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- Call 800-753-2160 (M-F, 8 AM-8 PM ET)
- Email customerservice@AudiologyOnline.com

continued[®]

Audiology: Diabetes Hearing & Balance Care

Pathophysiology

Audiology Medical Management

Inter Professional Education and Collaboration

Dr. Kathy Dowd, AuD Executive Director

The Audiology Project

continued[®]

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Learning Outcomes

After this course, participants will be able to:

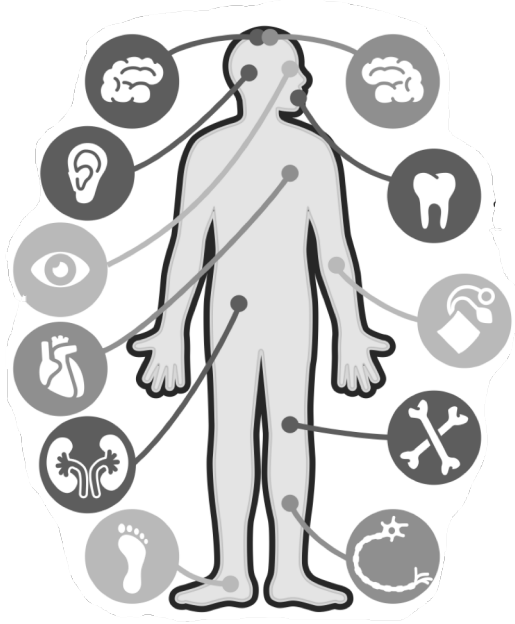
- 1) Describe the pathophysiology of diabetes on the cochlea and vestibular canals, neural systems and perception of hearing and balance.
- 2) Explain how audiology medical management will ensure the best patient outcomes for diabetes care.
- 3) Explain how to work toward interprofessional education and collaboration in their state and local venues for the inclusion of audiology in diabetes care.

What is happening in the body with diabetes

- Microangiopathy and Neural degeneration
- More susceptibility to infections
- Domino effect with other chronic diseases: CVD, CKD, etc.
- 9-12 years to identify diabetes or pre diabetes

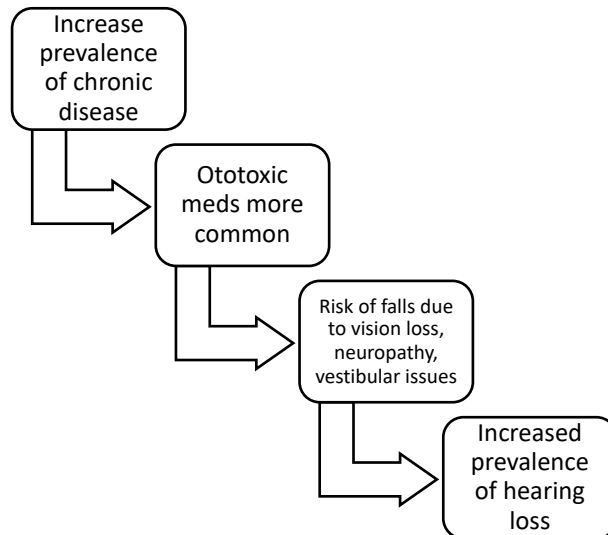
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Hearing loss is higher among individuals with diabetic retinopathy



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Weakened immunity with advancing age...



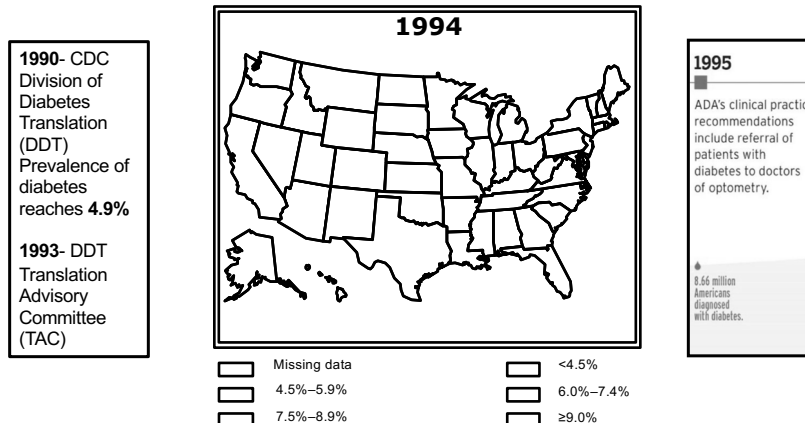
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Why is hearing loss not easily detected?

- Anosognosia is a confounding factor:
 - Patient's lack of awareness, signs and symptoms of an illness. Its not merely a denial: it's an actual neurological deficit.
 - Wikipedia: a deficit of self-awareness, a condition in which a person who suffers some disability, seems unaware of his or her disability
 - 'Denial of illness' by the patient

Age-Adjusted Prevalence of Diagnosed Diabetes Among US Adults

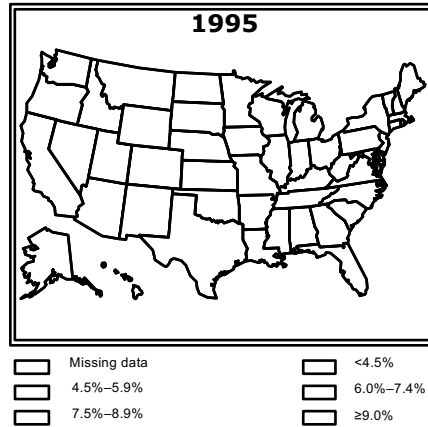


CDC's Division of Diabetes Translation. United States Surveillance System available at <http://www.cdc.gov/diabetes/data>



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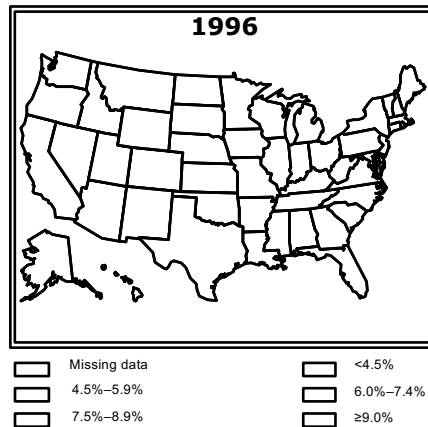
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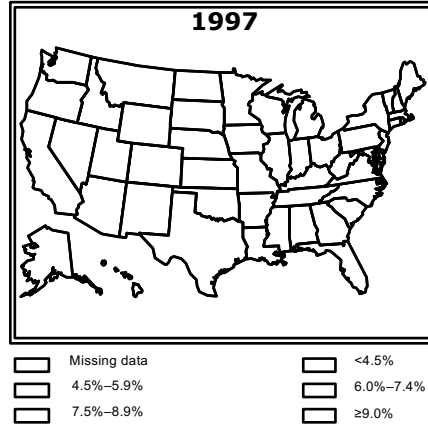
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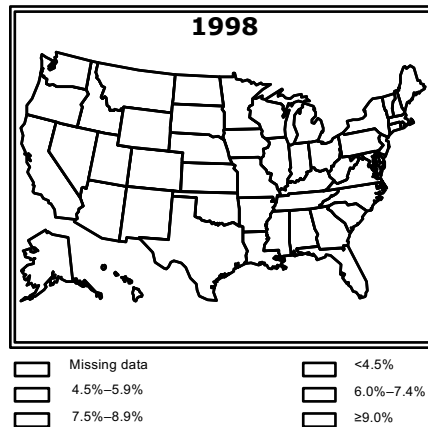
Age-Adjusted Prevalence of Diagnosed Diabetes Among US Adults



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Age-Adjusted Prevalence of Diagnosed Diabetes Among US Adults



1998- Prevalence of diabetes 6.5% - an increase of +33% from 1990

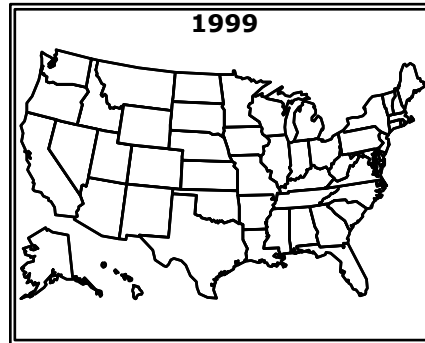


CDC's Division of Diabetes Translation. United States Surveillance System available at <http://www.cdc.gov/diabetes/data>



Age-Adjusted Prevalence of Diagnosed Diabetes Among US Adults

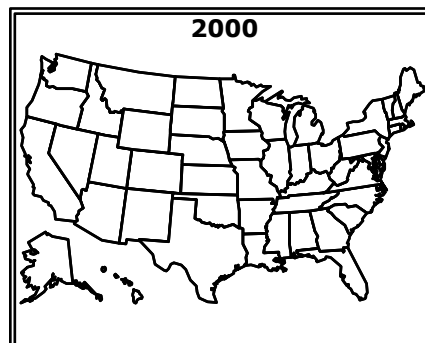
1999- PPOD
Jointly sponsored
program by Centers
for Disease Control
and Prevention
(CDC) and National
Institutes of Health
(NIH).



CDC's Division of Diabetes Translation. United States Surveillance System available at
<http://www.cdc.gov/diabetes/data>



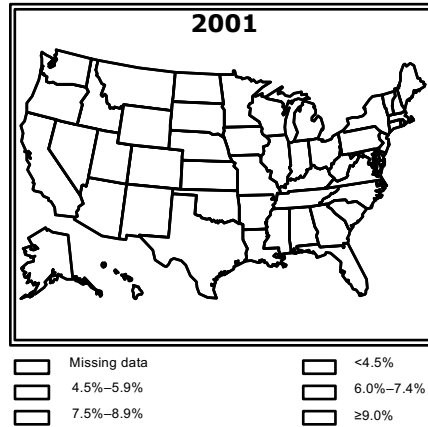
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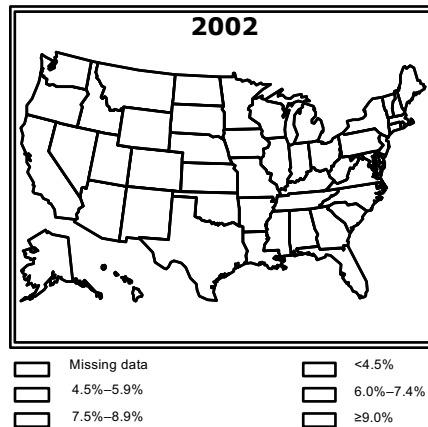
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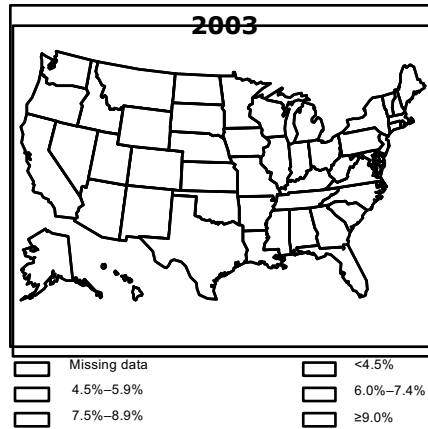
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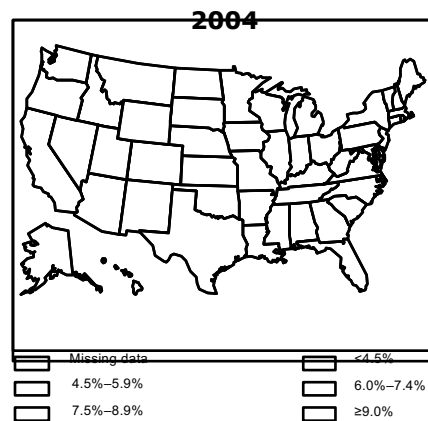
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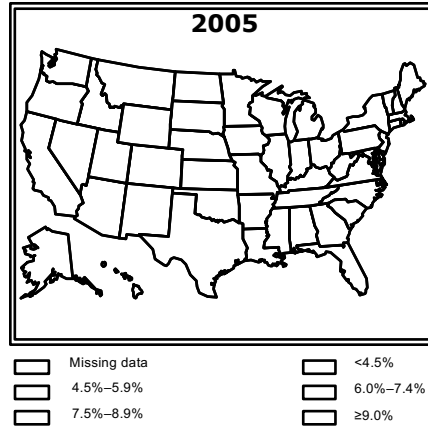
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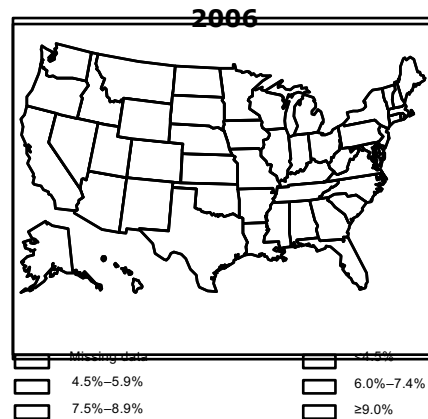
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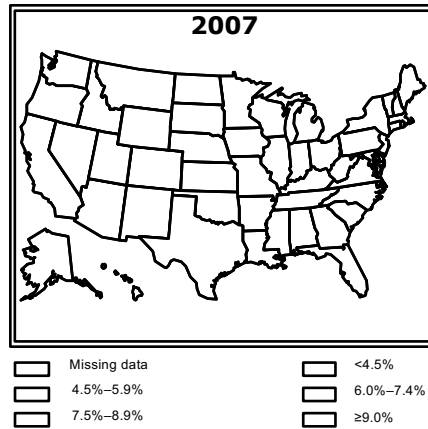
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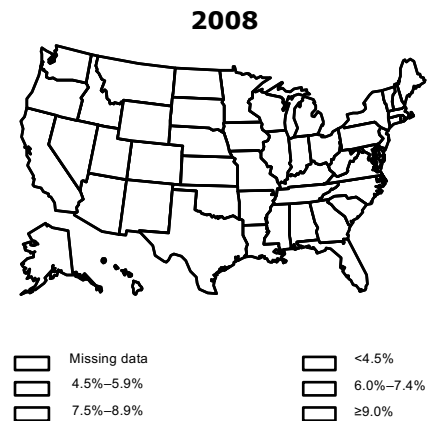
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Age-Adjusted Prevalence of Diagnosed Diabetes Among US Adults

2009



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Age-Adjusted Prevalence of Diagnosed Diabetes Among US Adults

2010

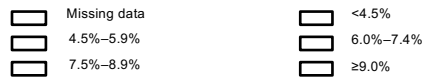


CDC's Division of Diabetes Translation. United States Surveillance System available at <http://www.cdc.gov/diabetes/data>



Age-Adjusted Prevalence of Diagnosed Diabetes Among US Adults

2011



CDC's Division of Diabetes Translation. United States Surveillance System available at <http://www.cdc.gov/diabetes/data>



Age-Adjusted Prevalence of Diagnosed Diabetes Among US Adults

2012



CDC's Division of Diabetes Translation. United States Surveillance System available at <http://www.cdc.gov/diabetes/data>



Age-Adjusted Prevalence of Diagnosed Diabetes Among US Adults

2013

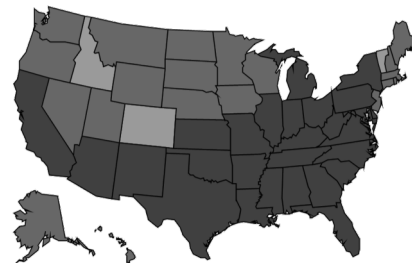


CDC's Division of Diabetes Translation. United States Surveillance System available at <http://www.cdc.gov/diabetes/data>



Age-Adjusted Prevalence of Diagnosed Diabetes Among US Adults

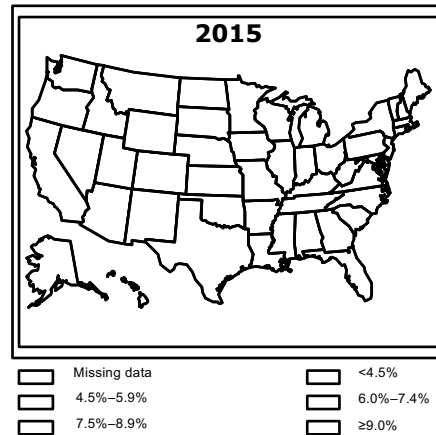
2014



CDC's Division of Diabetes Translation. United States Surveillance System available at <http://www.cdc.gov/diabetes/data>



Age-Adjusted Prevalence of Diagnosed Diabetes Among US Adults



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Diabetes & Hearing Loss

High blood glucose levels associated with **diabetes** cause **damage** to the small blood vessels in the **inner ear (microangiopathy)**, similar to the way in which **diabetes** can damage the eyes and the kidneys.

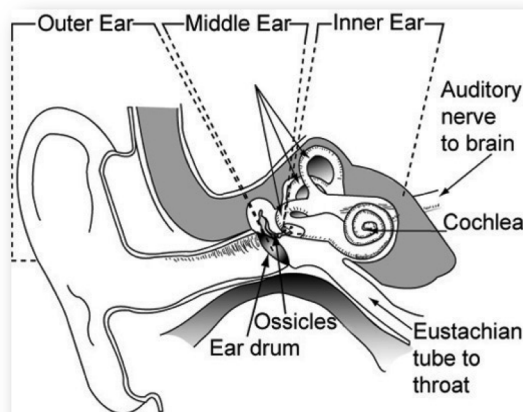


Figure 1: The Outer, Middle, and Inner Ear

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Why balance is important in diabetes care

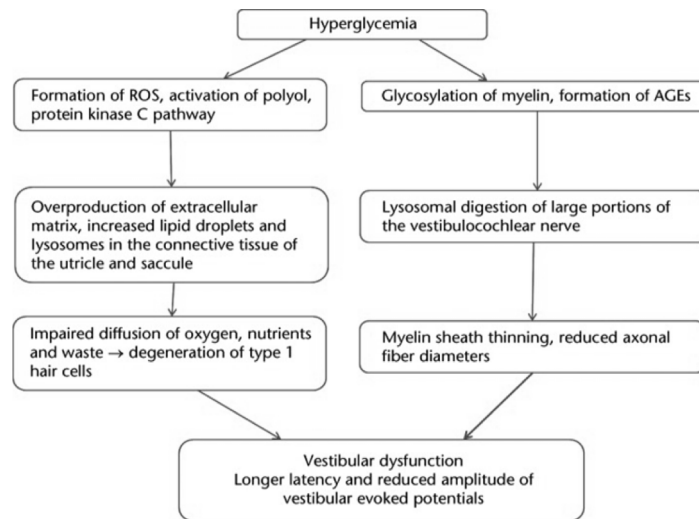
- Poor balance contributes to fall risk and fear of falling
- Risk of falls contributes to lack of exercise and falling leads to potential **bone fractures**
- Risk of falls impedes diabetes care

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Fall risk: where does vestibular impact occur

The American Diabetes Association lists bone fractures as a comorbid condition of diabetes, without mentioning fall risk

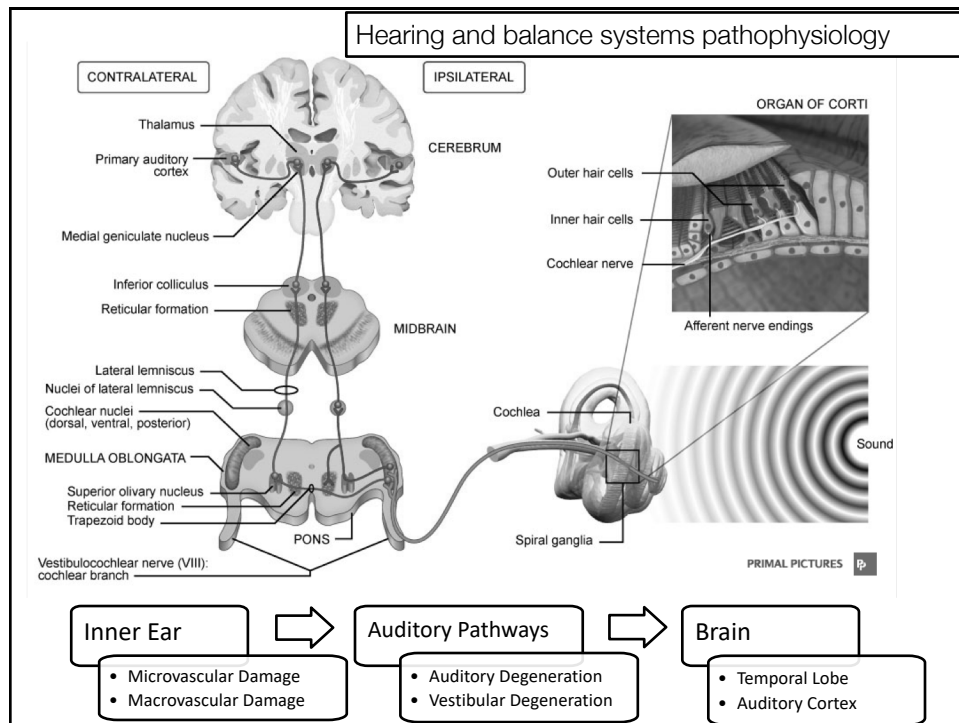


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Chronically high blood sugar levels damage nerves not only in your extremities but also in other parts of your body. These damaged nerves cannot effectively carry messages between the brain and other parts of the body.

BALANCE PARAMETERS include

- vision loss
- loss of sensation in feet
- vestibular disruption



continued

Rx for neuropathy, infections, other diseases = oto-vestibulo toxicity

Pain Meds

- Salicylates, NSAIDS

Infection Control Meds

- Aminoglycoside Antibiotics

Loop Inhibiting Diuretics

- Lasix, Furosemide

Chemotherapy

- Cisplatin 30%, carboplatin 12%

continued

Audiology medical management of hearing loss

- Baseline hearing test at time of diabetes diagnosis
- No hearing loss on pure tone audiogram: may indicate need for otoacoustic emissions or speech in noise for *hidden hearing loss*
- Case history is critical to know all factors influencing potential hearing loss
- Recommendations to MD on report set rationale for future monitoring program
- ALWAYS refer for diabetes education!!

continued

Audiology Management



continued

continued

Audiology Management

Hearing Evaluation

- Pure Tone audiogram
- Speech discrimination
- Speech in noise
- OAEs
- Balance screening

continued

Balance Screening

- ☐ Have you fallen in the past few months?
- ☐ Do you have a fear of falling?
- ☐ Vision problems? Neuropathy?

continued

continued

Audiology medical management of balance

Balance Testing

- VNG test battery: includes ocular motility, positional testing/BPPV, and caloric testing
- cVEMP, oVEMP, rotary chair, vHIT, posturography
- Foot neuropathy

continued

Audiology medical management

Recommend

- Retest hearing in ____ years due to _____
- Refer for diabetes education
- Amplification
- Refer to Fall Prevention clinic

continued

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Working together to manage diabetes:

- Give consistent diabetes messages. Recognize early danger signs. Promote the team approach to care. Integrated, comprehensive care benefits everyone involved—
- pharmacy, podiatry, optometry, dental and audiology



continued

Pharmacy: Are your patients taking their meds?



In the US 15% of prescriptions are never filled

50% of patients stop their Rx regimen within 6 months

continued

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Podiatry and Foot Care

Neuropathy and Diabetes

- More than 60% of non traumatic lower-limb amputations occur in people with diabetes.
- Patients with diabetes are 15-26 times more likely to have an amputation than patients without diabetes.
- Up to 20% of diabetes patients who participate in routine foot care will have a treatable foot care problem.

continued

Vision Health

Key Questions to Ask Your Patients About Eye Health

Patients should be referred to an optometrist if the answers to these questions are “no” or “unsure”:

- Do you get a full eye exam with dilated pupils at least once a year?
- Do you know how diabetes can affect your eyes?
- Do you know what to do if you have vision

continued

Dentistry and Oral Health

Oral Health and Diabetes

- 85% of patients with type 2 diabetes report that they have received no information on the association between diabetes and oral health.
- Periodontal disease has been associated with poor glycemic control.
- Tobacco use and poor nutrition are risk factors for compromised oral health.

continued

Audiology and PPOD

Align with Pharmacy for oto-vestibular toxicity monitoring

Collaborate with Podiatry for better foot care and balance

Ensure Optometry evaluation for lower risk of falls

Counsel patients to see the dentist several times a year

Ongoing IPE and IPC with other professions

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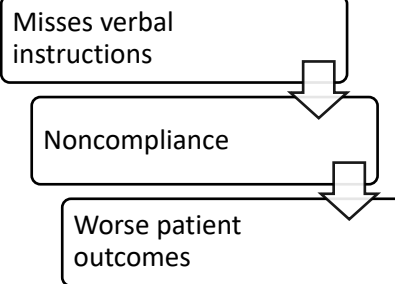
Family and Internal Medicine

Consequences of Hearing Loss

Symptoms

- Asks for repetition
- Brings 3rd party interpreter
- Associated with cognitive decline and depression
 - Social isolation
 - Stress
 - Confusion

Medical Management



Hearing screening will start the process

THE AUDIOLOGY PROJECT

ABOUT IMPACT EDUCATION MATERIALS WAYS TO HELP WEBINARS

SCREENING TEST
Know your hearing status in 3 minutes*



*Validated hearing test (Pangestor et al. 2016) | [By clicking START, you agree to the disclaimer](#)

hearDigits

hearScreen USA

The month of May is the time we celebrate **Better Hearing and Speech Month!** Many people live with unidentified hearing loss, often failing to realize that they are missing out on certain sounds and words. Checking one's hearing would be the first step toward addressing the issue.

hearScreen USA can help ALL identify hearing problems (starting within the US) - the first step in people's journey to better hearing. It is a web-based hearing screening widget which is clinically-validated and allows users to take a free hearing screening via a website in under 3 minutes. The Audiology Project (TAP) is proud to offer it to you here!

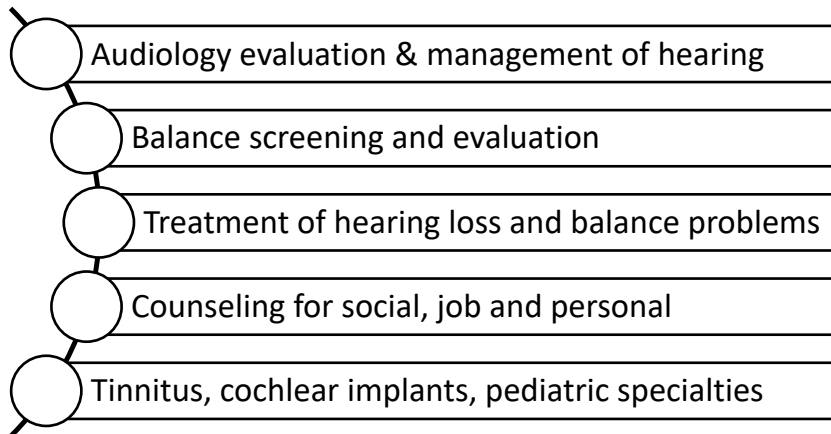
The screening analyzes the person's ability to perceive speech-in-noise. Based on the person's response, the app automatically generates a hearing score that indicates whether there may be a possible hearing loss...so plug in some headphones and click START!

To learn more about this app, visit their FAQs page [here](#).

continued

Educate about Audiology

Audiology Scope of Practice



continued

How to Advocate for Audiology in this Emerging Issue

- Join The Audiology Project state cohorts:
<https://www.theaudiologyproject.com/contact>
- Reach out to national, state and local level agencies and groups to educate medical professional. Offer to present to their group councils
- Align with PPOD professional organizations to host meetings for interprofessional education and collaboration
- Diabetes Educators (CDE) are the linchpin of diabetes care: CONNECT with a CDE close to your clinic. Offer to present to their groups or screen hearing.

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Educate yourself about diabetes

Learn the ABCs of diabetes

A1c

Blood pressure

Cholesterol control

Stop smoking!!

continued

References

- Seminars in Hearing Issue 04 · Volume 40 · November 2019
- <https://www.thieme-connect.com/products/ejournals/journal/10.1055/s-00000067>
- Research articles
<https://www.theaudiologyproject.com/education-materials>
- Hearing screening app
<https://www.theaudiologyproject.com/hearscreenusa>