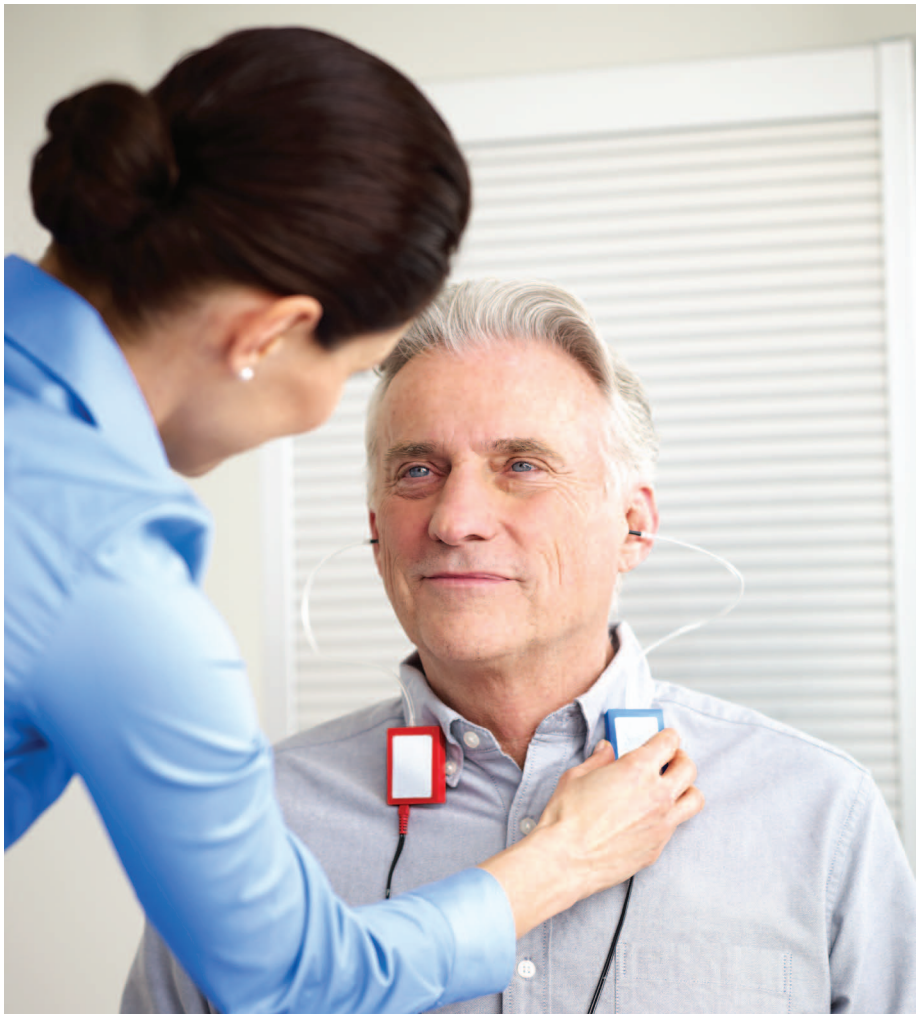
# Preventive Medicine and the Need for Routine Hearing Screening in Adults

Brian Taylor Au.D., Director of Practice Development & Clinical Affairs, Unitron, Plymouth, MN

Robert Tysoe, Marketing Consultant, Hearing Healthcare Marketing Company, Portland, OR

2474 MANL 09-12

unitron™



## Introduction

Recently, the U.S. Preventive Services Task Force issued a recommendation statement advising that "the evidence is inadequate to recommend hearing screening for asymptomatic adults age 50 and older." While this recommendation is grounded in empirical thinking, it neglects the broader consequences of hearing loss brought on by several chronic conditions, which are very prevalent in older adults. The purpose of this white paper is to review some of the common medical conditions that are associated with hearing loss in adults and provide a sensible clinical hearing screening process based on reasonable evidence.

## Dementia

Approximately 3.4 million Americans have been diagnosed with dementia and this number is expected to double by 2025. The majority of these patients are over the age of 85. Although the incidence rate of men to women is equal up to age 85, the lifetime risk for dementia in women is twice as high due to increased life expectancy and the accompanying higher dementia rates in extremely old age (Plassman, 2007). The Mini Mental State Examination (MMSE) is commonly used by physicians to diagnose dementia. Hearing loss and dementia are conditions that affect similar populations. Since many individuals do not seek treatment for their hearing loss, it is plausible that many patients seeking treatment for dementia have an untreated hearing loss. One unpublished study suggests that the loss of audibility associated with an untreated hearing loss effects scores on the MMSE (Jorgenson, 2012). Thus, physicians should account for the possibility of untreated hearing loss when using the MMSE to diagnosis dementia. One way to account for untreated hearing loss would be to conduct routine hearing screening on patients over the age of 85.

## Diabetes

Hearing loss is more than twice as common in adults with diabetes compared to those who do not have the disease, according to a new study funded by the National Institutes of Health. Twenty-one percent of the diabetics surveyed had hearing loss, compared to only 9% of non-diabetics. Of the diabetics tested, 68% of them were found to have hearing loss in the higher frequencies. Lin, et al. (2011) showed about twice the prevalence of hearing loss (20%) in the U.S.population compared to Bainbridge, et al. (NHANES), which indicated the prevalence of hearing loss in adults at 9%. This discrepancy is likely due to the age of the populations studied. Lin, et al. (2011) included the over 69-years-old population, whereas Bainbridge, et al. (2012) used 69-years-old as the cut off for the cohort population. As Lin, et al. (2011) indicate, 54% of the individuals with bilateral hearing impairment were over 70 years of age; if these individuals are excluded, the Lin, et al. (2011) results would show 9.3% of the under 70 years of age population as being hearing impaired. After accounting for this difference in the study design, the prevalence for hearing loss in adults reported in both studies is similar.

A certain degree of hearing loss is a normal part of the aging process for all of us, but it is often accelerated in patients with diabetes, especially if blood-glucose levels are not being controlled with medication and diet. Women between the ages of 60 and 75 with poorly controlled diabetes had significantly worse hearing than those whose diabetes was controlled. Given these findings, diabetic patients and those at-risk for developing diabetes should have their hearing screened on an annual basis.

## Smoking

Approximately 45 to 48 million Americans currently smoke, with female smokers slightly outnumbering male smokers. Current estimates suggest that approximately 60% of children in the United States are exposed to secondhand smoke each day. Research indicates that smokers were 1.69 to 2.1 times as likely to have a hearing loss as non-smokers (Cruickshanks et al., 1998); Secondhand smoking also appears to have a deleterious effect on hearing, as individuals exposed to smokers have a 1.83 increased risk of sensorineural hearing loss compared to those not exposed to secondhand smoking (Lalwini, et al., 2011).

Research findings show that different mechanisms play a role in hearing loss due to exposure to smoking. The first may be related to tissue hypoxia (lack of oxygen) – nicotine and carbon monoxide may actually deplete oxygen levels to the highly vascularized cochlea which is bathed in electrolytic fluids. If oxygen is depleted, tissue damage can occur (Katbamna, 2009).

The affect smoking has on hearing appears to be correlated with the amount of cigarettes smoked. In a study conducted on Japanese office workers who smoke, the research showed "that as the number of cigarettes smoked per day and pack years of smoking increased, the risk of high-frequency hearing loss increased in a dose dependent manner. In other words, the more people smoked each day and the longer they smoked, the worse the hearing damage was – especially in the high frequency range.

Smoking and secondhand smoke is associated with elevated pure-tone thresholds and an increased prevalence of both low and high frequency sensory-neural hearing loss that is directly related to level of exposure.

## Screening for Hearing Loss

Hearing loss is prevalent in nearly two-thirds of adults over the age of 70 (Lin, et al. 2012), therefore, it seems prudent to routinely screen the hearing of all adults over that age, especially those with chronic conditions associated with hearing loss outlined here. Unlike other screening procedures for cancer in which a false positive result, which poses the risk of physical harm and unnecessary emotional suffering for patients that undergo procedures for conditions they do not have, a hearing screening takes a few minutes and can cost nothing. Koike et al. have created a questionnaire that correlates to a measureable hearing test. This Quick Hearing Check can be completed from the comforts of home and shared with the physician during a routine appointment. In addition, there are several downloadable apps, including Unitron's uHear that can be used to accurately and reliably screen hearing. Finally, physicians have the option of referring a patient directly to an audiologist for hearing screening.

A failed hearing screening would require a referral to an audiologist for a more comprehensive evaluation. In this age of preventive medicine, this process begins with a hearing screening for those that present with the risk factors outlined here. Based on a reasonable amount of evidence, hearing screening should be conducted on any adult presenting with a case history that includes smoking, or diabetes. Additionally, adults over the age of 60, especially those that present with dementia like symptoms should have a routine hearing screening.

References

Bainbridge et al. (2008) Diabetes and Hearing Impairment in the United States (NHANES) Annals of Internal Medicine, 149, 1, 1-10.

Cruickshanks K.J. M.D. et al. University of Wisconsin, Madison(1998) Cigarette Smoking and Hearing Loss: the Epidemiology of hearing loss study. JAMA1998 June 3;279(21).

Jorgenson, L. (2012) Unpublished PhD dissertation. University of Pittsburgh

Katbamna, B. (2009) Effects of Smoking on the Auditory System. Audiology Online. Downloaded Sept 2

Koike , J.; Hurst, M.K.; and Wetmore, S. J.(2010). Correlation between the American Academy of Otolaryngology- Head and Neck Surgery five minute hearing test and standard audiological data, Otolaryngology – Head and Neck Surgery, 111, 5, 625-632.4, 2012.

Lalwani, et al., NYU (2011) Exposure to Secondhand Smoke Associated With Hearing Loss in Adolescents. Archives of Otolaryngology – Head and Neck Surgery. July: 655-662.

Lin, F. et al. (2011) Hearing Loss Prevalence in the United States. Archives of Internal Medicine, Nov 14.

Lin, F., et al. (2012) Hearing loss prevalence and risk factors among older adults in the United States. Journal of Gerontology. 66, 5, 582-590.

Plassman, B., et al. (2007). Prevalence of Dementia in United States: The Ageing, Demographics, and Memory Study. Neuroepidemiology, 29, 125-132.