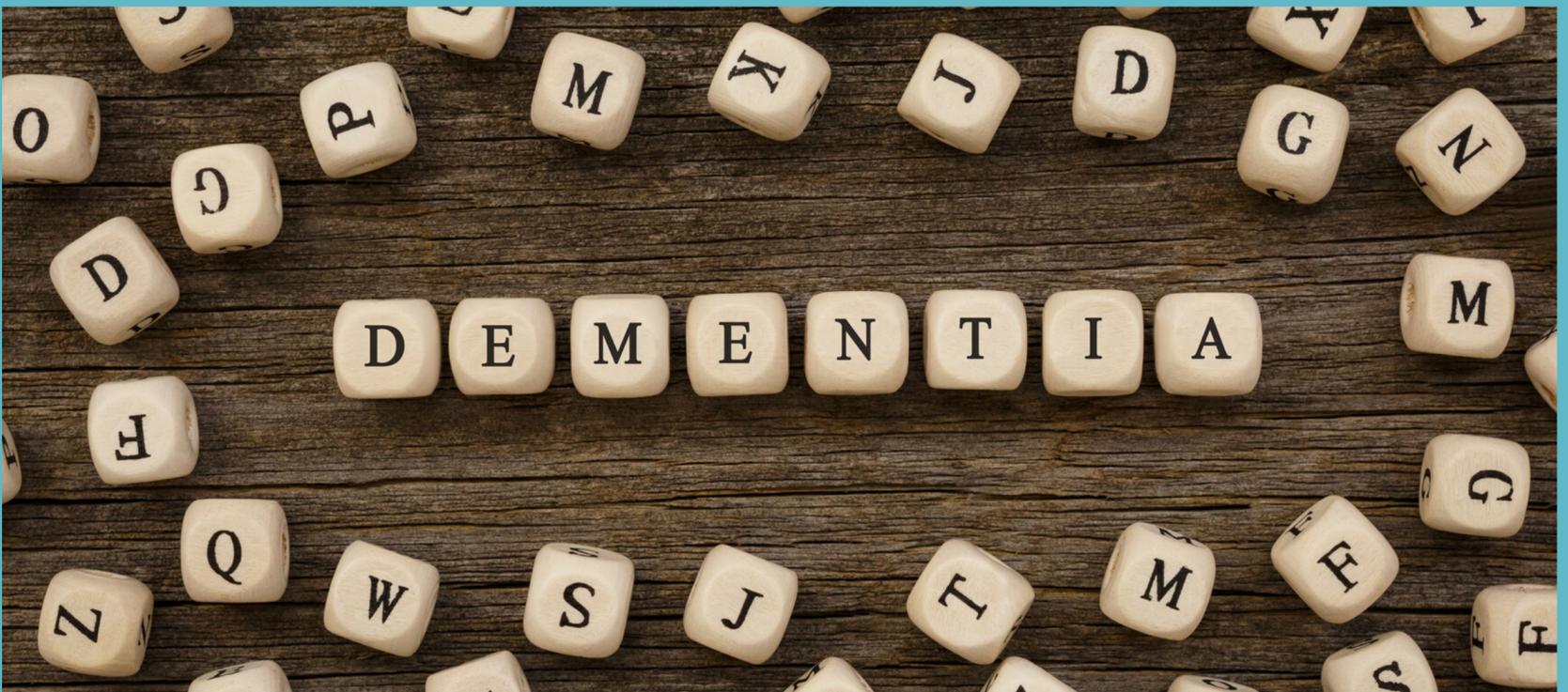


DEMENTIA

Official publication of The Hearing Assessment Center



WHAT'S INSIDE THIS ISSUE:

Hearing loss is a comorbid disease, meaning it results or relates to many other conditions (please check out our **EBook: Comorbidities of Hearing Loss**). Below, we will be discussing one of the more well-known **comorbidities of hearing loss**, and that is cognitive impairment. In particular, we will reference dementia. The prevalence of cognitive impairment is much higher in those with hearing loss. Did you know that the treatment of hearing loss is the single most modifiable factor for preventing dementia?

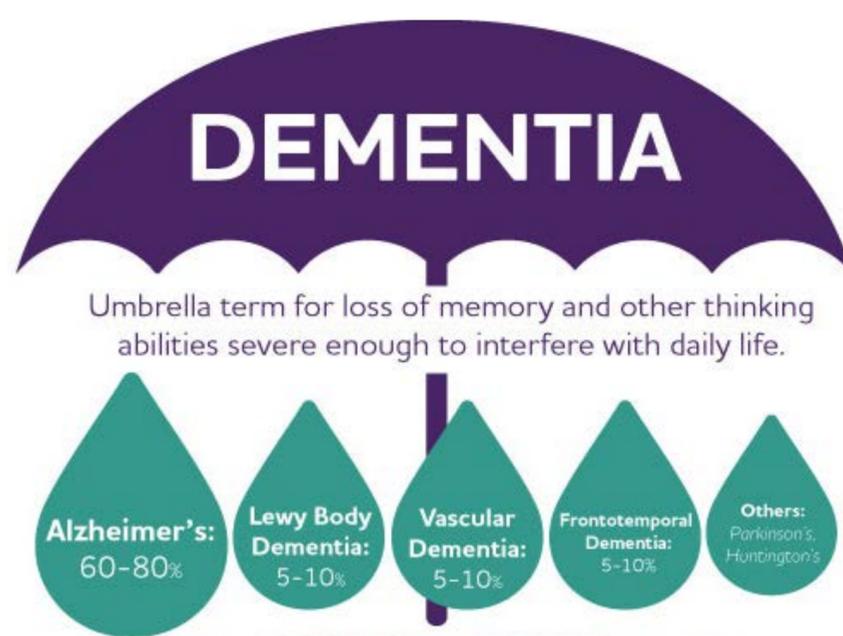
Before discussing the link between [hearing loss and dementia](#), let's better understand the difference between mild cognitive impairment and dementia and explain how these conditions may impact one's quality of life.



MILD COGNITIVE IMPAIRMENT AND DEMENTIA

Mild cognitive impairment (MCI) causes a slight, but noticeable and measurable, decline in cognitive abilities, including memory and thinking skills without affecting the individual's ability to carry out everyday activities. A person with MCI is at an increased risk of developing Alzheimer's or another form of dementia.

Dementia is not a single disease, it is an overall term that covers a wide range of specific diseases and conditions characterized by a decline in memory, language, problem-solving, and other thinking skills that affect a person's ability to perform everyday activities. Disorders falling under the umbrella term "dementia" are caused by abnormal, physical changes within the brain. As a result, this triggers a decline in thinking skills (known as cognitive abilities), impairment of daily life, and reducing independent function. Furthermore, behaviors, feelings, and relationships may also be affected.



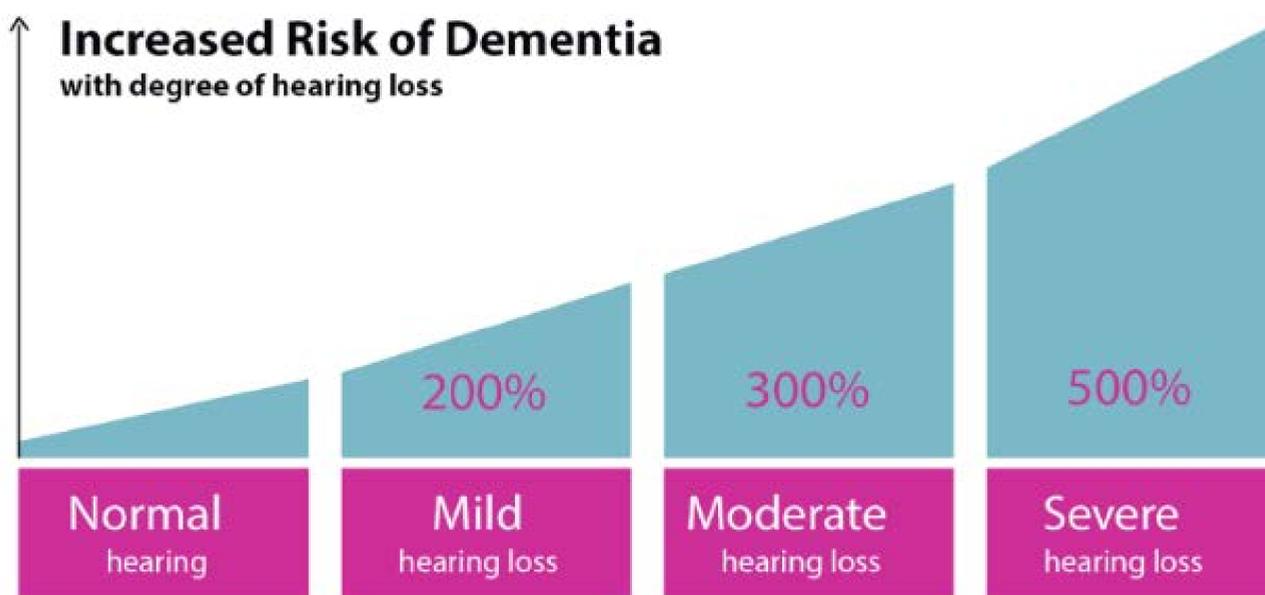
Alzheimer's is the most common cause of dementia. The second most common is vascular dementia, which occurs because of microscopic bleeding and blood vessel blockage in the brain. There are many other conditions that can cause symptoms of dementia, including thyroid problems, vitamin deficiencies, depression, and more recently discovered, **hearing loss**.



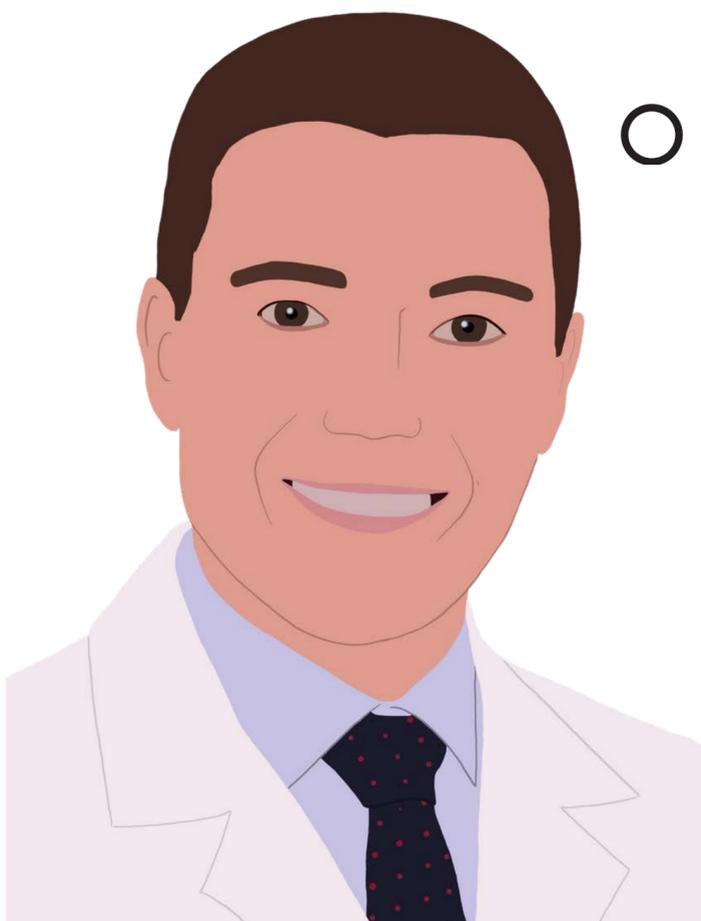
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Approximately, 45 million people worldwide have some form of dementia. In perspective, 48+ million people in the United States have hearing loss alone. Research indicates that the prevalence of cognitive impairment is much higher in those with hearing loss. Dr. Frank Lin at Johns Hopkins was the first researcher to document the link between hearing loss and dementia. This research shows that hearing loss can increase the risk of dementia by 200-500%. This is a HUGE fact. In the past, our society was exposed to cigarettes, lead paint, and asbestos. Previously, we used these items because we did not understand the danger and consequence. That is, until research showed us the connection between these items and cancer. For too long, hearing loss has been very casually thought of and treated. But now we know that treating your hearing loss appropriately might be the single best way to offset your risk of developing dementia.



I always will tell my patients that we walk with our spine and we hear with our brain. So the term "hearing loss" doesn't quite seem significant enough! We call it like it is, hearing loss is a communication handicap. And since hearing loss can lead to reduced cognitive performance, we feel a better term is Cognitive Hearing Loss.



Dr. Rory Cernik



HEARING ASSESSMENT CENTER, LLC
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We routinely see patients with one or more of the following signs of a cognitive hearing loss. If you have ANY of the below symptoms and you do not currently treat your hearing loss, you are at risk of cognitive decline. We define cognitive hearing loss as:

1. Lack of Clarity

The inability to clearly understand the speaker. You may misinterpret words, for example, if you are at dinner with your wife and she asks "what kind is it?" you may respond with "it is quarter to 8pm." Mistaking "time" for "kind."

2. Tinnitus

The occasional or constant ringing, buzzing, or chirping in your ear(s) in the absence of any external sound. Tinnitus is often associated with hearing loss.

3. Difficulty in the Presence of Background Noise

The most common complaint among those with hearing loss is the inability to hear in a noisy environment. Any noise, speech or babble that competes with the primary speech signal is considered background noise. Most of us are in this type of setting for the majority of the day.

If you have one or more of the following, we recommend you call our office today.

Testing for Cognitive Hearing Loss at the Hearing Assessment Center

Can you believe that most hearing-care practices still DO NOT assess their patient's ability to hear in a background noise environment? In fact, less than 15% do so. At this clinic (HAC), we examine each patient's cognitive abilities by running a battery of tests. One particular test is able to test your processing abilities. The test is referred to as speech in noise testing, where you would be asked to repeat a few sentences in the presence of background noise. The test gives us a ratio, which tells us how much louder you need the speech or sentence to be above the noise for you to comprehend and reiterate it.

Here is Dr. Rory Cernik giving an example:

"An unremarkable brain may be able to filter speech from background noise, even when speech is heard at the same intensity (volume) level as the background noise. In contrast, someone with a diagnosed cognitive hearing loss may require speech to be 15 dB (volume) above the background noise-level, just to hear and understand. Without doing the proper testing and/or gaining this information, we cannot properly help our patients reduce their risk of cognitive decline associated with hearing loss."

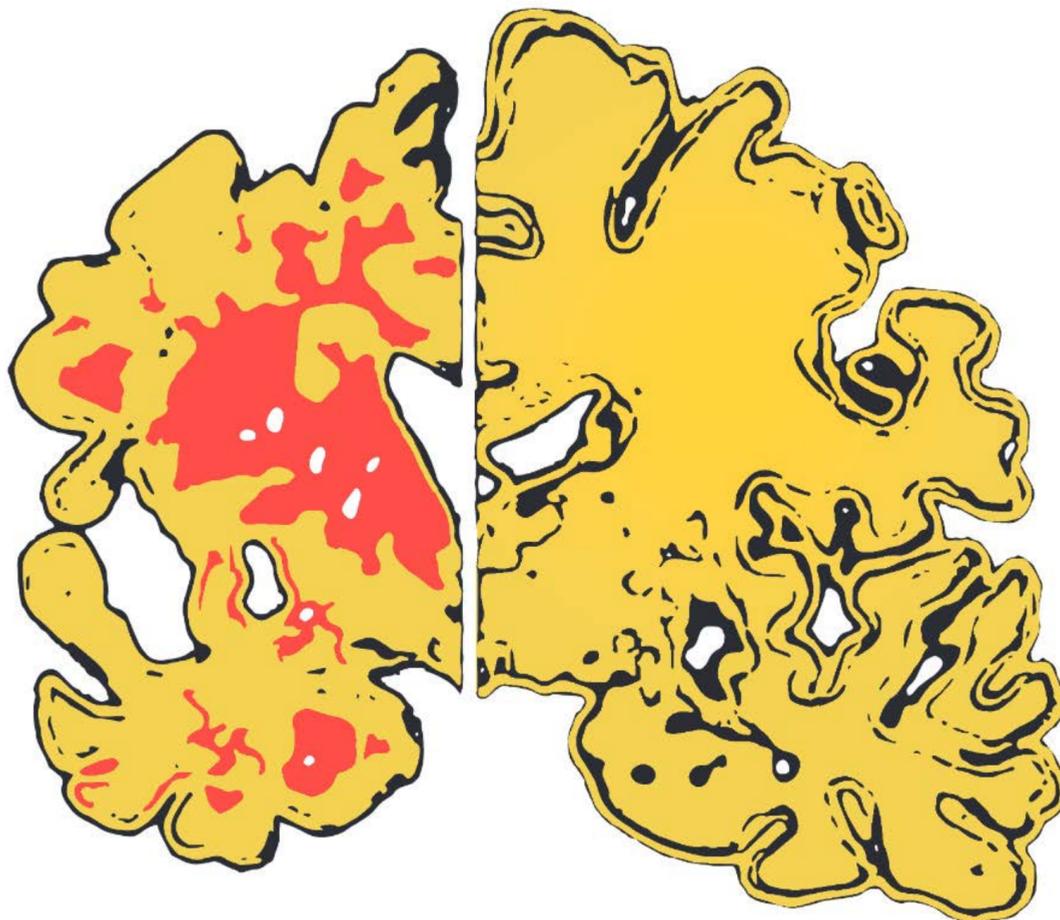


This is a valuable test for counseling our patients and recommending the appropriate treatment in order to reduce their listening effort and strain on the brain.

Link Between Cognitive Impairment and Hearing Loss

Multiple studies have suggested older people with hearing loss are more likely to have a faster rate of cognitive decline due to:

1. **Cerebral Atrophy (aka Brain Shrinkage):** The concept of your brain shrinking due to a loss of neurons is well documented and has been associated with dementia, as well as Mild Cognitive Impairment. In recent years, MRI scans of the brain have shown that hearing impairment is associated with accelerated brain atrophy in both the overall brain, as well as important parts of the brain that focus on memory, hearing, speech, and language.



Brain With Hearing Loss

Brain With Normal Hearing

2. **Social Isolation:** Social isolation occurs from reduced social and physical activity. For those with hearing loss, they often withdraw from social situations due to embarrassment, fear of making mistakes in conversation, and feeling disengaged from conversations. It is also common for those with hearing loss to withdraw from physical activity as well. When you combine the social isolation and the diminished physical activity, you increase the risk of developing dementia. This result comes in the form of cognitive understimulation.

3. **Cognitive Overload:** The loss of hearing is not normal and neither is the excess strain it puts on the brain. With hearing loss, the brain is constantly on 'overload' trying to fill in the missing pieces, and lead to a reduction in processing abilities. The increased cognitive load and increased listening effort are risk factors for developing dementia.

When your brain is in cognitive overload it is very similar to trying to pull a trailer up a hill with the wrong horse powered truck. At some point, you are going to burn-out and/or destroy the engine. The same happens to your brain - it burns out. The good news is when you treat your hearing loss, the reduction of load on the brain can increase your memory recall by as much as 30% when following conversation.

How Hard Does Your Brain Work to Listen?

Hearing in noise is the biggest problem people with hearing loss face, as we previously mentioned. For a person with hearing loss, your brain is working hard to process what is being said, and it is actually working even harder if you can understand all the words. The listening effort required to keep up with the conversations can be exhausting for a person with hearing loss.

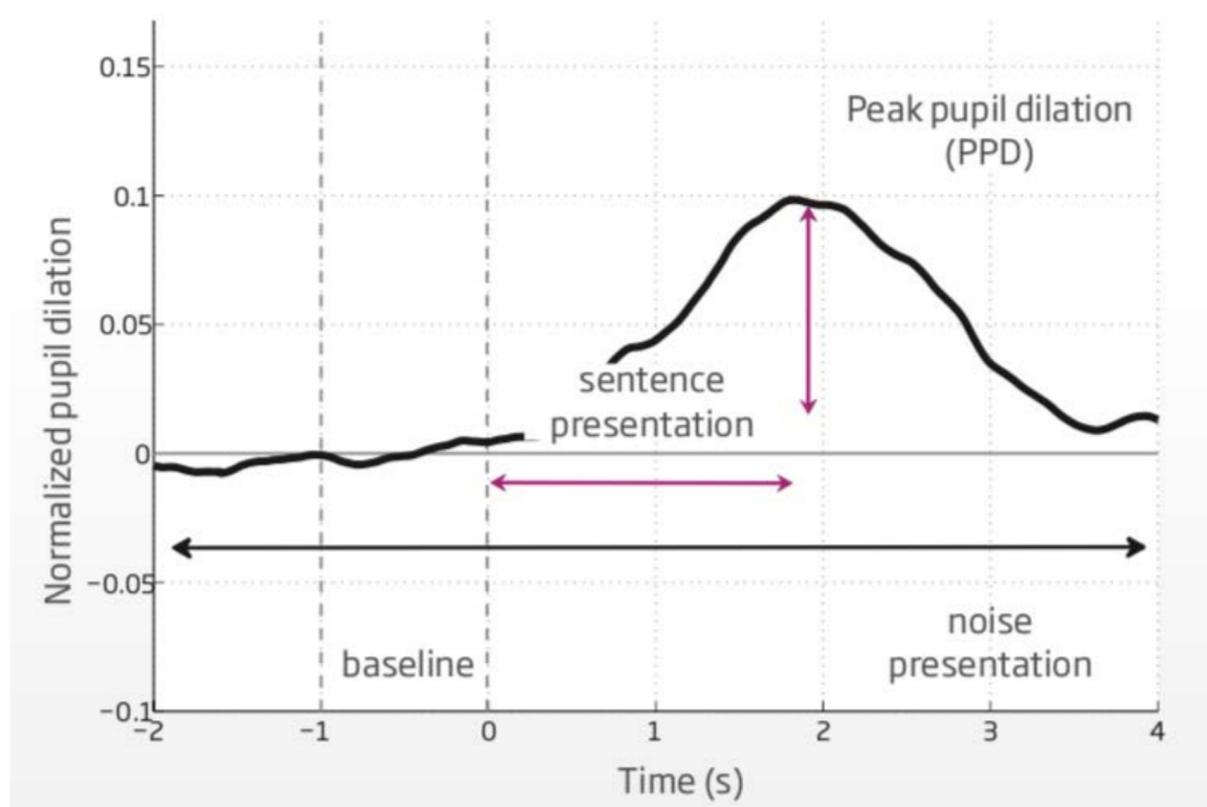
Recent studies have looked at how hard your brain has to work in order to understand speech in different environments such as around the dinner table via **pupillometry**.

Pupillometry is a well-recognized way to measure pupil dilation. Pupillary responses reflect activation of the part of the brain that is responsible for various cognitive tasks. Greater pupil dilation has been associated with higher level of processing within the brain. This is what we call cognitive load. Researchers have found that when we pay attention to sound, the muscles in the eyes contract and release based on listening effort. Pupillometry has become a valuable new way to assess strain on the brain's processing power when trying to understand speech.

In one study, pupil dilation was recorded while the participants repeated back sentences in simulated noisy environments. See below how the participants were oriented in the booth. The study compared premium technology to basic/older hearing technologies.



The results showed the new premium technology (which is what we use at HAC), had a 20% reduction of listening effort in the presence of background noise, thus making it easier for the brain to process. Premium technology can reduce pupillary dilation and listening efforts in the presence of background noise; therefore, there will be a reduction in cognitive load.



What (HAC) Does to Treat Hearing Loss and Dementia

Prior to determining the proper treatment, you will undergo a battery of tests which will look at individual parts of the auditory system, and the system as a whole. This will give us a good idea of what is going on and your risk for developing a cognitive impairment. We will counsel and educate you and whomever accompanies you to your appointment on your results and find the treatment option that works best for you.

When asked about our mission here at HAC, **Dr. Rory Cernik** commented:



"Our ultimate goal in treating hearing loss is to reduce the risk factors of developing dementia and potentially improve cognitive abilities. That is why we use premium technology when treating hearing loss because it gives our patients the best likelihood of reducing their cognitive load, thus reducing the incidence of dementia."

Research has found premium hearing devices can reduce listening efforts and improve cognitive function, particularly the area called working memory after only 3 months of use. As previously mentioned, treating your hearing loss is the single most important thing you can do to reduce your risk of developing a cognitive impairment.

Things you can do now that can help reduce your risk:

- Have regular hearing evaluations, starting at the age of 50 years old.
- Following the recommended treatment plan laid out by your hearing care professional.
- Improving the environment, for example by reducing background noise and distractions and making sure the area is well lit.

Look out for our next eBook where we will discuss COMORBIDITIES OF HEARING LOSS!

The logo consists of several concentric, overlapping curved lines in a gold or olive green color, forming a stylized circular shape that resembles a sound wave or a hearing aid component.

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