Nursing Management of Hearing Impairment in Nursing Facility Residents

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Grading Scheme

This guideline was developed from a literature review and synthesis of current evidence on Nursing Management of Hearing Impairment in Nursing Facility Residents. Research findings and other evidence, such as guidelines and standards from professional organizations, case reports and expert opinion were critiqued, analyzed, and used as supporting evidence.

The practice recommendations were assigned an evidence grade based upon the type and strength of evidence from research and other literature.

Scheme for grading the strength and consistency of evidence in the guideline:

- A1 = Evidence from well-designed meta-analysis or well-done systematic review with results that consistently support a specific action (e.g., assessment, intervention, or treatment)
- A2 = Evidence from one or more randomized controlled trials with consistent results
- B1 = Evidence from high quality Evidence-Based practice guideline
- B2 = Evidence from one or more quasi experimental studies with consistent results
- C1 = Evidence from observational studies with consistent results (e.g., correlational, descriptive studies)
- C2 = Inconsistent evidence from observational studies or controlled trials
- D = Evidence from expert opinion, multiple case reports, or national consensus reports

Purpose

The purpose of this evidence-based practice guideline is to provide guidelines for nursing care of nursing facility residents who have hearing impairment. The guideline is intended for front-line nursing staff (registered nurses, licensed practical nurses, and certified nursing assistants) caring for older adults who have a hearing impairment. This guideline will also be useful for directors of nursing, nurse managers, and nursing faculty responsible for gerontological nursing competency evaluations and education on standards of nursing care for hearing impairment in older adults in nursing facilities.

Background

Prevalence of Hearing Impairment in Older Adults

The World Health Organization estimates that there are approximately 432 million adults living with disabling hearing impairment globally (2018). It is one of the top 10 health conditions associated with disability in older populations (60+ years) and is the leading cause of years lost to disability within low- and middle-income countries (World Health Organization [WHO], 2015). The prevalence of hearing impairment increases with age, ranging from 13.29% in individuals aged 50 to 59 years to 81.47% in individuals aged 80 years or older (Goman & Lin, 2016).

Given that hearing impairment is associated with growing older, it is particularly prevalent among individuals living in long-term care facilities. In long-term care facilities across eight European countries, hearing impairment was prevalent among 44% of residents (N = 4007) (Yamada et al., 2014). Similarly, in long-term care facilities in Japan, 42% of residents (N = 1754) self-reported hearing impairment (Mitoku et al., 2016). Of note, both studies used subjective as opposed to objective measures of hearing impairment; and Yamada et al. (2014) measured residual hearing impairment when hearing aids were worn. Thus, prevalence is expected to be larger than that reported in these studies.

Even though the prevalence of hearing impairment is so significant, registered nurses, licensed practical nurses, and nursing assistants in nursing facilities often feel inadequately prepared to care for residents with hearing impairment (Azmak, 2017; Pryce & Gooberman-Hill, 2013; Ruesch, 2018; Slaughter, Hopper, Ickert, & Erin, 2014; Solheim, Shiryaeva, & Kvaerner, 2016) (Höbler et al., 2018).

Who is Most at Risk of Developing Hearing Impairment?

The following are risk factors associated with acquiring hearing impairment:

- Older age (Goman & Lin, 2016; Lin, Thorpe, et al., 2011; [Evidence Grade = C1]).
- Male gender (Agrawal, Platz, & Niparko, 2008; Goman & Lin, 2016; Lin, Thorpe, et al., 2011; Nash et al., 2011; [Evidence Grade = C1]).
- White race (Agrawal, Platz, & Niparko, 2008; Goman & Lin, 2016; Lin, Thorpe, et al., 2011). However, in Lin et al. (2012), skin pigmentation was only associated with hearing impairment in Hispanics [Evidence Grade = C2]).
- Excessive noise exposure (Agrawal, Platz, & Niparko, 2008; Cruickshanks et al., 2015; Nash et al., 2011; [Evidence Grade = C1]).
- Chronic otitis media (Yen, Lin, Weng, & Lin, 2015; [Evidence Grade = C1]).
- Presence of cardiovascular risk factors and/or heart failure (Agrawal, Platz, & Niparko, 2008; Nash et al., 2011; Sterling et al., 2018; [Evidence Grade = C2]).
- Diabetes (Horikawa et al., 2013; [Evidence Grade = A1]).) (Cruickshanks et al., 2015; Kim et al., 2017; [Evidence Grade = C2]).
- Smoking (Agrawal, Platz, & Niparko, 2008; [Evidence Grade = C2]).
- Use of ototoxic medications (e.g., cisplatin) (Shorter et al., 2017; [Evidence Grade = C1]).
- Exposure to chemicals in solvents (Fuente, McPherson, & Hickson, 2013; [Evidence Grade = B2]).
- Exposure to environmental lead and cadmium (Choi & Park, 2017; [Evidence Grade = C1]).

Impact of Hearing Impairment

Hearing impairment impacts individuals' psychosocial health and wellbeing, as well as their physical health and mortality. Accordingly, hearing impairment has been associated with poorer quality of life (Dalton et al., 2003; Hawkins et al., 2012; Tsuruoka et al., 2001; [Evidence Grade = C1]) and health-related quality of life (Carlsson et al., 2015; Chia et al., 2007; Eisele et al., 2015; Gopinath, Schneider, Hickson, et al., 2012; [Evidence Grade = C1]). In a prospective, longitudinal study involving 1,968 primary care patients with a mean age of 82.6 years, mild hearing impairment (but not severe/profound hearing impairment) was found to be an important indicator of poorer health related quality of life among female patients and those with only a primary school education (Eisele et al., 2015; [Evidence Grade = C1]). In a smaller, cross-sectional study conducted in a long-term care facility involving 60 participants (mean age = 79 years), self-reported hearing disability and hearing handicap were significantly associated with the psychological (e.g., agitation, loneliness) and physical health domains of quality of life (Tsuruoka et al., 2001; [Evidence Grade = C1]).

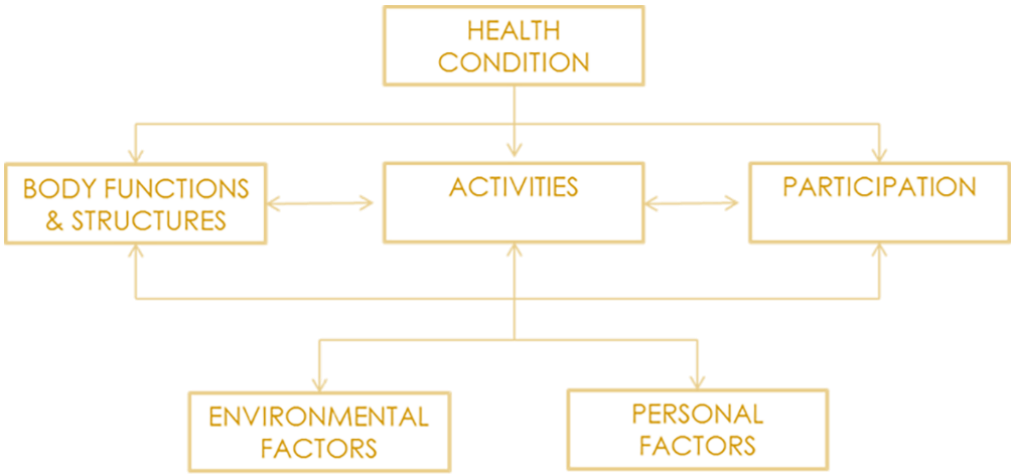
Psychosocial and Psychological Health and Wellbeing

The psychosocial and psychological consequences of hearing impairment are numerous and can include loneliness (Pronk et al., 2011; Sung, Li, Blake, Betz, & Lin, 2016), depression (Brewster et al., 2018; Han, Lee, Jung, & Park, 2018; Jayakody et al., 2018; Lawrence et al., 2019; Simning, Fox, Barnett, Sorensen, & Conwell, 2018), anxiety (Contrera et al., 2017; Jayakody et al., 2018; Kelly, Neimeyer, & Wark, 2011; Lawrence et al., 2019; Simning et al., 2018) (Shoham et al., 2019), psychosis (Linszen, Brouwer, Heringa, & Sommer, 2016), decreased emotional vitality (i.e., high sense of personal mastery and happiness, few depressive symptoms, and low levels of anxiety) (Contrera et al., 2016), and suicidal ideation (Cosh et al., 2018; [Evidence Grade = C1]).

Reasons why hearing impairment can result in poor psychosocial and psychological functioning are related to the associated activity limitations and participation restrictions that occur. The World Health Organization's International Classification of Functioning, Disability, and Health (ICF) defines impairment as negative changes to body structure and function; activity limitations as difficulties in the execution of a task or action; and participation restrictions as problems experienced by an individual in life situations (World Health Organization [WHO], 2001) (see Figure 1). The overarching term for hearing impairments, activity limitations and participation restrictions are hearing disability.

Figure 1. The World Health Organization's International Classification of Functioning, Disability, and Health

(WHO, 2001)



Functioning and Disability

A team of international experts in hearing rehabilitation conducted a series of studies, including a systematic review, qualitative interviews with individuals with hearing impairment, and an international consensus survey, to identify and classify the major impacts of hearing impairment according to the ICF (Danermark, Granberg, Kramer, Selb, & Moller, 2013; Granberg, Dahlström, Möller, Kähäri, & Danermark, 2014; Granberg, Möller, Skagerstrand, Möller, & Danermark, 2014; Granberg, Pronk, et al., 2014; Granberg, Swanepoel, Englund, Möller, & Danermark, 2014). Within the comprehensive ICF Core Set for Hearing Loss that was developed in this international project, 26 categories pertained to impairment (e.g., structure of inner ear) and 42 to activity and participation (e.g., conversing with many people).

In relation to older adults and changes to their hearing, examples of impairment are reductions in the number of outer hair cells in the cochlear and asynchrony of the firing of auditory nerve fibers. Typical examples of activity limitations are difficulties understanding speech in the presence of background noise and problems hearing the television at a normal volume (Bennion & Forshaw, 2013; Dillon, Birtles, & Lovegrove, 1999; Stark & Hickson, 2004). Typical examples of participation restrictions experienced by older adults with hearing impairment are withdrawing from social situations and feelings of isolation (Gopinath, Hickson, et al., 2012; Mick, Kawachi, & Lin, 2014; Pryce & Gooberman-Hill, 2012).

Third Party Disability

Hearing impairment adversely affects communication and communication is a two-way process. It is therefore not surprising that hearing impairment has also been found to cause activity limitations and participation restrictions for the significant others of older adults with hearing impairment (Kamil & Lin, 2015; [Evidence Grade = A1]). The World Health Organization (2001) refers to such impacts as Third-Party Disability where a family member, for example, may not have a hearing impairment themselves but they nevertheless experience conversation breakdowns and withdraw from social situations.

Contextual Factors

Not every individual with a given degree of hearing impairment experiences the same activity limitations and participation restrictions; in fact, correlations across measures of impairment, activity limitations, and participation restrictions are moderate at best (Dalton et al., 2003; Stumer, Hickson, & Worrall, 1996). According to the ICF, contextual factors impact how an individual experiences a health condition (see Figure 1) and thus help to explain the everyday impacts of hearing impairment (Meyer et al., 2016); these contextual factors are classified as personal factors or environmental factors (WHO, 2001).

Personal factors are diverse and can include the individual's demographics, attitudes, and concomitant health conditions. Importantly, multimorbidity is particularly common in individuals over the age of 65 (Wallace et al., 2015) and this can impact the experience and subsequent management of hearing impairment in these individuals. Two conditions in particular can exacerbate hearing disability: concomitant visual impairment (i.e., dual sensory loss) (Chia et al., 2006; Guthrie et al., 2018; Guthrie, Declercq, Finne-Soveri, Fries, & Hirdes, 2016; Turunen-Taheri, Skagerstrand, Hellström, & Carlsson, 2017; [Evidence Grade = C1]), and concomitant cognitive impairment/dementia (Guthrie et al., 2018; Slaughter et al., 2014; [Evidence Grade = C1]). Within long-term care facilities across four countries (Canada, US, Belgium, Finland), the prevalence of dual sensory loss ranged from 9.7% to 33.9% (Guthrie et al., 2016) [Evidence Grade = C1]; and in individuals over the age of 80 in the US, was reported to be 11.3% (Swenor, Ramulu, Willis, Friedman, & Lin, 2013 [Evidence Grade = C1]). In long-term facilities in Canada, the proportion of people reported to have both dual sensory loss and cognitive impairment was 29.2% (Guthrie et al., 2018 [Evidence Grade = C1]).

Within the ICF Core Set for Hearing Loss, 48 categories of environmental factors were identified as being relevant to hearing impairment (Danermark et al., 2013). In relation to nursing facilities, in particular, O'Halloran et al. (2011) identified 7 key factors: the healthcare provider's knowledge of communication-related impairments (e.g., hearing impairment) and communication devices (e.g., hearing aids), their communication skills (e.g., use of face-to-face communication), attitudes (e.g., respect for the patient), and individual characteristics (e.g., foreign accent); as well as the presence of family (e.g., communication support), the physical environment (e.g., acoustic environment), and hospital procedures and policies (e.g., staffing) [Evidence Grade = C1].

Physical Health and Mortality

In addition to the commonly acknowledged psychosocial impacts of hearing impairment, hearing impairment has been associated with changes in physical health and mortality. Over the past decade, strong evidence from epidemiology studies has identified an association between hearing impairment and both cognitive impairment (Fischer et al., 2016; Lin, Ferrucci, et al., 2011; Lin et al., 2013) and incident dementia (Davies, Cadar, Herbert, Orrell, & Steptoe, 2017; Deal et al., 2017; Ford et al., 2018; Fritze et al., 2016; Lin, Metter, et al., 2011; Su et al., 2017; Wei et al., 2017; [Evidence Grade = C1]). A recent systematic review and meta-analysis, based on 36 studies and approximately 20,264 participants, confirmed these observations, albeit noting that the associations were small (Loughrey, Kelly, Kelley, Brennan, & Lawlor, 2018; [Evidence Grade = A1]).

In addition, large scale cross-sectional and prospective observational studies have identified an association between hearing impairment and self-reported physical functioning (e.g., activities of daily living, leisure and social activities, and general physical activities) (Chen et al., 2015; Chen, Genther, Betz, & Lin, 2014; Choi et al., 2016; Liljas et al., 2016), particularly among people with moderate or greater hearing impairment (Gispen, Chen, Genther, & Lin, 2014; Gopinath, Schneider, McMahon, et al., 2012; [Evidence Grade = C1]). There is also a greater risk of frailty (Kamil et al., 2016; Liljas et al., 2017) and increased mortality (Genther et al., 2015) among adults with hearing impairment [Evidence Grade = C1]. For nursing home residents with dual sensory loss, this association with mortality was mediated by involvement in activities; only residents with both hearing and vision impairment who were not involved in activities had a higher chance of mortality, relative to residents who did not have dual sensory loss (Yamada et al., 2016; [Evidence Grade = C1]).

It should be highlighted, however, that it is not currently known if these associations between hearing impairment and cognitive functioning, physical functioning, and mortality are causal.

Definitions of Hearing Impairment (Maltby, 2016; Stach, 2003)

Hearing is the sense that enables sound to be perceived.

Sound is described in terms of frequency or pitch measured in Hertz (Hz) and intensity or loudness measured in decibels (dB)

Hearing loss and hearing impairment are terms that are used interchangeably and refer broadly to the loss of audibility of sound associated with abnormalities in the peripheral and/or central auditory systems. The peripheral auditory system includes the outer ear or pinna, the middle ear and the inner ear or cochlea. The central auditory system includes the auditory nerve pathways from the acoustic nerve, to the cochlear nuclei in the brainstem to the auditory cortex. We will use hearing impairment here as it is the term used by the WHO. To describe hearing impairment, four things are usually defined: 1) the type of hearing impairment, 2) the degree of hearing impairment, 3) the configuration of the hearing impairment, and 4) whether it is in one ear only (unilateral) or affects two ears (bilateral).

Types of hearing impairment. There are three major types:

1. **Conductive hearing impairment** results from a physical disruption in the transmission of sound waves through the external or middle ear. Causes of conductive hearing loss include external blockage, perforated eardrum, genetic or congenital abnormality, otitis media, and otosclerosis.

The most common cause of conductive hearing impairment in the elderly is buildup of cerumen (i.e., wax) in the auditory canal (Walling & Dickson, 2012). As a person ages, the cerumen glands atrophy, therefore cerumen becomes drier and the cilia become coarse and stiff, reducing their function and causing cerumen build-up. The buildup of excessive wax is more prevalent in older adults living in nursing facilities than it is in older adults living in the community and Hopper et al. (2016) reported that 16 of 65 residents (24%) needed to have cerumen removed as part of their audiologic management.

2. Sensorineural hearing impairment is the result of damage to the inner ear, including the cochlea or auditory/eighth cranial nerve. Common causes of sensorineural hearing loss include aging, hereditary or genetic factors, viral or bacterial infections, head trauma, noise exposure and ototoxic medications. The vast majority of hearing impairment in older adults is sensorineural in nature with only 2-3% reported as having a conductive impairment (Chia et al., 2007).

3. Mixed hearing impairment is the term used when a conductive and a sensorineural hearing impairment co-occur.

Degree of hearing impairment. Descriptive categories are used to summarize results showing the softest sounds a person can hear at a range of frequencies. Different organizations and researchers have developed somewhat different categories and two examples are shown in Table 1.

Table 1. Examples of some commonly used categories of degree of hearing impairment

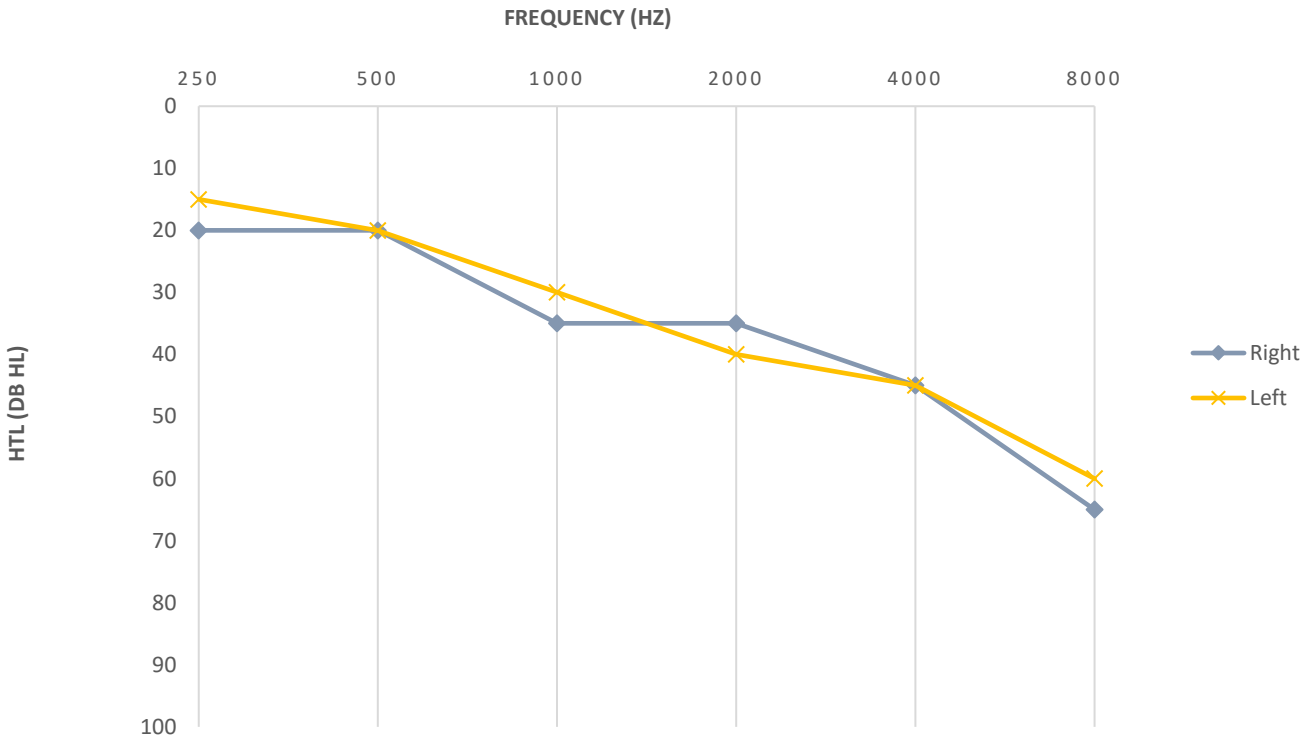
WHO Degree of impairment (WHO, 2012)	Hearing Threshold average at 500, 1000, 2000 and 4000 Hz	American Speech-Language-Hearing Association (ASHA) (based on Clark, 1981)	Hearing Threshold average at 500, 1000 and 2000 Hz
No impairment	25 dB or less	Normal	-10 to 15 dB
Slight/mild	26-40 dB	Slight	16-25 dB
Moderate	41-60 dB	Mild	26-40 dB
Severe	61-80 dB	Moderate	41-55 dB
Profound	81 dB or greater	Moderately severe	56-70 dB
		Severe	71-90 dB
		Profound	91 dB or greater

Configuration of hearing impairment. This refers to the pattern of hearing sensitivity across frequencies and this pattern can be seen in the audiogram which is the most common way in which hearing results are described. An audiogram is the result of pure-tone audiometry in which the clinician records the softest sounds that an individual can hear at a range of frequencies. Increased hearing thresholds for the high frequencies only (i.e., about 2000 Hz) would be called a high frequency hearing impairment. Configurations can be sloping (i.e., getting worse from low to high frequencies), flat (i.e., the same across all frequencies), rising (i.e., getting better from low to high frequencies), or saucer-shaped (i.e., worse in the mid frequencies (i.e., around 1000Hz).

Presbycusis is a word meaning "old hearing" and is sometimes used to describe age-related hearing impairment. It is becoming much less commonly used over time as it is not considered appropriate to attribute all of the hearing changes found in older adults with a single cause. Age-related hearing impairment is multifactorial and caused by a range of intrinsic and extrinsic factors.

Age-related hearing impairment is typically bilateral, sensorineural, sloping mild to moderate in degree (see Figure 2).

Figure 2. Typical audiogram pattern of an older adult



Assessment Criterion

Due to the high prevalence of hearing impairment in nursing facility residents, all residents should be screened and assessed for hearing impairment on admission and on an ongoing basis (American Speech-Language-Hearing Association [ASHA], 1997; Centers for Medicare & Medicaid Services [CMS], 2015; [Evidence Grade = D]).

Assessment of Resident's Hearing

All nursing facility residents should be screened and assessed for hearing impairment on admission and on an ongoing basis (ASHA, 1997; CMS, 2015). A timeframe for this ongoing evaluation of nursing facility residents for hearing impairment should minimally coincide with the federally mandated MDS timelines (admission, significant change in status, or as needed, but minimally on an annual basis) (ASHA, 1997; CMS, 2015).

Several bedside assessment tools are available for registered nurses to screen and assess for hearing disability in nursing facility residents. The most common assessment instruments include:

- Impairment Level
  - Otoscopic Examination (see Appendix A.1)
  - Hand-Held Screening Audiometer (see Appendix A.2)
- Activity and Participation Level
  - Minimum Data Set Assessment (MDS) (see Appendix A.3)
  - Hearing Handicap Inventory for the Elderly-Screening (HHIE-S) (Ventry & Weinstein 1983) (see Appendix A.4)
  - Nursing Home Hearing Handicap Index (NHHI) (Nilforoush, Nasr Esfahani, Ishaghi, & Sepehrnejad, 2012) (see Appendix A.5)
- Contextual Factors
  - Minimum Data Set Assessment (MDS) (see Appendix A.3)
  - Severe Dual Sensory Loss (SDSL) screening tool (Roets-Merken, Zuidema, Vernooij-Dassen, & Kempen, 2014; Svingen & Lyng, 2006) (see Appendix A.6)
  - Inpatient Functional Communication Interview – Staff Questionnaire (IFCI-SQ) (O'Halloran, Worrall, Toffolo, Code, & Hickson, 2004; O'Halloran, Coyle & Lamont, 2017) (see Appendix A.7)

Impairment Level

Otoscopic Examination (Appendix A.1)

Any hearing assessment should begin with otoscopic examination which allows for visualization of the external ear and the tympanic membrane or ear drum. In particular from a nursing perspective, the exam can identify conditions requiring medical treatment such as excessive wax in the ear canal and/or the presence of any discharge from the middle ear in the canal.

Hand-Held Screening Audiometer (Appendix A.2)

Pure-tone audiometry is considered the gold standard of hearing assessments and testing is typically conducted by a health professional with specialist education, such as an audiologist, audiometrist or a hearing aid dispenser. The individual is played a series of "pure tones" under headphones; tones vary in pitch (frequency) and loudness (decibels) and the softest sounds the individual can hear are recorded on an audiogram (see Figure 2).

A hand-held screening audiometer (e.g., Audioscope by Welch Allyn) allows for both otoscopy and a portable screening version of the pure-tone audiometry test and can be conducted by nurses or primary care physicians. Tones are presented at a restricted range of frequencies (i.e., 500, 1000, 2000 and 4000 Hz) at a single loudness level which is usually set at 40 dB. A lack of response at this level indicates the possibility of a moderate hearing impairment and full pure-tone audiometry would then be indicated.

A screening audiometer is easy to use and has demonstrated validity and reliability when used in a quiet environment (Yueh, Shapiro, MacLean, & Shekelle, 2003; [Evidence Grade = C1]).

Activity and Participation Level

Quality Standards for Nursing Facilities

The Nursing Home Quality Initiative (NHQI) provides information for consumers and providers of the quality care necessary in nursing homes and contains details about the need to complete a comprehensive resident assessment known as the Resident Assessment Instrument (RAI). The RAI is completed on admission, when there are significant changes in status, and at least annually thereafter. There is a Minimum Data Set (MDS) which is at the core of the RAI and aims to allow assessors to use standard terms to define the problems and conditions that residents may have.

Section B of the RAI is entitled "Hearing, Speech and Vision" and its stated intent is to "document the resident's ability to hear, understand, and communicate with others and whether the resident experiences visual, hearing or speech limitations and/or difficulties". In relation to hearing, it is pointed out that hearing difficulties in residents can contribute to social isolation and mood disorders and can be mistaken for confusion or cognitive impairment. In item B0200 in the RAI, the assessor is asked to score each resident's ability to hear (with a hearing aid or hearing appliance if normally used) as follows:

1. Adequate – no difficulty in normal conversation, social interaction, listening to TV. The resident hears all normal conversational speech and telephone conversation and announcements in group activities.
2. Minimal difficulty – difficulty in some environments (e.g., when person speaks softly, or setting is noisy). The resident hears speech at conversational levels but has difficulty hearing when not in quiet listening conditions or when not in one-on-one situations. The resident's hearing is adequate after environmental adjustments are made, such as reducing background noise by moving to a quiet room or by lowering the volume on television or radio.
3. Moderate difficulty – speaker has to increase volume and speak distinctly. Although the resident has a hearing impairment, they can hear when the speaker makes adjustments and when the speaker's face is clearly visible.
4. Highly impaired – absence of useful hearing. The resident hears only some sounds and frequently fails to respond even when the speaker makes adjustments.

The RAI also includes useful guidelines for making the assessment of a resident's hearing:

- Make sure the resident is wearing a hearing device if they have one.
- Interview the resident and ask about hearing in a range of situations, for example, when talking to staff and family, using the telephone, listening to TV, attending activities in the home.
- Observe the resident in communication with staff and family.
- Take note of modifications necessary to communicate with the resident. Do you need to speak more clearly? Do you need to speak louder? Do you need to use gestures? Does the resident hear better in a quiet area? Does the resident need to see your face to hear? These are all signs that they have a hearing impairment.
- Review the resident's medical record.
- Consult with the resident's family, direct care staff, activities personnel and speech or hearing specialists.

There is an additional code, B0300, which asks the assessor to respond yes or no to whether or not the resident wears a hearing aid or hearing device.

The MDS has demonstrated reliability and validity identifying functional status of nursing facility residents (Hawes et al., 1995; Morris et al., 1997; [Evidence Grade = C]). The use of a one-question global measure of hearing impairment has been effective in screening older adults with unrecognized hearing loss using the MDS assessment (CMS, 2003; Sindhusake et al., 2001; [Evidence Grade = C]).

Nursing Home Hearing Handicap Index (NHHI) (Appendix A.5)

Another scale for self-assessment of hearing handicap is the Nursing Home Hearing Handicap Index (NHHI). The NHHI has two 10 item versions: one to be completed by residents and one by staff. It was developed specifically for the nursing home population by Schow and Nerbonne (1977). The NHHI was derived from questions found in the literature to discriminate maximally between normal hearing- and hearing-impaired subjects (Schow & Nerbonne, 1977). The NHHI has demonstrated reliability when correlated with pure-tone audiometric testing (Garahan, Waller, Houghton, Tisdale, & Runge, 1992; Jupiter & Spivey, 1997; Schow & Nerbonne, 1980; Culbertson, Griggs, & Hudson, 2004; Nilforoush et al., 2012; [Evidence Grade = C]).

The Hearing Handicap Inventory for the Elderly-Screening (HHIE-S) (Appendix A.4)

The HHIE-S is a 10-item test with scores ranging from 0-40 designed to be administered to adults over the age of 60. A score of 8 to 24 indicates mild hearing loss. Scores above 24 indicate moderate to severe hearing loss (Sindhusake et al., 2001; Ventry & Weinstein, 1983). The HHIE-S has been widely used for hearing screening in cognitively intact older adults and has demonstrated reliability and validity when compared to audiometric measures for hearing impairment in the elderly (Abyad, 2004; ASHA, 1996, 2002; Bentler & Kramer, 2000; Gates, Murphy, Rees, & Fraher, 2003; Hands, 2000; Hopper et al., 2001; HyWug, Chin, & Tong, 2004; Jupiter & Palagonia, 2001; Lichtenstein & Hazuda, 1998; Lichtenstein, Bess, & Logan, 1988a/b; Punch & Weinstein, 1996; Scudder, Culbertson, Waldron, & Stewart, 2003; Sindhusake et al., 2001; Weinstein, 1986; Wiley, Cruickshanks, Nondahl, & Tweed, 2000; Servidoni & Conterno, 2018; [Evidence Grade = C]).

Contextual Factors

Minimum Data Set Assessment (MDS) (Appendix A.3)

Importantly, in addition to identifying hearing impairment, the MDS is used to evaluate a resident's holistic functioning. Therefore, it can be used to identify hearing impairment in the context of other concomitant conditions (e.g., related to speech and vision, cognitive patterns, mood, behavior, functional status, bladder and bowel, active diagnoses), accounting for multimorbidity.

Severe Dual Sensory Loss (SDSL) screening tool (Appendix A.6)

The SDSL is a 12-item tool that can be completed by nurses who are familiar with the resident to identify hearing impairment (6 items), vision impairment (6 items), or dual sensory loss (combined scale) (Roets-Merken et al., 2014). Each scale has strong internal consistency, substantial inter-rater reliability, and satisfactory predictive validity compared to pure tone audiometry (≥40 dB PTA) and a combination of visual acuity and visual field assessments (<0.3 diopter or visual field <30°). Each item is marked as observable or not; one observable behavior could accurately identify an individual with hearing and/or vision impairment with a sensitivity of 0.71 and 0.69, respectively (Roets-Merken et al., 2014).

Inpatient Functional Communication Interview- Staff Questionnaire (IFCI-SQ) (Appendix A.7)

The IFCI (O'Halloran et al., 2004) is a tool that allows the overall assessment of communication function in adults. It has three parts: gathering relevant information from the resident's medical history, interviewing the resident and interviewing relevant members of staff. The full interview would most appropriately be applied by a speech and language therapist however there is a 14-item questionnaire (IFCI-SQ) that could be used by staff.

A summary of the common bedside screening and assessment instruments, abnormal assessment findings, and type(s) of hearing impairment can be found in Appendix A. Copies of the instruments and instructions for their completion are also found in Appendix A.

Management of Resident's Hearing Impairment

Hearing impairment affects millions of older adults and directly impacts their independence, communication skills, and functional abilities. Regardless of the etiology, hearing impairment has a profound effect on a nursing facility resident's communication abilities. In the first instance, residents identified with hearing impairment should be referred to a primary care provider to initiate interventions (cerumen management), or to an ENT physician and/or audiologist for further detailed hearing tests and hearing rehabilitation. Nursing facility staff can contribute to the physical and emotional well-being of residents with hearing impairments by becoming sensitive to their needs. Intervention strategies include effective communication and the management of hearing devices such as hearing aids, assistive listening devices and cochlear implants. Many residents will require assistance with hearing devices.

Impairment Level Support

Cerumen (Wax) Management

Excessive cerumen can be treated, and this relatively simple treatment is essential to avoid additional unnecessary hearing impairment and, for those residents who wear hearing aids, to ensure that the hearing aid is delivering amplified sound as it should. Wax in the ear canal can stop the hearing aid from working.

The National Institute for Health and Care Excellence has developed an evidence-based guideline for "Hearing Loss in Adults: Assessment and Management" (National Institute for Health and Care Excellence, 2018 [Evidence Grade = B1]). The guideline recommends the removal of earwax in a primary care setting and possible treatments are 1) irrigation of the ear canal using an electronic irrigator, 2) microsuction or 3) manual removal with a probe. Practitioners who undertake such work should have training and expertise in using the particular technique that is selected and must be aware of any contraindications to the use of any technique. For example, irrigation is contraindicated for residents with a perforated ear drum.

For ear irrigation, also called aural lavage, it is recommended that the wax is softened prior to treatment. This can be either immediately before ear irrigation or for up to 5 days beforehand. Rojahn (2010) conducted a systematic review of the effectiveness of wax softeners (ceruminolytic agents, saline and water) and concluded that saline or water were just as effective as cerminolytics [Evidence Grade = A2].

If irrigation is not successful on the first attempt, it is recommended to repeat the use of wax softeners or instill water into the ear canal 15 minutes before repeating the ear irrigation. If irrigation is unsuccessful after two attempts, referral to an Ear, Nose and Throat specialist is recommended.

The use of cotton buds to clean the external canal is strongly discouraged because this often pushes the cerumen deeper into the canal, as well as poses a risk for injury to the canal walls and tympanic membrane (Schwartz et al., 2017; [Evidence Grade = B1]).

Care and Maintenance of Hearing Devices

Amplification from hearing aids, assistive listening devices or cochlear implants can improve the audibility of sound for residents with hearing impairment. Hearing aids are the most common amplifier and their use increases with age and with degree of hearing impairment, such that 22% of adults with hearing impairment over the age of 80 years in the US are reported to use hearing aids compared to 7% aged in their 60s (Chien & Lin, 2012; [Evidence Grade = C1]). When older adults use hearing aids, the evidence is that they reduce activity limitations and participation restrictions and improve health-related quality of life (Ferguson et al., 2017; [Evidence Grade = A1]). There is also evidence that hearing aid use may improve cognitive performance in older adults (Dawes et al., 2015; Maharani, Dawes, Nazroo, Tampubolon, & Pendleton, 2018; [Evidence Grade = C2]).

Less commonly, older adults may have assistive listening devices that connect directly to things they want to hear like television or radio. In addition, a growing number of people wear cochlear implants; however, if this is the case it is likely that the resident and their family will have extensive knowledge about how to care and maintain the implant.

All nursing personnel (RN, LPN, CNA) are responsible for the care and management of hearing devices, yet many nursing home staff have not received formal training in this area and report not feeling that they have the knowledge and skills to best assist residents (Azmak, 2017; Solheim, Shiryaeva, & Kvaerner, 2016; [Evidence Grade = C1]). Training nursing personnel on the use, care, and maintenance of hearing aids and assistive listening devices is vital to providing quality nursing care to residents with hearing impairment (Pryce & Gooberman-Hill, 2013; [Evidence Grade = C1]).

Hearing Aids: Use, Care, and Maintenance

A hearing aid is a battery-powered, sound-amplifying device that consists of a microphone to pick up sound and convert it to electric energy, an amplifier to magnify the electric energy, a receiver to convert the electric energy back into sound, and an ear piece of some kind that directs the sound into the ear.

There are several different types of hearing aids (see Figure 3). The most common type is the behind-the-ear (BTE) aid. This type fits snugly behind the ear and the hearing aid case holds elements of the aid that amplify the sound. The sound is then delivered from the aid to the ear via a piece of plastic tubing connected to an ear piece which can be custom made for the individual (usually called an ear mold) or be a stock ear tip (usually called a dome). Another widely used type of hearing aid is the in-the-ear (ITE) aid. This is a one-piece aid and has all the components within the earmold.

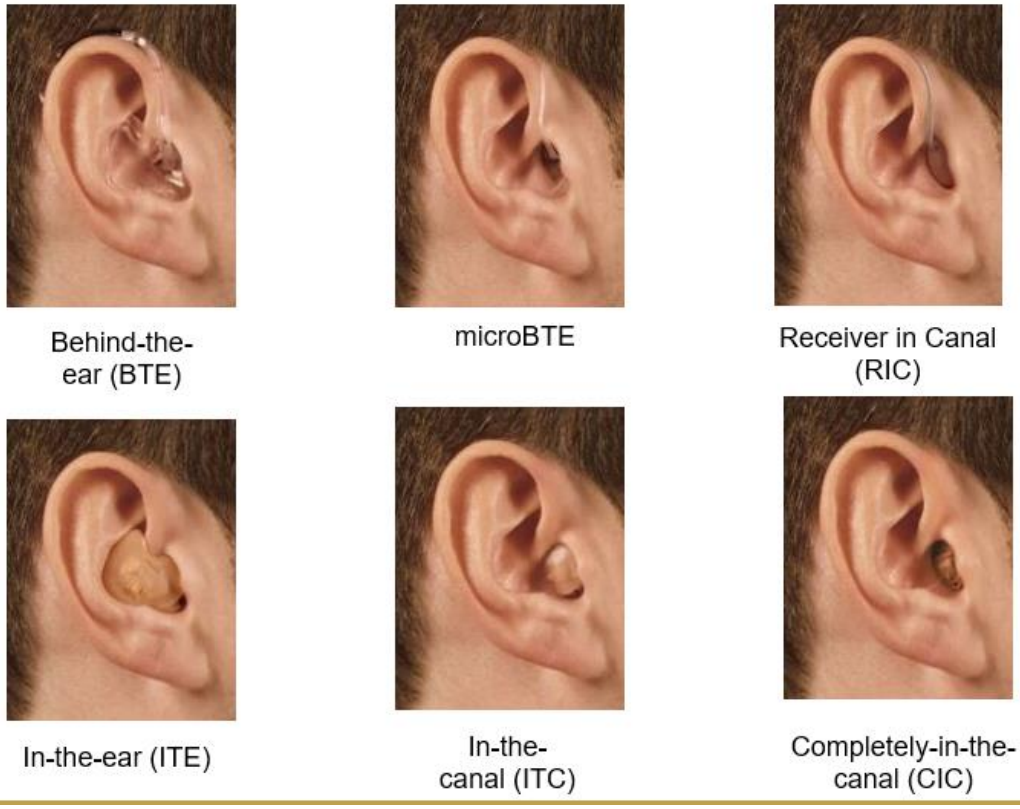
Hearing aids can be put on in the morning and left on all day. They only need to be taken out when going to bed at the end of the day and when going to have a shower or a bath. Aids cannot be worn in water and should not get wet. Some residents will be able to manage their own hearing aids, particularly if they have had them for some time, whereas others will need assistance. To check a resident's ability to manage hearing aids, you can ask the resident to complete the Hearing Aid Skills and Knowledge Inventory (HASKI-self) (Bennett, Meyer, Eikelboom, & Atlas, 2018). The HASKI-self is a comprehensive, 73-item questionnaire that evaluates the knowledge and skills required for hearing aid management across three domains: daily hearing aid use, hearing aid maintenance and repairs, and advanced hearing aid knowledge. The completed questionnaire can be forwarded to the resident's hearing care professional to help inform their management. Family members often know about the hearing aid and can help with management of them.

Typically hearing aids have the following features:

- A volume control which could look like a wheel or a switch
- A program switch for listening in different environments
- A Telecoil so that the hearing aid user can hear the sound directly from the telephone
- Multiple microphones that help the hearing aid user hear in noisy situations
- A red mark on the aid that indicates it is for the right ear and a blue mark on the aid for the left ear
- A battery that powers the hearing aid. Some new hearing aids are rechargeable and are plugged in regularly without the need for batteries to be changed.

Each hearing aid is different and individually fitted to suit the hearing impairment of each resident and their ability to manage the devices. It is important to follow the Hearing Aid User Guide accompanying the hearing aid as this specifies how to turn them on and off, how to change the battery, and how to clean them, along with other instructions that might be specific to the aids. If you cannot find the hearing aid user guide, then contact the clinician who provided the hearing aid and ask for the guide. Unfortunately, research indicates that many user guides are not clear or well designed (Caposecco, Hickson, & Meyer, 2014; [Evidence Grade = C2]). If this is the case, then it is important to ask the clinician for clear information that explains the basic functions of a particular aid. Research evidence indicates that older adults can manage hearing aids significantly better if provided with user guides that are modified to adhere to best practice health literacy principles (Caposecco, Hickson, Meyer, & Khan, 2016; [Evidence Grade = A2]).

Figure 3. Different styles of hearing aids.



Courtesy of Sonova

In addition to the user guides, excellent evidence-based video materials about hearing aid management called C2Hear are available on YouTube (Ferguson, Brandreth, Brassington, Leighton, & Wharrad, 2016; [Evidence Grade = A2]).

Assistive Listening Devices: Use, Care, and Maintenance

Assistive listening devices (ALDs) are any type of device (other than hearing aids and cochlear implants) that assist someone who is hearing impaired to hear better and function better in day to day communication. They can be devices for listening to specific signals such as television, radio or alarms, or for listening to general signals individually or in a group. They can be used in conjunction with a hearing aid or cochlear implant or on their own. ALDs are also referred to as Hearing Assistance Technology (HAT) (Southall, Gagne, & Leroux, 2006).

The following are examples of the more common types of ALDs that have been used in nursing facilities (Aberdeen & Fereiro, 2014; Palmer, Mulla, Dervin, & Coyan, 2017; [Evidence Grade = C2]):

- **Personal amplifiers**: Comprised of a microphone that the speaker talks into, an amplifier to make the sounds louder, and a wire leading to the headphones/earphones worn by the resident. The volume is adjustable. These types of ALDs are simple to use, and appropriate for one on one conversation, TV, and radio listening. However, due to the wire connection, this type of ALD may be too restrictive for large group conversations. They are considerably less expensive than conventional hearing aids and can be purchased over the counter. New smaller versions of such amplifiers are also increasingly becoming available and are referred to as Personal Sound Amplification Products (PSAPS) in the United States. Reed, Betz, Kendig, Korczak, and Lin (2017) compared a sample of PSAPs with conventional hearing aids and found that some of them improved speech understanding to the same extent as the hearing aids [Evidence Grade = C2].
- **Television devices:** These typically consist of a set top box that picks up the signal and transfers amplified sound directly to the listener who is wearing headphones/earphones. The connection might be hard wired with a plug into the television, however wireless infrared transmission has been reported to be more suitable for aged care (Palmer et al., 2017; [Evidence Grade = D]). In the infrared system a microphone picks up the energy from the speaker, converts it, and transmits it to an infrared converter. The converter transmits the signal on an infrared carrier beam. The listener wears a receiver which looks like lightweight earphones. This type of system allows the resident to be involved in group activities or to watch TV in a lounge area. This type of system cannot be used in direct sunlight.
- **Amplified telephones:** Telephones with large buttons and amplification should be available to residents in nursing facilities. These can be used with or without hearing aids.

- **Alerting devices:** There are many other ALDs that could be provided depending on the individual resident's needs. For example, residents who cannot hear a knock on their door may wish to have a visual signal that someone is entering their room.
- **Frequency Modulation (FM) systems**: Such systems are used with hearing aids or cochlear implants and are fitted by an audiologist. The speaker wears a small microphone (usually hung around the neck) and signals are transmitted via radio frequency carrier waves directly to the resident's hearing aids or cochlear implants. The FM system is particularly useful in group situations where the resident wants to listen to a single speaker in the group.
- **Induction Loop Systems:** Some nursing facilities may have an induction loop system to help residents who wear hearing aids or cochlear implants to hear in group situations. The system consists of a microphone, an amplifier, and a wire that surrounds a designated area of space. It may be that a whole room in a facility is looped and the wire that allows this will not be visible (could be laid in the flooring). A microphone is placed near the speaker and the signal is directly picked up by those wearing suitable hearing aids or cochlear implants. It would be important for nursing staff to discuss the use of the loop system with an audiologist. They can be remarkably effective for residents with hearing impairment, but training is necessary.

Strategies for Hearing Aid Use for Residents with Dual Sensory Loss

A high proportion of residents with hearing impairment will also have vision impairment. It is recommended that the resident's audiologist consider a person's vision impairment when discussing device options, battery type, and need for other ALDs (Saunders & Echt, 2007). Kricos (2007) points out that the fundamental consideration in such cases is to increase the visibility of devices and components and, if possible, to make functions automatic rather than requiring the resident to make changes. For example, the volume and settings of hearing aids could be set automatically by the audiologist. It will also be important for hearing aid instruction manuals to be provided in large print, or electronically so that they can be used with screen readers.

Strategies for Hearing Aid Use for Residents with Cognitive Impairment or Dementia

Given that a high proportion of Residents with hearing impairment will also have cognitive impairment / dementia, the following strategies may help Residents remember to use and care

for their hearing aids (Meyer et al., 2019). These strategies have been developed in the context of evidence-based memory support strategies (Smith et al., 2011) and include:

- Use of reminders, including spoken prompts, visual reminders, written reminders, and picture reminders, to help Residents remember to wear their hearing aids.
- Deciding on a place for devices and their accessories and storing these in the same place each day when not in use. Labels can be helpful.
- Establishment of consistent routines for daily hearing aid use.
- Practice and allowance of extra time to carry out tasks.
- Breaking down hearing aid use into simple steps.

If any problems persist or if difficulties with hearing aid management cannot be corrected by the above, please refer to the resident's audiologist. Document pertinent data including any problems the resident has with the hearing aid. In addition, daily care and maintenance may be recorded on a flowsheet. Hearing aid insertion and removal times of each resident may be included on the flowsheet.

Contextual Factors: Environmental-Level Support

If impairment level support is provided, the evidence is that it will improve a person's activity limitations and participation restrictions; however further improvement will be gained if the environment can be optimized for the person with hearing impairment.

As noted earlier, key environmental factors that can impact how a resident experiences illness relate to the health care professional themselves (i.e., knowledge, attitudes), as well as the presence of family, the physical environment, and hospital procedures and policies (O'Halloran et al., 2011).

Communication Strategies for Health Care Professionals

Nursing staff are frequent communication partners of residents with hearing loss and therefore need to adopt good communication practices when interacting with residents. Currently, the evidence suggests that people with self-reported hearing impairment perceive patient-physician communication and their overall health care to be poorer, relative to individuals without hearing impairment (Mick, Foley, & Lin, 2014; [Evidence Grade = C1]).

Prior to communicating with residents who have hearing impairment, it is important to identify the resident's preferred communication method (verbal, written, lip-reading, sign language) and to note this in the resident's care plan. In a sample of 999 participants with hearing loss, those who felt more comfortable using sign language reported a preference for having their

hospital consultations only in sign language, either directly with a health professional or through a hearing interpreter; and 70% of participants who felt more comfortable using spoken language reported a preference for using spoken language with an awareness of lip/speech-reading during hospital consultations (Middleton et al., 2010; [Evidence Grade = C1]). If the resident is likely to benefit from hearing aids and/or ALDs, and does not yet own such devices, nursing staff need to arrange a referral to hearing services. Referral processes will vary depending on the individual resident's health insurance and eligibility or otherwise for government support.

Nursing staff also need to use communication strategies to facilitate good communication with residents who have hearing impairment. Below are a list of common communication strategies that can be used (Jupiter & Spivey, 1997; Middleton et al., 2010; Newton & Shah, 2013) [Evidence Grade = D].

Gain attention	Residents with hearing impairment may not be aware that you are talking to them. • Begin a conversation by using the resident's name. • If the resident is not facing you, consider alerting them by gently touching their hand, arm or shoulder.
Face the resident and spotlight your face	People with hearing impairment often lip read and therefore need to see you to hear you. • Position yourself so that you can look directly at the resident at eye level before speaking. Do not speak directly into the resident's ear. • Do not chew gum or cover your mouth when speaking. • Face a window or a lamp so that the light is on your face, not the resident's, when you speak. • If the room is dark, move to another area with more lighting. • Minimize glare.
Reduce background noise	Speech can be difficult to understand when there is any background noise. • Minimize noise where possible (e.g., turn off the television, turn down the radio, close a window) • Move to a quieter area to communicate.

Speak clearly at a moderate pace - do not shout	Shouting distorts the sound of speech making it more difficult to understand. It also distorts the face of the speaker, making lip-reading difficult, and may frighten and upset the resident. • Speak clearly and slowly, pausing occasionally to help the resident keep up with the word flow. • Articulate carefully and avoid mumbling. • Do not exaggerate expressions as this makes lip reading difficult. • Do not use a high pitch tone. A lower, deeper voice is often easier to understand. • If the resident has better hearing in one ear, try to position yourself so that you speak closest to that ear. • Do not use "elder speak" (e.g., use of diminutives [honey, sweetie], inappropriate plural pronouns ["we" instead of "you"], tag questions that imply an answer, and baby talk) (Williams, Kemper, & Hummert, 2005).
Use simple language and allow time for the resident to respond	Residents with hearing impairment will need extra time to understand what is said especially if the language is complex and/or there is background noise. When it is too difficult to listen, some residents may agree with everything, even when they do not understand what is being said. • Use simple language and emphasize key words. • Use gestures if you need to clarify a statement or question. • Avoid changing the topic of conversation without warning. • Allow time for the resident to listen and respond. • If the resident does not understand a particular phrase or word, try rephrasing instead of repeating. • Use written communication if needed.

Family Presence

Family involvement in a resident's care is considered a common element of patient- and family-centered care (Kogan, Wilber, & Mosqueda, 2015; Scholl, Zill, Harter, & Dirmaier, 2014; [Evidence Grade = A1]). In the context of communication disability, family members can help facilitate effective communication between residents and health care professionals through

the provision of background information about the resident; or by repeating and/or remembering information for the resident (O'Halloran et al., 2011; [Evidence Grade = C1]).

Physical Environment

With respect to the physical environment, the key consideration for nursing facilities is background noise. Nursing facilities are typically very noisy environments and therefore it can be helpful to identify and, where possible, reduce noise levels to promote better communication (Pryce & Gooberman-Hill, 2012). In a review by Joseph and Ulrich (2007) [Evidence Grade = D], key strategies for reducing noise in hospital environments include:

- Installation of sound-absorbing ceiling tiles. Research indicates that these can significantly reduce reverberation times and sound propagation, which subsequently results in better speech understanding (Joseph & Ulrich, 2007)
- Removal or reduction of loud noise sources, where possible. Examples include paging systems, television, radio, running water, and air conditioning units (Joseph & Ulrich, 2007; O'Halloran et al., 2011).
- Staff education about the impact of noise on patients. Encourage staff to have quiet conversations in the hallways/nursing stations.

Nursing Interventions Classification

"The **Nursing Interventions Classification (NIC)** is a comprehensive standardized classification of interventions that nurses perform. The Classification includes the interventions that nurses do on behalf of patients, both independent and collaborative interventions, both direct and indirect care. An intervention is defined as any treatment, based upon clinical judgment and knowledge, that a nurse performs to enhance patient/client outcomes. NIC can be used in all settings (from acute care to intensive care units, to home care, to hospice, to primary care) and all specialties (from critical care nursing to pediatric nursing and gerontological nursing) (Butcher, Bulechek, Dochterman, & Wagner, 2018).

Planning care and services using nursing standardized languages begins with assessment to generate accurate NANDA-I nursing diagnoses (Herdman & Kamitsuru, 2018). For the Nursing Management of Hearing Impairment in Nursing Facility Residents guideline some of the nursing diagnoses that are particularly relevant are Communication Enhancement: Hearing Deficit, Communication Enhancement: Speech Deficit, Ear Care, Referral, and Surveillance: Safety (Herdman & Kamitsuru, 2018). Selected nursing interventions from the Nursing Interventions Classification (NIC) and outcomes from the Nursing Outcomes Classification (NOC) (Moorhead, Swanson, Johnson, & Maas, 2018) are listed to illustrate the process of clinical reasoning when

assessing elders at risk for heart failure or worsening health failure. The interventions and outcomes below are intended to serve as examples, and not as an exhaustive list. A sample NIC intervention **Communication Enhancement: Hearing Deficit--4974** is included in Appendix B.

Major Intervention

4974 **Communication Enhancement: Hearing Deficit** - Assistance in accepting and learning alternate methods for living with diminished hearing

Suggested Interventions

These will address the guideline but are selected less frequently than the priority interventions.

4976 **Communication Enhancement: Speech Deficit** - Assistance in accepting and learning alternate methods for living with impaired speech

1640 **Ear Care** - Prevention or minimization of threats to ear or hearing

8100 **Referral** - Arrangement for services by another care provider or agency

6654 **Surveillance: Safety** - Purposeful and ongoing collection and analysis of information about the patient and the environment for use in promoting and maintaining patient safety

Additional Optional Interventions

These are interventions that apply only to some situations and allow the nurse to further tailor the plan of care.

5270 **Emotional Support** - Provision of reassurance, acceptance, and encouragement during times of stress

6490 **Fall Prevention** - Instituting special precautions with patient at risk for injury from falling

Nursing Outcomes Classification

The **Nursing Outcomes Classification (NOC)** is a standardized classification of patient/client outcomes developed to evaluate the effects of nursing interventions. A nursing-sensitive patient outcome is "an individual, family, or community state, behavior or perception that is measured along a continuum in response to nursing intervention(s). Each outcome has an associated group of indicators that are used to determine patient status in relation to the outcome." (Moorhead, Swanson Johnson, & Maas, 2018 p. viii). A sample NOC outcome most relevant to Nursing Management of Hearing Impairment in Nursing Facility Residents is **Hearing Compensation Behavior--1610** and is included in Appendix C.

Major Outcomes

1610 **Compensation Behavior** - Personal actions to identify, monitor, and compensate for hearing loss

Suggested Outcomes

These are outcomes that are closely related to the guideline.

0903 **Communication: Expressive** - Expression of meaningful verbal and/or non-verbal messages

0904 **Communication: Receptive** - Reception and interpretation of verbal and/or non-verbal messages

1610 **Hearing Compensation Behavior** - Personal actions to identify, monitor and compensate for hearing loss

2401 **Sensory Function: Hearing** - Extent to which sounds are correctly sensed

Additional Optional Outcomes

These are outcomes that are other possible choices for use with this guideline.

0901 **Cognitive Orientation** - Ability to identify person, place, and time accurately

1403 **Distorted Thought Self-Control** - Self-restraint of disruptions in perception, thought processes, and thought content

Guideline Implementation

Implementation of a practice guideline is a challenging step to achieving evidence-based practice. "**The Iowa Model Revised: Evidenced-Based Practice to Promote Excellence in Health Care©**" (Appendix D.1) is a valuable resource to organizations, nurse leaders, and individuals who are interested in implementing an EBP Guideline into practice. To assist readers in implementing this guideline we have included the Iowa Model© and a diagram that highlights a number EBP implementation strategies that can be used to implement this guideline into a practice setting. Details on the Iowa Model can be found in Evidence-based Practice in Action: Comprehensive Strategies, Tools, and Tips from the University of Iowa Hospital and Clinics (Cullen et al., 2018). Specific implementation tools can be found in Chapter 8: Implementation, including how to develop tools on how to develop Sound Bites, Journal Clubs, Posters, Education, Pocket Guides, Case Studies, Incentives, Checklists, Documentation, and Peer Influence. The "**Implementation Strategy for Evidence-based Practice**" in Appendix D.2 of this guideline includes a list of strategies the are explained in detail in the Evidence-based Practice in Action: Comprehensive Strategies, Tools, and Tips from the University of Iowa Hospital and Clinics (2018) textbook.

Evaluation of Process and Outcomes

Process Indicators

Process Indicators are those interpersonal and environmental factors that can facilitate the use of a guideline. One process factor that can be assessed with a sample of nurses (RNs, LPNs, and CNAs) is knowledge about hearing impairment in nursing facility older adults. **The Hearing Impairment Knowledge Assessment Test** (See Appendix E) should be administered before and following the education of staff regarding use of this guideline.

The same sample of nursing staff to which the Knowledge Assessment Test was given should also be given the **Process Evaluation Monitor** (See Appendix F) approximately one month following use of the guideline. The purpose of this monitor is to determine understanding of the guideline and to assess the support for carrying out the guideline.

Outcome Process Indicators

Outcome indicators are outcomes expected to change or improve with consistent use of the guideline. The major outcome indicators that should be monitored over time are (Jennings & Head, 1997; Shapiro & Shekelle, 2004; [Evidence Grade = D]):

1. Residents are screened/assessed on admission, quarterly, and with significant change for hearing impairment.
2. Residents with hearing impairment are treated and referred to an ENT physician and/or audiologist.
3. Residents with hearing impairment receive appropriate nursing interventions.

The **Hearing Impairment Outcomes Monitor** described in Appendix G is to be used to monitor and evaluate the usefulness of the Hearing Impairment guideline in improving outcomes of older adults with hearing impairment who reside in nursing facilities.

Appendix A

Hearing Impairment Assessment Tools

Appendix A contains examples of assessment tools, instruments, and forms to use in patient assessment of Hearing Impairment in Nursing Facility Residents. The purpose of the tool(s) and instruction(s) for use accompany each tool or form. Tools, instruments, and forms in Appendix A are summarized in Table 2 below.

Table 2. Bedside Hearing Impairment Assessment/Screening Instruments

Appendix	Assessment or Screening Tool	Abnormal Findings of Assessment or Screen	Type of Hearing Impairment
Appendix A.1	Otoscope	Obstruction or damage to external or middle ear	Conductive
Appendix A.2	Hand-Held Screening Audiometer (e.g., Audioscope by Welch Allyn) Tones presented at 25 or 40 dB at 500 Hz, 1000 Hz, 2000 Hz, and 4000 Hz in each ear	Hearing impairment is indicated if the resident does not respond at 40dB at any frequency in either ear.	Conductive, Sensorineural, or Mixed
Appendix A.3	Minimum Data Set (MDS) 0 = normal	Abnormal = answers 1, 2, or 3	Conductive, Sensorineural, or Mixed
Appendix A.4	Hearing Handicap Inventory Elderly-Screening (HHIE-S)	0-8 = no hearing handicap 9-24 = mild to moderate hearing handicap 25-40 = Severe hearing handicap	Conductive, Sensorineural, or Mixed
Appendix A.5	Nursing Home Hearing Handicap Index (NHHI)	0-20 = no hearing handicap 21-40 = slight hearing handicap 41-70 = mild to hearing moderate handicap >71 = severe hearing handicap	Conductive, Sensorineural, or Mixed
Appendix A.6	Severe Dual Sensory Loss (SDSL) Screening Tool	Individuals who score ≥ 1 on both subscales may have clinically significant dual sensory impairment.	Conductive, Sensorineural, or Mixed
Appendix A.7	Inpatient Functional Communication Interview – Staff Questionnaire (IFCI-SQ)	"Always" = no communication difficulty "Sometimes" or "Never" = communication difficulty	Conductive, Sensorineural, or Mixed

Appendix A.1

Otoscopic Examinations

Purpose: The otoscopic examination allows for visualization of the auditory canal and external and middle ear. The otoscopic examination should be used to screen all residents in the nursing facility on admission, with a significant change in status, and minimally on an annual basis.

Instructions: (Dillon, 2003; Jarvis, 2004; [Evidence Grade = D]):

1. Tilt the resident's head slightly away from you toward their opposite shoulder.
2. Turn the otoscope light on.
3. Pull the pinna up and back to straighten the ear canal.
4. Hold the pinna gently but firmly.
5. Hold the otoscope upside down along your fingers and have the back of your hand along the person's cheek braced to steady the otoscope.
6. Slowly and gently insert the scope along the axis of the external auditory canal (about a ½ inch).
7. Be careful to enter only the outer third of the ear canal.
8. With the scope inserted, put your eye up to the viewing lens.
9. If you cannot visualize the tympanic membrane, do not move the otoscope. Instead, apply more traction, pull on the ear, or carefully adjust the angle to the otoscope more toward the resident's nose.
10. Visualize the canal and tympanic membrane. The canal should be clear without redness or drainage. The tympanic membrane normally is shiny, pearl gray, intact, and mobile.
11. Do not release the traction on the ear until the speculum of the otoscope has been removed from the ear.
12. Remove the speculum in the same angle as it was inserted, and then release the traction to the pinna.

Appendix A.2

HAND-HELD SCREENING AUDIOMETER

Purpose: A hand-held screening audiometer (e.g., Audioscope by Welch Allyn) is a portable version of the audiometer that is used to assess pure-tone hearing and delivers a 25 or 40 dB tone at 500 Hz, 1000 Hz, 2000 Hz, and 4000 Hz. These are the most common tested frequencies needed to hear speech (ASHA, 1996, 2002; Bienvenue, Michael, Chaffinch, & Zeigler, 1985; Wallhagen, Pettengill, & Whiteside, 2006; Yueh et al., 2003). A screening audiometer is easy to use and has demonstrated validity and reliability when used in a quiet environment (Yueh, Shapiro, MacLean, & Shekelle, 2003; [Evidence Grade = C1]). A lack of response at 40 dB indicates the possibility of a moderate hearing impairment and full pure-tone audiometry would then be indicated.

Instructions: In a quiet environment, the patient sits with an elbow propped on the armrest of a chair with the hand in the form of a gentle fist. Instruct the patient that they will hear faint tones of different pitches and that they should raise their finger when they hear a tone and lower their finger when they no longer hear the tone.

If the patient is unable to respond with finger or arm movements due to a physical disability, instruct the patient to answer yes when they hear the test tone. (Have the patient repeat the instructions back to you to ensure they understand the instructions). Visualize the ear canal and tympanic membrane prior to the procedure with an appropriately fitting speculum.

The speculum should be inserted into the ear canal to get a tight seal between the speculum and the ear canal. Present pure tones of random loudness (in decibels) to prevent the patient from anticipating the loudness of the next presented tone (each tone has an on time of 1.5 seconds and an off time of 1.5 seconds). Document the results and repeat the procedure in the contralateral ear (Bagai, Thavendiranathan, & Detsky 2006, p.421).

Appendix A.3

Minimum Data Set (MDS) – Section B: Hearing, Speech, and Vision

Purpose: To provide a comprehensive functional assessment for residents in nursing facilities.

Instructions: For each patient receiving the Nursing Management of Hearing Impairment in Nursing Facility Residents evidence-based guideline, please complete the MDS as per nursing facility regulatory guidelines (admission, significant change in status, and annually). Focus attention on section B which is included on the following page. Identify residents that trigger the Communication Resident Assessment Guideline and implement the hearing impairment guideline intervention strategies appropriate for the resident.

Source: Centers for Medicare & Medicaid Services (CMS). (2019). Long-Term Care Facility Resident Assessment Instrument 3.0 User's Manual: Version 1.17.1. Retrieved from https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/NursingHomeQualityInits/MDS30RAIManual. **Legal Notice Regarding MDS 3.0** - Copyright 2011 United States of America and interRAI. This work may be freely used and distributed solely within the United States.

MINIMUM DATA SET (MDS):
SECTION B: HEARING, SPEECH, AND VISION

B0100. Comatose

Enter Code

_____

Persistent vegetative state/no discernible consciousness

1. **No,** Continue to B0200, Hearing
2. **Yes,** Skip to G0110, Activities of Daily Living (ADL) Assistance

B0200. Hearing

Enter Code

_____

Ability to hear (with hearing aid or hearing appliances if normally used)

1. **Adequate** – no difficulty in normal conversation, social interaction, listening to TV
2. **Minimal difficulty** – difficulty in some environments (e.g., when person speaks softly or setting is noisy)
3. **Moderate difficulty** – speaker has to increase volume and speak distinctly
4. **Highly impaired** – absence of useful hearing

B0300. Hearing Aid

Enter Code

_____

Hearing aid or other hearing appliance used in completing B0200, Hearing

1. **No**
2. **Yes**

B0600. Speech Clarity

Enter Code

_____

Select best description of speech pattern

1. **Clear speech** – distinct intelligible words
2. **Unclear speech** – slurred or mumbled words
3. **No speech** – absence of spoken words

B0700. Makes Self Understood

Enter Code

_____

Ability to express ideas and wants, consider both verbal and non-verbal expression

1. **Understood**
2. **Usually understood** – difficulty communicating some words or finishing thoughts **but** is able if prompted or given time
3. **Sometimes understood** – ability is limited to making concrete requests
4. **Rarely/never understood**

Source: Centers for Medicare & Medicaid Services (CMS). (2019). Long-Term Care Facility Resident Assessment Instrument 3.0 User's Manual: Version 1.17.1. Retrieved from https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/NursingHomeQualityInits/MDS30RAIManual. **Legal Notice Regarding MDS 3.0** - Copyright 2011 United States of America and interRAI. This work may be freely used and distributed solely within the United States.

Continued on next page

MINIMUM DATA SET (MDS):
SECTION B: HEARING, SPEECH, AND VISION (CONT'D)

B0800. Ability to Understand Others

Enter Code _____

Understanding verbal content, however able (with hearing aid or device if used)

1. **Understands** - clear comprehension
2. **Usually understands** - misses some part/intent of message **but** comprehends most conversation

B1000. Vision

Enter Code _____

Ability to see in adequate light (with glasses or other visual appliances)

1. **Adequate** - sees fine detail, such as regular print in newspapers/books
2. **Impaired** - sees large print, but not regular print in newspapers/books
3. **Moderately impaired** - limited vision; not able to see newspaper headlines but can identify

B1200. Corrective Lenses

Enter Code _____

Corrective lenses (contacts, glasses, or magnifying glass) used in completing B1000, Vision

1. **No**

Source: Centers for Medicare & Medicaid Services (CMS). (2019). Long-Term Care Facility Resident Assessment Instrument 3.0 User's Manual: Version 1.17.1. Retrieved from https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/NursingHomeQualityInits/MDS30RAIManual. **Legal Notice Regarding MDS 3.0** - Copyright 2011 United States of America and interRAI. This work may be freely used and distributed solely within the United States.

Appendix A.4

HEARING HANDICAP INVENTORY ELDERLY-SCREEN – SHORT FORM (HHIE-S)

Purpose: The HHIE-S is recommended to be used to screen all cognitively intact residents in nursing facilities for hearing impairment on admission, quarterly, and with a significant change in health status.

Instructions: This inventory is recommended to be used to screen for hearing impairment by the nurse who is primarily responsible for the specified resident's care.

Interpreting the Raw Score:

0 to 8	=	13% probability of hearing impairment (no handicap/no referral)
10 to 24	=	50% probability of hearing impairment (mild to moderate handicap/refer)
26 to 40	=	84% probability of hearing impairment (severe handicap/refer)

Hearing Handicap Inventory Elderly-Screen Short Form (HHIE-S)

Item		Yes (4 pts)	Sometimes (2 pts)	No (0 pts)
1.	Does a hearing problem cause you to feel embarrassed when you meet new people? (E-1)			
2.	Does a hearing problem cause you to feel frustrated when talking to members of your family? (E-2)			
3.	Do you have difficulty hearing when someone speaks in whisper? (S-3)			
4.	Do you feel handicapped by a hearing problem? (E-4)			
5.	Does a hearing problem cause you difficulty when visiting friends, relatives, or neighbors? (S-5)			
6.	Does a hearing problem cause you to attend religious services less often than you would like? (S-6)			
7.	Does a hearing problem cause you to have arguments with family members? (E-7)			
8.	Does a hearing problem cause you difficulty when listening to TV or radio? (S-8)			
9.	Do you feel that any difficulty with your hearing limits or hampers your personal or social life? (E-9)			
10.	Does a hearing problem cause you difficulty when in a restaurant with relatives or friends? (S-10)			

"E" denotes emotional items
"S" denotes social/situational items

Raw Score: _____

(sum of the points assigned to each item)

Ventry, I. M., & Weinstein, B. (1983). Identification of elderly people with hearing problems, ASHA, 37-42. Reprinted with permission

Appendix A.5

Hearing Handicap Inventory Elderly-Screen (Self-Version for Resident)

Purpose: The NHHI is recommended to be used to screen all cognitively intact residents in nursing facilities for hearing impairment on admission, quarterly, and with a significant change in health status.

Instructions: This inventory is recommended to be used to screen for hearing impairment by the nurse who is primarily responsible for the specified resident's care.

Interpreting the Raw Score:

0 to 20	=	no hearing handicap
21 to 40	=	slight hearing handicap
41 to 70	=	mild to moderate hearing handicap
> 71	=	severe hearing handicap

Hearing Handicap Inventory Elderly-Screen (NHHI)
(Self-Version for Resident)

Item	Very Often				Almost Never
1. When you are with other people do you wish you could hear better?	5	4	3	2	1
2. Do other people feel you have a hearing problem (*when they try to talk to you)?	5	4	3	2	1
3. Do you have trouble hearing another person if there is a radio or TV playing (*in the same room)?	5	4	3	2	1
4. Do you have trouble hearing the radio or TV?	5	4	3	2	1
5. (*How often) do you feel life would be better if you could hear better?	5	4	3	2	1
6. How often do you feel embarrassed because you don't hear well?	5	4	3	2	1
7. When you are alone do you wish you hear better?	5	4	3	2	1
8. Do people (*tend to) leave you out of conversations because you don't hear well?	5	4	3	2	1
9. (*How often) do you withdraw from social activities (*in which you ought to participate) because you don't hear well?	5	4	3	2	1
10. Do you say "what" or "pardon me" when people speak to you?	5	4	3	2	1

*words in parenthesis are optional when items are read to resident.

Raw Score: _____

(multiply the sum of the points assigned to each item by 2)

Schow, R., & Nerbonne, M. (1977). NHHI: Self-version for the resident. Journal of Rehabilitative Audiology, 10(2), 201-249. Reprinted with permission.

Appendix A.6

Severe Dual Sensory Loss (SDSL) Screening Tool

Instruction: The screen should be administered by a professional nurse familiar with the older person. Put a mark (✓) on all the statements in the screen, which coincide with observed problems.

Statement	✓	
Hearing Subscale:	Yes	No
1. He/she does not hear you when you knock on the door or ring the doorbell.		
2. You have to speak very loudly, clearly and/or slowly for him/her to be able to understand what you are saying (although it is quiet around you).		
3. He/she has problems understanding what you are saying when there is noise in the room (e.g. sound from a radio, vacuum cleaner, traffic, etc.).		
4. He/she has problems following a conversation when there are several people present.		
5. He/she has problems understanding what is being said on television, on the radio or other amplified source (e.g. sits very close to the source of the sound or/and turns the volume very high).		
6. He/she has complained about reduced hearing.		

Subscale Score: _____

Visual Subscale:	Yes	No
1. You are not recognized when you visit unexpectedly		
2. He/she has problems reading the newspaper and watching television (e.g. sits very close to the screen).		
3. He/she needs help to find objects that have been mislaid.		
4. He/she has problems knowing what the time is because he/she cannot see the clock face or watch.		
5. He/she needs a companion or is afraid when moving about out of doors and/or indoors in unfamiliar places (except when this is due to difficulties in walking or other physical impairment).		
6. He/she complains about worsening vision.		

Scores per item are 0 (no) or 1 (yes). For each subscale, the sum-score ranges from 0 to 6.

Subscale Score: _____

Svingen, E. M., & Lyng, K. (2006). SDSL-SCREEN Screening for Severe Dual Sensory Loss in Old Age. Norwegian Institute for Research on Adolescence, Welfare and Ageing, Oslo Norway.

Appendix A.7

Inpatient Functional Communication Interview - Staff Questionnaire

Introduction: The Inpatient Functional Communication Interview-Staff Questionnaire (IFCI-SQ) assesses the frequency of successful communication between the patient and healthcare provider. The IFCI-SQ should be completed by a nurse who has cared for the patient for one shift.

Interpretation of Score:

- No communication difficulty - A patient who is rated as "**Always**" able to communicate in all communication situations that are scored does not have difficulty communicating their healthcare needs in hospital.

- Communication difficulty - A patient who is rated as "**Sometimes**" or "**Never**" able to communicate in one or more of the communication situations scored does have difficulty communicating their healthcare needs in hospital.

O'Halloran, R., Worrall, L., Toffolo, D., Code, C., & Hickson, L. (2004). Inpatient Functional Communication Interview. Bicester: Speechmark. © The IFCI-SQ is reproduced with the permission of the copyright holders R. O'Halloran, L. Worrall, D. Toffolo, C. Code, and L. Hickson.

Inpatient Functional Communication Interview - Staff Questionnaire

Instructions: Circle the number that best matches your ability to communicate with the patient in each of the following situations.

Items	Always	Sometimes	Never	Don't Know
	No communication difficulty	Communication difficulty		
1. I can get their attention.	2	1	0	--
2. They can describe what happened to bring them into hospital.	2	1	0	--
3. They understood their medical condition e.g. "Your blood pressure is a bit low buddy".	2	1	0	--
4. They understand the implications of their current medical condition. E.g. "because you are unsteady on your feet, you need to call me if you want to go to the toilet, OK?"	2	1	0	--
5. You can follow instructions. E.g. "lean forward", "don't touch it" and longer ones such as "the minute that gets too warm give me a buzz or push it out on the floor".	2	1	0	--
6. They can express their feelings.	2	1	0	--
7. They can tell about their medical history e.g. "have you got diabetes?"	2	1	0	--
8. They understand and remember information about what is happening, going to happen, in relation to their healthcare.	2	1	0	--
9. They can ask you questions about their care.	2	1	0	--
10. They can tell me about any medical concerns they have e.g. if they feel constipated, dizzy, hot or nauseous.	2	1	0	--
11. They can tell me if they have any pain or discomfort.	2	1	0	--
12. They can ask for something, e.g. asking for an extra blanket, asking for help to move.	2	1	0	--
13. They can tell me what they do or do not like e.g. "do you want a shower now or after breakfast?"	2	1	0	--
14. They can call a nurse if they need to.	2	1	0	--

Appendix B

NURSING INTERVENTIONS CLASSIFICATION (NIC)

Communication Enhancement: Hearing Deficit – 4974

Definition: Use of strategies augmenting communication capabilities for a person with diminished hearing.

Activities:

- Perform or arrange for routine hearing assessments and screenings
- Monitor for excessive accumulation of cerumen
- Instruct patient not to use foreign objects smaller than patient's fingertip (e.g., cotton-tipped applicators, bobby pins, toothpicks, and other sharp objects) for cerumen removal
- Remove excessive cerumen with twisted end of washcloth while pulling down the auricle
- Consider ear irrigation for the removal of excessive cerumen if watchful waiting, manual removal, and ceruminolytic agents are ineffective
- Note and document patient's preferred method of communication (e.g., verbal, written, lip reading, or American Sign Language) in plan of care
- Gain patient's attention before speaking (e.g., obtain attention through touch)
- Avoid noisy backgrounds when communicating
- Avoid communicating more than 2 to 3 feet from patient
- Use gestures, when necessary
- Listen attentively, allowing patient adequate time to process communication and respond
- Refrain from shouting at patient
- Facilitate lip reading by facing patient directly in good lighting
- Ask patient to suggest strategies for improved communication (e.g., speaking toward better ear and moving to well-lit area)
- Face the patient directly, establishing eye contact, and avoid turning away midsentence
- Simplify language (i.e., do not use slang and use short, simple sentences), as appropriate
- Use a lower, deeper voice when speaking

- Avoid "baby talk" and exaggerated expressions
- Avoid smoking, chewing food or gum, and covering mouth when speaking
- Verify what was said or written using patient's response before continuing
- Facilitate use of hearing aids and assistive listening devices (e.g., phone amplifier, hardwire device, personal frequency modulation, and computers)
- Remove and insert hearing aid properly
- Remove hearing aid battery when hearing aid is not in use for several days
- Clean detachable earmold using a mild soapy solution, removing moisture or debris with soft cloth, and avoiding isopropyl alcohol, solvents, and oil
- Clean nondetachable earmold using a damp cloth, removing moisture or debris with soft cloth, and avoiding isopropyl alcohol, solvents, and oil
- Check hearing aid batteries routinely, replacing, when necessary
- Refer to manufacturer's guidelines on proper use of, care for, and maintenance of hearing aids and assistive listening devices
- Instruct patient, nursing personnel, and family on use of, care for, and maintenance of hearing aids and assistive listening devices
- Assist patient or family in acquiring hearing aid and assistive listening device
- Refer to primary care provider or specialist for evaluation, treatment, and hearing rehabilitation

1st edition 1992; revised 2000, 2013

Background Reading:

Adams-Wendling, L., & Pimple, C. (2008). Nursing management of hearing impairment in nursing facility residents [S. Adams & M. G. Titler, Eds.]. Journal of Gerontological Nursing, 34(11), 9–17.

Lindblade, D., & McDonald, M. (1995). Removing communication barriers for the hearing-impaired elderly. MedSurg Nursing, 4(5), 377–385.

Maas, M., Buckwalter, K., Hardy, M., Tripp-Reimer, T., Titler, M., & Specht, J. (Eds.). (2001). Nursing care of older adults: Diagnoses, outcomes, & interventions (p. 485). St. Louis, MO: Mosby.

Smeltzer, S. C., & Bare, B. G. (2004). Brunner & Suddarth's textbook of medical surgical nursing (Vol. 2) (10th ed.). Philadelphia, PA: Lippincott Williams & Wilkins.

Source: Bulechek, Butcher, Dochterman, & Wagner, 2013

Appendix C

NURSING OUTCOMES CLASSIFICATION (NOC)

Hearing Compensation Behavior – 1610

Definition: Personal actions to identify, monitor, and compensate for hearing loss

Outcome Target Rating: Maintain at _____ Increase to _____

Outcome Overall Rating		Severe 1	Substantial 2	Moderate 3	Mild 4	None 5	NA
Indicators:							
161001	Monitors symptoms of hearing deterioration	1	2	3	4	5	NA
161002	Positions self to advantage hearing	1	2	3	4	5	NA
161003	Reminds others to use techniques that advantage hearing	1	2	3	4	5	NA
161004	Eliminates background noise	1	2	3	4	5	NA
161005	Uses sign language	1	2	3	4	5	NA
161006	Uses lip reading	1	2	3	4	5	NA
161007	Uses closed captioning for television viewing	1	2	3	4	5	NA
161009	Uses hearing supportive devices	1	2	3	4	5	NA
161012	Uses hearing aids correctly	1	2	3	4	5	NA
161010	Cares for internal hearing assistive devices correctly	1	2	3	4	5	NA
161011	Cares for external hearing assistive devices correctly	1	2	3	4	5	NA
161013	Uses support services for hearing impaired	1	2	3	4	5	NA

Domain-Health Knowledge & Behavior (IV) Class-Health Behavior (Q) 2nd edition 2000; revised 2004, 2008

Outcome Content References:

Burrell, L. O. (Ed.), (1992). Adult nursing in hospital and community settings. Norwalk, CT: Appleton & Lange.

Phipps, W. J., Monahan, F. D., Sands J. K., Marek, J., & Neighbors, M. (Eds.), (2003). Medical-surgical nursing: Concepts and clinical practice (7th ed.). St. Louis, MO: Mosby.

Smeltzer, S. C., & Bare, B. G. (Eds.), (2003). Brunner and Suddarth's textbook of medical-surgical nursing (10th ed.). Philadelphia, PA: Lippincott Williams & Wilkins.

Source: Moorhead, Johnson, Maas, & Swanson, 2013

Appendix D

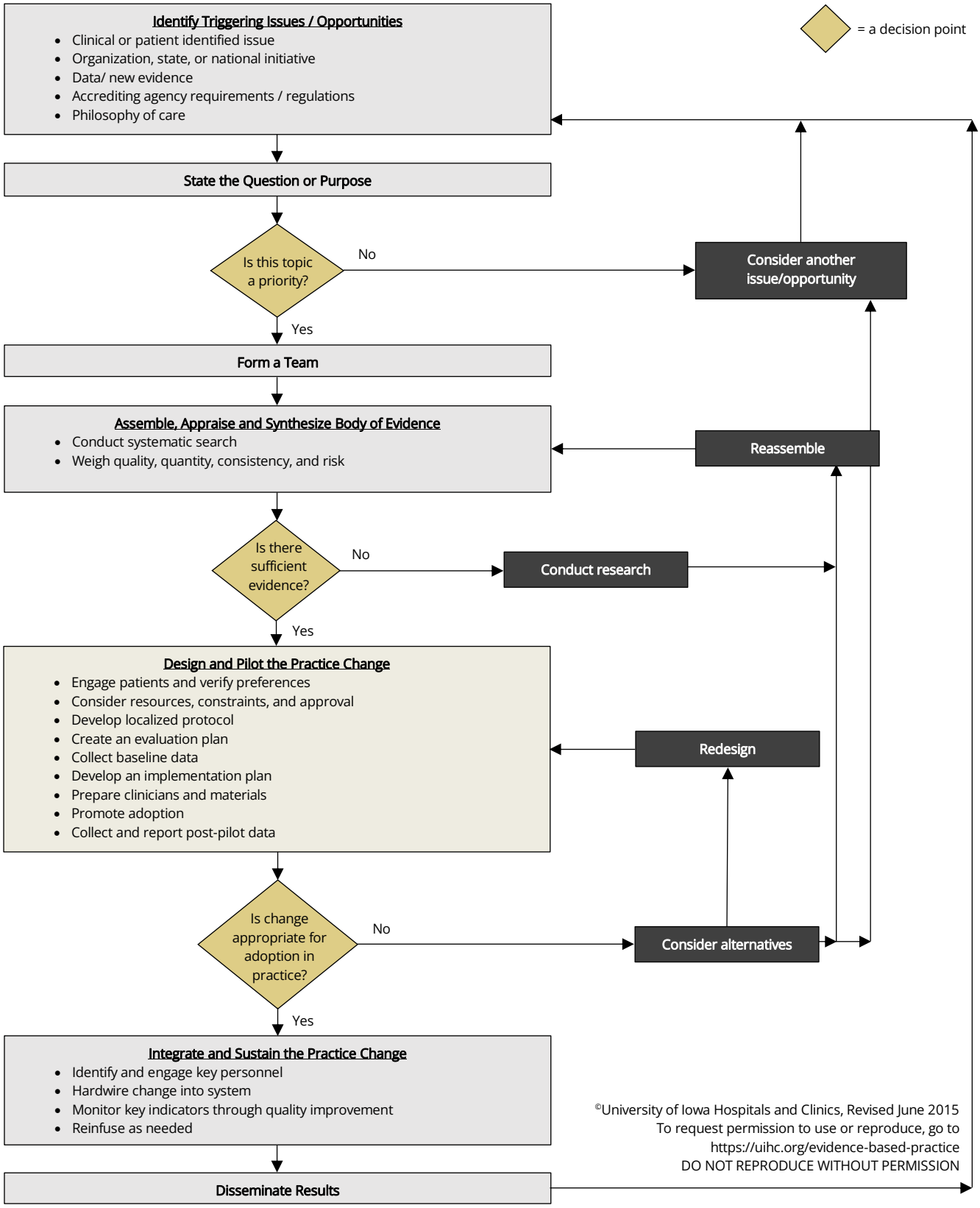
GUIDELINE IMPLEMENTATION PROCESS

Appendix D contains tools to assist in implementing this guideline into practice. These tools include:

- **Appendix D.1:** The Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care©
- **Appendix D.2:** Implementation Strategies for Evidence-Based Practice

Appendix D.1

The Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care©



Appendix D.2

Implementation Strategies for Evidence-Based Practice

	Create Awareness & Interest	Build Knowledge & Commitment	Promote Action & Adoption	Pursue Integration & Sustained Use
Connecting with Clinicians, Organizational Leaders and Key Stakeholders	• Highlight advantages* or anticipated impact* • Highlight compatibility* • Continuing education programs* • Sound bites* • Journal club* • Slogans & logos • Staff meetings • Unit newsletter • Unit inservices • Distribute key evidence • Posters and postings/ fliers • Mobile 'show on the road' • Announcements & broadcasts	• Education (e.g., live, virtual or computer-based)* • Pocket guides • Link practice change & power holder/stakeholder priorities* • Change agents (e.g., change champion*, core group*, opinion leader*, thought leader, etc.) • Educational outreach or academic detailing* • Integrate practice change with other EBP protocols* • Disseminate credible evidence with clear implications for practice* • Make impact observable* • Gap assessment/gap analysis* • Clinician input* • Local adaptation* & simplify* • Focus groups for planning change* • Match practice change with resources & equipment • Resource manual or materials (i.e., electronic or hard copy) • Case studies	• Educational outreach/academic detailing* • Reminders or practice prompts* • Demonstrate workflow or decision algorithm • Resource materials and quick reference guides • Skill competence* • Give evaluation results to colleagues* • Incentives* • Try the practice change* • Multidisciplinary discussion & troubleshooting • "Elevator speech" • Data collection by clinicians • Report progress & updates • Change agents (e.g., change champion*, core group*, opinion leader*, thought leader, etc.) • Role model* • Troubleshooting at the point of care/ bedside • Provide recognition at the point of care*	• Celebrate local unit progress* • Individualize data feedback* • Public recognition* • Personalize the message to staff (e.g., reduces work, reduces infection exposure) based on actual improvement data • Share protocol revisions with clinician that are based on feedback from clinicians, patient or family • Peer influence • Update practice reminders
Building Organizational System Support	• Knowledge broker(s) • Senior executives' announcements • Publicize new equipment	• Teamwork* • Troubleshoot use/ application* • Benchmark data* • Inform organizational leaders* • Report within organizational infrastructure* • Action plan* • Report to senior leaders	• Audit key indicators* • Actionable and timely data feedback* • Non-punitive discussion of results* • Checklist* • Documentation* • Standing orders* • Patient reminders* • Patient decision aides* • Rounding by unit & organizational leadership* • Report into quality improvement program* • Report to senior leaders • Action plan* • Link to patient/ family needs & organizational priorities • Unit orientation • Individual performance evaluation	• Audit and feedback* • Report to senior leaders* • Report into quality improvement program* • Revise policy, procedure or protocol* • Competency metric for discontinuing training • Project responsibility in unit or organizational committee • Strategic plan* • Trend results* • Present in educational programs • Annual report • Financial incentives* • Individual performance evaluation

* = Implementation strategy is supported by at least some empirical evidence in healthcare

Source: Cullen et al., 2018

Appendix E

Hearing Impairment in Nursing Facility Residents Knowledge Assessment Test

Introduction: The individual who will be managing use of this evidence-based guideline and coordinating education of staff should be the only one who has access to this test key. Following proper education with regard to Nursing Management of Hearing Impairment in Nursing Facilities each RN, LPN, CMA/CNA should be given an opportunity to take this test. Use this test as a learning tool only. Please have each RN, LPN, CMA/CNA take this test without the key present, and once he/she is done, let them code how many questions they answered correctly and incorrectly. Guidance in determining why he/she answered as they did can also be part of the learning process.

Knowledge Assessment Test Key

1. A & B
2. E
3. D
4. D
5. C
6. A
7. F
8. B
9. A
10. A

Hearing Impairment in Nursing Facility Residents
Knowledge Assessment Test

1. What are common screening tests for the older adults to identify hearing impairment?

   A. MDS
   B. HHIE-S & NHHI
   C. MMSE
   D. None of the above

2. The following are assessment tests that can be performed to identify hearing impairment.

   A. Rinne/Weber Tests
   B. Audioscope
   C. Whisper Test
   D. Balance Test
   E. A, B, and C

3. The types of hearing loss include:

   A. Sensorineural
   B. Conductive
   C. Mixed
   D. All of the above

4. Upon assessment of a cerumen impaction, referral is indicated when?

   A. Signs of otitis media are present
   B. The resident reports a perforated eardrum
   C. The resident is able to hear only with the impacted ear
   D. All of the above

5. The most common cause of conductive hearing loss in nursing facility residents is:

   A. Ringing in the ears
   B. Ruptured ear drum
   C. Wax or cerumen impaction
   D. Trauma to the ear

6. The most common type of sensorineural hearing loss in nursing facility residents is:

A. Presbycusis
B. Mumps
C. Meniere's disease
D. CAD

7. The following are considered Assistive Listening Devices:

A. Pocket Talker
B. Personal FM Device
C. Loop System
D. Telephone amplifier
E. Infrared System
F. All of the above

8. What are the best distances to communicate with a hearing-impaired resident?

A. Four feet
B. Two feet
C. Three feet
D. One foot

9. Speaking directly into a person's ear is:

A. Discouraging since it prevents the listener from using visual cues
B. Discouraging because it makes the listener more dependent
C. Encouraging because they can communicate more effectively
D. Encouraging when discussing private matters

10. If the resident reports a whistling sound or squeal after insertion of their hearing aid, which of the following actions should the nurse take initially?

A. Turn down the volume on the hearing aid
B. Remove the hearing aid and place in the other ear
C. Instruct the resident to notify the nurse if the sound continues longer than one hour
D. Notify the resident's audiologist

Total Score: _____

Appendix F

Process Evaluation Monitor

Instructions: The purpose of this monitor is to evaluate perceived understanding and support of each nurse in carrying out the protocol.

Scoring: Once the nurses who are using the protocol complete this Process Evaluation Monitor, the individual in charge of implementing the protocol needs to review each form with the nurse. For the nine questions, please tally up the responses provided by adding up the numbers circled. For example, if Question 1 is answered '2' and Question 2 is answered '3' and Question 3 is answered '4' the nurse's score for those three questions (2+3+4) equals 9. The total score possible on this monitor is 36, while the lowest score possible is 9. Nurses who have higher scores on this monitor are indicating that they are well-equipped to implement the protocol and understand its use and purpose. On the other hand, nurses who have relatively low scores are in need of more education and support in the use of the protocol.

Process Evaluation Monitor

Directions: Please circle the number that best communicates your perception about your use of the Nursing Management of Hearing Impairment in Nursing Facility Residents guideline.

Your Perception	Strongly Disagree	Disagree	Agree	Strongly Agree
1. I feel knowledgeable to carry out the Nursing Management of Hearing Impairment in Nursing Facilities Residents Evidenced-Based Guideline.	1	2	3	4
2. Implementing the Nursing Management of Hearing Impairment in Nursing Facility Residents Evidence-Based Guideline enhances the quality of nursing care in the nursing facility.	1	2	3	4
3. I feel supported in my efforts to implement the Nursing Management of Hearing Impairment in Nursing Facility Residents Evidence-Based Guideline.	1	2	3	4
4. I feel well prepared to carry out the Nursing Management of Hearing Impairment in Nursing Facility Residents Evidenced-Based Guideline.	1	2	3	4
5. I am able to identify nursing facility residents at risk for hearing impairment.	1	2	3	4
6. I am able to identify and carry out the essential activities of the Hearing Impairment intervention:	1	2	3	4
• Screen and assess for hearing impairment in nursing facility residents (RNs Only)	1	2	3	4
• Communicate effectively with hearing impaired residents in nursing facilities (RNs, LPNs, CNAs)	1	2	3	4

Continued on next page

PROCESS EVALUATION MONITOR (CONT'D)

Your Perception	Strongly Disagree	Disagree	Agree	Strongly Agree
• Manage hearing aids effectively (RNs, LPNs, CNAs)	1	2	3	4
• Manage Assistive Listening Devices (ALDs) (RNs, LPNs, CNAs)	1	2	3	4
• Manage cerumen impaction and removal effectively (RNs Only)	1	2	3	4
7. I had enough time to learn about the Nursing Management of Hearing Impairment in Nursing Facility Residents Evidenced-Based Guideline before it was implemented.	1	2	3	4
8. We are managing hearing impairment of nursing facility residents more effectively with the use of the guideline.	1	2	3	4
9. The guideline enables me to identify and meet hearing impairment needs of most nursing facility residents.	1	2	3	4

Total Score: _____

Appendix G

Hearing Impairment in Nursing Facility Residents Outcomes Monitor

Instructions: For each patient receiving the Hearing Impairment guideline, please complete the form on the following page. This form should be completed on at least an annual basis. For each resident receiving the intervention, please keep a record of the changes observed in his or her records.

Place the appropriate key criteria next to the three separate outcomes for each patient assessment. A total of 4 boxes have been provided, which represent the first four quarters of the year.

EXAMPLE

Directions: Please place the appropriate key next to the outcomes for each assessment period.

Criteria Key: **Y = Yes**/met criteria **N = No**/criteria not met **J = Justified Variation**
(**Justified Variation** e.g. patient not included in the monitor; note **why** patient is not included)

Criteria	Q1	Q2	Q3	Q4
Outcome 1: Residents are screened/assessed on admission, quarterly, and with significant change, for hearing impairment				
Resident Medical Record reveals: **Hearing History/Screen:** 1. HHIE-S or NHHI (cognitively intact residents)	N	Y	Y	Y

HEARING IMPAIRMENT IN NURSING FACILITY RESIDENTS
OUTCOMES MONITOR

Directions: Please place the appropriate key next to the outcomes for each assessment period.

Criteria Key: **Y = Yes**/met criteria **N = No**/criteria not met **J = Justified Variation**

(**Justified Variation** e.g. patient not included in the monitor; note **why** patient is not included)

Criteria	Q1	Q2	Q3	Q4
Outcome 1: Residents are screened/assessed on admission, quarterly, and with significant change, for hearing impairment	_____	_____	_____	_____
Resident Medical Record reveals:	- - - - -	- - - - -	- - - - -	- - - - -
Hearing History/Screen:				
a. Current section C of the MDS (all residents)	_____	_____	_____	_____
b. HHIE-S or NHHI (cognitively intact residents)	_____	_____	_____	_____
Hearing Physical Exam:				
a. Audioscope or Whisper Test	_____	_____	_____	_____
b. Otoscope Exam	_____	_____	_____	_____
c. Weber Test (optional)	_____	_____	_____	_____
d. Rinne Test (optional)	_____	_____	_____	_____
Outcome 2: Residents with Hearing Impairment are referred to Primary Care Physician/Practitioner (PCP), ENT and/or Audiologist	_____	_____	_____	_____
Resident Medical Record reveals:	- - - - -	- - - - -	- - - - -	- - - - -
1. RNs complete a hearing assessment as per guideline	_____	_____	_____	_____
Hearing History/Screen:				
a. Current section C of the MDS (all residents)	_____	_____	_____	_____
b. HHIE-S or NHHI (cognitively intact residents)	_____	_____	_____	_____
Hearing Physical Exam:				
a. Audioscope or Whisper Test	_____	_____	_____	_____
b. Otoscope Exam	_____	_____	_____	_____
c. Weber Test (optional)	_____	_____	_____	_____
d. Rinne Test (optional)	_____	_____	_____	_____

Continued on next page

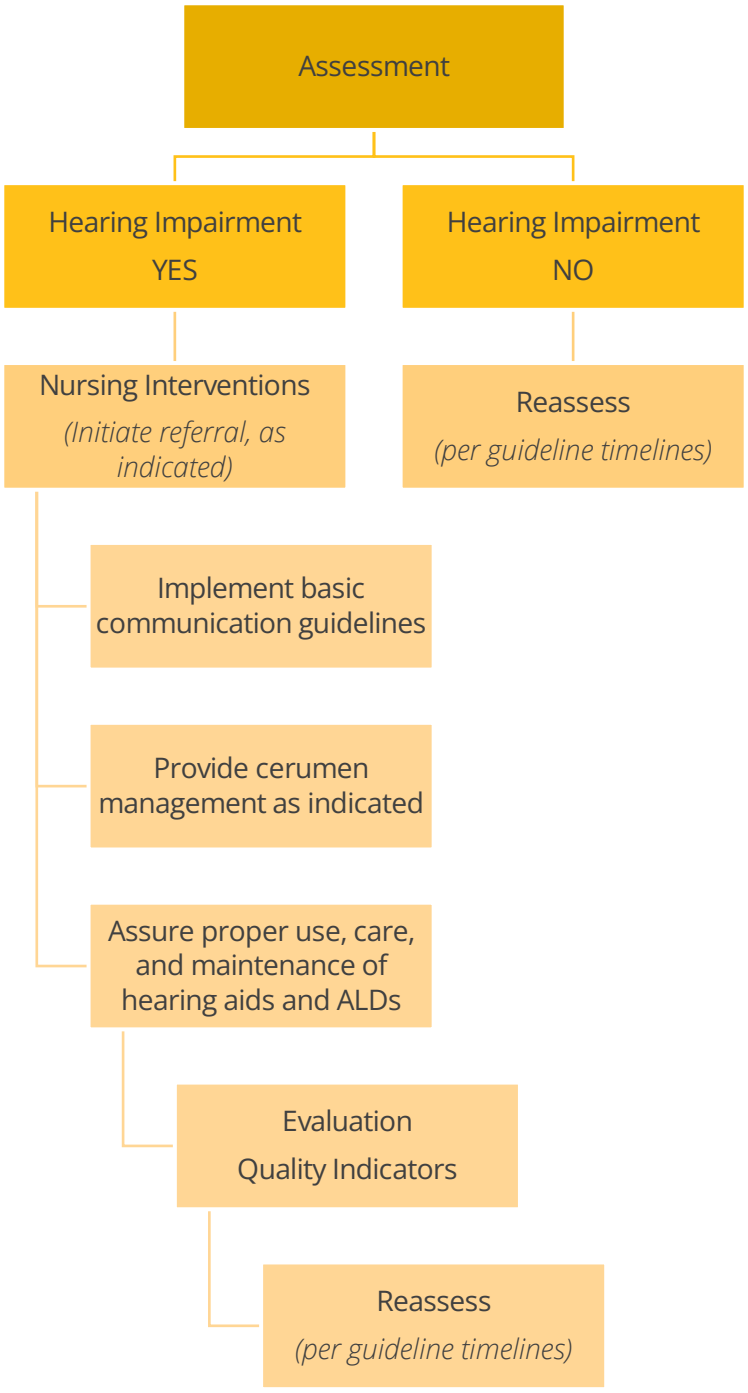
HEARING IMPAIRMENT IN NURSING FACILITY RESIDENTS
OUTCOMES MONITOR (CONT'D)

Criteria	Q1	Q2	Q3	Q4
Outcome 3: Residents with hearing impairment receive appropriate nursing interventions	_____	_____	_____	_____
Resident Medical Record Reassessment reveals:	- - - - -	- - - - -	- - - - -	- - - - -
1. Improvement in MDS score section C and/or HHIS-E or NHHI	_____	_____	_____	_____
Resident Observation:	- - - - -	- - - - -	- - - - -	- - - - -
1. Effective communication between resident and staff.	_____	_____	_____	_____
2. Nursing staff demonstrate communication strategies as outlined in guideline.	_____	_____	_____	_____
3. Residents with hearing impairment are using hearing aids.	_____	_____	_____	_____
4. Residents with hearing impairment are using assistive listening devices (ALDs).	_____	_____	_____	_____
5. Cerumen removal is completed per guideline.	_____	_____	_____	_____

Appendix H

Hearing Impairment in Nursing facility Residents Algorithm

The Hearing Impairment in Nursing Facility Residents Algorithm is designed to be used by RNs, LPNs, and CMA/CNAs for the purpose of identifying and managing hearing impairment in nursing facility residents.



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This guideline is one of a number of evidence-based guidelines made available by The University of Iowa Barbara & Richard Csomay Center for Gerontological Excellence. If you have any questions regarding this guideline, please contact the author or the Csomay Center:

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