

City University of New York (CUNY)

CUNY Academic Works

Dissertations, Theses, and Capstone Projects

CUNY Graduate Center

6-2021

Optimizing Communication in Palliative and Hospice Care: A Toolkit for Audiologists

Sherry E. Queen

The Graduate Center, City University of New York

[How does access to this work benefit you? Let us know!](#)

More information about this work at: https://academicworks.cuny.edu/gc_etds/4233

Discover additional works at: <https://academicworks.cuny.edu>

This work is made publicly available by the City University of New York (CUNY).

Contact: AcademicWorks@cuny.edu

OPTIMIZING COMMUNICATION IN PALLIATIVE AND HOSPICE CARE: A TOOLKIT
FOR AUDIOLOGISTS
by
SHERRY QUEEN

A capstone research project submitted to the Graduate Faculty in Audiology in partial fulfillment
of the requirements for the degree of Doctor of Audiology, The City University of New York

2021

© 2021

SHERRY QUEEN

All Rights Reserved

OPTIMIZING COMMUNICATION IN PALLIATIVE AND HOSPICE CARE: A TOOLKIT
FOR AUDIOLOGISTS

by

SHERRY QUEEN

This manuscript has been read and accepted for the Graduate Faculty in Audiology in
satisfaction of the capstone project requirement for the degree of Au.D.

Date

Barbara Weinstein, Ph.D.

Faculty Mentor and Advisor

Date

Brett Martin, Ph.D.

Executive Officer

THE CITY UNIVERSITY OF NEW YORK

ABSTRACT

OPTIMIZING COMMUNICATION IN PALLIATIVE AND HOSPICE CARE: A TOOLKIT
FOR AUDIOLOGISTS

by

SHERRY QUEEN

Advisor: Barbara Weinstein, Ph.D.

The prevalence of hearing loss increases with age, with age-related hearing loss (ARHL) being one of the most prevalent forms of sensory decline in older adults. Hearing loss is often overlooked in medical settings including palliative and hospice care. Screening for hearing loss in these settings is rare as is formal staff training on assessing and managing hearing loss in palliative and hospice care. An evidence-based toolkit for integrating audiologists into end-of-life care protocols is presented. This toolkit was developed to optimize communication in palliative and hospice care for patients, caregivers, audiologists, physicians, and other palliative care staff. Effective communication has been identified as an important tool for the acceptance of the impending death, for easing suffering, and for connecting at the end of life, both for the individuals that are dying, as well as their family and caregivers.

Key words: “End-of-life care,” “hospice,” “palliative care,” “hearing,” “hearing loss,” “communication,” “Deaf,” “deaf,” “hard of hearing,” “quality of life,” “palliative medicine,” “consultative palliative care,” “palliative care assessment,” “physician,” “audiology,” “speech-language pathology.”

ACKNOWLEDGEMENTS

This paper would not have been possible without the guidance and mentorship of Dr. Weinstein. Thank you for your support and for being an indispensable resource for our program. I would also like to express my deepest gratitude to the entire faculty and staff of the Audiology Program at the Graduate Center, CUNY. Without your efforts, advocacy, and direction, my classmates and I would not be where we are today.

I am grateful for my classmates, who I have had the pleasure to work with and grow alongside for the past four years. Each member of this cohort has provided me with guidance for which I will be eternally thankful for. Throughout this journey, you have become an essential support system and I will cherish the memories we have made along the way.

Nobody has been more important to me in the pursuit of this degree and career than my family. I would like to thank my parents and brother, whose love and guidance are with me wherever I go. Most importantly, I wish to thank my loving and supportive husband, Anthony. I am grateful every day for what you bring to my life.

TABLE OF CONTENTS

ABSTRACT	IV
ACKNOWLEDGEMENTS	V
LIST OF TABLES	VII
INTRODUCTION	1
DEATH AND DYING	1
END-OF-LIFE CARE: PALLIATIVE CARE VERSUS HOSPICE CARE	1
THE IMPORTANCE OF COMMUNICATION AT THE END-OF-LIFE	4
HEARING STATUS AND PALLIATIVE/HOSPICE CARE DELIVERY	8
IMPORTANCE OF PERSON-CENTERED CARE AT THE END-OF-LIFE.....	12
ADDRESSING HEARING LOSS IN PALLIATIVE CARE AND HOSPICE	14
ADDRESSING INDIVIDUALS WHO ARE PART OF THE DEAF COMMUNITY AND/OR WHO ARE BORN DEAF.....	18
ADDRESSING INDIVIDUALS WITH DUAL SENSORY IMPAIRMENT (DSI)/ DUAL SENSORY LOSS (DSL).....	21
MANAGEMENT OF HEARING DIFFICULTIES	22
<i>Hearing Aids</i>	23
<i>Hearing Assistive Technologies (HATs)</i>	26
<i>Cochlear Implants</i>	33
<i>Communication Strategies</i>	34
DISCUSSION	38
TOOLKIT FOR PALLIATIVE AND HOSPICE CARE PROVIDERS.....	38
<i>Clinical Signs of Hearing Loss/Difficulty Communicating</i>	38
<i>Available Communication Technologies</i>	40
<i>Basics on Performing a Hearing Aid Check for Experienced Hearing Aid Users</i>	42
<i>Daily Use and Care of a Cochlear Implant</i>	47
<i>Communication Strategies for Individuals with Hearing Difficulties</i>	48
<i>Navigating Hearing Loss and Hearing Aid Use During COVID-19</i>	50
CONCLUSION	51
REFERENCES	52

LIST OF TABLES

Table 1: Definition of Palliative Care, Consultative Palliative Care, and Hospice Care.....	2
Table 2: Five Core Values Integral to Delivery of Palliative and Hospice Care.....	6
Table 3: Six Aspects of Dying Well and Their Relationship to Palliative and Hospice Care.....	12
Table 4: Approaches to Identifying Patients with Communication Challenges in Palliative and Hospice Care Settings (i.e. Case Findings).....	17
Table 5: Advantages and Disadvantages of Utilizing Hearing Aids in Palliative and Hospice Care.....	24
Table 6: Four Categories of HATs.....	32
Table 7: Clinical Signs of Communication Challenges Associated with Hearing Loss.....	39
Table 8: Non-implantable Communication Technologies.....	40
Table 9: Basics on Replacing Hearing Aid Batteries for Experienced Hearing Aid Users.....	43
Table 10: Basics on Recharging Hearing Aids for Experienced Hearing Aid Users.....	44
Table 11: Basics on Performing a Hearing Aid Listening and Visual Check for Experienced Hearing Aid Users.....	45
Table 12: Basics on Checking a Hearing Aid for Cerumen for Experienced Hearing Aid Users.....	46
Table 13: Daily and Monthly Tasks Essential to Cochlear Implant Care.....	47
Table 14: Communication Strategies.....	49
Table 15: Tips for Wearing Facemasks During COVID-19.....	50

LIST OF FIGURES

Figure 1: The Williams Sound Pocketalker	27
Figure 2: CaptionCall.....	30
Figure 3: Sonic Bomb Extra Loud Alarm Clock with Bed Shaker.....	32

INTRODUCTION

Death and Dying

Dying is a part of life, something every living being has in common with one another. Nonetheless there are many aspects of the dying process that are overlooked and under-appreciated. For example, the importance of hearing and effectively communicating with members of the medical community and family members is under-appreciated. Palliative and hospice care professionals rarely screen for hearing loss, rarely notice difficulty communicating, and rarely use management tools to overcome these challenges (Olson & Mckeich, 2017). As a result, a disruption of information transfer including treatment plans, goals of care, prognosis, adherence, and social or spiritual support occurs. This disruption often leads to feelings of isolation, loneliness, and depression (Smith, Ritchie, & Wallhagen, 2016). Visser and Erby (2014) wrote: “There is no human healthcare without communication” (p. 272). This so aptly characterizes the unfortunate fact that hearing status is not considered relevant at the end of life.

End-of-Life Care: Palliative Care versus Hospice Care

It is estimated that at any given time a little under a quarter of all hospitalized patients have palliative care needs (Virdun et al., 2015). The mission of palliative care is to enhance quality of life when dealing with a serious and life-threatening illness (Wallhagen et al., 2019). An essential component of such care is skilled communication, which reflects sensitivity, cultural differences, and understanding. Misunderstandings and the inability to hear during sensitive discussions such as symptom management, values of the patient, goals of care, and end-of-life decisions may significantly impair the quality of care provided (Wallhagen et al., 2019).

Palliative medicine focuses on quality of life and the alleviation of symptoms and pain in patients with serious illness. This type of care encompasses both consultative palliative care for patients with serious illnesses and hospice care for patients at the end-of-life. The differences in these types of care are illustrated in Table 1. Hospice care focuses on providing comfort and relief from symptoms and suffering, and addresses the patient’s psychological, social, and spiritual needs (Izumi et al., 2012). Hospice is appropriate for patients whose prognosis, in terms of life expectancy, is six months or less. In contrast, consultative palliative care is designed to assess and treat patients anywhere along the chronic disease trajectory, regardless of prognosis. In short, hospice inherently recognizes a trajectory toward end-of-life while consultative palliative care strives to address complex symptoms and quality-of-life needs to support the interdisciplinary medical professionals before patients become terminally ill (Swetz & Kamal, 2012).

Table 1: Definition of Palliative Care, Consultative Palliative Care, and Hospice Care

Term	Definition
Palliative care	Encompasses consultative palliative care and hospice care; it entails active symptom management throughout the continuum of a patient’s illness, even before a patient enters the terminal stage of their illness. Palliative care should be offered from the time of diagnosis to the end of life throughout the course of illnesses (Izumi et al., 2012).
Consultative palliative care	A type of palliative care that focuses on assessing and treating patients anywhere along the chronic disease trajectory,

	regardless of prognosis. This type of care strives to address complex symptoms and quality-of-life needs to support the interdisciplinary medical professionals before patients become terminally ill (Izumi et al., 2012).
Hospice care	A type of palliative care that recognizes a trajectory toward end-of-life; designed for patients whose prognosis is six months or less. Hospice care focuses on providing comfort and relief from symptoms and suffering, and addresses the patient's psychological, social, and spiritual needs (Izumi et al., 2012).

Palliative care may be warranted if the patient has had multiple emergency department visits or hospitalizations for a chronic disease or if the patient feels that the information h/she needs is not accessible. Further, palliative care or the need for advanced care planning may be warranted if the patient is concerned about the future, if the patient is concerned about the effects of an illness on a loved one, or if the patient is worried about getting the right treatment should their disease suddenly worsen. Whether or not the medications the patient is taking is helping to alleviate symptoms such as pain, tiredness, and/or shortness of breath should be taken into account (Swetz & Kamal, 2012).

While working alongside primary care and subspecialty providers, consultative palliative care can assist in managing complex symptoms, conducting family meetings, and assisting in navigating difficult conversations with the goal of maintaining the physical, mental, spiritual, and social well-being of patients and their loved ones. Supporting this goal will consequently keep up hope while safeguarding patient dignity and respecting autonomy.

Consultative palliative care is interdisciplinary with the goal being to provide resources to aid the medical team in addressing the patient's needs. Essential to interdisciplinary teams is effective communication among professionals as well as between patients and healthcare professionals as interpersonal communication is essential to achieving clinical goals. According to Swetz and Kamal (2012), the interdisciplinary team usually includes physicians, advanced practice nurses, chaplains, social workers, psychiatrists, psychologists, dietitians, pharmacists, physical therapists, and occupational therapists. Other services that the team may call upon are music and pet therapists, mindfulness training practitioners, massage therapists, child life experts, and bereavement/grief counselors (Swetz & Kamal, 2012). Based on data regarding the average age of those accessing palliative and hospice care services and on the prevalence of hearing loss, communication breakdowns associated with hearing difficulties are likely. However, communication specialists such as speech-language pathologists or audiologists are not typically included on the interdisciplinary team. The fact that audiologists are not listed as part of the interdisciplinary team is alarming as the average age of persons seeking palliative or hospice care is 72 years and hearing loss affects a high proportion of individuals in this age cohort (Olson & Mckeich, 2017).

The Importance of Communication at the End-of-Life

The COVID-19 pandemic has brought about many challenges, including communication breakdowns caused by wearing facemasks and social distancing. According to Goldin et al. (2020), facemasks/shield create an absence of visual cues and degraded speech signals. In combination with other environmental barriers, such as poor room acoustics or ambient noise, speech is rendered close to unintelligible for many listeners. These cascading effects thereby

hamper communication exchanges in palliative and hospice care. They highlight that in order for communication to be effective, “it must take place in a manner appropriate to one’s age, understanding, and communication abilities... and must be complete, accurate, timely, unambiguous, and understood by the patient” (Goldin et al., 2020, p. 8). It goes without saying that palliative or hospice care is a stressful situation for all. Each medical professional in these environments has a responsibility to ease the burden of death and dying on patients and their loved ones via effective communication practices.

Communication is a process that begins with the formation of a message, or the idea that the sender wants to communicate with the receiver. It is one of the domains of care that is most important at the end-of-life in the hospital setting. Effective communication is essential to person-centered care and shared decision making. Vaidhyanathan et al. (2020) define communication as, “the process of exchanging information and ideas, and involves understanding and expression” (p. 1). Communication can happen through verbal, non-verbal, or a combination of both models (Vaidhyanathan et al., 2020). King and Hoppe (2013) noted that successful communication should be uncomplicated, be specific, use some repetition, minimize jargon, and check patient understanding. In addition, communication should simultaneously employ a patient-centered approach and interpersonal interaction to promote patient satisfaction (King & Hoppe, 2013).

Communication at the end of an individual’s life offers an opportunity to create new memories, to share important moments, and to give a final message of love. Additionally, this communication can create a space and time for people to acknowledge their fears and concerns about death and about a life without one another. End-of-life conversations are a last opportunity

to forgive past hurts and resolve conflicts which give survivors the opportunity to achieve closure in their relationships (Generous & Keeley, 2014).

Rider et al. (2014) identified five fundamental categories of human values that should be present in every healthcare interaction and are essential to communication in healthcare settings: compassion, respect for persons, commitment to integrity and ethical practice, commitment to excellence, and justice in healthcare. As is evident in Table 2, compassion is the understanding of others and commitment to the healing and caring of others. Respect should be upheld for any individual, patient or loved one, including their beliefs, confidentiality, autonomy, and any differences they may have. Integrity and ethical practice are the building blocks for a trusting relationship. This includes a commitment to honesty, reliability, accountability, and responsibility. Commitment to excellence involves utilizing evidence-based practice and lifelong learning. Justice in healthcare is upheld by advocacy on the part of all stakeholders. This includes advocating for equality of care and fighting against discrimination and prejudice (Rider et al., 2014).

Table 2: Five Core Values Integral to Delivery of Palliative and Hospice Care

Core Value	Application to Palliative and Hospice Care
Compassion	Understand the condition of others; to commit oneself to the caring necessary for end of life care and to the relief of physical and mental suffering (Rider et al., 2014).
Respect for persons	Admire and understand the feelings, wishes, rights, opinions, and traditions of others, as

	well as any differences between yourself and others (Rider et al., 2014).
Commitment to integrity and ethical practice	Uphold the values of honesty, trustworthiness, accountability, responsibility, and reliability throughout care; to acknowledge your own limitations and provide non-judgmental care (Rider et al., 2014).
Commitment to excellence	Provide the best and most effective care to patients, including building a good relationship between yourself and others and maintaining effective communication to best serve others (Rider et al., 2014).
Justice in healthcare	Advocate for yourself as well as your patients for the best possible care and for equality of care; fight against discrimination and prejudice, and acknowledge barriers to care (Rider et al., 2014).

These core values are intended to facilitate the efforts of providers and caregivers in improving healthcare delivery. The execution of these values in palliative and hospice care is dependent on the communication feedback loop. The message must be sent through an appropriate transmission medium that converts the message into the signal that is being transmitted. The medium will depend on the receiver’s needs and the urgency of the message. The signal must then be received and decoded, therefore allowing the listener to understand the message. When the listener comes to understand the message being delivered, the feedback loop is closed. This process repeats with every message that is sent between the listener and speaker (Communication Theory, 2014). It is therefore of paramount importance to ensure adequate audibility of conversations for all participants so these values can be upheld as part of end-of-life

care (Rider et al., 2014). Failure to identify factors that may impede communication has always been important and is even more important during the COVID-19 pandemic, which impacts older adults more so than most other individuals. The high prevalence of hearing loss among older adults receiving palliative or hospice care along with the current need for wearing facemasks and maintaining social distancing, pose barriers to delivery of palliative and hospice care professionals.

Hearing Status and Palliative/Hospice Care Delivery

In light of increases in life expectancy, projections for the future are indicative of increased prevalence of hearing loss. According to Goman and Lin (2016), two-thirds of individuals aged 70 and older have bilateral hearing loss and almost three-quarters of the same population have hearing loss in at least one ear. In the United States, two-thirds of individuals aged 70 years and older have bilateral hearing loss and almost three-quarters of the same population have hearing loss in at least one ear (Goman & Lin, 2016). Further, the prevalence of hearing loss roughly doubles with each decade of life. Over 80% of individuals aged 80 years and older have a “clinically significant hearing loss” in the United States (Lin et al., 2011). According to the National Hospice and Palliative Care Organization (NHPCO), 87.4% of Medicare hospice patients were 70 years of age or older in 2017 (National Hospice and Palliative Care Organization, 2020). Although the prevalence of hearing loss is high and continues to increase, it is still a silent and underappreciated problem throughout the healthcare system including at the end of one’s life.

The high probability of hearing loss in the palliative and hospice patient population along with the environmental communication barriers inherent in these facilities makes patients in

palliative and hospice care particularly vulnerable to communication breakdowns (Olson & Mckeich, 2017). Weinstein (2015) stated that “audiologists have an invaluable role to play in both raising awareness and recognition of behaviors typical of people with hearing impairment, and delineating skills and strategies essential to improving the communication experience and associated outcomes. Minimizing sensory and other obstacles that arise, and providing solutions to ensure that end-of-life care is compassionate and the best possible quality, should increasingly be considered part of audiologists’ Scope of Practice” (p. 24).

Hearing loss manifests itself differently from individual to individual and prevalence differs based on how it is quantified. Self-rated hearing difficulties yield different estimates from pure tone data because personal and environmental factors such as cognitive function, socio-economic status, personality, and living situation can modulate the impact of hearing loss on daily life (Humes, 2020). Two individuals who have the same hearing impairment often have a different perception of how “disabling” the hearing loss is (Humes, 2020). The disparities highlight the importance of evaluating the auditory needs for each patient individually and holistically rather than merely relying on objectively measured pure tone thresholds. Smith, Ritchie, Miao, et al. (2016) assessed the prevalence and correlates of self-reported hearing difficulty during the last two years of life. They found that self-reported hearing problems were highly prevalent near the end of life noting that one in three older adults report fair or poor hearing during the last 2 years of life (Smith, Ritchie, Miao, et al., 2016). Between the high prevalence of unilateral and bilateral hearing loss defined by audiometric thresholds in individuals 70 years and older, and the high prevalence of subjective hearing/communication difficulty at the end of life, it is likely that an individual in palliative or hospice care will face communication challenges posed by difficulties hearing.

Age-related hearing loss (ARHL) is gradual in onset and as a result, individuals are often unaware of the environmental sounds and communication they are no longer hearing or experiencing (Smith, Jain, & Wallhagen, 2015). ARHL is characterized by a progressive degeneration at all levels of the auditory system from the ear to the brain resulting in difficulties understanding speech (especially in the presence of background noise). The hallmarks include reduced hearing sensitivity, impaired localization of sound, increased listening effort, difficulty in suboptimal listening environments, and listening fatigue (Ludlow et al., 2018; McGarrigle et al., 2014).

Listening effort and fatigue are symptomatic of persons with ARHL as additional cognitive resources are required to hear and understand, detracting from the ability to remember information being relayed by healthcare professionals. To explain, listening effort is the mental exertion required to attend to, and understand, an auditory message with attention and intention (McGarrigle et al., 2014; Rosemann & Thiel, 2019). Listening effort increases as cognitive demands increase. When cognitive capacity is limited because of the increased cognitive demands necessary during communication and listening, fewer cognitive resources will be available for other simultaneous cognitive tasks such as rehearsal, recall, environmental monitoring, remembering, or following a conversation (Picou et al., 2013). Listening may become effortful as a result of various factors including a degraded acoustic signal or a hearing loss. A hearing loss often requires allocation of cognitive resources to meet the demands of the acts of listening and understanding (Rosemann & Thiel, 2019). This often leads to fatigue, or “a feeling of being extremely tired, usually because of hard work or exercise” (Oxford English Dictionary, 2012). In addition, there is an association between hearing loss and frailty. Frailty is characterized by decreased physiologic reserve and an increased vulnerability to stressors. Kamil

et al. (2014) note that frailty is present when three or more of the following criteria are met: unintentional weight loss, slow walking speed, weakness, exhaustion, and low physical activity (Kamil et al., 2014). Liljas et al. (2017) examined the association between hearing impairment and frailty in older adults. They found that hearing impairment in prefrail older adults, or older adults with only one or two of the frailty criteria listed above, was associated with greater risk of becoming frail. This finding suggests that hearing impairment may hasten the progression of frailty (Liljas et al., 2017). Frailty and weakness require greater use of cognitive resources in daily functions. This in turn leads to less resources available to focus on auditory messages being delivered, thereby compromising hearing and understanding. Compromised hearing and understanding have negative implications for persons in palliative and hospice care as these individuals are not able to effectively communicate with their loved ones and medical professionals. Difficulty communicating negatively impacts both the plan of care, and important end-of-life discussions.

Improved audibility of speech and sounds can diminish the listening effort required. As such, palliative and hospice care professionals should implement strategies and technologies for reducing listening effort in this population. Alternative communication technologies are ideal in these situations, as they can help reduce listening effort and listening fatigue and help optimize communication. Compensating for hearing difficulties by increasing the audibility of a speech signal in the palliative and hospice care population is critical, especially at present with the number of COVID-19 cases on the rise. The need to wear facemasks and social distancing during the COVID-19 pandemic, and potentially for the foreseeable future, increases hearing and communication difficulties among healthcare providers and palliative or hospice care patients. This further underscores the importance of compensating for hearing difficulties at the end-of-

life and insuring that palliative and hospice care teams are fully conversant with effective communication strategies.

Importance of Person-Centered Care at the End-of-Life

While there is no uniform understanding or definition of what constitutes a “good death,” communication at the end of life is an integral and essential component of palliative and hospice care. Patients, families, and caretakers have identified six aspects of end-of-life care that are most important: (a) effective communication and shared decision making; (b) expert care; (c) respectful and compassionate care; (d) trust and confidence in clinicians; (e) maintenance of an adequate environment for care; and (f) minimizing burden and the importance of organizing financial affairs (Virdun et al., 2015).

Table 3: Six Aspects of Dying Well and Their Relationship to Palliative and Hospice Care

Six Aspects to Dying Well	Application to Palliative and Hospice Care
Effective communication and shared decision making	Effective communication: honest communication, the ability to prepare for death, ensuring availability of someone to listen, being aware of what to expect about their physical condition Shared decision making: limiting futile tests and treatments, avoidance of life support when there was little hope for recovery, and having an opportunity to nominate a preferred decision maker (Virdun et al., 2015).
Expert care	Clinicians who are attentive to and provide good physical care (particularly regarding hygiene and personal care needs), symptom

	and pain management, and integrated care (clinicians working well together and honoring the patient’s last wishes) (Virdun et al., 2015).
Respectful and compassionate care	Preservation of dignity, compassionate and supportive clinicians, and clinicians taking personal interest in the patient (Virdun et al., 2015).
Trust and confidence in clinicians	Trust and confidence will allow for a healthy clinician-patient relationship and better adherence to medical recommendations (Virdun et al., 2015).
An adequate environment for care	Allowing items from home into the place of care and having a comfortably sized room (Virdun et al., 2015).
Minimizing burden and the importance of having financial affairs in order	The patient should not feel like a physical, emotional, or financial burden (Virdun et al., 2015).

Ludlow et al. (2018) state that person-centered care encourages collaboration between healthcare professionals, patients, and family members or caregivers (Ludlow et al., 2018).

Carpenter et al. (2017) completed a retrospective cross-sectional analysis on 5,592 patients who died in a Veterans Affairs inpatient hospice and palliative care unit. They examined the associations between palliative care consultation timing and bereaved families’ evaluation of care, and found that earlier palliative care consultations were associated with greater family satisfaction with care (Carpenter et al., 2017). Ideally, these discussions should take place when

the patient's functional status and quality of life are intact but declining, and before the patient loses the ability to express preferences (Swetz & Kamal, 2012). Person-centered care and shared decision making require effective communication. Effective communication occurs when patients are encouraged to express their opinions and be active participants in their care, no matter what stage of life they are in (Ludlow et al., 2018).

As previously discussed, the majority of individuals seeking palliative and hospice care are likely to have some degree of hearing loss and experience communication breakdowns. Understanding the importance of shared decision making and person-centered care at the end-of-life, healthcare workers and caregivers underscore the necessity to prioritize these elements of care. It is particularly important to consider ways to apply person-centered care to individuals with hearing and communication difficulties, as projections for the future are indicative of increased prevalence of hearing loss.

Addressing Hearing Loss in Palliative Care and Hospice

Palliative and hospice care facilities tend to be environments where the quality of communication is compromised because of poor room acoustics and competing background noise. Common sources of background noise in these settings include televisions, announcement systems, and nearby conversations. As previously discussed, communication about goals-of-care and planning is a key element in helping to assure that patients in palliative and hospice care receive the care that they want. This open communication will also help alleviate anxiety and support families throughout the care that they receive. Data show substantial and highly consistent associations between failure or delay in discussing end-of-life care options with poor outcomes (Bernacki & Block, 2014). Unfortunately, background noise along with hearing loss

restrict engagement and participation in decision making in medical facilities. An understanding of the effects of hearing loss, modifying environmental factors, establishing formal staff training, improving access to hearing services, and engaging in communication enhancing strategies could facilitate communication opportunities and thus person-centered care (Ludlow et al., 2018).

Staff education may involve lessons regarding what contributes to a difficult listening environment, ways to address these barriers, and what strategies will facilitate better communication. Hard-surfaced floors, bare walls, and poor room acoustics all contribute to difficult listening environments and are all common in palliative and hospice care settings. A few examples of environmental modifications include minimizing background noise from televisions and radios, ensuring adequate lighting during communication, or installing sound-absorbing acoustical tiles. Some palliative and hospice care facilities may be able to implement “quiet hours” to limit the amount of background noise (McCreeley et al., 2018). It is also important to include appropriate signage to notify medical professionals, staff members, and other visitors that the patient has hearing loss or difficulty communicating. Signs should be in plain sight and located in and around the room (including the door and bed).

Training medical professionals about how to identify individuals with hearing loss and difficulty communicating would be beneficial for both medical providers and patients. Smith, Ritchie, and Wallhagen (2016) conducted a national survey on palliative and hospice care providers to determine whether these providers screen for or received training on hearing loss. Providers were also surveyed about whether they believe hearing loss impacts patient care. Researchers found that palliative and hospice care providers reported that hearing loss impacted care for many of the patients for whom they cared. More specifically, 88% of the respondents recalled a situation where hearing loss created a communication problem with the patient,

however only 13% of those surveyed reported screening for hearing loss (Smith, Ritchie, & Wallhagen, 2016). This estimate of 13% is even lower than the reported average screening rates of 20-25% in primary care settings (Smith, Jain, & Wallhagen, 2015; Smith, Ritchie, & Wallhagen, 2016; Wallhagen et al., 2019).

Screening for communication difficulties in non-traditional settings such as palliative or hospice care should be a priority. This can be accomplished through a few ways. First, any clinical signs or symptoms of communication difficulties should be identified. The patient can also be directly asked about any difficulty hearing and/or communicating. Lastly, regular checks for impacted cerumen which is highly prevalent in this population should be completed. Clinical signs that older adults with serious illness have communication challenges includes lack of understanding, nonadherence, speech reading, lack of engagement, watching the television at high volumes, or not being able to understand the conversation during a phone call (Smith, Ritchie, Miao, et al., 2016). These individuals may smile and nod without admitting that they did not understand. They may also fail to respond to a question, or answer incorrectly, and may ask “‘what?’” repeatedly. Enhancing communication opportunities for any given patient with hearing loss in palliative and hospice care should ultimately add quality to end-of-life care. Clinicians should make every effort to employ strategies to optimize communication for patients exhibiting any of the above behaviors.

Table 4: Approaches to Identifying Patients with Communication Challenges in Palliative and Hospice Care Settings (i.e. Case Findings)

Clinician Behaviors	Patient Behavior
Observe clinical signs of communication difficulties caused by hearing loss	Lack of understanding characterized by nodding as if the message is understood, but failure to repeat back the message; asking “what” or for repetition frequently; failure to respond/failure to respond correctly to a question
	Nonadherence characterized by failure to adhere to medical recommendations and/or treatments
	Speech reading, or focusing on the mouth and lips, in order to understand the conversation
	Lack of engagement or little/no participation in medical or personal conversations
	Listening to the television at high volumes/difficulty understanding the television
	Difficulty understanding conversation on the phone/difficulty hearing the phone ring
Directly asking about difficulty hearing and/or communicating	This can be a yes/no question; if “yes,” ask the patient to elaborate on situations that are found to be difficult (i.e. what setting, which speaker, etc.)

Regular checks for impacted cerumen using and otoscopy	Impacted cerumen can cause difficulty hearing and communicating, and should be removed with patient permission
--	--

Addressing Individuals who are Part of the Deaf Community and/or who are Born deaf

In any setting, a distinction must be made between individuals who are Deaf, deaf, or hard of hearing. Individuals who identify themselves as “Deaf” are part of the Deaf socio-linguistic and cultural group. The term “deaf” refers to the audiological condition of individuals who have a severe to profound hearing loss, with little to no useful residual hearing. This term encompasses an estimated 87 million individuals worldwide (Napier, 2002; Turton et al., 2020). Individuals who are deaf may or may not identify themselves as Deaf. They do not always share the knowledge, beliefs, and practices that make up the culture of the Deaf community. The term hard-of-hearing encompasses any degree of hearing loss and can include individuals who identify themselves as “Deaf” or “deaf” (Napier, 2002). Individuals who are deaf or have longstanding congenital hearing loss and individuals who are Deaf will usually identify themselves as such. Estimates of the size of the Deaf community range from 100,000 to 1.8 million in the U.S. alone (Kehl & Gartner, 2009). According to Mitchell (2005) an estimated 1.5% of the U.S. population, or approximately 514,321 individuals, are considered “functionally deaf” at or over the age of 65 years (Mitchell, 2005). Up to 2 million Americans use American Sign Language (ASL) for everyday communication, and it is considered to be the third most commonly used language in the United States (Kehl & Gartner, 2009; Allen et al., 2002). It is important to note that ASL is a visual language used by members of the Deaf community with its own grammar and syntax.

Communication barriers for members of the Deaf community result in miscommunication and insufficient conversation about death, dying, and palliative or hospice care. Healthcare providers who cannot communicate via ASL or who lack an understanding of Deaf culture pose a challenge to individuals who are Deaf. Allen et al. (2002) found that individuals who are Deaf identified access to information in ASL as a barrier in which affected the ability to understand illness and make decisions about end-of-life care (Allen et al., 2002). Individuals who are D/deaf may utilize hearing aids or cochlear implants to aid in conversation. However, these devices have limitations for listening situations, and the assumption that these devices provide speech understanding for this population should not be made. Medical professionals and caretakers should explore assistive listening solutions either through device streaming or as standalone products to meet the communicative needs of the patient (Turton et al., 2020).

Maddalena et al. (2012) studied the experiences as well as barriers to end-of-life and palliative care for individuals who are Deaf and their caregivers. They found participants to have limited knowledge of the services, treatment options, symptom management options, and options for location of death. Furthermore, caregivers and family members who are Deaf often lack the appropriate access to bereavement support after the death of a loved one. One essential way to overcome the language barrier is providing access to trained ASL interpreters, which is mandatory according to federal law. Under Title II of the Americans with Disabilities Act (ADA), all state and local governments are required to take steps to ensure that their communications with individuals with disabilities are as effective as communications with others. In other words, whatever is written or spoken must be as clear and understandable to persons who have disabilities as it is for persons who do not have disabilities (Americans with

Disabilities Act, 2007). Depending on an individual's preference, an aid or service such as an interpreter may be requested to help make all communication clear and effective. Unfortunately, interpreters are hard to come by, especially on weekends and nights or in rural areas. In these instances, the use of an alternative such as video-conferencing should be considered (Maddalena et al., 2012).

Healthcare professionals need cultural awareness and cultural competence training regarding the Deaf community. When delivering care, they must take into consideration the fact that individuals who are Deaf communicate through ASL. Medical professionals should advise patients and caretakers that final communication needs to occur early in the end-of-life trajectory due to the diminished ability to sign and to see signs as the dying individual weakens (Kehl & Gartner, 2009). Moreover, these professionals must recognize that individuals who are Deaf have varying levels of ASL fluency and therefore health literacy. A personalized approach is required to select the most effective means of communication. Scott and Hoffmeister (2017) note that individuals with a strong language base in ASL will have stronger linguistic abilities that allow them to understand and produce more advanced written English. ASL proficiency is identified as the key predictor of English reading comprehension. While individuals with D/deaf parents are typically identified as stronger ASL users and therefore have stronger linguistic abilities, individuals without D/deaf parents are not as proficient in ASL. This has a negative effect on their English reading comprehension (Scott & Hoffmeister, 2017). The aforementioned findings further emphasize the need to ensure that patients and caregivers who are D/deaf understand and participate in conversation with medical professionals. Strategies such as teach-back and maintaining an appropriate reading level for written materials or transcriptions of conversation should be implemented. Medical professionals must develop relationships with their D/deaf

patients and get to know these patients as whole individuals. It is also important for the medical facility to formally introduce the healthcare professionals and support staff that the patient will encounter and maintain caregiver consistency throughout care (Maddalena et al., 2012). Taking these steps will comfort patients who are D/deaf and will reduce their anxiety during their stay at the facility.

Addressing Individuals with Dual Sensory Impairment (DSI)/ Dual Sensory Loss (DSL)

Oftentimes, hearing loss is accompanied by vision loss. Heine et al. (2019) define “dual sensory loss” as “the acquired loss, in various degrees of severity of both vision and hearing acuity, associated with aging and prevalent in older adults” (p. 92). Studies show variation in estimates of the number of older adults reporting the presence of dual sensory loss. Estimates range from 5.9% in adults aged 50 years and older to 25% in adults aged 80 years and older (Heine et al., 2019). Further, it is known that low levels of both vision and hearing are associated with poorer health and increased mortality rate. This suggests a higher need for palliative or hospice care in this population (Kiely et al., 2013).

While vision and hearing loss can both be addressed and managed in this population, the ramifications of these two sensory losses differ in selected ways. Kiely et al. (2013) found that symptoms of depression were associated with hearing loss and dual sensory loss were not associated with vision loss (Kiely et al., 2013). These findings may be explained by the results of a study conducted by Chia et al. (2006) who found that vision loss impacts an individual’s ability to actively engage with physical and spatial surroundings, whereas hearing loss impacts daily communication and social participation (Chia et al., 2006). Further, according to Gopinath et al. (2013), dual sensory loss is associated with a risk of death greater than that of either vision loss

only or hearing loss only. The above finding in combination with the high prevalence of dual sensory loss in palliative and hospice care, suggests that a large subgroup of palliative and hospice care patients will be at risk for an even shorter prognosis compared to their non-dual sensory loss counterparts. The results from the aforementioned studies emphasize the critical role hearing plays in social connections, especially at the end of life.

With the high prevalence of dual sensory loss in the older adult population and the large population of older adults in hospice and palliative care, it is likely that the ramifications of dual sensory loss are applicable to individuals in this medical setting (Kiely et al., 2013). The need to compensate for dual sensory loss in individuals receiving palliative or hospice care is of paramount importance as dual sensory loss is associated with poorer health, decreased wellbeing, and decreased quality of life.

Management of Hearing Difficulties

Communication with individuals with sensory loss must be as effective as communication with those without a sensory loss. Patients and providers alike must recognize that a better understanding of their health issues will promote collaborative communication, improve patient outcomes, enable physicians to be more supportive, and help optimize adherence to the treatment processes (Cohen et al., 2017). There are management options for individuals with hearing loss, such as the use of amplification, hearing assistive technologies, cochlear implants, along with communication strategies to supplement technology. Depending on patient status, some of these options may not be appropriate for every individual in palliative or hospice care. It is imperative that targeted and innovative communication solutions be implemented on an individualized basis.

Hearing Aids

One amplification option with which most are familiar is the hearing aid. It should be emphasized that this option is likely appropriate for experienced hearing aid users in palliative or hospice care. Patients in palliative or hospice care who have never worn hearing aids are presumably not candidates for hearing aids given the hurdles one must jump to adapt to hearing aid use. Barriers to obtaining hearing aids in this population include the resources needed to purchase hearing aids as well as the time needed to adapt to and learn how to use hearing aids. In short, learning how to hear with hearing aids is a process that could take three to six months for new users which is time that individuals in hospice care may not have (Smith, Jain, & Wallhagen, 2015). Adaptation requires time to adjust to the sound quality and to learn about how to care for and maintain the devices. Individuals in palliative or hospice care likely have other health concerns that limit their ability and time to learn how to utilize hearing aids. To reiterate, between the cost barriers, limited coverage options, and time needed to adapt to this new way of hearing, individuals in palliative or hospice care who have never used hearing aids should not be considered candidates for hearing aids (McCreedy et al., 2018). Instead, these patients could benefit from the many other options shown in Table 6 which are available to accommodate to their hearing/communication needs.

Individuals who are already utilizing hearing aids should be encouraged to continue wearing the devices. Assistance is typically required to ensure proper use, insertion, and removal. When not in use, hearing aids must be properly stored in a safe place when not in use (McCreedy et al., 2018). Further, daily maintenance such as battery checks, battery removal/insertion, cerumen inspections, and general cleaning of the devices are a necessity for operational devices.

Routine cerumen inspection is very important. Excessive cerumen or cerumen impaction affects a large proportion of this population and can negatively impact the benefit a hearing aid provides.

There are many benefits of consistent use of hearing aids. If well-fit, they can provide increased audibility and clarity to the hearing aid user. Wearing hearing aids can also reduce listening effort, ultimately resulting in reduced fatigue. However, since palliative or hospice care patients spend most of their time in bed falling in and out of sleep, they may choose not to utilize their hearing aids if they have them as they may be more of a nuisance than beneficial. Table 5 summarizes the advantages and disadvantages of hearing aid use for individuals who are experienced users.

Table 5: Advantages and Disadvantages of Utilizing Hearing Aids in Palliative and Hospice Care

Advantages of Utilizing Hearing Aids in Palliative and Hospice Care	Disadvantages of Utilizing Hearing Aids in Palliative and Hospice Care for Non-Users
Increased audibility and clarity of speech/other sounds	High cost of hearing aids
Reduced listening effort, leading to reduced fatigue	Adjustment period, or time needed after the initial hearing aid fitting for the patient to grow accustomed to the new way speech and other signals sound
Facilitated engagement with family, friends, and caregivers	Time needed to maintain the hearing aids and to attend appointments to adjust the hearing aids

A problem many are now facing during the COVID-19 pandemic is the difficulty of communicating when wearing a face mask as well as a hearing aid and eyeglasses. The CDC recommends that patients in nursing homes and long-term care facilities, such as hospice or palliative care, wear a cloth face covering or facemask whenever they leave their room. However, face coverings or facemasks should not be placed on anyone who has trouble breathing, or anyone who is unconscious, incapacitated, or otherwise unable to remove the mask without assistance (Centers for Disease Control and Prevention, 2020). Patients may find it difficult to manipulate the hearing aids around the facemasks. Many patients may forgo the hearing aids in order to follow COVID-19 safety guidelines of wearing a face covering or facemask in public spaces. Unfortunately, this is the time when patients need to wear their hearing aids the most. Face coverings or facemasks reduce sound levels at high frequencies, reduce discrimination of the speech signal against competing noise, eliminate visual cues, and have a small negative impact on speech production, creating more difficulty understanding speech (Goldin et al., 2020; Martin, 2020). Some hearing aid users may find it beneficial to use a facemask extender so the elastic loops of the mask no longer sit behind the ears next to the hearing aids. There are also other creative solutions such as wrapping the facemask loops around a ponytail or sewing buttons onto an old headband to secure the loops around. These potential solutions are listed in Table 15. The loops on the facemask should never lie on top of the hearing aid as it may interfere with the signal being delivered to the individual's ear. Further, the face covering or facemask should be removed carefully so the hearing aids do not inadvertently fall off (Victory, 2020).

Individuals who regularly utilize hearing aids should wear them as much as possible, especially in palliative and hospice care facilities. Either the patient, caretakers, or medical professionals must ensure that the devices are turned on and functional. It would be beneficial for medical professionals at these facilities to be trained on basic care and maintenance of hearing aids, such as checking the hearing aids for occluding cerumen and dead batteries. It should be emphasized that hearing is still impaired if hearing aids are not used correctly or are misplaced. Hearing aids do not reverse hearing loss or resolve all of the communication challenges posed by ARHL, but are wonderful tools that can support effective communication in palliative and hospice care for experienced users.

Hearing Assistive Technologies (HATs)

Affordable alternative amplification options include the use of hearing assistive technologies (HATs). HATs refer to various types of amplification devices and technologies designed to improve the communication of individuals with hearing or communication difficulties by enhancing the accessibility of the incoming auditory message. These devices are less advanced and less expensive than hearing aids, but are not professionally fit to an individual's hearing loss (Kim & Kim, 2014). Nonetheless, HATs are still very useful for individuals with hearing loss.

HATs are important forms of hearing assistance to utilize in palliative or hospice care settings as they can ease the burden of certain difficult listening situations. Noise, distance, and reverberation all affect the signal-to-noise ratio, and HATs increase the level of the signal above the noise making it easier to understand. In short, the intelligibility of the incoming signal is diminished with the presence of noise, too big a distance between the listener and signal source,

and excessive reverberation. HATs address these issues. HATs separate the sounds that an individual wants to hear, particularly speech, from background noise which improves the signal-to-noise ratio. When listening is challenging, HATs improve the signal-to-noise ratio in three ways: minimizing background noise, reducing negative influences due to distance between the sound source and the individual, and overriding poor acoustics such as reverberation (Kim & Kim 2014). HATs can be separated into four categories: (a) devices to facilitate face-to-face communication; (b) devices to facilitate the reception of electronic media; (c) devices to facilitate telephone reception; and (d) alerting devices (Compton-Conley, 2016).

Devices to facilitate face-to-face communication bring the desired signal closer to one's ear via a remote microphone next to the speaker. The signal is then sent to the listener via a hardwired or wireless link. The systems that can be used have varying modes of transmission, be it hardwired or wireless (FM, infrared, inductive). The Williams Sound Pocketalker is an example of a hardwired personal amplifier which optimizes one-on-one communication. The microphone in the Pocketalker picks up a speech signal, amplifies it, and the signal is then sent to the listener via headphones. The Pocketalker is ideal for an environment where the speaker and listener are in close proximity and there is background noise to overcome.



Figure 1: The Williams Sound Pocketalker

Speech-to-text apps are an example of a HAT that are an easy, inexpensive, and flexible tool to facilitate communication. One example is Google Live Transcribe which offers real-time transcription. One caveat of this app is that the speaker must be close to the microphone of the smartphone in order for the signal to be picked up and transcribed. Other speech-to-text apps include Dragon Anywhere and iTranslate Converse, which work similarly to Google Live Transcribe. While speech-to-text apps offer a variety of potential benefits for individuals with hearing and communication difficulties, potential risks include misuse, safety, privacy and use of personal information, and reliability of information (Paglialonga et al., 2015).

Personal sound amplification products (PSAPs) can be considered HATs as they are aids that optimize audibility of face-to-face communication. PSAPs are ear-level devices that provide audibility, and potentially have wireless capabilities, but are not intended to compensate for hearing loss. These consumer electronic products have many features that exist in hearing aids, such as directional microphones, but are not medical devices and are not regulated by the Food and Drug Administration (FDA). The treatment for hearing loss is not the intended use of PSAPs, therefore the distributors and manufacturers of these devices do not have to follow the same requirements and regulations necessary for hearing aids.

PSAPs are a category of assistive technology that are “intended for non-hearing impaired consumers to amplify sounds in the environment...” (U.S. Food and Drug Administration, 2009). The FDA prohibits manufacturers of PSAPs from marketing their products as hearing aids to individuals with hearing loss. However, PSAPs can be marketed for other uses that amplify sounds in the environment such as hunters who want to hear deer in the woods, for example. PSAPs should not be confused with over-the-counter hearing aids, which are regulated by the

FDA. Further, over-the-counter hearing aids do not require a consultation with a hearing healthcare professional and are directed towards individuals with a mild to moderate hearing loss to improve their hearing and communication.

While PSAPs do not have regulatory approval to be marketed as a hearing aid in the United States and are not intended for “non-hearing impaired consumers,” some PSAPs do offer sophisticated signal processing similar to that found in FDA approved hearing aids. According to Reed et al. (2017), some PSAPs are comparable to hearing aids and may be appropriate for mild to moderate hearing losses. They examined the accuracy of speech understanding in noise utilizing five PSAPs and compared results to the results obtained utilizing a hearing aid. They found that participants who utilized the Sound World Solutions, Soundhawk, and Etymotic BEAN PSAPs scored similarly (within five percentage points) to scores obtained utilizing the hearing aid. However, the results obtained when utilizing the MSA 30X Sound Amplifier were worse than the results obtained without any amplification at all (Reed et al., 2017). Mamo et al. (2017) studied the effects of the utilization of two different PSAPs on communication and behavioral symptoms of dementia for individuals diagnosed with dementia and their caretakers. They found that the use of PSAPs reduced depressive and/or neuropsychiatric symptoms. Their use also had a positive impact on communication and general demeanor of individuals with dementia and their caretakers (Mamo et al., 2017). While some PSAPs can offer a less costly option that provides comparable benefit for speech understanding, caution must be taken by the user when selecting a PSAP as not all of these devices have the same benefit compared with one another.

HATs that facilitate the reception of electronic media bring the desired signal closer to one's ear via a remote microphone next to the signal source, or by connecting directly into the

signal source. For example, streaming music can be made audible to the patient by utilizing Bluetooth headphones or streaming via remote microphone and headset. Schmid et al. (2018) examined the perspective of patients and healthcare providers on music therapy's impact in palliative care. They found that music therapy has a positive impact of several patient symptoms and needs, including an improvement in physical comfort and emotional relief. This positive effect thus led to an improvement in the participant's quality of life in palliative and hospice care settings (Schmid et al., 2018). This further emphasizes the need to utilize HATs to help meet the emotional and communicative needs of patients in palliative and hospice care.

Devices that facilitate telephone reception include amplifiers that either replace the telephone handset, attach to the phone between the handset and phone, or attach to the handset and are powered by a battery. There are also telephones with built-in amplification or telephone relay services, such as CaptionCall, that provide a real-time transcription of the conversation during a phone call (Compton-Conley, 2016). Perhaps the installation of CaptionCall may not be possible if care is taking place in a hospital setting, but it is a possibility if palliative or hospice care is taking place in one's home.



Figure 2: CaptionCall

The Pocketalker can also be utilized when on the telephone, on a video call, or when watching television. For example, when utilizing the Pocketalker when on a video call, the microphone can be placed close to the computer or telephone speaker. The auditory signal will then be sent to the headphones of the device worn by the listener. This may be an invaluable use of this technology during the COVID-19 pandemic as many loved ones are unable to be at the patient's bedside at the end-of-life.

Alerting devices allow individuals with hearing difficulty to be aware of environmental sounds and signals at home, in the hospital, in hospice or palliative care, or in other environments. Alerting devices use either microphones or electrical connections to pick up a signal. A hardwired or wireless transmission is utilized to send the signal to the listener in a manner by which the listener can understand, such as flashing light and vibration (Compton-Conley, 2016). Technology used for alerts is crucial for individuals with a variety of sensory losses or difficulties. This may include individuals with difficulty processing auditory input, individuals with dual sensory loss, individuals with a moderate hearing loss, or individuals with a severe to profound hearing loss. Something as loud as a fire alarm may sound soft and be difficult to detect. A standard fire alarm has an output of 3000 Hz, making it difficult for individuals with high frequency hearing losses to detect the alarm. A solution to this problem is installing an alarm that has an output of a lower frequency, such as 520 Hz (Edwards Detection and Alarm, 2015). It is important that individuals with difficulty processing auditory signals have alarms and alerts that offer more than just an auditory input. These individuals benefit from vibrotactile or visual inputs that help alert them. For example, a fire alarm that not only has a loud ring but also flashes light would be beneficial to an individual who has difficulty hearing the ringing of an alarm.



Figure 3: Sonic Bomb Extra Loud Alarm Clock with Bed Shaker

Table 6: Four Categories of HATs

Category of HAT	Definition	Main Purpose	Example
Devices to facilitate face-to-face communication	A speaker stands close to/holds a remote microphone and then the signal is sent to the listener via a hardwired or wireless link.	To facilitate hearing, understanding, and communicating with other people.	<ul style="list-style-type: none"> Williams Sound Pocketalker
Media devices	Brings the desired signal closer to one's ear via remote microphone next to the signal source, or by connecting directly into the signal source. The signal is then sent to the listener via a hardwired or wireless link.	To facilitate hearing and understanding of electronic sound sources such as the television, radio, music, etc.	<ul style="list-style-type: none"> TV Ears Williams Sound Pocketalker
Telecommunication devices	Devices that amplify or transcribe phone calls to provide access of the incoming	Aid in making phone calls accessible and understood by an individual with	<ul style="list-style-type: none"> CaptionCall Williams Sound Pocketalker

	message to the individual with hearing loss and/or communication difficulty.	hearing and/or communication difficulty.	
Alerting devices	Devices that use either microphones or electrical connections to pick up a signal. A hardwired or wireless transmission is utilized to send the signal to the listener in a manner by which the listener can understand, such as flashing light and vibration.	Provide safety by making environmental sounds and signals accessible at home, in the hospital, in hospice or palliative care, or in other environments.	<ul style="list-style-type: none"> • Fire alarms with flashing lights • Doorbells that flash lights • Alarm clocks that vibrate

Cochlear Implants

Individuals who are in palliative or hospice care who are D/deaf may have cochlear implants. Cochlear implants are designed to restore the ability to perceive sounds and understand speech for individuals who are audiologic candidates. Maintenance and care of these devices are necessary for optimization of cochlear implants. Healthcare providers must know how to care for the devices and to how to communicate with persons who have implants.

Similar to hearing aids, assistance should be offered to ensure that the external component, or sound processor, is properly placed and removed, properly turned off and stored in a safe place when not in use, and is operational when on. Daily maintenance such as battery checks and general cleaning of the devices are also a necessity for operational devices. Some processors have one microphone while others have multiple, and the microphones may be

located in different positions depending on the device. Therefore, it is important to become familiar with the specific processor the patient has in order to properly maintain the sound processor (Med-El, 2017). Further, some individuals utilize a hearing aid in one ear and a cochlear implant in the other ear (bimodal). If this is the case, healthcare providers and caretakers should ensure that both devices are on and functional when appropriate in order to optimize communication.

Healthcare providers and caretakers should also regularly check for infection at the site of implantation, however this is a rare occurrence. Olsen, Larsen, et al. (2018) examined the frequency and management of post-operative cochlear implant infections. Researchers found the rate of major infections in their study population was 2% and the rate of minor infections was 8%. Olsen, Larsen, et al. (2018) also found that, while the majority of infections occurred within the first year of implantation, some infections occurred after several years following implantation. This finding indicates that infections can occur more or less at any time after cochlear implantation. This emphasizes the need for healthcare providers and caretakers to know the signs of infection, which can include redness, irritation, swelling, pain, discharge or pus at the site of the implant. Knowing the signs of a suspected infection allows for healthcare providers to proceed with appropriate care, such as antibiotic treatment (Olsen, Larsen, et al., 2018).

Communication Strategies

Healthcare settings are often noisy, including noise from the televisions, intercoms, and background conversations (McCreedy et al., 2018). Whether or not HATs or amplification are available, appropriate communication strategies must always be utilized by medical

professionals and caretakers. A few examples of communication strategies include minimizing background noise from televisions and radios, using slow, loud, and clear speech, taking turns when speaking, ensuring adequate lighting during communication, facing the patient when talking, writing down all instructions or important messages, and implementing the teach-back method (asking the patient to repeat back what you discussed with them). These strategies help ensure that the patient understands what is being discussed. Further, if in a situation where face coverings or facemasks are being worn, clear plastic facemasks are a good option (if feasible) so that speech reading is possible (Victory, 2020; Goldin et al., 2020). Atcherson et al. (2020) noted that transparent facemasks improved speech understanding in noise by making the lips and mouth visually accessible, with the greatest benefit observed in individuals with a severe to profound hearing loss. They conducted a study that examined the reduction in sound pressure level as a result of various facemasks and face shields. They found that a facemask in conjunction with a face shield had the most dramatic negative effect on sound pressure level, noting that the presence of the face shield led to a reduction in sound pressure level by as much as 29 dB. Each of the three transparent masks attenuated the signal more than their non-transparent counterparts (surgical mask, KN95 mask, and N95 mask) (Atcherson et al., 2020). Further, another drawback to clear facemasks is the fogging of the clear plastic window that rescinds the benefit of offering visual cues (Martin, 2020). It is therefore best to utilize clear facemasks for patients who rely on visual cues more heavily than speech clarity to understand communication.

While surgical facemasks can be discarded after use, clear facemasks can be re-used. Clear facemasks should be wiped clean, disinfected on the outside as well as the inside, and then allowed to fully dry (air dry or with clean absorbent towels) before re-use. Gloves should be

worn while cleaning the facemasks and removed promptly after cleaning is completed. Proper hand hygiene should be completed following the disinfection of the facemasks (Centers for Disease Control and Prevention, 2020, July 15; Centers for Disease Control and Prevention, 2020, August 7). As previously mentioned, facemasks and face shields create a degraded speech signal that negatively affects the comprehension of speech. It is therefore important to include appropriate signage in and around the room (including on the door and bed) of the patient with hearing loss or communication difficulty. This will notify others that the patient has a hearing loss and appropriate measures should be taken to meet their communication needs.

The unfortunate event of the COVID-19 pandemic has exposed various difficulties regarding communication. It is now commonplace to wear face coverings and facemasks during face-to-face interaction, no matter how brief. It is unclear if this protocol will be longstanding, however this situation illuminates the benefit communication technologies can provide. Wearing a mask robs the listener of critical visual cues, making understanding speech more difficult (Goldin et al., 2020). Implementation of technology such as PSAPs, HATs, and/or providing written copies of key points discussed will greatly improve understanding of conversations. Again, implementing the teach-back method is highly valuable in such settings.

Management of hearing loss will look different for each patient. Individualized care is particularly important in the population receiving palliative or hospice care. One goal of caring for this population is to ensure that they are comfortable, but every patient will have different wants and needs which includes addressing and managing hearing loss. To have the aforementioned tools available is one step in addressing hearing loss in palliative and hospice care, but it is even more important to decide how to utilize these tools optimally to bring the greatest benefit to these individuals. Everyone involved in palliative and hospice care, including

physicians, nurses, aides, and loved ones need to be educated on assessing and addressing hearing loss. Each of these individuals should consider the wants and needs of each patient and utilize their best judgment to determine the most appropriate way to manage hearing loss and communication breakdowns experienced by a patient in palliative or hospice care.

DISCUSSION

Toolkit for Palliative and Hospice Care Providers

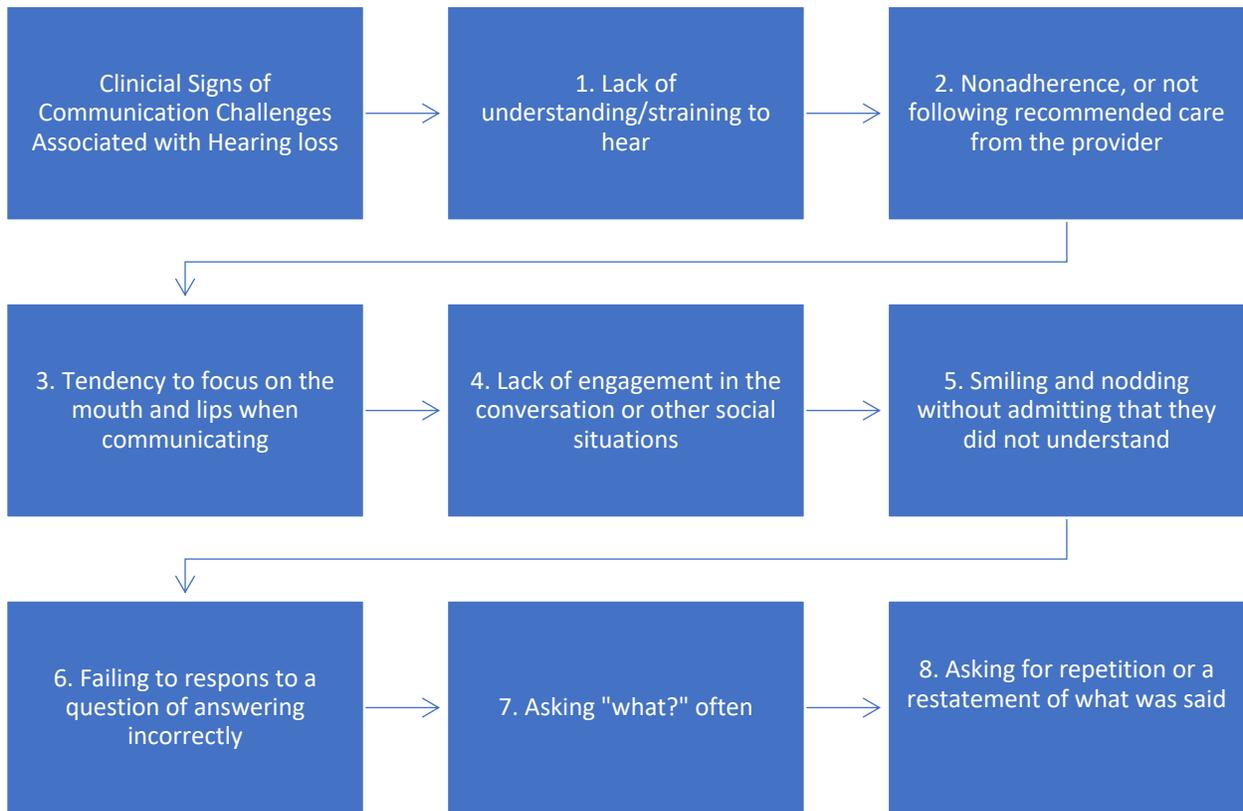
The need to address hearing loss and communication difficulties in palliative and hospice care settings plays an important role in the well-being of persons who have hearing loss, who identify as D/deaf, and who suffer from dual sensory loss. The toolkit that follows is intended for clinical use to describe signs of hearing loss, various technologies to assist individuals with hearing loss, steps to complete a hearing aid check, and communication strategies for individuals with hearing loss.

The obstacles posed by the COVID-19 pandemic on effective communication make these tools particularly useful. Now more than ever individuals are experiencing challenges in hearing and communication due to the mandate of wearing face coverings or facemasks and social distancing in public areas. Some of the tools provided in this toolkit may address some of these barriers faced by many individuals during the COVID-19 pandemic and perhaps in the aftermath.

Clinical Signs of Hearing Loss/Difficulty Communicating

Medical providers and caregivers who interact with individuals in palliative and hospice care should be aware of clinical signs of hearing loss and communication difficulties (Table 7). This is the first step towards optimizing hearing health. If signs of hearing loss are observed, such as continuously asking “what” or asking for repetition, providers may confirm or deny their suspicions with the question “Do you have a hearing loss or difficulty hearing or communicating?” Furthermore, a hearing screening or hearing test may be ordered for the patient if deemed appropriate.

Table 7: Clinical Signs of Communication Challenges Associated with Hearing Loss



Adapted from Smith, Ritchie, Miao, et al. (2016)

Available Communication Technologies

When it comes to choosing technology and devices appropriate for an individual, their wants and needs need to be discussed and met. As previously mentioned, purchasing a new hearing aid may not be the best, nor even possible, option for individuals in palliative or hospice care. Table 8 offers various technology options as well as pros and cons for each. When choosing a device or technology, it is important to practice person-centered care and shared decision making. A recommendation should be made after taking into consideration the patient's preferences as well as their mental and physical health.

Table 8: Non-implantable Communication Technologies

Technology	Description
<p>Hearing Assistive Technologies (HATs)</p> <p>Pro: Usually a cheaper alternative to a conventional hearing aid; particularly useful for individuals who tend to misplace things or have dexterity difficulties</p> <p>Con: Not intended for full-time use</p>	<p>Assist individuals with hearing loss in specific listening environments by improving the signal-to-noise ratio, counteracting the effect of distance, or minimizing the effect of poor acoustics</p> <p>Examples</p> <ul style="list-style-type: none"> ▷ Devices to facilitate face-to-face communication: FM systems (remote microphone), Communication Access Real-time Translation (CART), Williams Sound Pocketalker ▷ Devices to facilitate the reception of electronic media: FM systems, Bluetooth connectivity, TV Ears, Williams Sound Pocketalker ▷ Devices to facilitate telephone reception: CaptionCall ▷ Alerting devices: doorbell lights, vibrating alarm clocks, fire alarm lights

	<ul style="list-style-type: none"> ▷ Apps on mobile devices and phones: Google Live Transcribe, Hearing Aid app ▷ Hearing aid accessories: ReSound Multi Mic, Phonak Roger Pen
<p>Hearing Aids</p> <p>Pro: Can be adjusted and personalized to a specific hearing loss; there are various types and technologies available</p> <p>Con: Usually pricey and various issues with performance and maintenance may occur</p>	<p>A hearing instrument that amplifies sound and is specifically fit to an individual's hearing loss by a hearing professional</p> <p>Types of hearing aids</p> <ul style="list-style-type: none"> ▷ Behind-the-Ear ▷ Receiver-in-the-Ear ▷ In-the-Ear ▷ In-the-Canal ▷ Completely-in-the-Canal/Invisible-in-the-Canal ▷ Extended-wear hearing aids (Lyric)

Basics on Performing a Hearing Aid Check for Experienced Hearing Aid Users

For individuals who have and utilize one or two hearing aids, regular checks need to be done in order to ensure functioning devices. Providers must ask the patient or caregiver if the patient wears hearing aids. This should be kept on record to better navigate communication between the provider and patient. As part of a daily routine, providers or caregivers should check if the hearing aids are working. Simply cupping a hand over the hearing aid and listening for a whistle is a sign of a functioning hearing aid. Tables 9, 10, 11, and 12 outline steps to complete basic maintenance steps on a hearing aid and how to address common problems.

Table 9: Basics on Replacing Hearing Aid Batteries for Experienced Hearing Aid Users

DISPOSABLE BATTERIES

<p>Battery Check</p>	<p>Check if the battery is inserted and is not dead. You can do this multiple ways. First, if the hearing aid is on, cup the hearing aid in your gloved hands and you should hear a high-pitched whistling. Second, if you have a battery tester, place the battery in the tester and push the appropriate button to indicate whether the battery is good, weak, or dead. Lastly, you can drop the battery on the table. If it is dead or weak, it will bounce. If it is new and full, it will not bounce (or bounce very little).</p>
<p>Replacing the Battery</p>	<p>Open the battery door on the hearing aid by pulling on the lip of the battery door. Take the appropriately sized battery that still has a colorful sticker on the top (blue, yellow, brown, or orange). Remove the sticker and place the battery in the battery door. The smooth (+) side of the battery should be facing up to where you are able to see the entire (+) symbol and it should be laying flush against the battery door. Close the battery door completely and securely, you should feel it snap into place. Once the battery is replaced, the hearing aid should automatically turn on. To check, cup the hearing aid in your hand and listen for the whistle.</p>
<p>Battery Door</p>	<p>Battery Door: Be sure the battery door is closed completely when the hearing aid is being used. You should feel the battery door snap shut and be secure when closed correctly and the hearing aid should be on and working.</p>

Table 10: Basics on Recharging Hearing Aids for Experienced Hearing Aid Users

RECHARGEABLE BATTERIES

Battery Check	Check if the battery is not dead by cupping the hearing aid in your gloved hands and listening for a high-pitched whistling. It will usually take a few seconds after being removed from the charging basket for the hearing aid to turn on.
When to Recharge	Ensure the charger is plugged in and in a safe place (usually a bedside table). Remove the hearing aids from the ear and place in the charger according to the hearing aid manufacturer's instructions (different manufactures have different charging baskets). Hearing aids should be removed and charged every night. They can be left to charge overnight without the risk of damaging the battery.
Replacing the Battery	The hearing aid(s) should be brought to a hearing healthcare professional in the case that the rechargeable batteries need to be replaced. This should not occur often, as rechargeable batteries are designed to last for many months at a time. A compatible rechargeable battery is needed for the hearing aid, which are not as readily available over-the-counter as compared to disposable hearing aid batteries. Further, depending on the hearing aid, rechargeable batteries may be encased in the hearing aid without a battery door that can easily be opened.

Table 11: Basics on Performing a Hearing Aid Listening and Visual Check for Experienced Hearing Aid Users

LISTENING AND VISUAL CHECK

<p>Turning Hearing Aids On/Off</p>	<p>Two methods for traditional battery powered:</p> <ol style="list-style-type: none"> 1. Open (off) and close (on) the battery doors. 2. Press and hold down the buttons on the hearing aids (if applicable and enabled). <hr style="border-top: 1px dashed black;"/> <p>Two methods for rechargeable:</p> <ol style="list-style-type: none"> 1. Insert and remove the hearing aids from the charger. Refer to the hearing aid manual for specific charger related information. 2. Press and hold the buttons on the hearing aids (if applicable and enabled).
<p>Visual Inspection</p>	<p>Ensure that the hearing aids are in the correct ear (indicated with coloring red = right ear and blue = left ear) and correctly placed in the ear canal. The hearing aids should be pushed fully and securely (but not forcefully) into the patient's ear canal. If the hearing aid is not securely in place it may whistle or it may not sound loud enough to the patient.</p>
<p>Volume Setting</p>	<p>The volume control should be set at an appropriate volume- not be all the way up nor all the way down. When adjusting the volume, typically pushing the button forward or upwards will make it louder and backward or downwards will make it softer. The volume control may also be set as a push on the right hearing aid button raises the volume and a push on the left hearing aid button lowers the volume. There may be no volume control at all.</p>
<p>Whistling</p>	<p>If the hearing aid whistles:</p> <ol style="list-style-type: none"> 1. Be sure the aid is inserted correctly. 2. Be sure the volume is not turned up too high. 3. Be sure there is no wax in the patient's ear canal or in the hearing aid.

Table 12: Basics on Checking a Hearing Aid for Cerumen for Experienced Hearing Aid Users

CERUMEN CHECK

<p>Wax</p>	<p>Wax can create two problems for hearing aid users. First wax can be lodged into the hearing aid and prevent sound from coming out. Look at the end of the hearing aid that sits in the ear canal. This is where sound comes out of the hearing aid. Check to see if there is wax on or around this piece. If there is a soft, plastic dome-like structure, you can carefully remove it and see if the white (or sometimes red/blue) circle is plugged with wax. If it is and the patient has extra clean “wax traps,” ask the caretaker/audiologist to replace the current wax trap with a new. You can also complete this process by following the steps in the hearing aid manual that is specific for the patient’s hearing aid. Another option is to take a small brush (you can even use an old toothbrush) and brush the tip of the hearing aid that sits in the patient’s ear canal and all around the hearing aid. A third option is to take a small wire tool (given to the patient with their hearing aid) and gently pick the wax out of the tubing/microphone/tip. Use caution to not push the wax further down into the hearing aid. Wax can also create a problem if it is impacted in the ear canal, this will reduce the effectiveness of the hearing aid and likely increase a patient’s hearing problem. Wax removal from the ear is recommended and should be performed by an ENT if hearing aids appear to be blocked by wax accumulation.</p>
<p>Tubing</p>	<p>If the hearing aid is a behind-the-ear type, check to be sure the tubing is not twisted or plugged (usually with wax). Hold it up to the light and look for drops of moisture or wax in the tubing. Be sure the tubing has not become hard or cracked, and that it is still firmly attached to the earmold. This tubing may look very thin.</p>

Daily Use and Care of a Cochlear Implant

To keep the external component (sound processor) in good condition, regular maintenance is important. Caregivers and other medical professionals may find it helpful to set up a routine to ensure the device is worn daily, if appropriate. For example, a morning routine for a patient who wears a cochlear implant may consist of waking up, using the bathroom, bathing, getting dressed, brushing teeth, putting on sound processor, and eating breakfast. A nighttime routine may include eating dinner, brushing teeth, using bathroom, changing into pajamas, removing sound processor, disconnecting the battery and placing it on the charger. To help implement a routine similar to the ones listed above, a checklist can be printed and placed in a part of the room that is easily visible to the patient, caregiver, and other medical professionals. Table 13 provides a maintenance checklist for a cochlear implant. It includes tasks that sound be done daily, monthly, and as needed.

Table 13: Daily and Monthly Tasks Essential to Cochlear Implant Care

	Task
Daily	Wear the sound processor (external component) as much as possible during waking hours (except when bathing).
	Disconnect the battery from the sound processor every night and place the on the charger to recharge overnight.
	Check the microphone, sound processor, and coil for damage, dirt, and/or moisture.

	Regularly clean the external parts of the cochlear implant and accessories (if applicable) using a dry, non-abrasive cloth or a stiff-bristled brush. This will remove dust and perspiration residue.
	Store the sound processor in a protective case when not in use.
	If available, store the sound processor in a desiccation system to remove moisture (i.e. humidity and sweat)
Monthly	Replace the microphone protectors and covers at least once every three months (or have an audiologist replace them).
As needed	If possible, keep back-up external parts (i.e. sound processor) in case of damage or malfunction of device.
	Replace batteries as needed.

Adapted from www.cisupportcenter.com

Communication Strategies for Individuals with Hearing Difficulties

Many individuals who have difficulty hearing and understanding conversation can alter speaker and environmental variables to help improve communication. Table 14 lists a few of these modifications. Many of these modifications require little financial investment and little time to implement. It is not necessary to implement all of the modifications listed. Applying even a few modifications to patient interactions can be incredibly helpful in hearing and understanding conversation.

Table 14: Communication Strategies

Communication Strategies	
<i>Speaker Variables</i>	<i>Environmental Variables</i>
Ask the patient about their preferred communication approach	Limit background noise and distractions (such as from the radio, television, intercom, other conversations, etc.)
Make sure you have the patient’s attention before starting the conversation Face the patient, maintain eye contact, and avoid looking down or at a computer when speaking to the patient	Make sure there is sufficient lighting in the room so the patient can see the speaker's face
Ask the patient if they can hear and understand you and if there is anything you need to do to help them understand you better	Keep a dry-erase board and marker or a notepad by the patient’s bedside
Use the teach-back method (ask the patient to summarize what they heard)	Educate and train palliative and hospice care staff
Use slow, loud, and clear speech but avoid shouting	Close the door to the patient’s room
Write down key words, phrases, and take-home points	Create opportunities for the patient to have a trusted person who does not have difficulty hearing present during the conversation to help with understanding and remembering the information
Utilize technology (hearing aids, personal amplifiers, hearing assistive technologies, etc.)	
Speak to the patient, not the caregiver(s)	
Take turns when speaking	
Look at eyes when facemask is worn to observe expressions	

Navigating Hearing Loss and Hearing Aid Use During COVID-19

During the COVID-19 pandemic, the CDC recommends patients in nursing home and long-term care facilities should wear a cloth face covering or facemask whenever they leave their room. This includes individuals receiving palliative or hospice care. Some exceptions to this guideline is if the patient has difficulty breathing, is unconscious, is incapacitated, or is unable to remove the mask without assistance (Centers for Disease Control and Prevention, 2020). The utilization of facemasks have surfaced some challenges regarding hearing aid use. Many individuals wearing hearing aids have found it difficult to wear the devices and the facemask at the same time. Table 15 outlines a few suggestions for modifications to facemasks with hearing aid use.

Table 15: Tips for Wearing Facemasks During COVID-19

Modifications to Facemasks and Tips to Improve Hearing Aid Use
<ul style="list-style-type: none">• Use a mask extender so the elastic loops of the mask no longer sit behind the ears next to the hearing aids• Wrap the mask loops around a ponytail• Sew buttons onto an old headband to secure the loops around• The loops of the medical mask should never lie on top of the hearing aid as it may interfere with the signal being delivered to the individual's ear• Facemasks should be removed carefully so the hearing aids do not inadvertently fall off• Speakers should try to wear clear face coverings/facemasks if available and if communication partner relies more on visual cues than clarity of speech for communication

CONCLUSION

Palliative and hospice care culture embodies the notion of person-centered care where patient and family needs are paramount. The capacity to hear allows individuals to access essential information, including treatment plans, goals-of-care discussions, prognosis, and social or spiritual support. Research shows that patients consistently want clear communication and decision-making conversations with their healthcare providers and caretakers to improve the quality of their care at the end of their lives (Olson & Mckeich, 2017). Inaccessible and inadequate patient-clinician communication will jeopardize care of persons with sensory disabilities. The COVID-19 pandemic has exacerbated the situation (Cohen et al., 2017).

Having a healthy death involves discussing the patient's last wishes with their loved ones in order for them to have a sense of peace knowing they fulfilled the patient's last wishes. Grief is inevitable in the process of death, but we can work to remove anxiety, guilt, fear, and stress by communicating the last wishes of those who are at the end of their lives and consequently have a part in fulfilling a part of their life's journey. Hearing is thought to be the last sense to go so we owe it to our loved ones to ensure that they can hear the people around them when they reach the end of their lives.

REFERENCES

- Advanced Bionics (2020). [Secure facemask over buttons on headbands] [Photograph].
https://advancedbionics.com/content/dam/advancedbionics/Documents/Global/en_ce/ConsumerGuides/wearing-a-face-mask-with-a-ci.pdf
- Allen, B., Meyers, N., Sullivan, J., & Sullivan, M. (2002). American Sign Language and end-of-life care: Research in the Deaf community. *HEC Forum*, 14(3), 197–208.
- Americans with Disabilities Act. (2007, February 27). *General Effective Communication Requirements Under Title II of the ADA*. United States Department of Justice.
<https://www.ada.gov/pcatoolkit/chap3toolkit.htm>
- Atcherson, S., Finley, E., McDowell, R., and Watson, C. (2020). More speech degradations and considerations in the search for transparent face coverings during the COVID-19 pandemic. *Audiology Today*, 32(6), 20-27.
- Bernacki, R., & Block, S. (2014). Communication about serious illness care goals. *JAMA Internal Medicine*, 174(12), 1994-2003. doi: 10.1001/jamainternmed.2014.5271
- Bisgaard, N., & Ruf, S. (2017). Findings from eurotrak surveys from 2009 to 2015: Hearing loss prevalence, hearing aid adoption, and benefits of hearing aid use. *American Journal of Audiology*, 26(3S), 451–461. doi: 10.1044/2017_aja-16-0135
- Boys Town National Research Hospital (2020). [Using mask extender with hearing aids] [Photograph]. <https://www.boystownhospital.org/knowledge-center/wearing-hearing-aids-with-face-mask>
- Carpenter, J., Mcdarby, M., Smith, D., Johnson, M., Thorpe, J., & Ersek, M. (2017). Associations between timing of palliative care consults and family evaluation of care for

- veterans who die in a hospice/palliative care unit. *Journal of Palliative Medicine*, 20, 745–751. doi: 10.1089/jpm.2016.0477
- Centers for Disease Control and Prevention. (2020, June 25). *Preparing for COVID-19 in nursing homes*. <https://www.cdc.gov/coronavirus/2019-ncov/hcp/long-term-care.html>
- Centers for Disease Control and Prevention. (2020, July 15). Strategies for optimizing the supply of eye protection. <https://www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategy/eye-protection.html>
- Centers for Disease Control and Prevention. (2020, August 7). Considerations for wearing masks. <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/cloth-face-cover-guidance.html#feasibility-adaptations>
- Chia, E., Mitchell, P., Rohtchina, E., Foran, S., Golding, M., & Wang, J. (2006). Association between vision and hearing impairments and their combined effects on quality of life. *Archives of Ophthalmology*, 124(10), 1465. doi: 10.1001/archopht.124.10.1465
- Cohen, J., Blustein, J., Weinstein, B., Dischinger, H., Sherman, S., Grudzen, C., & Chodosh, J. (2017). Studies of physician-patient communication with older patients: How often is hearing loss considered? A systematic literature review. *Journal of the American Geriatrics Society*, 65(8), 1642–1649. doi:10.1111/jgs.14860
- Communication Theory. (2014, July 10). *Shannon and Weaver Model of Communication*. <https://www.communicationtheory.org/shannon-and-weaver-model-of-communication/>
- Compton-Conley, C. (2016, March). Partnering for best practices in hearing care. *Hearing Loss Magazine*, 37(2), 36-37.

- Edwards Detection and Alarm. (2015). Low frequency emergency signaling handbook.
<https://www.edwardsfiresafety.com/Media/520Hz/520%20Hz%20Signaling%20Handbook.pdf>
- Generous, M., & Keeley, M. (2014). Creating the final conversations scale: A measure of end-of-life relational communication with terminally ill individuals. *Journal of Social Work in End-Of-Life & Palliative Care*, 10(3), 257–281. doi: 10.1080/15524256.2014.938892
- Goldin, A., Weinstein, B., Shiman, N. (2020). How do medical masks degrade speech perception? *Hearing Review*. 27(5), 8-9.
- Goman, A., & Lin, F. (2016). Prevalence of hearing loss by severity in the United States. *American Journal of Public Health*, 106(10), 1820-1822.
- Gopinath, B., Schneider, J., McMahon, C., Burlutsky, G., Leeder, S., & Mitchell, P. (2013). Dual sensory impairment in older adults increases the risk of mortality: a population-based study. *PloS ONE*, 8(3), e55054. <https://doi.org/10.1371/journal.pone.0055054>
- Heine, C., Gong, C., & Browning, C. (2019). Dual sensory loss, mental health, and wellbeing of older adults living in China. *Frontiers in Public Health*, 7, 92.
doi:10.3389/fpubh.2019.00092
- Humes, L., (2020). What is "normal hearing" for older adults and can "normal-hearing older adults" benefit from hearing care intervention. *Hearing Review*, 27(7).
- Izumi, S., Nagae, H., Sakurai, C., & Imamura, E. (2012). Defining end-of-life care from perspectives of nursing ethics. *Nursing Ethics*, 19(5), 608-618. doi: 10.1177/0969733011436205

- Kamil, R., Li, L., & Lin, F. (2014). Association between hearing impairment and frailty in older adults. *Journal of the American Geriatrics Society*, 62(6), 1186–1188.
<https://doi.org/10.1111/jgs.12860>
- Kehl, K., & Gartner, C. (2009). Can you hear me now? The experience of a Deaf family member surrounding the death of loved ones. *Palliative Medicine*, 24(1), 88–93. doi:
10.1177/0269216309348180
- Kiely, K., Anstey, K., & Luszcz, M. (2013). Dual sensory loss and depressive symptoms: The importance of hearing, daily functioning, and activity engagement. *Frontiers in Human Neuroscience*, 7. doi: 10.3389/fnhum.2013.00837
- Kim, J., & Kim, C. (2014). A review of assistive listening devices and digital wireless technology for hearing instruments. *Korean Journal of Audiology*, 18(3), 105.
doi:10.7874/kja.2014.18.3.105
- King, A., & Hoppe, R. (2013). "Best practice" for patient-centered communication: a narrative review. *Journal of Graduate Medical Education*, 5(3), 385–393.
<https://doi.org/10.4300/JGME-D-13-00072.1>
- Liljas, A., Carvalho, L., Papachristou, E., Oliveira, C., Wannamethee, S., Ramsay, S., & Walters, K. (2017). Self-reported hearing impairment and incident frailty in English community-dwelling older adults: A 4-year follow-up study. *Journal of the American Geriatrics Society*, 65(5), 958–965. <https://doi.org/10.1111/jgs.14687>
- Lin, F., Niparko, J., & Ferrucci, L. (2011). Hearing loss prevalence in the United States. *Archives of Internal Medicine*, 171(20), 1851–1852.
<https://doi.org/10.1001/archinternmed.2011.506>

- Ludlow, K., Mumford, V., Makeham, M., Braithwaite, J., & Greenfield, D. (2018). The effects of hearing loss on person-centered care in residential aged care: A narrative review. *Geriatric Nursing*, 39(3), 296–302. doi: 10.1016/j.gerinurse.2017.10.013
- Maddalena, V., Oshea, F., & Murphy, M. (2012). Palliative and end-of-life care in Newfoundlands Deaf community. *Journal of Palliative Care*, 28(2), 105–112. doi: 10.1177/082585971202800207
- Mamo, S., Nirmalasari, O., Nieman, C., McNabney, M., Simpson, A., Oh, E., & Lin, F. (2017). Hearing care intervention for persons with dementia: A pilot study. *The American Journal of Geriatric Psychiatry: Official Journal of the American Association for Geriatric Psychiatry*, 25(1), 91–101. <https://doi.org/10.1016/j.jagp.2016.08.019>
- Martin L. (2020). NAL update: Impact of face masks and face shields on communication. *Hearing Review*. 27(10):28-29.
- McCreeley, E., Weinstein, B., Chodosh, J., & Blustein, J. (2018). Hearing loss: Why does it matter for nursing homes? *Journal of the American Medical Directors Association*, 19(4), 323-327. doi:10.1016/j.jamda.2017.12.007
- McGarrigle, R., Munro, K., Dawes, P., Stewart, A., Moore, D., Barry, J., Amitay, S. (2014) Listening effort and fatigue: What exactly are we measuring? A British Society of Audiology Cognition in Hearing Special Interest Group ‘white paper.’ *International Journal of Audiology*, 53(7): 433–440. doi: 10.3109/14992027.2014.890296.
- Med-El. (2017, February 9). *10 Ways to Care for Older Adults and Cochlear Implants*. <https://blog.medel.com/10-ways-care-older-adults-cochlear-implants/>

- Mitchell, R. (2005). How many Deaf people are there in the United States? Estimates from the survey of income and program participation. *Journal of Deaf Studies and Deaf Education*, 11(1), 112-119. doi:10.1093/deafed/enj004
- Napier, J. (2002). The D/deaf-H/hearing debate. *Sign Language Studies*, 2(2), 141-149. doi:10.1353/sls.2002.0006
- National Hospice and Palliative Care Organization. (2020, August 20). *Hospice Facts & Figures*. <https://www.nhpco.org/wp-content/uploads/NHPCO-Facts-Figures-2020-edition.pdf>
- Olsen, L., Larsen, S., Wanscher, J., Faber, C., & Jeppesen, J. (2018). Postoperative infections following cochlear implant surgery. *Acta Oto-Laryngologica*, 138(10), 956-960. doi:10.1080/00016489.2018.1482422
- Olson, A., & Mckeich, M. (2017). Assessment and intervention for patients with hearing loss in hospice. *Journal of Hospice & Palliative Nursing*, 19(1), 97–103. doi: 10.1097/njh.0000000000000314
- Paglialonga, A., Tognola, G., & Pincioli, F. (2015). Apps for hearing science and care. *American Journal of Audiology*, 24(3), 293-298. doi: http://dx.doi.org.ezproxy.gc.cuny.edu/10.1044/2015_AJA-14-0093
- Picou, Ricketts, & Hornsby. (2013). How hearing aids, background noise, and visual cues influence objective listening effort. *Ear & Hearing*, 34(5), e52-e64. <https://doi.org/10.1097/AUD.0b013e31827f0431>
- Reed, N., Betz, J., Kendig, N., Korczak, M., Lin, F. (2017). Personal Sound Amplification Products vs a Conventional Hearing Aid for Speech Understanding in Noise. *JAMA*. 318(1):89–90. doi:10.1001/jama.2017.6905

- Rider, E., Kurtz, S., Slade, D., Longmaid, H., Ho, M., Pun, J., Eggins, S., Branch, W. (2014). The international charter for human values in healthcare: An interprofessional global collaboration to enhance values and communication in healthcare. *Patient Education and Counseling*, 96(3), 273-280. doi:10.1016/j.pec.2014.06.017
- Rosemann, S., & Thiel, C. (2019). The effect of age-related hearing loss and listening effort on resting state connectivity. *Scientific Reports*, 9(1). doi:10.1038/s41598-019-38816-z.
- Schmid, W., Rosland, J. H., von Hofacker, S., Hunskar, I., & Bruvik, F. (2018). Patient's and health care provider's perspectives on music therapy in palliative care - an integrative review. *BMC Palliative Care*, 17(1), 32.
<http://dx.doi.org.ezproxy.gc.cuny.edu/10.1186/s12904-018-0286-4>
- Scott, J. & Hoffmeister, R. (2017). American Sign Language and academic English: Factors influencing the reading of bilingual secondary school Deaf and hard of hearing students. *Journal of Deaf Studies and Deaf Education*, 22(1), 59-71. doi:10.1093/deafed/enw065
- Smith, A., Jain, N., & Wallhagen, M. (2015). Hearing loss in palliative care. *Journal of Palliative Medicine*, 18(6), 559–562. doi: 10.1089/jpm.2014.0367
- Smith, A., Ritchie, C., Miao, Y., Boscardin, W., & Wallhagen, M. (2016). Self-reported hearing in the last 2 years of life in older adults. *Journal of the American Geriatrics Society*, 64(7), 1486–1491. doi: 10.1111/jgs.14145
- Smith, A., Ritchie, C., & Wallhagen, M. (2016). Hearing loss in hospice and palliative care: A national survey of providers. *Journal of Pain and Symptom Management*, 52(2), 254-258. doi: 10.1016/j.jpainsymman.2015.12.052
- Swetz, K., & Kamal, A. (2012). Palliative care. *Annals of Internal Medicine*, ITC2–1-ITC2–16.

- Turton, L., Souza, P., Thibodeau, L., Hickson, L., Gifford, R., Bird, J., . . . Timmer, B. (2020). Guidelines for best practice in the audiological management of adults with severe and profound hearing loss. *Seminars in Hearing, 41*(03), 141-246. doi:10.1055/s-0040-1714744
- U.S. Food and Drug Administration. (2009, February 25). *Regulatory requirements for hearing aid devices and personal sound amplification products*. <https://www.fda.gov/regulatory-information/search-fda-guidance-documents/regulatory-requirements-hearing-aid-devices-and-personal-sound-amplification-products>
- Vaidhyathan, P., Dadlani, N., Meera, S., & Chandra, P. (2020). Communication beyond barriers: Effective communication with individuals with neuropsychiatric disorders when wearing masks. *Asian Journal of Psychiatry, 54*(12), 1-2. doi:10.1016/j.ajp.2020.102286
- Victory, J. (2020, August 19). Tips for wearing a face mask and hearing aids. *Healthy Hearing*. <https://www.healthyhearing.com/report/53084-Face-masks-and-hearing-aids>
- Virdun, C., Luckett, T., Davidson, P., & Phillips, J. (2015). Dying in the hospital setting: A systematic review of quantitative studies identifying the elements of end-of-life care that patients and their families rank as being most important. *Palliative Medicine, 29*(9), 774–796. doi: 10.1177/0269216315583032
- Visser, A., & Erby, L. (2014). Communication in healthcare: Lessons from diversity. *Patient Education and Counseling, 96*(3), 271-272. doi:10.1016/j.pec.2014.08.001
- Wallhagen, M., Ritchie, C., & Smith, A. (2019). Hearing loss: Effect on hospice and palliative care through the eyes of practitioners. *Journal of Pain and Symptom Management, 57*(4), 724–730. doi: 10.1016/j.jpainsymman.2018.12.340

Weinstein, B. (2015). Palliative care: Defining the role of the audiologist. *The Hearing Journal*, 68(1), 23–24. doi: 10.1097/01.hj.0000459740.48510.d0