Differential Diagnosis for the Dispensing Doctor

Alexandra Tarvin, Au.D.
Alicia D.D. Spoor, Au.D.

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AUDIOLOGY UNLEASHED

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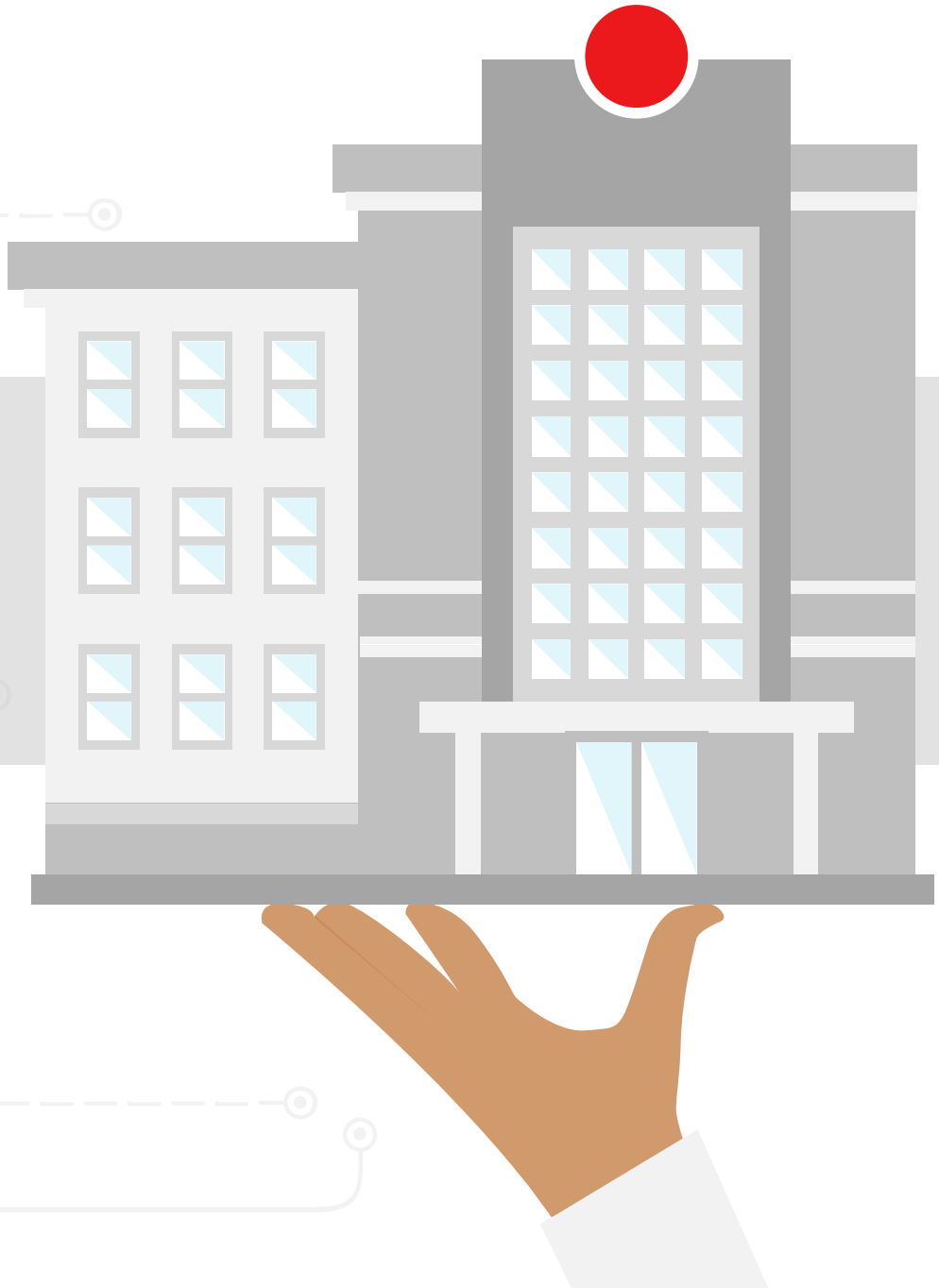


Presenters

Alexandra Tarvin, Au.D.

Financial Disclosures:

- Owner, Elevate Audiology

Non-Financial Disclosures:

- Advocacy Committee, Academy of Doctors of Audiology
- Technology Chair, South Carolina Academy of Audiology
- Member, SC Chapter, The Audiology Project

Presenters

Alicia D.D. Spoor, Au.D.

Financial Disclosures:

- President, Designer Audiology
- Lead Learning and Simulation Developer-Audiology, Simucase
- Consultant, Tracey Fox King & Walters

Non-Financial Disclosures:

- Advocacy Chair, Academy of Doctors of Audiology
- Representative, Audiology Quality Consortium
- Representative, Health Care Economics Committee
- Legislative Chair, Maryland Academy of Audiology
- Member, Osborne College of Audiology, Salus University

Learning Objectives

At the end of this presentation, attendees will be able to:

- List three additional items that can be added to a Comprehensive Audiologic Evaluation to determine differential diagnoses.
- Identify follow-up diagnostic timeframes based on the differential diagnoses.
- Identify appropriate codes, as applicable, for each procedure.

Differential Diagnosis

Systemic process used to identify the proper diagnosis from a set of possible competing diagnoses.

Differential Diagnosis

Diagnostic Process: identifying or determining the etiology of a disease through patient history, physical examination, review of data.

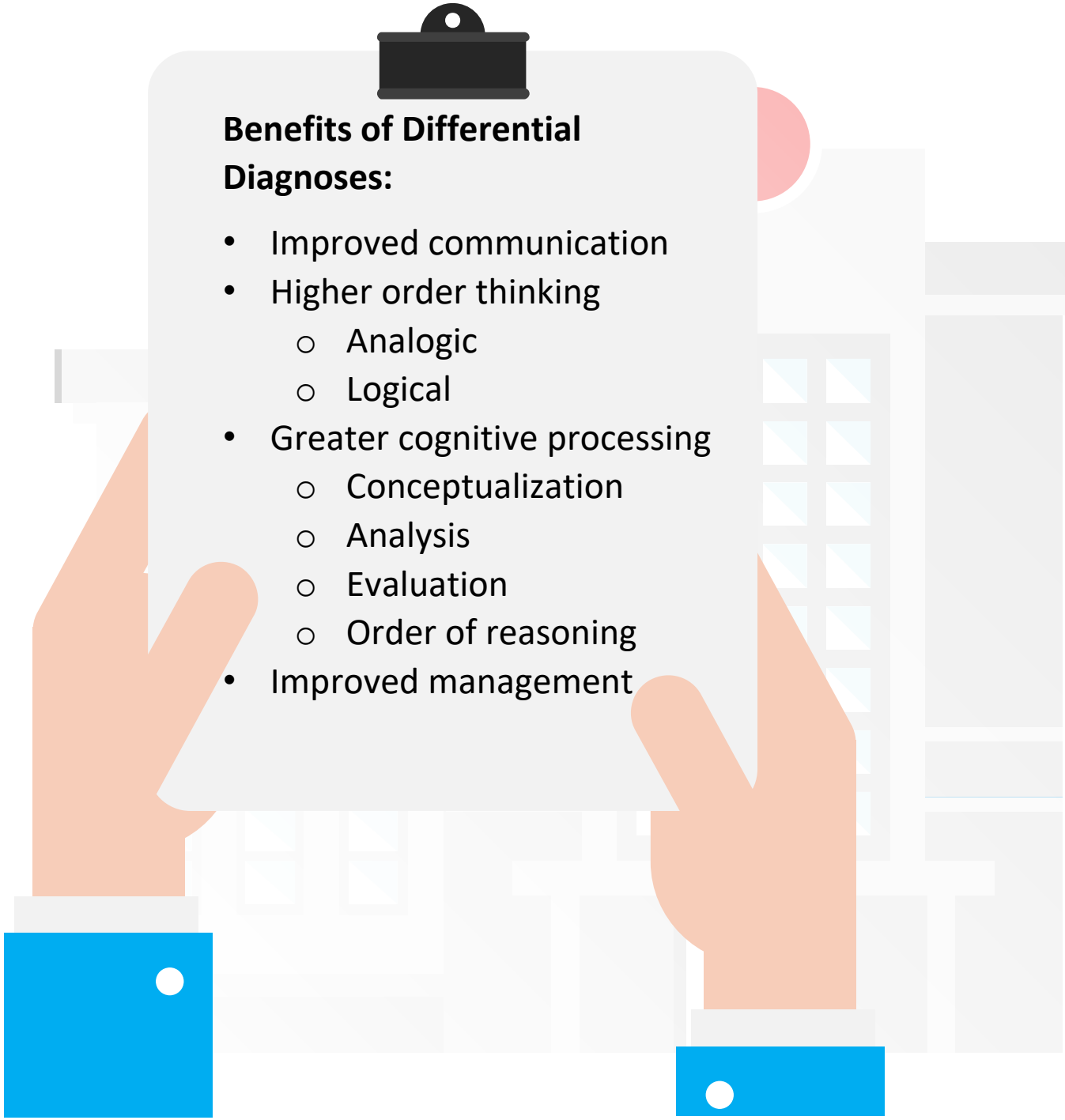


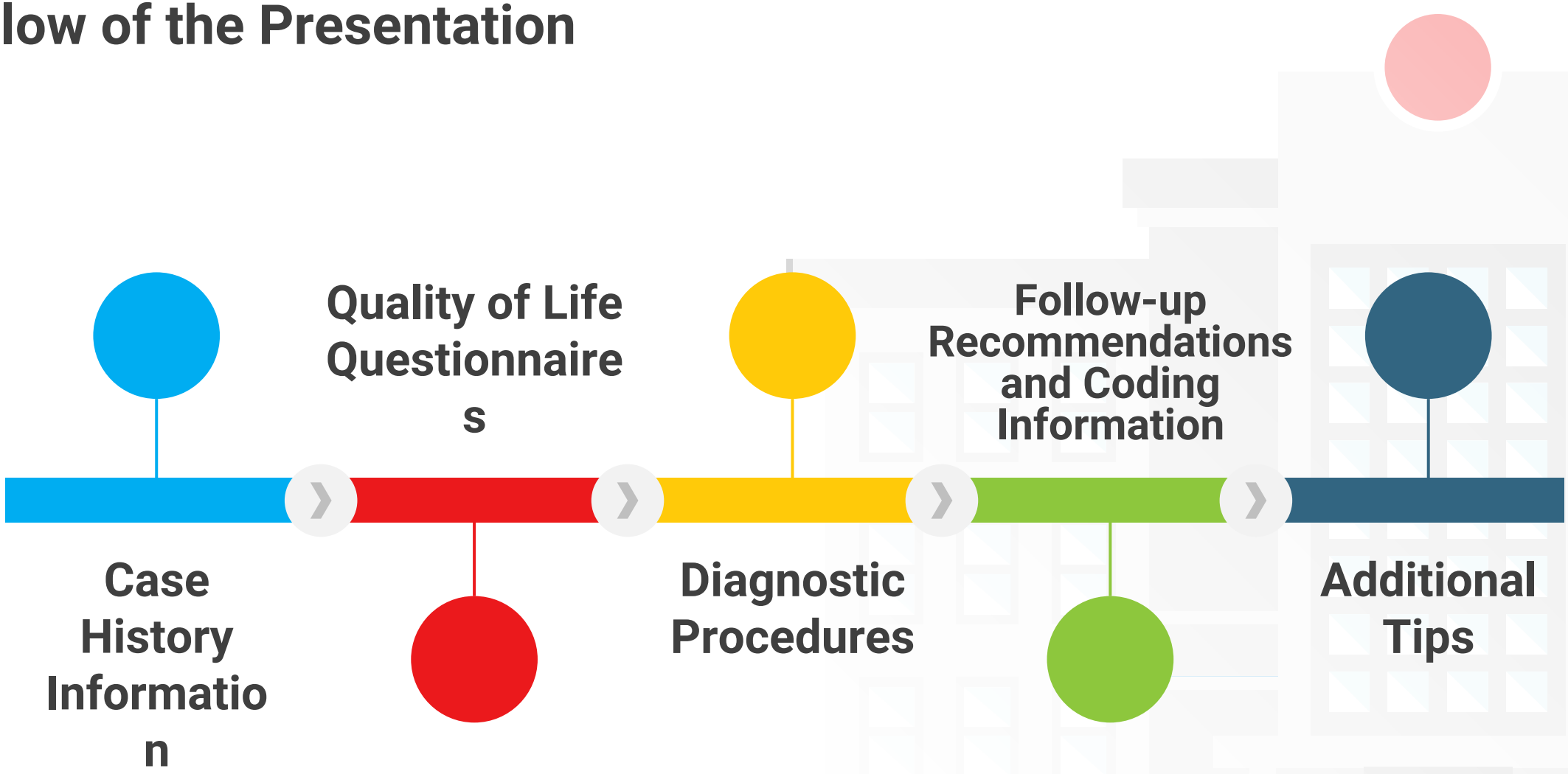
Table 1

Common test metrics for differential diagnosis.

Metric	Abbreviation	Definition
Sensitivity	SN	Percentage of people who test positive for a specific disease among a group of people who have the disorder.
Specificity	SP	Percentage of people who test negative for a specific disease among a group of people who do not have the disorder.
Positive Predictive Value	PPV	Probability that subjects with a positive test truly have the disorder.
Negative Predictive Value	NPV	Probability that subjects with a negative test truly don't have the disorder.
Positive Likelihood Ratio	LR+	The odds of a patient to have a disorder if the test is positive compared to the probability for someone who does not have the disorder.
Negative Likelihood Ratio	LR−	The odds of a patient not having the disorder if the test is negative compared to the probability for a patient who has the disorder.

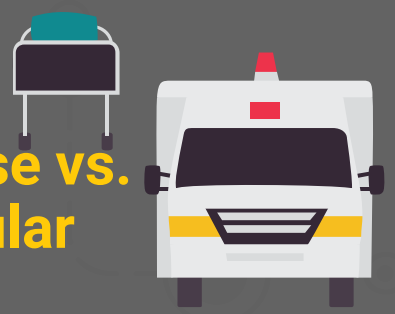
Source: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6994315/

Flow of the Presentation

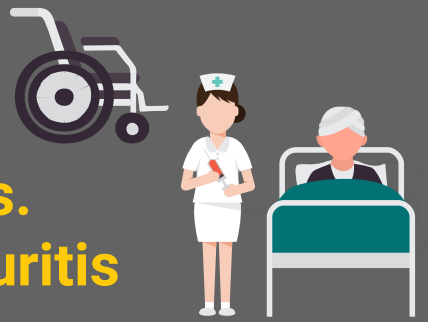


Topics to be Covered

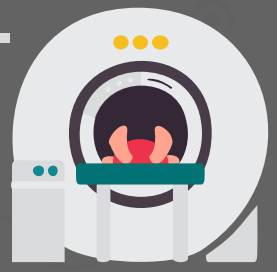
1. Meniere's Disease vs. Enlarged Vestibular Aqueduct



2. Labrynthitis vs. Vestibular Neuritis



3. Hyperacusis vs. Misophonia



4. Noise Exposure vs. Presbycusis

Diagnosis: hearing loss, tinnitus, aural fullness, dizziness.

Differential Diagnosis

Meniere's Disease

Enlarged Vestibular Aqueduct (EVA)

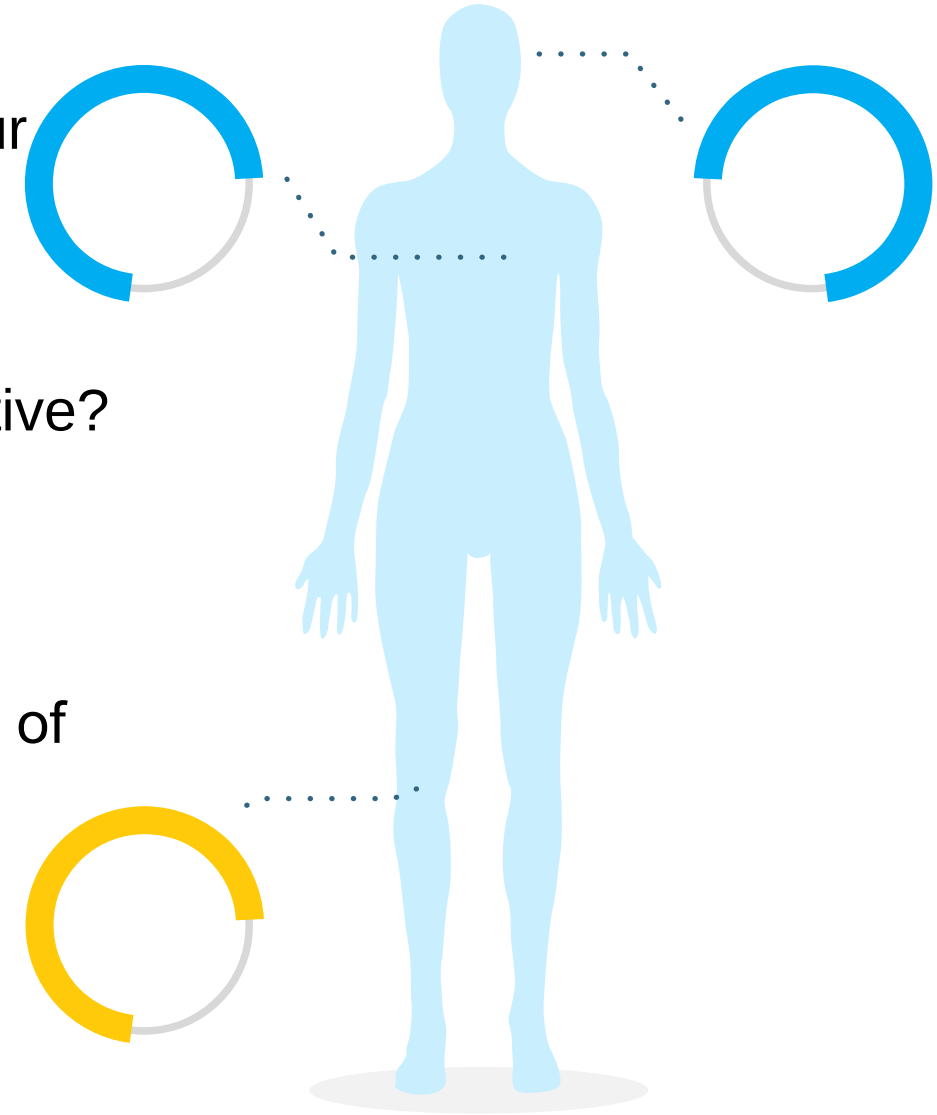
Case History: Meniere's vs. Enlarged Vestibular Aqueduct

Hearing Acuity

- Did the hearing loss occur suddenly/gradually?
- Is the hearing loss stable/fluctuating?
- Sensorineural or conductive?

Demographics

- Meniere's Disease: 1.2% of the population
- EVA:
  - 5-15% in pediatrics
  - Slight female preponderance



Pertinent Case History

- Head injuries
- Genetic syndromes (e.g, Pendred's)
- Episodic vs. general imbalance
- Tinnitus
- Age of symptom onset

Source: MedScape

Quality of Life Questionnaires: Meniere's vs. Enlarged Vestibular Aqueduct

- Dizziness Handicap Inventory
- Dizziness Symptom Profile
- Hearing Handicap Inventory-Adult/Elderly/Screening
- Tinnitus Handicap Inventory
- Tinnitus Functional Index

Diagnostic Procedures: Meniere’s vs. Enlarged Vestibular Aqueduct

Otoscopy

Case History & Interview

Pure Tone Audiometry (92557)

Vestibular Screening

Follow-up Recommendations and Coding: Meniere's vs. Enlarged Vestibular Aqueduct

Coding

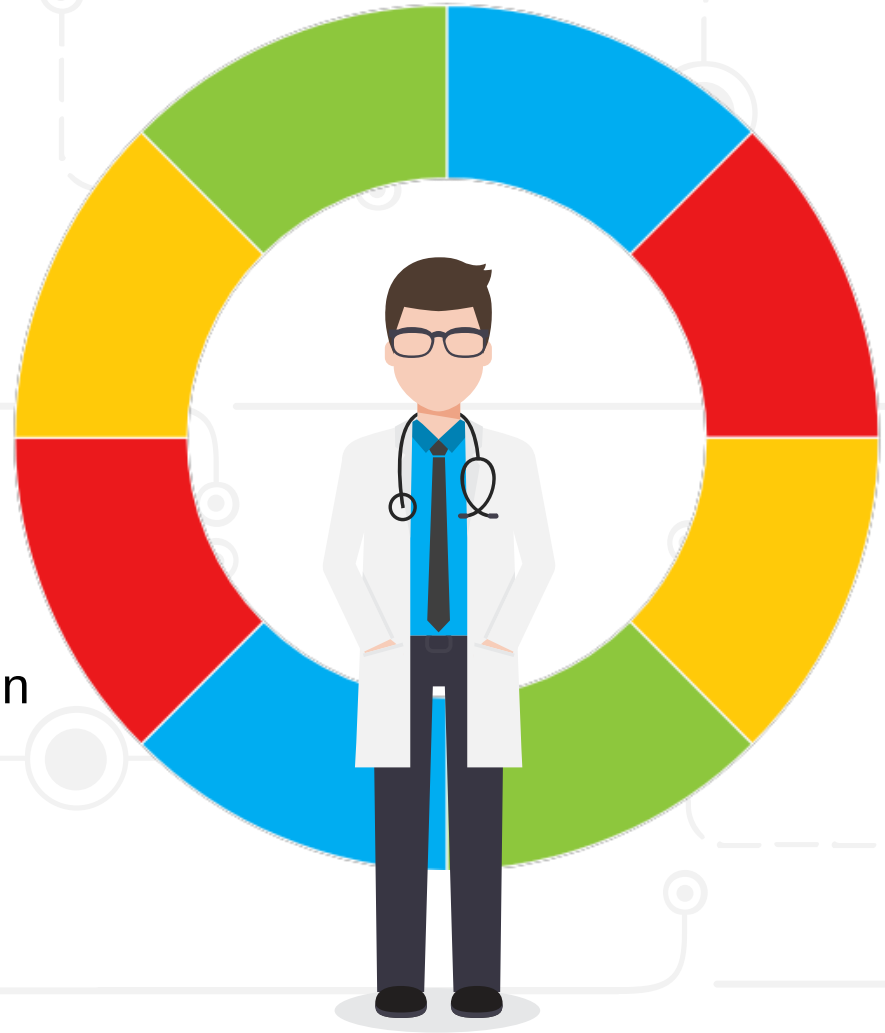
Meniere's disease

- H81.01- Right Ear
- H81.02- Left Ear
- H81.03- Bilateral
- H81.09- Unspecified

Follow-up Testing

Meniere's Disease

- Annual
- With any fluctuations, changes in symptoms



Coding

EVA

- Q16.5- Congenital malformation of inner ear

Follow-up Testing

EVA

- Annual
- After any head injury or significant pressure change, especially sports-related
- With any fluctuations, changes in symptoms

Additional (Helpful) Tips: Meniere's vs. EVA

Genetic testing should be completed with EVA

Follow-up testing may need to be complete without significant amount of notice

Treatments may include amplification in both situations

Diagnosis: Dizziness/Giddiness

Differential Diagnosis

Labrynthitis

Vestibular Neuritis

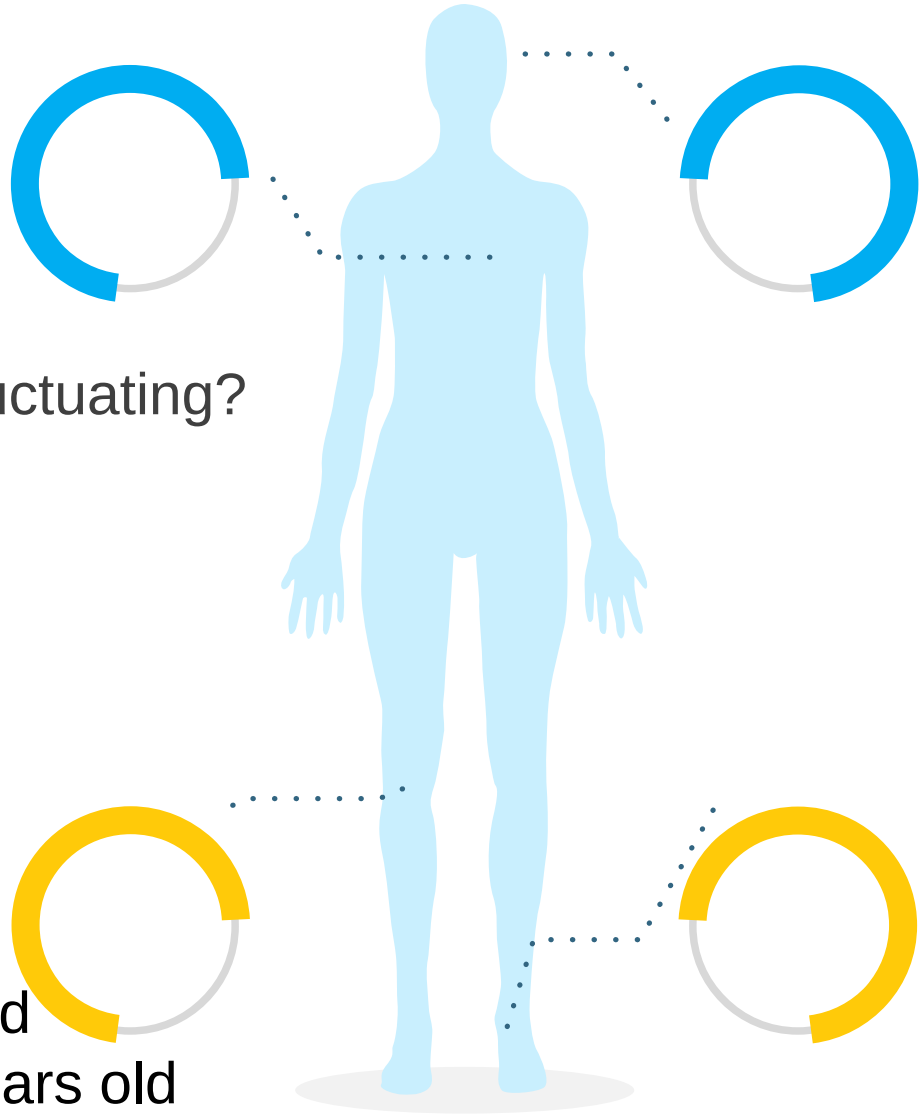
Case History: Labyrinthitis vs. Vestibular Neuritis

Hearing Acuity

- Did the hearing loss occur suddenly/gradually?
- Is the hearing loss stable/fluctuating?

Dizziness Descriptions

- Sudden onset
- Severity
- Accompanied by:
  - Hearing loss
  - Tinnitus



Demographics

- Labyrinthitis: 30-60 years old
- Vestibular Neuritis:30-60 years old

Vestibular Symptoms

- Dizziness
- Vertigo
- Off-balance

Source: Journal of Immunology Research

Quality of Life Questionnaires: Labrynthitis vs. Vestibular Neuritis

Dizziness Handicap Inventory

Dizziness Symptom Profile

Diagnostic Procedures: Labrynthitis vs. Vestibular Neuritis

Otoscopy

Case History & Interview

Air Conduction Audiometry (92552)

Vestibular Screening (92700)

Follow-up Recommendations and Coding: Labrynthitis vs. Vestibular Neuritis

Coding

Labrynthitis

- H83.01- Right Ear
- H83.02- Left Ear
- H83.03- Bilateral
- H83.09- Unspecified

Coding

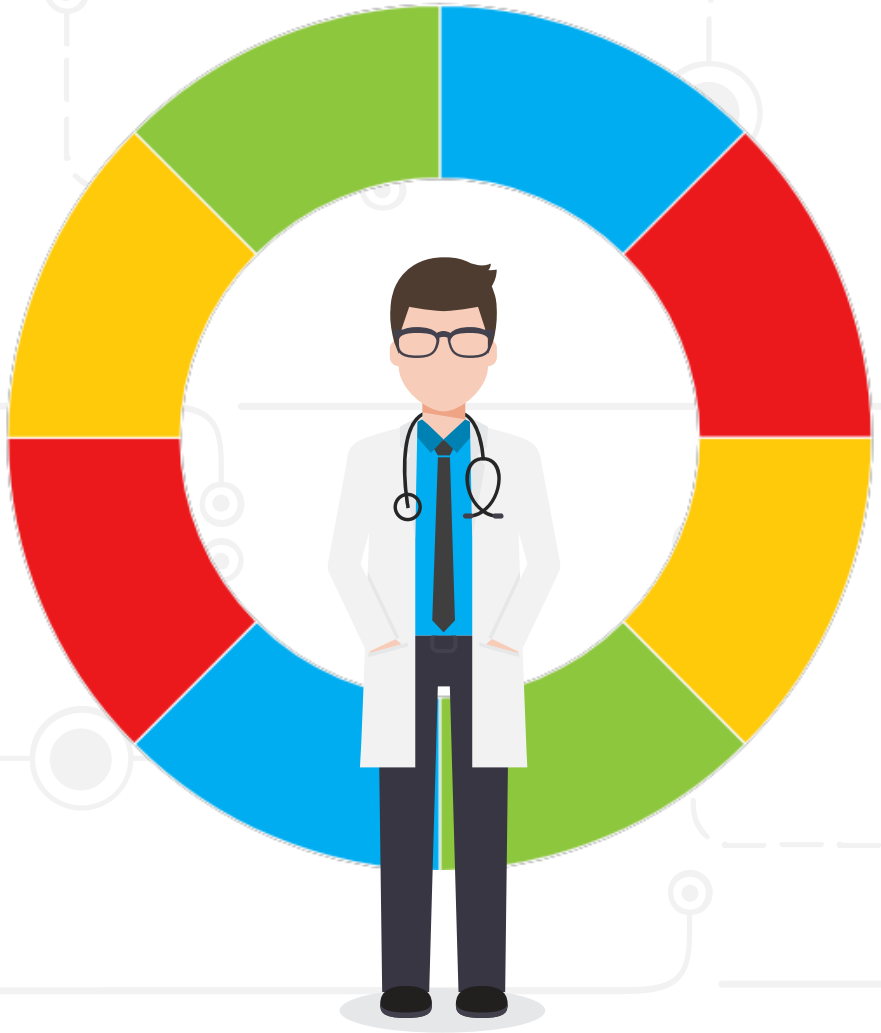
Vestibular Neuritis

- H81.20- Unspecified
- H81.21- Right ear
- H81.22- Left ear
- H81.23- Bilateral

Coding

Dizziness & Giddiness

- R42



Follow-up Testing

Labrynthitis:

- 1 year to monitor rate of change (if any)
- Every 3 years, if results are stable

Follow-up Testing

- Under age 50: 10 years
- Age 50-65: 3-5 years

Follow-up Testing

Vestibular

- Evaluation
- Treatment
- 30-day confirmation

Additional (Helpful) Tips: Labrynthitis vs. Vestibular Neuritis

Add the Timed Up & Go (TUG) for all patients complaining of dizziness/vertigo.

Consider if you need to complete a Comprehensive Hearing evaluation, or simply pure tone air/bone conduction.

If you see enough patients with this complaint, consider adding vestibular services to your practice.

Diagnosis: Sound Sensitivity

Differential Diagnosis

Hyperacusis

Misophonia

Case History: Hyperacusis vs. Misophonia

Hearing Acuity

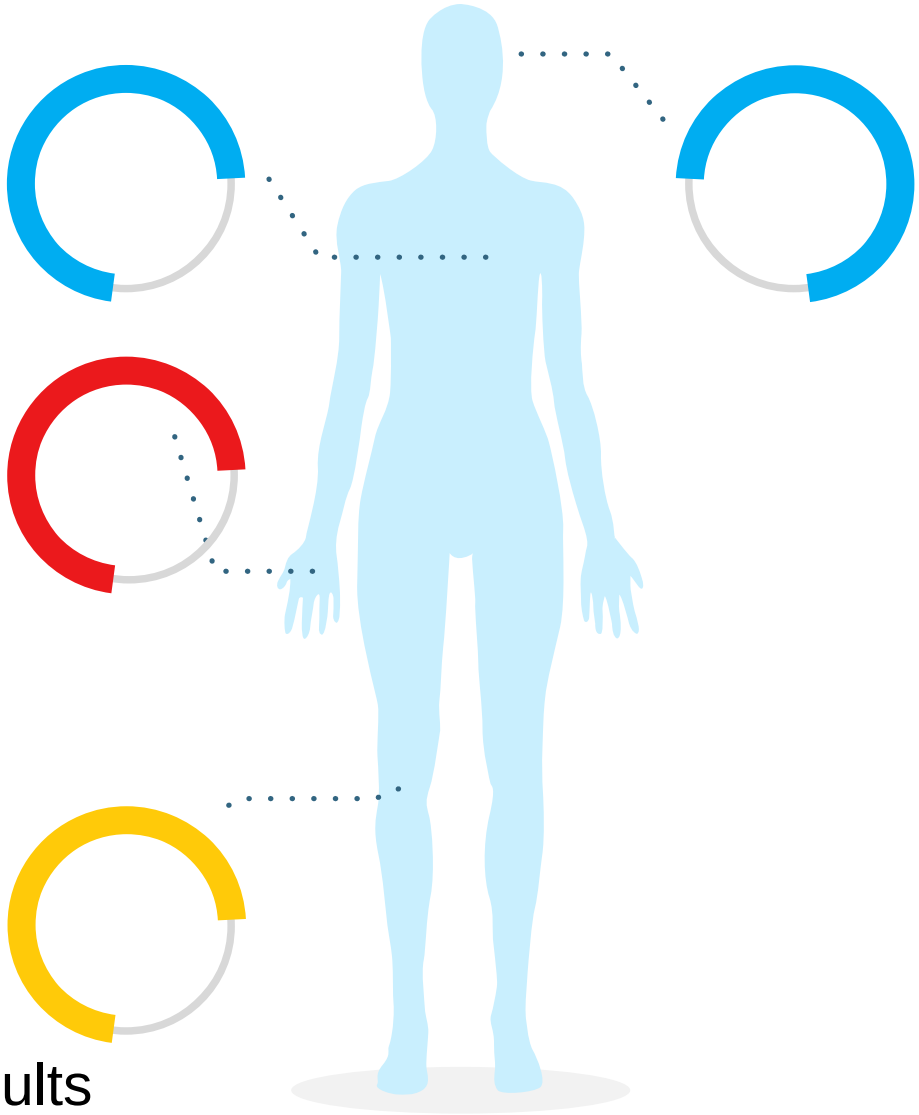
- No/minimal concerns

Emotional Reaction

- Rage
- Pain
- Avoidance

Demographics

- Hyperacusis: 3.2-9% general population
- Misophonia: 15-20% adults



Sound Sensitivity

- What sounds are triggers?
- Do sounds bother you if created by specific people?
- Do you produce sounds that bother you?
- Do you have any other sensitivities (e.g., light, touch)?
- Do you have tinnitus?
- Do you have aural fullness or pain?
- Are the trigger sounds quiet or loud?

Aazh, Daneshet al. 2019; Cederroth, PirouziFardet al. 2019)

Quality of Life Questionnaires: Hyperacusis vs. Misophonia

- Misophonia Assessment Questionnaire
- Amsterdam Misophonia Scale (A-MISO-S)*
- MisoQUEST
- Hyperacusis Questionnaire
- Inventory of Hyperacusis Symptoms (IHS)
- Modified Khalfa Hyperacusis Questionnaire

Diagnostic Procedures: Hyperacusis vs. Misophonia

Case History & Interview

Pure Tone Audiometry
(92552/3/7)

Uncomfortable Loudness Levels
(92700)

Follow-up Recommendations and Coding: Hyperacusis vs. Misophonia

Coding

Hyperacusis

- H93.231- Right Ear
- H93.232- Left Ear
- H93.233- Bilateral
- H93.239- Unspecified

Coding

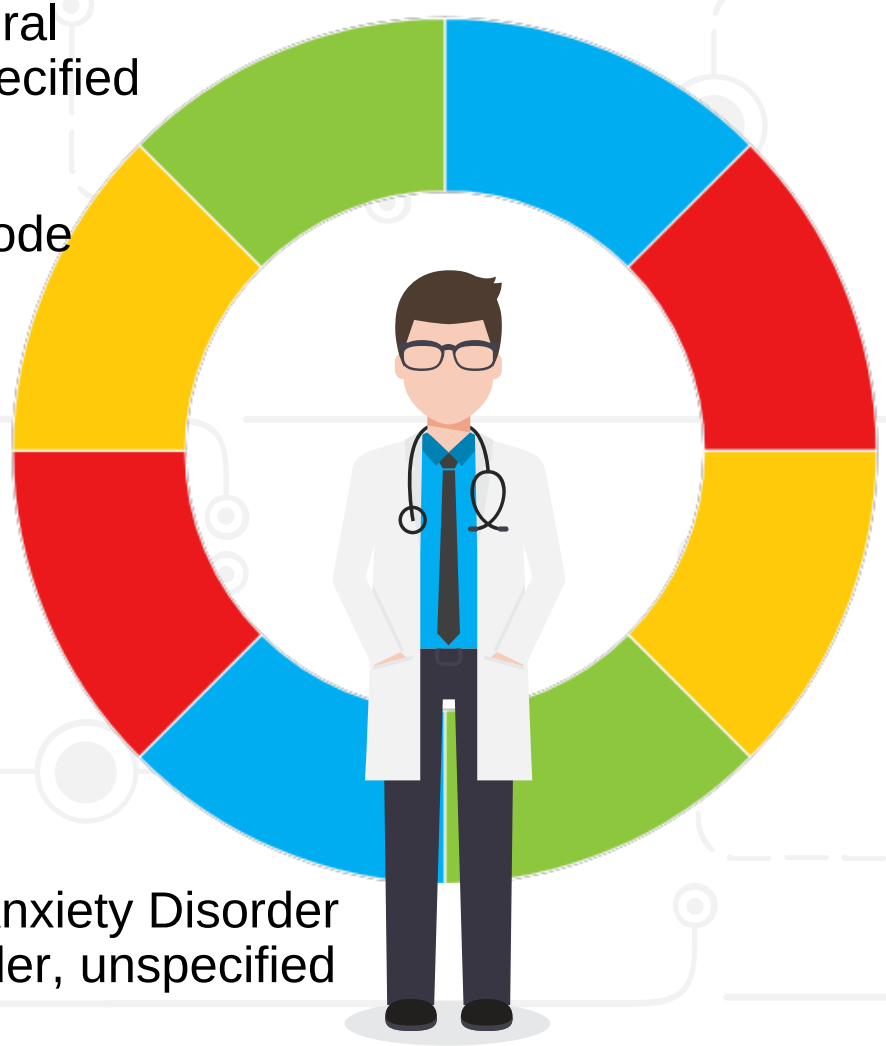
Misophonia- No specific diagnosis code

- H93.291 Abnormal auditory perception, right ear
- H92.392 Abnormal auditory perception, left ear
- H93.293 Abnormal auditory perception, bilateral
- H93.299- Abnormal Auditory Perception, Unspecified

Coding

Anxiety

- F41.1- Generalized Anxiety Disorder
- F41.9- Anxiety Disorder, unspecified



Follow-up Testing

Misophonia

- Determined as part of treatment plan/plan of care

Follow-up Testing

Hyperacusis

- Determined as part of treatment plan/plan of care

Additional (Helpful) Tips: Hyperacusis vs. Misophonia

Misophonia is typically a conditioned reflex response

Hyperacusis is an auditory based condition- Central Gain Theory

Misophonia triggers are often human-generated, regardless of loudness

Hyperacusis is often triggered by inanimate objects crossing a loudness threshold

Refer appropriately

Diagnosis: Symmetrical, sloping high frequency hearing loss.

Differential Diagnosis

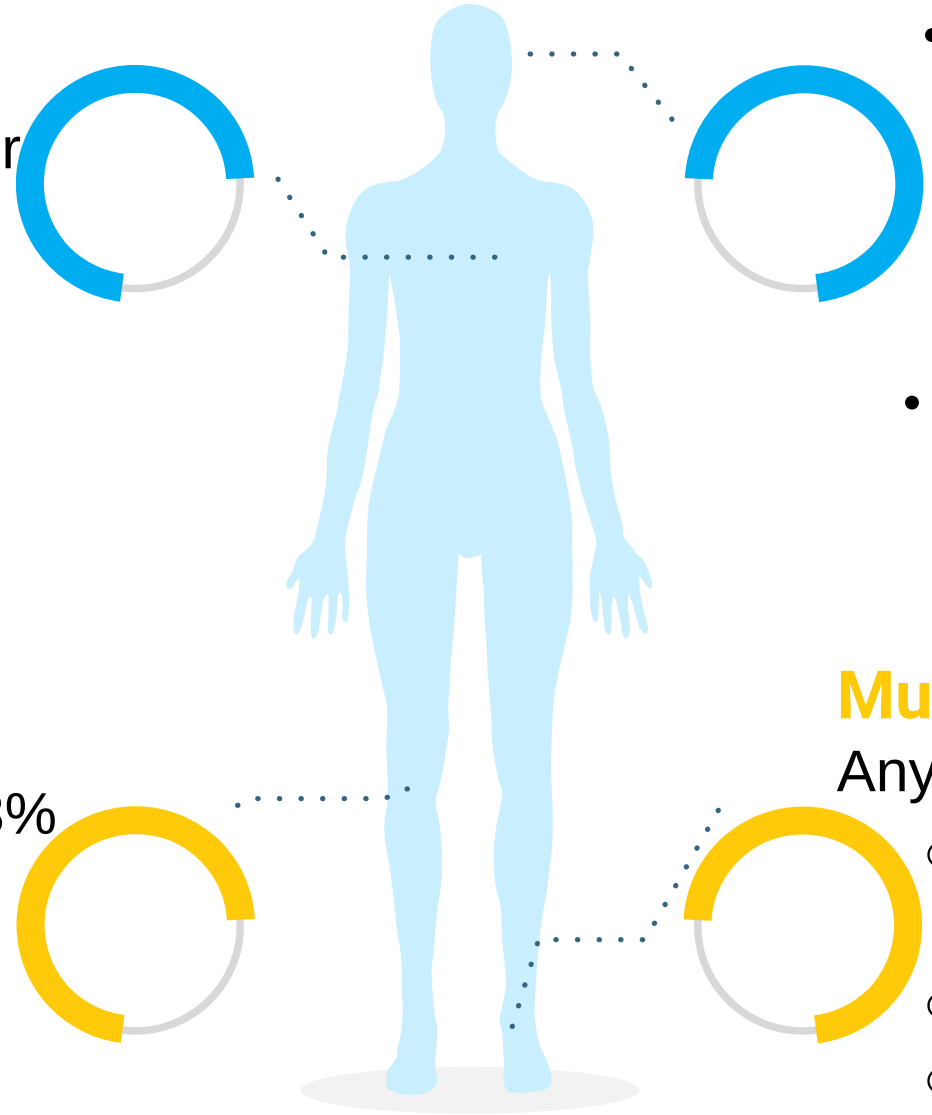
Noise Exposure

Presbycusis

Case History: Presbycusis vs. Noise Exposure

Hearing Acuity

- Did the hearing loss occur suddenly/gradually?
- Is the hearing loss stable/fluctuating?



Noise Exposure

- Is there any current and/or past history of noise exposure?
  - Military
  - Occupational
  - Recreational
- Was the noise exposure:
  - Recurrent
  - Single episode

Demographics

- Age 65 to 74 years old: 33%
- Age 75 and older: 50%

Music Exposure

Any history of music exposure?

- Exposure per day/week/month
- Environment
- Loudness

Quality of Life Questionnaires: Presbycusis vs. Noise Exposure

- Abbreviate Profile of Hearing Aid Benefit (Unaided)
- Client Oriented Scale of Improvement
- Hearing Handicap Inventory-Adult/Elderly/Screening
- International Outcomes for Hearing Aids

Diagnostic Procedures: Presbycusis vs. Noise Exposure

Case History & Interview

Otoscopy

Pure Tone Audiometry
(92552/3/7)

Otoacoustic Emissions
(92587, 92588)

Follow-up Recommendations and Coding: Presbycusis vs. Noise Exposure

Coding

Presbycusis:

- H91.10- Unspecified
- H91.11- Right Ear
- H91.12- Left Ear
- H91.13- Bilateral

Coding

Noise Effects on the inner ear

- H83.3X1- Right Ear
- H83.3X2- Left Ear
- H83.3X3- Bilateral
- H83.3X9- Unspecified

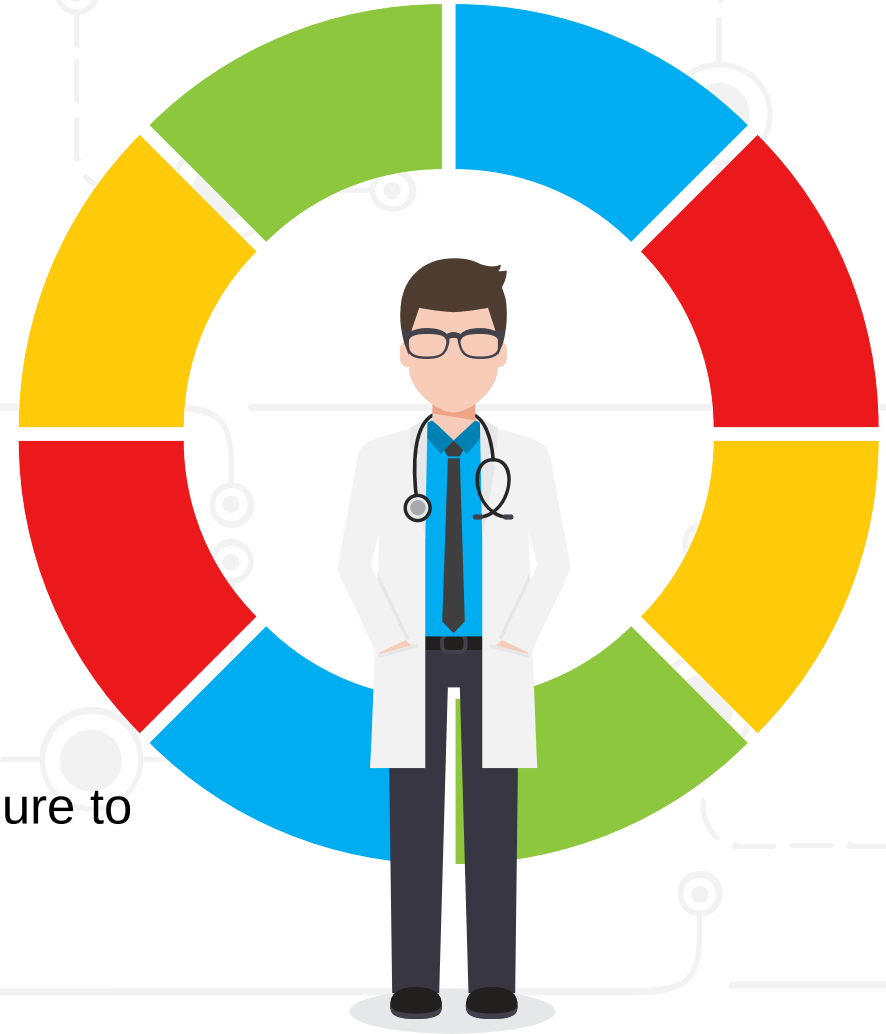
Coding

Occupational exposure to noise

- Z57.0

Contact with and (suspected) exposure to noise

- Z77.122



Follow-up Testing

Presbycusis:

- 1 year to monitor rate of change (if any)
- Every 3 years, if results are stable

Follow-up Testing

Ongoing Noise Exposure:

- Annually to monitor
- Sooner with reported changes

Follow-up Testing

Past Noise Exposure:

- Based on medical history

Additional (Helpful) Tips: Presbycusis vs. Noise Exposure

Noise Exposure notch at 3000 Hz, 4000 Hz, and/or 6000 Hz.

Add Otoacoustic Emissions (OAEs) to pure tone battery to help diagnose or rule out the differential diagnosis.

Counseling, re: Hearing Protection Devices- could lead to additional sales of OTC and/or custom products.

Report Writing Ideas

Layout — SOAP notes vs. APSO notes

Diagnosis — Audiologic-Vestibular diagnoses

Impressions — Appropriate area to list Differential Diagnoses on the written report and allows ability to explain a little about why it may be applicable.

Differential Diagnoses — Maximum of two differential diagnoses.

Sample Report

DIAGNOSIS:
Pure tone testing (Symmetric): Right Ear- Normal-Mild Sensorineural Sloping Hearing Loss; Left Ear- Normal-Mild Sensorineural Sloping Hearing Loss. Normal tympanic membrane functioning, bilaterally. **Elevated/absent contralateral acoustic reflexes, bilaterally.** The patient's tinnitus was matched to a 4620 Hz, 34 dB HL, pure tone signal in the right ear.

IMPRESSIONS:
A decrease in hearing was noted at 250 Hz and 4000 Hz in the right ear and at 250 Hz in the left ear, since the evaluation in 2017. **Differential Diagnosis:** 1.) Ossicular chair dysfunction. 2.) Otosclerosis. **Reliability of testing:** Good.

RECOMMENDATIONS:
1. Common enhancers of tinnitus were reviewed with the patient, including hearing loss, noise exposure, caffeine, alcohol, medications, diet, and exercise. Sound therapy was explained and the patient was encouraged to begin using a just-audible, white noise or relaxing sound (e.g. music, water, birds), at least 2-4 hours a day, for 3 weeks to begin the desensitization process of the tinnitus. Designer Audiology's tinnitus handout was provided.
2. Utilize communication strategies for improving speech understanding (i.e. encourage face-to-face conversation, reduce background noise, enhance room lighting, etc). A copy of Designer Audiology's communication strategies handout was provided to the patient.
3. A comprehensive otologic evaluation was recommended with an ear, nose, and throat (ENT) physician due to the subjective complaints (e.g., otalgia). A list of local ENT physicians was provided.

Download** This

Abbreviated Profile of Heating Aid Benefit (APHAB): https://harlmemphis.org/abbreviated-profile-of-hearing-aid-benefit-aphab/

Amsterdam Misophonia Scale (A-MISO-S)*: https://misophoniainstitute.org/misophonia-test-do-you-have-misophonia/

Client Oriented Scale of Improvement (COSI): https://www.nal.gov.au/products/downloadable-software/cosi-and-hauq/

Contour Test/Sound Tolerance Testing: https://harlmemphis.org/contour-test/

Dizziness Handicap Inventory: email Gary Jacobson, Ph.D.: gary.jacobson@vumc.org

Dizziness Symptoms Profile: https://www.theaudiologyproject.com/education-materials; What You Need to Know About the Hearing and Vestibular Consequences of Diabetes by Pike, Spankovich, Romero, Memering, & Pierantoni for a great overview of this tool

Download** This (cont.)

General Anxiety Disorder (GAD): https://www.phqscreeners.com/

Hearing Handicap Inventory- Adult/Elderly/Screening: email Barbara Weinstein, Ph.D.: bweinstein@gc.cuny.edu

Hyperacusis Questionnaire: https://tinnitustherapy.org.uk/hyperacusis-questionnaire-hq/

International Outcome Inventory for Hearing Aids (IOI-HA): https://harlmemphis.org/international-out come-inventory-for-hearing-aids-ioi-ha/

Inventory of Hyperacusis Symptoms (IHS): https://tinnitustherapy.org.uk/inventory-of-hyperacusis-symptoms-ihs/

Misophonia Assessment Questionnaire: https://misophoniainstitute.org/misophonia-test-do-you-have-misophonia/

More Information

MisoQUEST: https://www.mdpi.com/1660-4601/17/5/1797/pdf ; MisoQuest – a questionnaire for assessing decreased sound tolerance; authors: Siepsiak, M., Śliwerski, A., Dragan, W. Ł

Modified Khalfa Hyperacusis Questionnaire: https://pubmed.ncbi.nlm.nih.gov/12499770/

Tinnitus Functional Index (TFI): https://apps.ohsu.edu/research/tech-portal/technology/view/1004796

Tinnitus Handicap Inventory (THI): Newman, C., Jacobson, G., Spitzer, J. (1996).

Timed Up & Go (TUG) Vestibular Screening:
Audiology Online 20Q: https://www.audiologyonline.com/articles/20q-audiologists-balance-screenings-26952
CDC: https://www.cdc.gov/steadi/pdf/TUG_test-print.pdf

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Questions?

Thank You!

Dr.Tarvin@ElevateAudiology.com

Alicia.Spoor@gmail.com