

Hearing Screenings

Paige Aaseth, Cheri Charboneau,  
Roxanne DoBrava, & Kayla Nelsen  
Nursing 456: Public Health Nursing  
Department of Nursing  
Minot State University

### Abstract

The topic “Hearing and Other Sensory or Communication Disorders,” has been chosen as a public health project by Minot State University Nursing Students from the Healthy People 2020 topics list. The topic has encouraged the students to implement hearing screenings within Henry Towers and surrounding Minot Community Members for those aged 55 and over. These community members have been identified to be at risk for hearing impairments related to changes in the inner ear, ototoxic medications, hypertension, diabetes, and smoking. Through health promotion and prevention these individuals have access to a hearing screening. Assessment of the inner ear and tympanic membrane is completed with an otoscope prior to the test which is done with an audiometer. The audiometer is set at twenty five decibels and tests hearing frequency ranging from 250 to 3000 kHz. Education about the risks for hearing loss, communication techniques for those with a hearing impairment, and ear hygiene is reviewed with each individual during the hearing screening.

*Keywords:* hearing, screening, loss, impairment, communication, Healthy People 2020

### **Hearing Screenings**

The inability to hear can affect the individual in several ways, many of which are not visible to the naked eye. Hearing loss has a large impact on communication, which is a necessity of today's society. Hearing impairments may cause the individual to become depressed, isolated and have self-esteem issues from not being able to communicate. Many factors can be addressed to prevent hearing loss, help those with hearing loss cope with it, and to examine ways to adequately communicate.

### **Adult Health Maintenance Clinic**

Designed by student nurses at Minot State University (MSU), the Adult Health Maintenance Clinic (AHMC) provides public health nursing interventions to the residents of Henry Towers and the general community in Minot, North Dakota. Currently, MSU nursing students offer foot care as their primary service. Students also take blood pressure readings, history of current medications, health histories, and provide education on various health related topics each month. Insurance is not accepted, and although there is a twenty-five dollar suggested donation, services are rendered regardless of payment. This is a great opportunity for nursing students to obtain experience in a public health setting and to reach their field work requirements. Public health student nurses work within the Scope and Standards of Practice for Public Health Nursing and the states' Nurse Practice Act and are under the supervision of faculty experienced in public health nursing while at the clinic. Students are currently working on expanding the clinic to offer more screenings for public health promotion and disease prevention.

### **Levels of Practice**

The MSU Adult Health Maintenance Clinic (AHMC) interventions are population-based and consider all levels of practice. The three levels of practice our interventions are based on

include population-based community-focused, population-based systems-focused and population-based individual-focused. According to the Public Health Nursing Section (2001), population-based community-focused practice “changes community norms, attitudes, awareness, practices, and behaviors” (p. 4). Systems-focused practice “changes organizations, policies, laws and power structures”; and individual-focused practice “changes knowledge, attitudes, beliefs, practices and behaviors of individuals” (Public Health Nursing Section, 2001, pp. 4-5). Residents of Henry Towers and the general community in Minot, North Dakota ages 55 and older have been identified as being at risk for hearing impairments related to changes in the inner ear, ototoxic medications, hypertension, diabetes, and exposures to loud noises.

Raising community awareness, encouraging participation in hearing screenings, and providing education to the community members are community-focused interventions are being implementing in order to make change in behaviors regarding hearing loss. The systems-focused level of practice is ~~changing~~ accomplished by expanding the AHMC to offer hearing screenings, which will impact the health of the community by reducing the prevalence of hearing impairments, decreasing the risk for social isolation, and providing education about communication, assistive devices, and ear hygiene. At the individual/ family practice level, individual hearing screenings; and providing individualized education to increase knowledge about behaviors that increase the risk for hearing deficits will be implemented. Education will be provided about hearing assistive devices and more effective ways for communication in order to improve social interaction.

### **Levels of Prevention**

Health of the population is the focus through primary prevention by providing education about hearing screenings, proper care for the ears, how often to have hearing checked, and the

importance of wearing hearing protection when exposed to excessive noise volumes, such as mowing the grass. Education about risk factors and causes of hearing loss will also be topics of discussion during the history assessment and screening.

Screening for hearing loss is secondary prevention by obtaining environmental health histories related to the use of hearing protection, the use of ear phones for listening to loud music, and past or current exposures to loud noise. An audiometer will be used for the hearing screening. The audiometer will be set at 25 decibels and frequency ranges from 250-3000 kHz.

Tertiary level of prevention includes case management for those with existing hearing problems. Referring the patient to their primary care physician to obtain referral with an audiologist is also at the tertiary level of prevention. The patient must be seen by their primary health care provider in order to be seen by an audiologist so that the health insurance will cover the cost of the visit. Another portion of tertiary care consists of patient referral to the audiologist to obtain hearing devices and providing education to clients with hearing loss about ways to prevent further damage. Education about effective ways to communicate with others will also be provided.

### **Disease and Other Health Event Investigation**

As the body becomes a bit older ~~throughout the years~~ there are many changes that occur within. Each body system is affected in a different way. Hearing is one system in which change occurs. Genetics, environmental exposures, and health related ailments such as hypertension, diabetes, and ototoxic medications are factors that increase the risk for developing hearing impairments. Exposures to loud noise and smoking are also risk factors for hearing loss. Existing records of members were reviewed showing that only four individuals currently use hearing aids but five have been identified as having hearing problems. However, the health history forms do

not go into depth about assistive hearing devices and hearing loss. Many of the forms were left blank as to whether or not an individual experiences hearing deficits. The records have indicated that hypertension and diabetes are the leading health related risk factors community members experience. Loud noise exposure will be assessed during our health history interview prior to performing the audiometric screening. Medicare does not cover the cost for hearing aids, but will cover the cost for an assessment with an audiologist as long as a referral has been obtained from his or her primary care provider. Primary care providers do not typically screen for hearing loss, nor refer a patient, unless concern is expressed by the individual. Causes and risk factors for hearing loss are discussed later within this paper.

### **Mission and Vision Statement**

Minot State University Nursing Students serve the Adult Health Maintenance Clinic (AHMC) at Henry Towers, focusing on the population of residents ages 55 and older with hearing impairments. The purpose and goal is to increase the awareness and decrease the prevalence of hearing impairments among the community. Hearing screenings and referrals to primary care providers are offered throughout the academic school year.

### **Goals and Objectives**

The goals and objectives that have been used for this project come from the Healthy People 2020 website ([US Department of Health and Human Services, 2015](#)). The topic, “Hearing and Other Sensory or Communication Disorders,” was utilized. From there, the tabs to choose from were overview, objectives, interventions and resources, and national snapshots tabs. The goal for Healthy People 2020 is to reduce the prevalence and severity of disorders of hearing and balance; smell and taste; and voice, speech, and language. While this is a great goal for the topic, the group changed the goal design to a population-focused public health nursing program that

will be implemented at the Adult Health Maintenance Clinic (AHMC) at Henry Towers. The program will focus on hearing screenings and education of individuals within the community that are 55 years of age or older. The goal of the program is to increase the awareness and decrease the prevalence of hearing impairments among the community.

**Goals Objectives identified to meet this goal** include (US Department of Health and Human Services, 2015):

**ENT-VSL-3.1** Increase the proportion of adults aged 20 to 69 years with hearing loss who have ever used a hearing aid.

**ENT-VSL-3.3** Increase the proportion of adults aged 70 years and older with hearing loss who have ever used a hearing aid.

**ENT-VSL-4.1** Increase the proportion of adults aged 20 to 69 years who have had a hearing examination in the past 5 years.

**ENT-VSL-4.2** Increase the proportion of adults aged 70 years and older who have had a hearing examination in the past 5 years.

**ENT-VSL-6.1** Increase the proportion of adults aged 20 to 69 years who have ever used hearing protection devices (earplugs, earmuffs) when exposed to loud sounds or noise (age adjusted to the year 2000 standard population).

**ENT-VSL-8** Reduce the proportion of adults who have elevated hearing thresholds, or audiometric notches, in high frequencies (3, 4, or 6 kHz) in both ears, signifying noise-induced hearing loss.

### **Causes of Hearing Loss**

According to the American Speech-Language Hearing Association (ASHA) (2015), hearing loss in adults happens for many reasons. The main causes of hearing loss are genetics,

illness, ototoxic drugs, loud noise, tumors, head injury, or the process of aging in the adult (*Causes of hearing loss in adults* ASHA, 2015). In otosclerosis, the tiny bones in the middle ear do not move correctly, causing a conductive hearing loss; however, surgery is available to treat this type of hearing loss. Ototoxic medications that affect hearing are medications such as: aminoglycoside antibiotics, salicylates, loop diuretics, or chemotherapy drugs. Loud noise damages the cilia in the inner ear and overtime, hearing loss occurs. This is a painless but a permanent type of hearing loss. Physical head injury, such as skull fractures or traumatic brain injury, can cause hearing loss by affecting the movement of middle ear structures. Presbycusis affects hearing gradually. This is a sensorineural loss and occurs as people age. The main problem with this is the ability to hear high pitched sounds, which causes speech to sound stifled, leading to confusion of words and misunderstanding. Predisposing factors may play a large role in the hearing loss process such as: diabetes, hypertension, and smoking. These factors will be discussed separately. Therefore, with all these types of hearing loss it is very apparent that people can become isolated, have difficulty communicating, and have feelings of hopelessness.

### **Diabetes and Hearing Loss**

Diabetes has many medical complications that occur if blood sugars are uncontrolled. A few of these medical complications include: stroke, hypertension, high cholesterol, amputations, neuropathies, and retinopathy. Therefore, it is thought that the auditory system could be affected as well. According to ASHA (2015), a pure tone air conduction test was done that tested thresholds at 500, 1000, 2000, and 4000 Hz, and found that at only a single frequency there were higher thresholds for diabetics. Another study was done testing pure-tone air conduction finding that hearing impairment was average of > 40 dB and there is no association with diabetes (Bainbridge, 2015). Next, the study done in Beaver Dam, Wisconsin showed an increase of



hearing loss in adults that have diabetes than those without. This was noticed when they defined hearing loss as a pure-tone average above 500, 1000, 2000, and 4000 Hz >25 dB in the worse ear (Bainbridge, 2015). However, no definition of hearing loss has been established, and it was found that the hearing loss prevalence was determined based on how the condition is defined. The definition that was used in the study by Bainbridge (2015) is high frequency (3000, 4000, 6000, and 8000 Hz) and low or middle frequency (500, 1000, and 2000 Hz) averages, at two levels of severity (>25 and >40 dB HL) in both the bad and good ear. With the use of this definition, there was a higher prevalence of hearing loss in adults with diabetes. The sociodemographic characteristics among persons with diabetes; ~~along with,~~ including age, education, ~~men and women~~ and gender, reveal that non-Hispanic White or non-Hispanic Black show a greater prevalence of hearing loss. Next, the study showed that there was a greater prevalence of hearing loss among younger people with diabetes, than older. This may have been found due to the age-related and lifetime contributing factors that cause hearing impairment; which then, decreases the prevalence in adults with diabetes and the adults without, due to the increasing age. According to Bainbridge (2015), diabetes is potentially aging the ear prematurely. The pathophysiology behind the premature aging of the ear with diabetes may be caused by injury to the vasculature or the neural system of the inner ear (Bainbridge, 2015). Also, it is thought that the loss of outer hair cells is prevalent in diabetic patients (citation). The data within the Bainbridge (2015) article shows that between the age of 50 and 69 years more than 70% of persons have high frequency loss, also showing that persons with diabetes will have hearing loss sooner. It is very important to encourage patients with diabetes to maintain good blood sugars and be informed that if they have a sibling or family member with diabetes, they are at an increased risk.

### High Blood Pressure and Hearing Loss

According to Capoani, Mondelli, and Lopes (2009), arterial hypertension that is present in adults may be a cause of hearing loss. Hypertension typically does not present with symptoms, but when it does it can present with the following: headache, dizziness, tinnitus, chest pain, and weakness. The pathophysiology behind hypertension and hearing loss deals with cells needing oxygen and nutrients to function properly. This supply then depends on the function of the heart and vessels. Therefore, if this is not working properly, it can damage the inner ear by increasing the stickiness of blood, which in return causes diminished capillary blood flow and oxygen to the inner ear. In addition to the decreased blood flow, tinnitus may occur. Once tinnitus occurs, 85 to 96% of these patients develop some degree of hearing loss (Capoani, Mondelli, & Lopes, 2009). The study was done on patients 45 to 60 years old. ~~They~~ **Participants** had to have arterial hypertension, but left out patients with a history of auditory disorders, other metabolic disorders, vascular disorders, and those exposed to occupational noise. The tools used during the study were acoustic emittance, conventional tonal audiometry, logo audiometry, and otoscopic exam. The participants in the study were split into two groups. One group including hearing impaired with hypertension and another group including hearing impaired individuals without hypertension. The study found that there is no significant difference in gender with hypertension and hearing loss. Next, out of the 552 participants with hypertension, 43% had moderate hearing loss (Capoani, Mondelli, & Lopes, 2009). Due to hypertension, neurosensory hearing loss ~~occurs~~ **resulting results** from occlusion by embolism, vasospasm, or hemorrhage. To conclude the study, it was found that ~~between~~ **within** both groups, the hearing loss degree and type were similar. In conclusion, arterial hypertension is a risk factor in hearing loss and preventative measures should

be initiated to reduce the worsening of the auditory system, ~~which is caused by hypertension.~~  
Also, detecting hearing loss in people with hypertension early is key to reducing progression.

### **Smoking and Hearing Loss**

Tobacco smoke and hearing loss have been found to be significantly related in many studies. Fabry, et al. (2011) created a study to associate the link between secondhand smoke exposure in current and never smokers, and sensorineural loss. The studied populations was anyone age 20-69 years old. The current smokers were excluded from the study to strictly ~~find~~ **out focus on** secondhand smoke exposure. The biomarker Cotinine was used to identify active smoking or secondhand smoke exposure (Fabry et al., 2011). The level of 3ng/ml or above for cotinine levels indicate **a** current smoker (Fabry et al., 2011). The participants that had a cotinine level of 0.050ng/ml or above were considered exposed to secondhand smoke (Fabry et al., 2011). Next, the pure tone air conduction thresholds were established at frequencies of 500, 1000, 2000, 3000, 4000, 6000, and 8000 Hz. Included in the study was the number of years smoked and years since quitting among the former smokers. The study's results show that the prevalence among former smokers with low frequency hearing loss was 14% and high frequency loss was 46% (Fabry et al., 2011). Compared to the former smokers, results of the never smoker's results where lower with low frequency loss at 8.6% and high frequency loss at 26.6% (Fabry et al., 2011). These results concluded that there was an association between secondhand smoke exposure and low and high frequency hearing loss among former and never smokers. The pathophysiology behind smoking and the risk for hearing loss is that nicotine has an ototoxic effect that causes ischemia in the cochlea (Fabry et al., 2011). It was prevalent that increased age, male gender, and diabetes also increased the risk of hearing loss in smokers. Even though it was shown that secondhand smoke was definitely prevalent among former smokers, there was no

significant relationship with number of years smoked, or years since quitting and hearing loss. Also, it is figured that former smokers are at risk for the continuance of a pathogenic process that could eventually cause the high-frequency hearing loss to become worse. In conclusion, the study showed that the exposure to secondhand smoke and the risk of hearing loss was a significant public health concern. A smoker is responsible for themselves and their own exposure to the toxic substance and puts themselves at risk. Yet, the smoker should be educated about the possible effects it has on the persons surrounding them and themselves. Therefore, smokers should be advised to participate in a cessation program.

### **Ototoxic Medications**

The American Speech-Language-Hearing Association (2015) states that ototoxicity occurs when a medication causes hearing loss, tinnitus, or balance problems. There are 200 known medications that cause ototoxicity and ~~normal~~ are commonly used to treat heart problems, cancer, or severe infections (Cone, Dorn, Konrad-Martin, Lister, & Ortiz, 2015). Examples of medications that cause permanent hearing loss include; gentamicin (antibiotic), cisplatin, and carboplatin (chemotherapy medications). Examples of medications that cause temporary hearing loss include pain relievers such as aspirin, quinine, and loop diuretics. Also, exposure to loud noise may increase the hearing damage while taking the ototoxic medications. Hearing loss and balance problems are sometimes reversed once the medication is discontinued; however, sometimes what was lost may be never regained. Therefore, providers do consider the effects of an ototoxic medication; yet, the benefits may outweigh the risks. The effects that may be noticed in ototoxicity are ringing in the ears which could develop into hearing loss. This usually goes unnoticed until it is more difficult to understand speech (Cone et al., 2015). Also, balance problems may occur but these problems tend to be temporary due to the body learning to adapt to

the balance problem. The series of problems from ototoxicity is caused by the damage to the sensory cells in the inner ear which controls the hearing and balance (Cone et al., 2015).

Therefore, to prevent ototoxicity or diminish the effect, monitoring hearing and balance before starting treatment and during treatment is important. A baseline for hearing and balance should be recorded. The baseline test should include high-pitched testing, word recognition, and other tests when needed (Cone et al., 2015). Next, during the treatment with ototoxic medications a hearing test should be performed periodically to note any changes in the hearing and balance. These steps will have identify significant changes within the hearing and balance system and help the client report any changes.

### **Social Marketing**

The group collaborated together to create an easy to read brochure about the Minot State University Nursing Student's Adult Health Maintenance Clinic (AHMC): Hearing Screenings for 2015. The brochure is an easy to read, trifold layout, with information located throughout. On the Cover, there is a title "Hearing Screenings & Education." Following that, as the brochure is opened, the Mission Statement is visible to the reader. Open the brochure again, and the left page will show a Self-Test, which we found on the Professional Hearing Services (2015) website. There is information about what an audiologist is and how to get a referral appointment if one feels like they need one. Finally, on the right page of the inside of the brochure is a list of all the audiologists in Minot. The first and last names, facility location, phone number, and physical work address is listed for the reader. ~~At the bottom of this page also includes an~~ An asterisk (\*) ~~indicating~~ indicates whether the audiologist accepts Medicare. The back page of the brochure includes the Minot State University Nursing pin, contact information for Minot State University Nursing, Aauthors names, and citations for the brochure information and photos. The target

audience ~~that we would like the brochure to appeal to~~ are the residents of Henry Towers ages 55 and older, ~~members and clients~~ of the AHMC, ~~and residents of Henry Towers that are under the age of 55~~ with hearing disabilities. The objective of the brochure is to give information to the viewers and help them determine a possible hearing loss problem through the Self-Test. ~~We would also like for the viewers to~~ **Viewers should** be able to look at the brochure and ~~be able to~~ identify and understand who the audiologists are in Minot, ND and whether or not they accept Medicare. ~~We would like~~ **In addition** the residents ~~to become more aware of~~ **will be educated about** potential hearing impairments. The *SMART* terms objective of the brochure is that by May 2015, there will be ~~approximately~~ a 20% increase in residents of Henry Towers detecting hearing impairments by using the Self-Test. It will be measured by a questionnaire created by the Minot State Nursing Student's group: Hearing. In order ~~for us~~ to relay this message to ~~our~~ the target audience, ~~we had~~ brochures **were** printed out and available during the final AHMC and screening date. There were also brochures located in the hearing testing room. Brochures were handed out and explained to each ~~patient~~ **participant**.

### **Equipment**

Hearing testing may be done with a variety of different equipment or no equipment at all. Some of the equipment that may be used are an audiometer and an otoscope. An audiometer is a machine which measures the hearing acuity of the ears. There are different frequencies that the machine can be set at. The frequencies are in decibels which range from 200 to 8,000 depending on the machine. The audiometer ~~is a machine which~~ requires interaction between the machine operator and the client. Certain frequencies will be played in either the left or right ear and the client must specify if they hear the sound and in which ear.

For the hearing screenings at the Adult Health Maintenance Clinic (AHMC), an audiometer will be borrowed from the First District Health Unit (FDHU) for the day of the screening. Permission was granted to do so by an employee at FDHU. It will be the responsibility of the testing group to adequately care for the machine and return it to the unit when finished with the screening. The Adult Health Maintenance Clinic currently has an otoscope with probe covers for examination and will supply cleaning supplies for cleaning equipment between clients.

### **Screening at Adult Health Maintenance Clinic**

As mentioned previously, adults ages fifty-five and older are at an increased risk for hearing deficits. Although there may be precipitating factors, a public health nurse must identify the individuals who currently have hearing loss. According to the Public Health Nursing Section (2001) screening helps to determine the individuals who are exposed to unrecognized risk factors or certain disease processes within the population.

According to [the Minnesota Department of Health](#), Public Health Nursing Section (2001, p. 65-67), there are eleven steps for proper Public Health screening. They are as follows:

- 1.) Determine if the health risk or disease is an important threat to the population's health.
- 2.) Consider the extent to which the population believes the health risk or disease an important health problem.
- 3.) Determine if adequate information exists about outcomes expected from screening.
- 4.) Determine if the risk or disease has a recognizable latent or early symptomatic state which makes early identification feasible.

- 5.) Decide if the disease's natural course of history is understood sufficiently to allow early intervention.
- 6.) Consider whether an acceptable treatment for the risk or disease exists.
- 7.) Determine whether a suitable test exists.
- 8.) Determine if the screening test is acceptable to the population of interest.
- 9.) Arrange for further assessment/diagnosis and treatment for those with positive findings.
- 10.) Establish agreed-upon policies regarding whom to treat.
- 11.) Determine whether adequate funds or resources exist to support the entire process.

~~Public Health Nursing Section (2001, p. 65-67)~~

~~According to the above guidelines for screening and the previous research done, the population served at the Adult Health Maintenance Clinic (AHMC) is at a higher risk for hearing deficits.~~ There is sufficient research that has been done to determine that early screening and interventions for hearing problems can increase the quality of life of individuals. Hearing loss can be detected at early stages when an audiometer is used. Treatment options are hearing aids and several types of hearing devices are available for purchase. Many individuals do not have the financial means to purchase hearing aids or assistive devices; therefore, communication techniques can be learned to be able to adequately communicate with a hearing deficit. Communication techniques are listed under the health teaching heading. An audiometer will be used to test the hearing and has been approved for testing of all ages. Those with positive screening findings will be referred to their primary care provider. The policy for referral and follow-up and whether resources are available to continue the screening will be discussed later in the paper.



Hearing screenings at the AHMC will follow a specific guideline. When clients arrive to the clinic the student nurse will assist them in filling out a questionnaire. ~~It~~ **This** measures the individual's perception of their hearing loss and the emotions that arise from the condition. ~~When all questions regarding the survey are answered the~~ **The** student will then assess the structures of the external ear canal and tympanic membrane with an otoscope. Next, the hearing tests will take place in a quiet room with an audiometer. After the testing is complete, the test results will be interpreted and relayed to the client. Documentation sheets of all tests ~~that were~~ completed on the client will be put into the patient's chart for **future** reference. ~~With the test results in hand,~~ Finally, the student will determine whether or not the client will benefit from a referral to his/her primary care provider for further treatment.

### **Interventions**

Interventions that occur during the hearing screening ~~at the Adult Health Maintenance Clinic (AHMC) at the Henry Towers~~ will follow evidence-based practice. ~~according to the procedure to be done.~~ After the questionnaire is completed with the client, the student will ~~then~~ assess the inner structures of the ear with an otoscope. According to Jarvis (2012), the steps for the correct procedure ~~of an otoscope~~ for otoscopic assessment are as follows:

- Inspect the external ear and choose the largest speculum that will fit comfortably in the client's ear and attach it to the otoscope.
- Tilt the client's head slightly away from you and toward the opposite shoulder.
- Pull the pinna up and back to straighten out the S-shape of the ear canal. Hold the pinna gently and do not let go until the otoscope is removed from the ear.
- Hold the otoscope upside down along your fingers and have the back of your hand resting against the client's cheek to steady the otoscope.

- Insert the speculum slowly and carefully along the axis of the canal, watch as you insert then put your eye up to the otoscope.
- If you are unable to see the structures apply more pressure to the pinna, point the speculum towards the client's nose and reposition the client's head.

According to Harkin and Kelleher (2011) older individuals usually have a greater amount of cerumen built up due to the decreased movement of skin and debris out of the ear canal. The amount of ear wax, or cerumen, does not determine the cleanliness of the individual's ears. When examining the inner structures of the ear there is a possibility that cerumen could be obstructing the canal, which can prevent the client from passing a hearing test. Cerumen impaction is a ~~need~~ cause for referral and follow-up. ~~in order to prevent the client from failing their hearing test.~~

### **Case Management**

Clients who attend the Adult Health Maintenance Clinic and individuals that currently use assistive hearing devices will have the ability to be tested also. These individuals may have had previous experience with having their hearing tested. It is the responsibility of the public health nurse to assess the needs of these people as well.

Case Management falls under the category of tertiary prevention. For example, a client ~~who~~ has an existing hearing condition may have a case ~~manager~~ **management** nurse that can assist the client in maintaining adequate hearing screenings according to the recommended time frame and provide them with resources regarding their hearing health. ~~Pre-existing conditions may be hearing aids, cochlear implants, microphone assistive devices, untreated hearing loss, and individuals with a history of surgical procedures to the ears.~~ Through case ~~management~~ **the nurse manager** should be able to assure that the client is receiving adequate services for all of his/her

needs. ~~The nurse case manager has the knowledge of available resources which would fit the client's needs. The nurse will take into consideration the cost and quality of life of the client at the same time. Collaboration efforts will also be needed when the nurse assists the client in planning the care they need and talking to other providers regarding proper care and treatment.~~

### **Referral and Follow-up**

Each patient that attended the hearing section of the Adult Health Maintenance Clinic (AHMC) screening was evaluated according to his or her results of the audiometer test. ~~Each patient was screened using the same documentation sheet, which~~ A documentation sheet was created by ~~Minot State Nursing Students~~ the authors of this paper. A referral to the client's primary care provider was needed if the patient client did not pass the screening. ~~A patient was told that a referral to their primary care provider by a nursing student.~~ A referral form was given to the patient and they were instructed to take it with them to their appointment. On the referral form, it The referral form stated whether or not the patient was in need for a referral. The student nurse placed a checkmark in the box beside *Referral Recommended* or *Referral Not Needed at This Time*. If the patient was not in need of a referral, the form instructs that they still continue to have their hearing checked annually and to contact their primary care provider if they feel any hearing loss of changes. If the patient was in need of a referral, the form stated that it is recommended that an appointment with their primary care provider be made. There is a disclaimer that includes the Minot State University Nursing instructor Nikki Medalen RN, BSN, PHN's phone number, so that the patient can call or have their provider call Nikki to follow-up. ~~Once the patient follows up with Nikki on their appointment, it~~ , which will be charted in their file at Henry Towers for safekeeping future reference.

### Health Teaching

Education is part of primary prevention. It plays a large role in preventing ~~hearing loss~~ and ~~failed hearing tests~~ early intervention ~~of hearing loss~~. The **Minnesota Department of Health** Public Health Nursing Section (2001) explains that health teaching portrays the facts, skills and ideas in order to change the way the receiver thinks about the topic. The receiver could be the individual, their family, the community, or a system. When providing health teaching the nurse needs to examine the individual and their knowledge level in order for them to understand. Those who believe they are at risk are more likely to be receptive of the teaching. When teaching, **the nurse is** be sure to give examples of how to follow through with the action, and **takes** barriers into consideration. Health teaching during the hearing screening includes proper care of the ears, the importance of hearing protection and communication techniques for communicating with the hearing impaired.

~~An assessment question that each~~ **Each** client is asked is, “How do you clean your ears?” Many state that they use Q-tips ~~to clean their ears~~. Q-tips do not benefit the ears at all, **but** only push the cerumen, or ear wax, further into the ear and increase the chances of tympanic membrane rupture. When the cerumen is pushed further into the ear, this can ~~cause hearing loss~~ **obstruct hearing**. Cerumen ~~serves a bactericidal purpose for the ear canal~~. It prevents bacteria from growing in the canal and is very beneficial. The amount of ear wax does not determine the cleanliness of the ears. Clients need to be educated on the proper way to clean out ~~there~~ **their** ears. Cerumen needs to be specifically removed by a professional. The external ear and pinna can be cleaned with soap and water and dried thoroughly with a towel. As many providers would say, “Do not stick anything into your ear that is smaller than your elbow.” It is recommended

that all clients have their hearing checked annually, which would be a great time for a physician to clean out the ears.

Many clients do not realize that everyday ~~activities~~ noises such as a household blender, lawn mower, motorcycle, or tractor can begin to ~~cause~~ damage hearing loss with long exposures. Hearing protection comes in several different ways such as small ear plugs and large earmuffs. A client is more likely to fail a hearing test if he/she does not wear hearing protection around loud noises.

Communication is an essential in the lifestyles of all human beings. Lack of communication can have a lasting effect on self- esteem, socialization and one's emotions. Individuals who are hearing impaired may begin to isolate themselves and become depressed (citation?). Health teaching on communication techniques can instill hope in those with hearing loss. Face-to-face communication techniques are one way to adequately communicate with hearing impaired individuals. Potter and colleagues (2013) write of several ways to communicate with clients adequately. Selected tips are as follows:

- Sit facing the person so they can see your face.
- Sit at the same level as the one you are communicating with.
- Sit where the person can read your lips and speak slowly and articulate well.
- Do not speak with food in your mouth.
- If you are not understood rephrase the sentence rather than repeat it.
- Speak with your hands, facial expressions and all other bodily expressions.
- There is no need to talk loudly. When talking loud the pitch goes up and makes those hearing impaired less likely to understand.
- When speaking talk toward the client's ear that has the least hearing loss.

The client that is experiencing hearing loss should be sure to look closely at the person's lips which will make lip reading easier. The individual should not be afraid to ask the person to write down what he/she is saying. Socialization is an essential concept of overall health.

### **Program Evaluation**

Hearing screenings was a success, with ~~of~~ eleven community members eagerly ~~to~~ participate~~ing~~. Of the eleven individuals, seven have been referred to a primary care provider for follow-up with an audiologist for a more in-depth hearing exam. One of the participants has been referred to see a primary care provider in order to safely remove cerumen. History of hearing impairments and other concerns have been assessed. Current medication use, exposures to loud noises, and health histories were also assessed. Teaching about ototoxic medications, hearing protection and ways to improve communication was implemented **on an individual basis**. Participants were ~~eager to have their hearing checked and were~~ grateful to be provided a hearing screening. As the day progressed we were able to change and accommodate to **meet** unexpected needs, such as bringing extra chairs for those waiting their turn.

### **Suggested Changes to Program**

**When conducting the audiometer test,** ~~E~~explain to the participant that what they will be hearing is not a very loud noise. It seems as though the clients were expecting to hear tones the same as they hear when talking with someone. ~~Explain that the tones will be very quiet and difficult to hear,~~ ~~t~~They may even mistake the tones for ringing in the ears if this is something they already suffer from. It will be important for the patient to distinguish the tones from tinnitus they may already have. Patients have also stated that they feel like they hear the sound in both ears when the sound is really only in one. They could raise both hands in response to this sensation and the nurse administering the test can document the results.

Documentation forms need to have places for ~~both~~ **each** ears; ~~A~~ **a** right and left ear picture, right and left spaces for the cone of light and other internal ear structures, right and left spaces for pain in internal, external, and middle ear structures.

~~Interview in separate room from the audiometer testing.~~ **In the future, it would be best to interview in a room separate from the audiometer testing.** We were able to conduct our hearing screening in a quiet room, but there was no furniture and there was a lot of echo. So while other community members were waiting to utilize the audiometer, they were talking, making it difficult for the participant being tested to hear tones from the audiometer.

**Conclusion?**

## References

- American Psychological Association. (2010). *Publication manual of the American Psychological Association* (6<sup>th</sup> ed.). Washington, DC: Author.
- American Speech-Language-Hearing Association (ASHA). (2015). *Causes of hearing loss in adults*. Retrieved from <http://www.asha.org/public/hearing/Causes-of-Hearing-Loss-in-Adults/>
- Bainbridge, K. (2015). *Diabetes and hearing impairment: An epidemiological perspective*. Retrieved from The American Speech-Language-Hearing Association website: <http://www.asha.org/aud/articles/diabetes-hearing-impairment/>
- Cone, B., Dorn, P., Konrad-Martin, D., Lister, J., Ortiz, C., & Schairer, K. (n.d.). *Ototoxic medications (Medication effects)*. Retrieved from the American Speech-Language-Hearing Association website: <http://www.asha.org/public/hearing/Ototoxic-Medications/>
- ~~Cruice, M., Worrall, L., & Hickson, L. (2005). Personal factors, communication and vision predict social participation in older adults. *Advances In Speech Language Pathology*, 7(4), 220-232. doi:<http://dx.doi.org/10.1080/14417040500337088>~~
- ~~Demers, K., Kimball, D. (2013). Hearing screening in older adults (Issue No. 12). *Try this: Best practices in nursing care to older adults*. The Hartford Institute for Geriatric Nursing, New York University, College of Nursing. Retrieved from [http://consultgerirn.org/uploads/File/trythis/try\\_this\\_12.pdf](http://consultgerirn.org/uploads/File/trythis/try_this_12.pdf)~~
- Fabry, D.A., Davila, E.P., Arheart, K.L., Serdar, B., Dietz, N.A., Bandiera, F.C., & Lee, D.J. (2010). Secondhand smoke exposure and the risk of hearing loss. *Tobacco Control*, 20(1), 82-85. doi:<http://dx.doi.org/10.1136/tc.2010.035832>



- Harkin, H., & Kelleher, C. (2011). Caring for older adults with hearing loss. *Nursing Older People*, 23(9), 22-28. doi:<http://dx.doi.org/10.7748/nop2011.11.23.9.22.c8780>
- Jarvis, C. (2012). Ears. *Physical examination and health assessment* (6<sup>th</sup> ed., pp. 323-349). St. Louis, Missouri: Elsevier.
- ~~McCullagh, M.C., & Frank, K. (2012). Addressing hearing loss in primary care. *Journal of Advanced Nursing*, 69(4), 896-904. doi:<http://dx.doi.org/10.1111/j.1365-2648.2012.06078.x>~~
- Mondelli, M.F.C.G., & Lopes, A.C. (2009). Relation between arterial hypertension and hearing loss. *International Archives of Otorhinolaryngology*, 13(1), 63-68. Retrieved from [http://www.internationalarchivesent.org/conteudo/pdfForl/590\\_eng.pdf](http://www.internationalarchivesent.org/conteudo/pdfForl/590_eng.pdf)
- ~~Morata, T.C. (2007). Promoting hearing and the combined risk of noise-induced hearing loss and ototoxicity. *Audiological Medicine*, 5(1), 33-40. doi:<http://dx.doi.org/10.1080/16513860601159018>~~
- ~~Patterson, B.M., & Renaud, M. (2012). Routine hearing screening in primary care for adult populations using distortion product otoacoustic emissions testing. *Journal of the American Academy of Nurse Practitioners*, 24(7), 400-404. doi:<http://dx.doi.org/10.1111/j.1745-7599.2012.00718.x>~~
- Potter, P.A., Perry, A.G., Stockert, P.A., & Hall, A.M. (2013). *Fundamentals of nursing* (8<sup>th</sup> ed.). St. Louis, Missouri: Elsevier.
- Professional Hearing Services. (2015, January 15). Hearing loss: Self-test. Retrieved March 21, 2015, from <http://www.heardakota.com/>

**Minnesota Department of Health**, Public Health Nursing Section. (2001). *Public health interventions-Applications for public health nursing practice*. St. Paul: Minnesota Department of Health.

~~Pyykkö, I., Toppila, E., Zou, J., & Kentala, E. (2007). Individual susceptibility to noise-induced hearing loss. *Audiological Medicine*, 5(1), 41-53.  
doi:<http://dx.doi.org/10.1080/16513860601175998>~~

~~Stanhope, M., & Lancaster, J. (2012). *Public health nursing* (8<sup>th</sup> ed.). Maryland heights, MO: Elsevier.~~

U.S. Department of Health and Human Services, Healthy People 2020. (2015). *Hearing and other sensory or communication disorders*. Retrieved from <https://www.healthypeople.gov/2020/topics-objectives/topic/hearing-and-other-sensory-or-communication-disorders>

Appendices

Appendix A GANTT chart..... p. 27

Appendix B PERT Flowchart..... p. 28

Appendix C Brochure..... p. 29

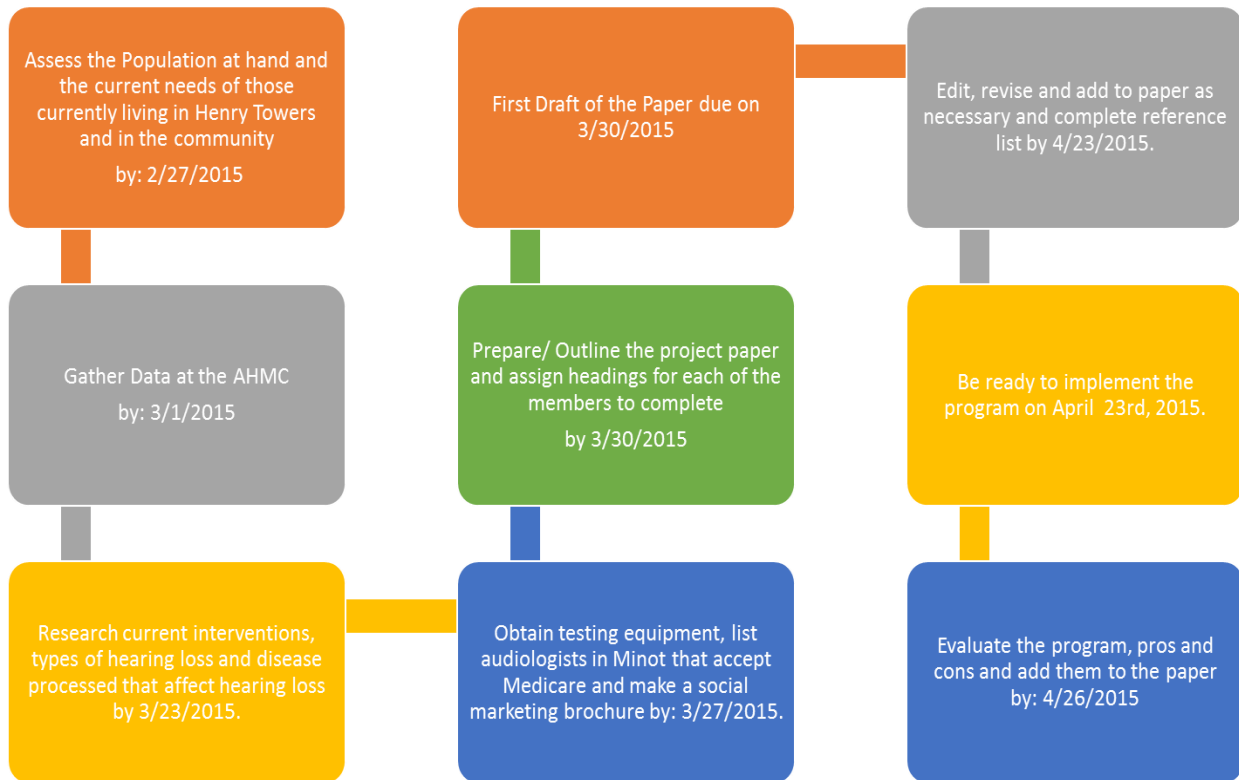
Appendix D Hearing Assessment tool..... p. 30

Appendix E Documentation Form .....pp. 31-32

Appendix F Referral Form .....p. 33



Appendix B  
PERT Flow sheet



**Goal:** To design a population focused public health nursing program that will be implemented at the Adult Health Maintenance Clinic at the Henry Towers. The program will focus on hearing screenings and education of individuals within the community that are 55 years of age or older. The goal of the program is to increase the awareness and decrease the prevalence of hearing impairments among the community.

Appendix C


Brochure

### Our Mission

Minot State University Nursing Students serve the Adult Health Maintenance Clinic at Henry Towers, focusing on the population of residents ages 55 and older with hearing impairments. Our purpose and goal is to increase the awareness and decrease the prevalence of hearing impairments among the residents. We offer hearing screenings and referrals throughout the academic




**Minot State University Nursing**  
 500 University Ave W  
 Minot ND, 58707  
 701-858-3101  
 800-777-0750  
 Fax 701-858-4309



Hearing Screenings & Education

Brochure By:  
 Kayla Nelsen, Roxanne DoBrava, Cheri Charboneau, and Paige Aaseth

Self (2015, January 15). Retrieved March 21, 2015, from <http://www.hearstakota.com/>

Photo nurse and patient (2015). Retrieved March 23, 2015, from <http://pressoundblog.com/page/2/>

Photo Ear (2015). Retrieved March 21, 2015, from <http://commons.wikimedia.org/wiki/File:Ear.jpg>

Minot State University Nursing  
 Adult Health Maintenance Clinic

**Minot State University**  
 Be Seen. Be Heard

### Identify Hearing Loss: The Self Test

- Often asking people to repeat themselves
- Feeling that people mumble
- Being accused of not paying attention
- Hearing a ringing or buzzing in the ears
- Missing sounds coming from behind you
- Turning the TV or radio too loud for others
- Having the feeling that your hearing is "bad"
- Often misunderstanding what you have "heard"

If you say YES to three or more questions, you may have a potential hearing problem. For an accurate diagnosis and referral - See your primary care provider.

### Where to Get Help & Advice

Audiologists are professionals who administer and conduct hearing screening programs; evaluate and treat hearing loss, balance, and related disorders; recommend and provide appropriate technology, including hearing aids and hearing assistive devices and systems; and provide audiologic rehabilitation. Referrals can be obtained from your primary care provider.



### Audiologists Near YOU!

**\*Jerrica Maxson**

Trinity ENT  
 101 3<sup>rd</sup> Ave SW Suite 203  
 (701) 857-5986

**\*Tricia Nechodom**

Trinity ENT  
 101 3<sup>rd</sup> Ave SW Suite 203  
 (701) 857-5986

**Miracle-Ear Hearing Aid Center**

1425 24<sup>th</sup> Ave SW  
 (888) 491-2281

**Professional Hearing Services**

1400 37<sup>th</sup> Ave SW  
 \*Andrea Larson  
 \*Ed Malazdrewicz  
 \*Jessica Wells  
 \*John Tongen  
 (701) 852-6565

(\* ) ACCEPTS MEDICARE

Appendix D

Hearing Assessment Tool

Hearing Handicap Inventory for the Elderly Screening Version (HHIE-S)

**Instructions:** Please check “yes,” “no,” or “sometimes” in response to each of the following items. Do not skip a question if you avoid a situation because of a hearing problem. If you use a hearing aid, please answer the way you hear without the aid.

	Item	Yes (4 pts)	Sometimes (2 pts)	No (0 pts)
E	Does a hearing problem cause you to feel embarrassed when meeting new people?	_____	_____	_____
E	Does a hearing problem cause you to feel frustrated when talking to members of your family?	_____	_____	_____
S	Do you have difficulty hearing when someone speaks in a whisper?	_____	_____	_____
E	Do you feel handicapped by a hearing problem?	_____	_____	_____
S	Does a hearing problem cause you difficulty when visiting friends, relatives, or neighbors?	_____	_____	_____
S	Does a hearing problem cause you to attend religious services less often than you would like?	_____	_____	_____
E	Does a hearing problem cause you to have arguments with family members?	_____	_____	_____
S	Does a hearing problem cause you difficulty when listening to TV or radio?	_____	_____	_____
E	Do you feel that any difficulty with your hearing limits or hampers your personal or social life?	_____	_____	_____
S	Does a hearing problem cause you difficulty when in a restaurant with relatives or friends?	_____	_____	_____
<b>TOTAL SCORE = _____</b> (sum of the points assigned to each of the items)				

E = Emotional; S = Social

**Interpretation of score:**

- 0-8 suggests no hearing handicap
- 10-24 suggests mild-moderate hearing handicap
- 26-40 suggests significant hearing handicap

Refer for additional hearing evaluation if score is  $\geq 10$  points

Reprinted with permission from Ventry, I.M., & Weinstein, B.E. (1983). Identification of elderly people with hear-ing problems. ASHA, 25, 37-42. Copyright 1983 by American Speech-Language-Hearing Association. All rights reserved.

Appendix E

Documentation Form

Name \_\_\_\_\_ Screening Date \_\_\_\_\_  
 DOB \_\_\_\_\_ Primary Care Provider \_\_\_\_\_  
 Hearing Aids \_\_\_\_\_ R \_\_\_\_\_ L \_\_\_\_\_ Current Audiologist \_\_\_\_\_

- Screening questionnaire (concerns)

\_\_\_\_\_  
 \_\_\_\_\_

- Recent Health History

\_\_\_\_\_  
 \_\_\_\_\_

- Loud Noise Exposure

-Noticeable Hearing Loss \_\_\_\_\_ Onset \_\_\_\_\_ Character \_\_\_\_\_

Exacerbated by certain situations? \_\_\_\_\_

- Tinnitus \_\_\_\_\_

-Self Care Behaviors \_\_\_\_\_ What do you use to clean out your ears? \_\_\_\_\_

- Updated Medication List

New Medications:

\_\_\_\_\_  
 \_\_\_\_\_

- Go over medication list (Ototoxicity)

- Pain Level currently in ears: Internal \_\_\_\_\_ External \_\_\_\_\_

- Examination (External and Internal)

External \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_

Internal: Tympanic Membrane

- Cone of Light \_\_\_\_\_

- Malleus \_\_\_\_\_

- Color of tympanic membrane: \_\_\_\_\_

- Discharge \_\_\_\_\_

- Cerumen \_\_\_\_\_

- Other concerns:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



Appendix E

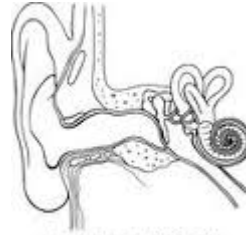
Documentation Form Continued

- Audiometer Testing

Right:

Frequency:

300	Y	N
500	Y	N
800	Y	N
1000	Y	N
2000	Y	N
3000	Y	N



Left:

Frequency:

300	Y	N
500	Y	N
800	Y	N
1000	Y	N
2000	Y	N
3000	Y	N

Comments \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Referral Recommended                      Y        N  
 Reason: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Education Provided:  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Other: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Signature: \_\_\_\_\_

## Appendix F

# Referral Form



## Referral Recommended

According to the Adult Health Maintenance hearing screening provided by the Minot State University Students, we **recommend that you make an appointment with your primary care physician to have your hearing further examined.**

- Please bring this form with to your primary care appointment. For follow up please contact Nikki Medalen RN, BSN, PHN, at (701) 858-3101 to let her know you have scheduled an appointment with your primary care provider.



## Referral Not Needed at This Time

According to the Adult Health Maintenance hearing screening provided by the Minot State University Students, we **do not recommend that an appointment is needed at this time.** Continue to have your hearing checked yearly and call your primary care provider if you feel any hearing loss or changes.