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Why Hearing is a
Surprising Porthole
into preventative
health care





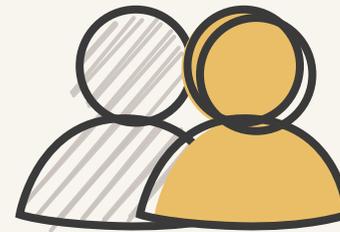
What does **the ear** have to do with diabetes, cardiovascular disease, and chronic conditions, like kidney disease?

This small structure can be the first to signal metabolic change in the body. It means the first signs of chronic conditions such as diabetes, cardiovascular disease, anemia, kidney dysfunction, depression, and dementia are observed by keen audiologists.

Not too long ago, the only thing a hearing test told us was how well a person could hear. In recent years that has changed dramatically and science has discovered one of the most exciting, and needed, connections in a generation. At the center? The tiny ear structure.

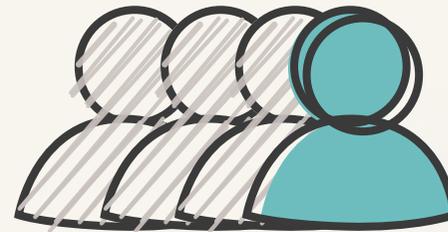
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With chronic diseases as the leading cause of death, disability, and health care costs in the US, this discovery has massive implications for ways to control chronic disease spend.



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1 in 4

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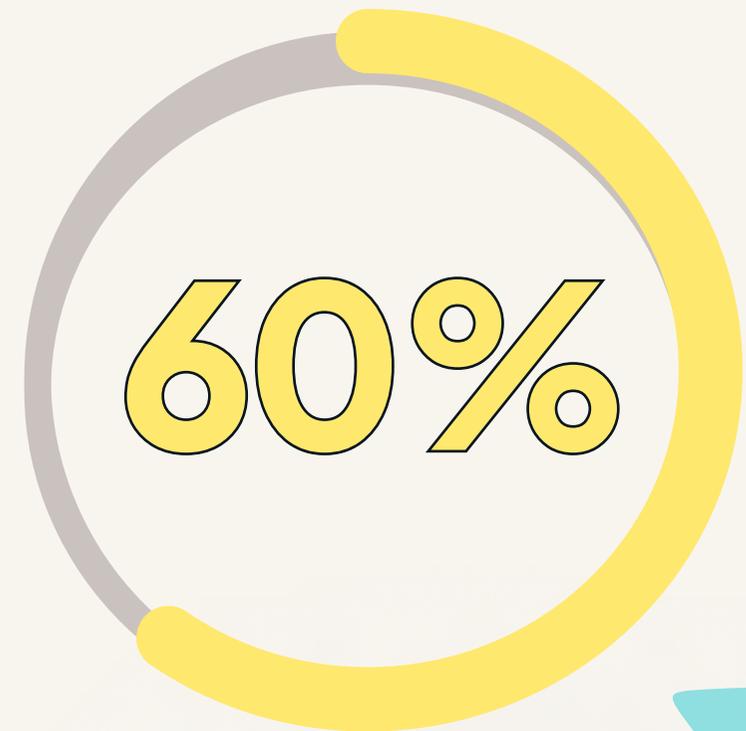


1 in 2 adults in the US have a chronic condition. One in 4 adults in the US have two or more chronic conditions (1). Major medical plan premiums and spend for employers is spiraling out of control. When it comes to fighting these conditions, the fact that the tiny ear structure is often the first to signal metabolic change in the body, places a new importance on an often overlooked benefit, hearing health coverage, and positions a new approach, one with screening and prevention, as an important part of the total benefits package for working-age adults and their families.

We've known hearing loss is a comorbidity of many chronic illnesses and diseases for some time but now, we have the technology to affordably open access to everyone, using the findings as an early warning system, with the audiologist raising the alarm to the rest of the care team for changes in the body, signaling warning signs long before a diagnosis is made.

However, these early signs of chronic disease are revealed only if the individual can access and afford this kind of audiologic care, and the other providers caring for the individual get the data necessary to make appropriate adjustments and diagnoses. Unfortunately, 60% of employees have no employer-sponsored hearing health coverage, and of the 40% who do, it's almost exclusively limited to discounted hearing aids or expensive ENT visits.

The opportunity presented here has benefits for employees, plan sponsors, and society overall. With audiologists able to identify the early warning signs of chronic conditions, we can improve the health of our colleagues, family, and friends, and the economy.



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How can the ear signal a chronic disease?

The auditory system provides a unique method to get sound to the brain where it can be heard and interpreted. Without an intact system, we struggle to communicate. We don't have the ability to "turn off" our hearing or "close our ears" and the power needed to drive this system is much larger than previously suspected. To start with, it needs a good and consistent blood flow. It also needs a way to protect the delicate hearing organ (cochlea) from outside intruders.

We shouldn't just be using audiologists to check hearing health, we should be using them as a first line of defense and *as a crucial check for overall health*

This is the job of the stria vascularis (SV). The SV is located behind your eardrum, next to the cochlea, and can be thought of as a 'gatekeeper'. It's tasked with keeping the nasty toxins out by putting up a barrier (the blood-labyrinth barrier). It basically says 'thou shall not pass' so it can protect the cochlea and our hearing. At the same time, it lets in the energy and blood supply needed to power our hearing. It says 'you're ok to pass, c'mon on in'.

Where this gets really interesting is we now know this 'gatekeeper' can raise its hand and signal the need for help. That's because at the very earliest stages of, and sometimes, even before, chronic conditions crop up, cells that act as sound wires around the SV start to die. In other words, there's less good stuff to let in. There's likely not a perceptual change in hearing at all but the SV knows something is up and there's an imbalance. So if we're looking closely, and audiologists are the only people looking, we can see this signal.

That signal is really a big, red flag. It's a proven early warning system for the potential presence of a chronic condition. It means we shouldn't just be using audiologists to check hearing health, we should be using them as a first line of defense and as a crucial check for overall health.



What are some of the chronic diseases that we can impact with a new approach to hearing health?

○ Cardiovascular Disease

Let's start with the big one. Cardiovascular disease is in the top 5 causes of death for all 18–64 year olds (<https://wisqars.cdc.gov/data/lcd/home>) For employers, 4 of the top 10 most expensive conditions fall under cardiovascular disease, and each year, they spend over \$36 billion in lost productivity for employees with these conditions (<https://www.cdc.gov/chronicdisease/resources/publications/factsheets/workplace-health.htm>)

Nearly every benefits leader has containing cardiovascular disease costs as a strategic imperative, and traditional methods haven't worked. Why does hearing health offer a massive opportunity to support cost containment? It comes back to the job of the SV, our gatekeeping friend that can tell us when something is wrong.

Hearing issues related to chronic cardiovascular conditions start within the SV. In particular, hearing loss always precedes the clinical symptoms of coronary artery disease, atherosclerotic cardiovascular disease, cardiomyopathy, and many heart attacks.

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Even more importantly, the type of hearing loss that indicates cardiovascular disease shows a trademark pattern: it's the uncommon low-frequency hearing loss that develops first. For the individual experiencing this loss, they may not even notice the issue. If the last time their hearing was checked was in middle school, this valuable early indicator goes unnoticed until it's too late.

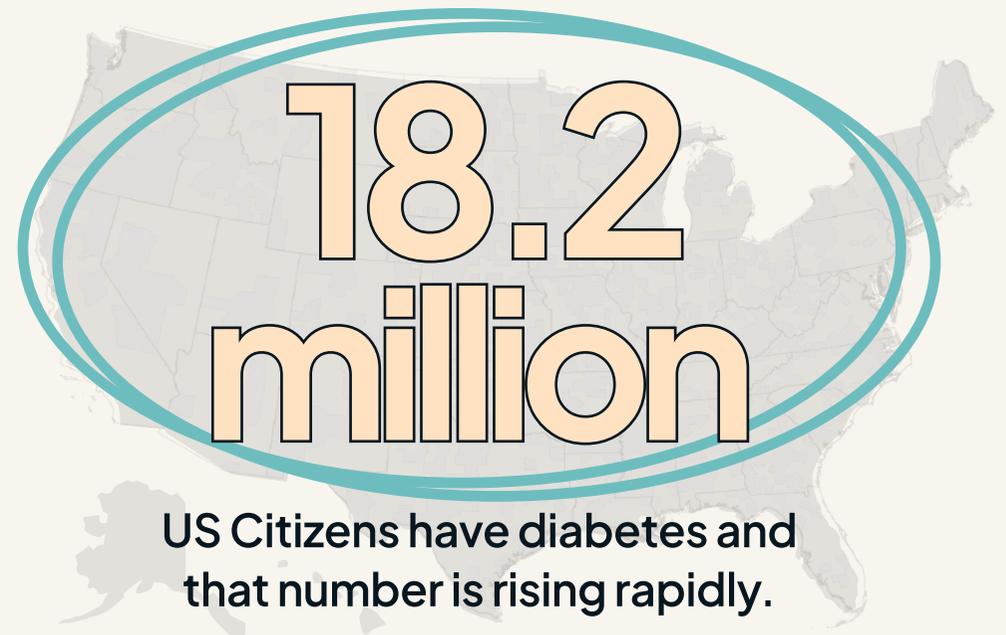
Unfortunately, for most individuals, the hearing loss isn't noticed, their PCP doesn't have the equipment (or time!) and their benefit excludes annual hearing screenings. So what happens? Cardiovascular disease and costs continue to spiral out of control.

Diabetes

Second to cardiovascular disease but by no means small and still incredibly costly, is diabetes. 18.2 million US Citizens have diabetes and that number is rising rapidly.

Worryingly, around one third of these will have no idea they are diabetic and suffering from a disease with no cure, that will be with them for life.

People with diagnosed diabetes have medical expenditures which are 2.3 times higher than those who are not diabetic.



It costs \$90 billion in reduced productivity and adds \$3.3 billion to the absenteeism bill annually (<https://diabetes.org/about-us/statistics/cost-diabetes>)

There are 41 million Americans who are considered to be pre-diabetic. This is a reversible condition if identified and treated early enough (<https://www.cdc.gov/diabetes/library/features/truth-about-prediabetes.html>). The problem is pre-diabetes is a master of not letting itself be known. You can have it for years without ever suspecting.



Yet, as with other chronic conditions, there is a strong comorbidity with hearing loss and we know diabetics will often present with reduced hearing. It's generally thought this is due to the high blood glucose levels causing damage to the small blood vessels.

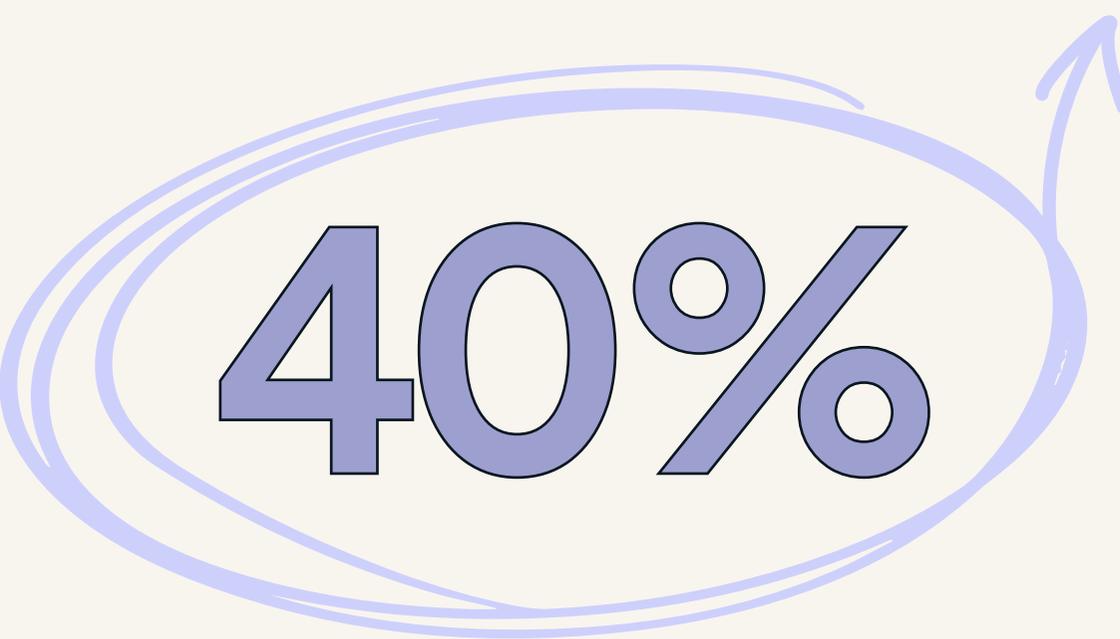
So yet again, our gatekeeping friend, the SV, has a role to play in raising a red flag and acting as an early warning system.

Where employers include an annual hearing screening they stand a greater chance of noticing these early warning sounds and helping reverse the effects of the disease before they lead to suffering for the individual, and higher costs for the company, both direct (medical) and indirect (productivity and absenteeism).

○ **Cognitive Decline & Dementia**

Hearing loss in adults is strongly and independently associated with the likelihood of having dementia. Even where the hearing loss is mild, there is an increased risk of dementia and the associated cognitive decline. This has led to calls by Alzheimer's Research UK to call for regular hearing screening for the workforce from 30 years of age.

In 2020, the Lancet published a report investigating the growing number of dementia cases worldwide, detailing a number of lifestyle factors that increase the chance of dementia as you age. Mitigating these risk factors can prevent or delay up to 40% of dementia cases.



40%

of dementia cases can be prevented or delayed by mitigating some lifestyle risk factors



Their findings showed conclusively that a mild hearing loss doubles the risk of dementia risk, while a moderate hearing loss trebles the risk. A severe hearing impairment will increase the risk of dementia x 5.

For employers, there's a sliding opportunity here for employee welfare and reduced costs. Annual screening can help prevent mild hearing loss, while those with hearing loss can benefit from mitigation strategies, devices and treatment that prevents the conditioning worsening.

If the individual's benefit doesn't include an annual hearing screening, this is not possible. Where the individual's benefit only includes a hearing aid, it's already too late.

Tuned is a digital-first hearing care company.

Available as a standalone and an employer-sponsored benefit, Tuned offers the only lifelong hearing benefit for patients of all ages.

Looking to the Ears to Predict the Future

We know hearing loss accompanies many chronic conditions. Modern science has proven that conclusively. We know our hearing includes a gatekeeper of sorts (the SV), able to warn audiologists there might be a problem, and to alert the other doctors caring for the patient so an issue can quickly be prevented or brought under control. We know that early detection can be enough to influence the prognosis for the individual if there is a condition present.

We know what to look for, and we know what it means if we find it. What do benefits leaders need to do? Take a look and see what hearing care looks like under their benefit plans. Are there any options? Is an annual screening included? Does the rider or summary of benefits include anything beyond discounted hearing aids for hearing loss?

Beyond what's available in an ENT clinic? If audiologists are available, how is hearing screening data getting back to the rest of the providers caring for your employees? Ask employee resource groups for employees with chronic conditions if they know about the link between hearing health and their condition. Hearing health is crucial to overall health.

With the availability of tele-audiology making access affordable, and the clear impact of hearing as a red flag on chronic condition spend, an annual hearing check should be a cornerstone of healthcare and 'must-include' in every benefits package.



Bibliography

CDC

Chung SD, Chen PY, Lin HC, Hung SH. Sudden sensorineural hearing loss associated with iron-deficiency anemia: a population-based study. *JAMA Otolaryngol Head Neck Surg*. 2014 May;140(5):417–22. doi: 10.1001/jamaoto.2014.75. PMID: 24626300.

Susmano A, Rosenbush SW. Hearing loss and ischemic heart disease. *Am J Otol*. 1988 Sep;9(5):403–8. PMID: 3202130.

Lin FR, Albert M. Hearing loss and dementia - who is listening? *Aging Ment Health*. 2014;18(6):671–3. doi: 10.1080/13607863.2014.915924. PMID: 24875093; PMCID: PMC4075051.

Lin FR, Metter EJ, O'Brien RJ, Resnick SM, Zonderman AB, Ferrucci L. Hearing loss and incident dementia. *Arch Neurol*. 2011 Feb;68(2):214–20. doi: 10.1001/archneurol.2010.362. PMID: 21320988; PMCID: PMC3277836.



Tuned supports care with comprehensive product options for hearing health, freeing employers from the need to evaluate thousands of practice groups, headsets, and software combinations. Today, 5.1 million people can access

Tuned through employer benefits and marketplaces.

Tuned is a private company headquartered in New York City, with audiologists across the United States and worldwide.

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