. Patients in developing regions often do not need access to the newest hearing aids with the most gadgets; they need access to hearing aids that would address their needs and have longevity. These hearing devices must be easily serviceable but not overly service-requiring. The supply chains must include any parts need replacing. And above all, the technology must have an accessible price-point. This is one of the largest barriers as every initiative expects different forms of payment for the amplification and services. While some initiatives provide everything free-of-charge, others ask patients to pay what they can. This requires technology to be well-made and relatively inexpensive. While some companies are venturing into this area, such as ComCare GLW and Mayflower, no hearing aid has come to the foreground of these initiatives, requiring professionals to rely on monetary or hearing aid donations. From these donations, patients might receive amplification that is not optimal for their situation. Sending donated hearing aids in for salvage credit that might not fit the situation best would be a viable option as hearing aids such as those that are rechargeable might be better off funding the refurbishment of another device

than being fit on a patient in a developing region. Again, the need for hearing aids to be developed specifically for developing regions is highlighted.

There is an incredible demand for hearing healthcare access world-wide; however, there are not enough audiologists to address the needs of these people. This is indicative of two necessities. First and foremost is the volunteering of audiologists to provide their services in developing regions that do not have access. Lawrence (2012) highlighted the difficulty of finding professionals who are willing and able to travel to developing regions to provide services. As consistency is key in sustainability, organizations not only have to find audiologists for a single trip but enough audiologists for consistent returns. And that is just for one region. Organizations that have multiple initiatives going at once must find enough volunteers to visit a multitude of places. This does not begin to highlight the number of other volunteers needed including community members, local health professionals, otolaryngologists, and coordinators. These trips are costly in terms of both money and time. Audiologists are asked to step away from their job for a specific amount of time and often repeatedly. On top of the cost of flying themselves to a region and room and board, the loss of time at their own clinic might be an additional loss of income. Humanitarianism could also be taxing on an audiologist mentally and emotionally. Audiologists might see a variety of living conditions and norms along with possible difficult situations or safety concerns. While humanitarianism is a noble act, it does not come without its share of sacrifices. These are just some of the reasons some audiologists might not see humanitarian audiology as something they want to be a part of. However, without audiologists, these initiatives would not exist. These professionals are the life and blood of providing hearing health care in developing regions.

Secondly, the low number of audiologists worldwide, especially in developing regions, points to the need for training programs. True sustainability of an initiative lies in empowering community members to learn a skillset based in hearing healthcare and to reach a level of testing and amplification knowledge for their patients. A very under-researched area is that of implementing audiology training programs in developing regions. Adam (personal communication, December 1, 2021) detailed how one of Entheos Audiology Cooperative's humanitarian initiatives is taking the steps to work with local universities to improve training and available equipment. The organization is working with the University of Jordan as they found it had old equipment and was not consistently getting reliable results. Funding for not only hearing aids but better diagnostic equipment and professors to go to these universities could give local students and providers the opportunity to become the hearing healthcare providers for their community instead of relying on incoming humanitarians (N. Adam, personal communication, December 1, 2021). Creating a cycle in which an educational program is available for local audiologists to train local students is a vital step in creating sustainability and infrastructural change.

This research emphasized the necessity of intercultural training and awareness in humanitarian initiatives. Research by Hart et al. (2019) indicated a clear lack of intercultural education being prioritized by major humanitarian organizations throughout the world. It is important that humanitarians demand intercultural training from these organizations in order to ensure the trainings are prioritized, instated, and easily accessible to the volunteers. As the foundation of humanitarianism is to truly assist those in need, it must be a pillar of this practice to take the time to learn how to best communicate and work alongside community members in a particular region.

Lastly, an important solution to achieving sustainability in humanitarian initiatives is the partnering with local organizations and leaders. This means working with government agencies, local healthcare providers, other humanitarian initiatives, and community leaders. Adam (personal communication, December 1, 2021) discussed a situation in Mozambique in which anti-malarial medication use was resulting in a high level of reverse slope hearing losses. Through the use of data analysis, a less toxic anti-malarial was recommended to the Mozambique Ministry of Health on the basis it would save the country a great deal of money in health care and lost incomes of those affected by the hearing loss. Mozambique then changed its primary anti-malarial to one that was less ototoxic (N. Adam, personal communication, December 1, 2021). True change comes from working with the community to determine and instill real change. This might take the form of healthcare infrastructural changes (such as a change in the government purchased medications), hearing healthcare changes, educational partnerships and programs, the funding and provision of equipment and parts, creation of sustainable supply chains, and public education on hearing loss etiologies and amplification. On a local scale, this looks very similar with the mitigation of the needs for supply chains and healthcare infrastructures but with a continued need of hearing healthcare changes, funding, and public education.

Future Directions

When looking toward the future of humanitarian audiology, the number of passionate, hard-working, and invested audiologists, healthcare workers, and volunteers is indicative of a bright future. The worldwide need for hearing health care is not likely to decrease. As humanitarian audiology touches a growing number of individuals in developing regions, there will likely be developments in how sustainability is achieved and these developments will likely

become standard across most initiatives with individual adjustments being made based on the region and culture.

The focus of audiology humanitarian efforts is likely to be rooted in accessible and adaptable amplification (self-fit, water-proof, solar-powered), multi-functional evaluation equipment, streamlined supply chains, telepractice as a support for initiatives, the assistance in the creation of systemic and educational infrastructures, and intercultural competence. There is also a future for cochlear implants in humanitarian settings if the cost of the device could be decreased and infrastructures could be put into place that allow for local surgery and routine follow-ups. Cochlear implantation in a developing region is likely to follow on the heels of a hearing healthcare initiative that has found success in becoming self-sustaining in a specific region. Having an audiologic infrastructure in place would allow for the growth of a cochlear implant branch of a clinic much more easily than a cochlear implant clinic beginning as a stand-alone. Above all else, it is hoped that in the future, all humanitarian audiology initiatives will have the overarching goal of sustainability.

Throughout future audiology humanitarian initiatives, it would be beneficial for those involved to share their experience, even if in a case study design, to assist others in determining successes and barriers.

Summary

There is a huge need for hearing health care in many developing regions with 466 million people worldwide estimated to have a moderate to profound hearing loss as of 2018 (Davis & Hoffman, 2019) and only 17% of people who are candidates for hearing aids having them (WHO, 2020). Hearing healthcare infrastructures are needed in most developing regions including diagnostic testing and access to amplification.

Sustainability is the foundation for the strongest humanitarian initiatives and ones that make the most positive long-term impact. In the future, sustainability should be the basis for most humanitarian initiatives with very few exceptions. Audiologic services for those with hearing loss require consistent annual hearing evaluations, hearing aid adjustments, and possible aural rehabilitation. For cochlear implants, needed follow-ups are even more frequent. The importance of sustainability cannot be overstated.

Through the review of the literature, varying initiatives showed similar trends regarding the most important aspects to be considered in the creation of a humanitarian initiative. These included the following:

- A need for reliable and sufficient funding.
- Supply chain creation in developing regions. These supply chains must provide hearing aids as well as replacement parts, batteries (if applicable), supplies for testing equipment, earmold impression materials, and hearing protection.
- Training programs available to community members including training to become audiology assistants as well audiologists. This process is likely a slow one and depends on partnerships with local universities or healthcare workers.
- Intercultural partnership must be foundational in the planning and execution of the initiative. This allows initiatives to be truly orchestrated around the culture and needs of a region, and with insight into how to structure the initiative to have the most impact. Working with local healthcare workers and government is a must.
- While humanitarianism sounds worthwhile to many people, to many other people it is not. Whether it is a lack of interest in travel or a lack of funds, a limited

number of audiologists are willing to dedicate large portions of their time to humanitarian initiatives. It takes a certain type of audiologist to find a passion in this. These people are needed to continue initiatives.

- Diagnostic equipment is needed in developing regions as well as more advanced systems that are smaller and more affordable.
- Accessible amplification (either purchased with donations or donated) as well as amplification that is manufactured specifically for developing regions and could easily be integrated into a supply chain.
- A location to work out of, whether this means the use of a pre-existing clinic, rental of one, or the creation of a new center.
- There needs to be a clear plan for the future of the initiative. When volunteers are in the process of planning, it is important that the big picture is developed with clear steps for the initiative as it moves farther along and more integrated into the region.
- Without support from the local community, an initiative will not succeed and should likely not be started in the first place. Partnerships, need, and want in the region are vital. If a region does not want humanitarians to come in for hearing health care, they should not be going in as that would mean valuing the opinion of the humanitarians over those who would be helped. Every region has different cultures and beliefs and these should never be infringed upon by outside humanitarians.
- The education of community members on hearing loss, causes, and treatments. When entering a community that might not have had hearing healthcare

> accessible to them previously, it is vital that the humanitarians go in with a concrete plan on how to educate community members on the services being provided. Otherwise, true change is likely not going to be achieved if community members are not given the resources and autonomy to make their own health decisions.

The future of humanitarian audiology is bright. It is urged that those who feel even a small interest explore it further. This kind of work is needed on micro and macro scales. Real change in the availability of hearing healthcare throughout the world is in the hands of audiologists everywhere. “When you start something like this, you have to be a little naïve, because otherwise you’ll never start. You have to just jump in and see what happens” (N. Adam, personal communication, December 1, 2021).

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