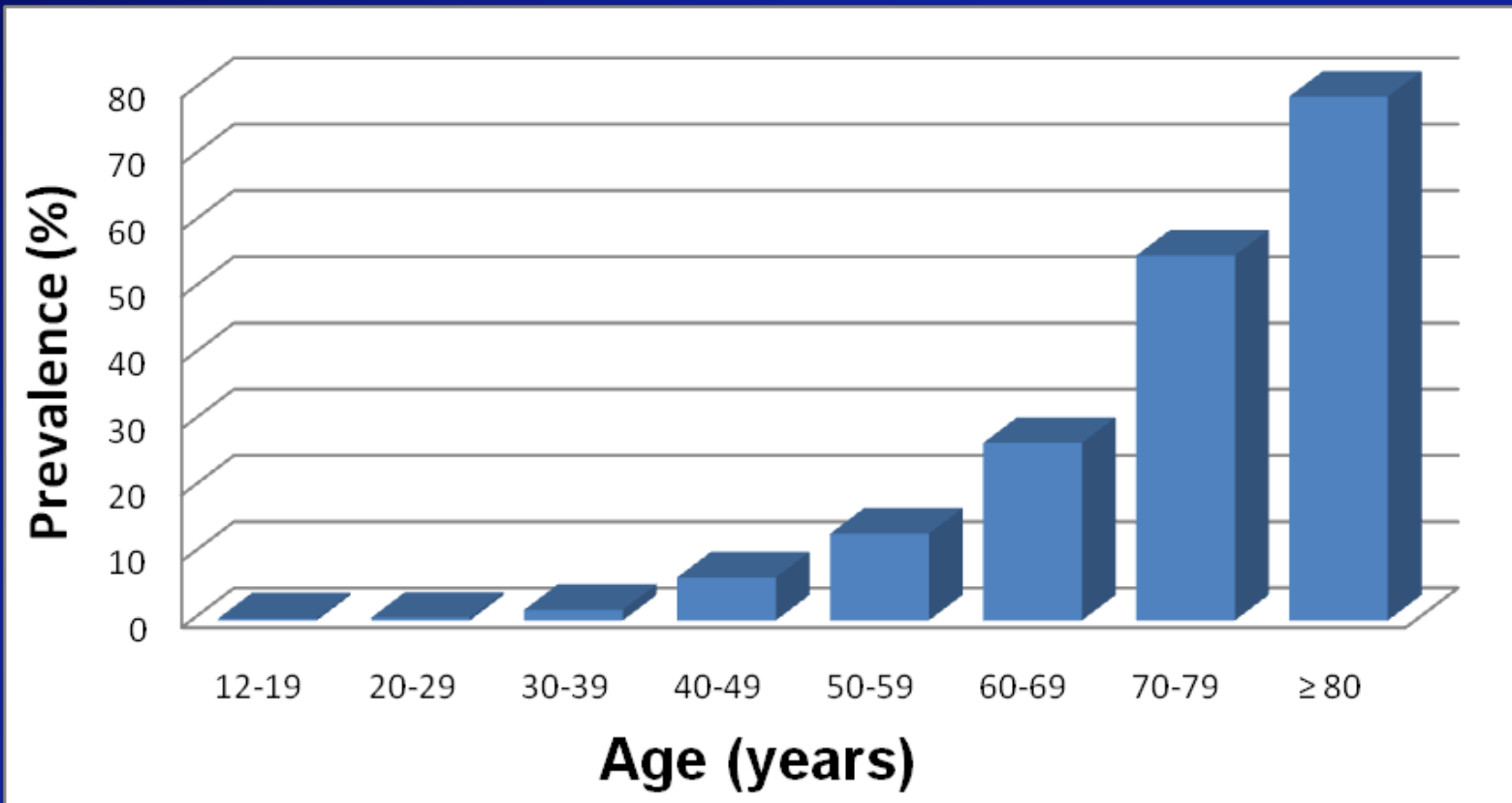


Hearing Loss & Healthy Aging: An IOM-NRC Workshop

Frank R. Lin, M.D. Ph.D.
Johns Hopkins University

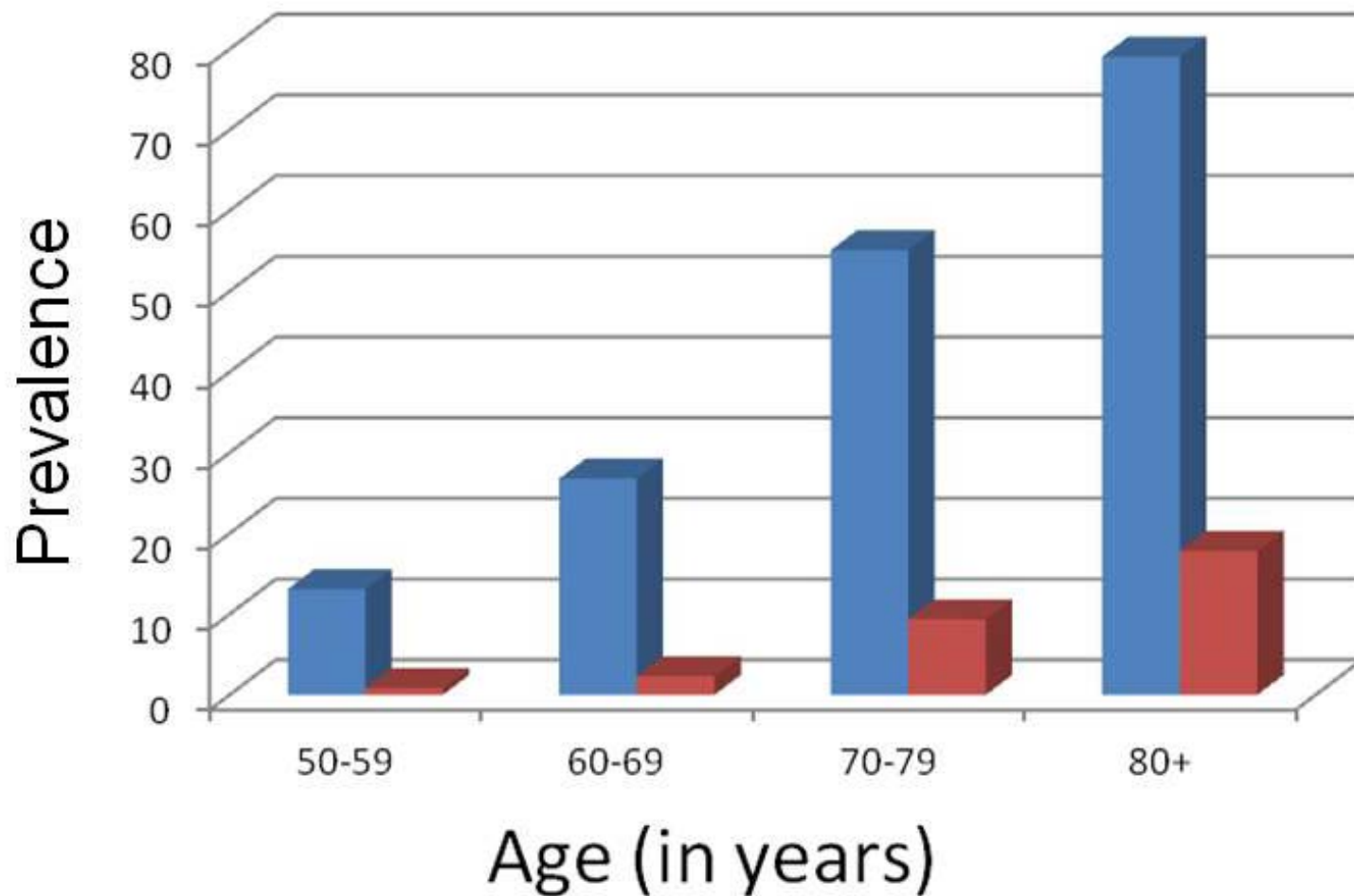
INSTITUTE OF MEDICINE *AND*
NATIONAL RESEARCH COUNCIL
OF THE NATIONAL ACADEMIES

Prevalence of Hearing Loss in the United States, 2001-2008



Hearing loss defined as a better-ear PTA of 0.5-4kHz tones > 25 dB

Hearing Loss & Hearing Aid Use Prevalence in the U.S. , 1999-2006



Prevalence of Hearing Aid Use

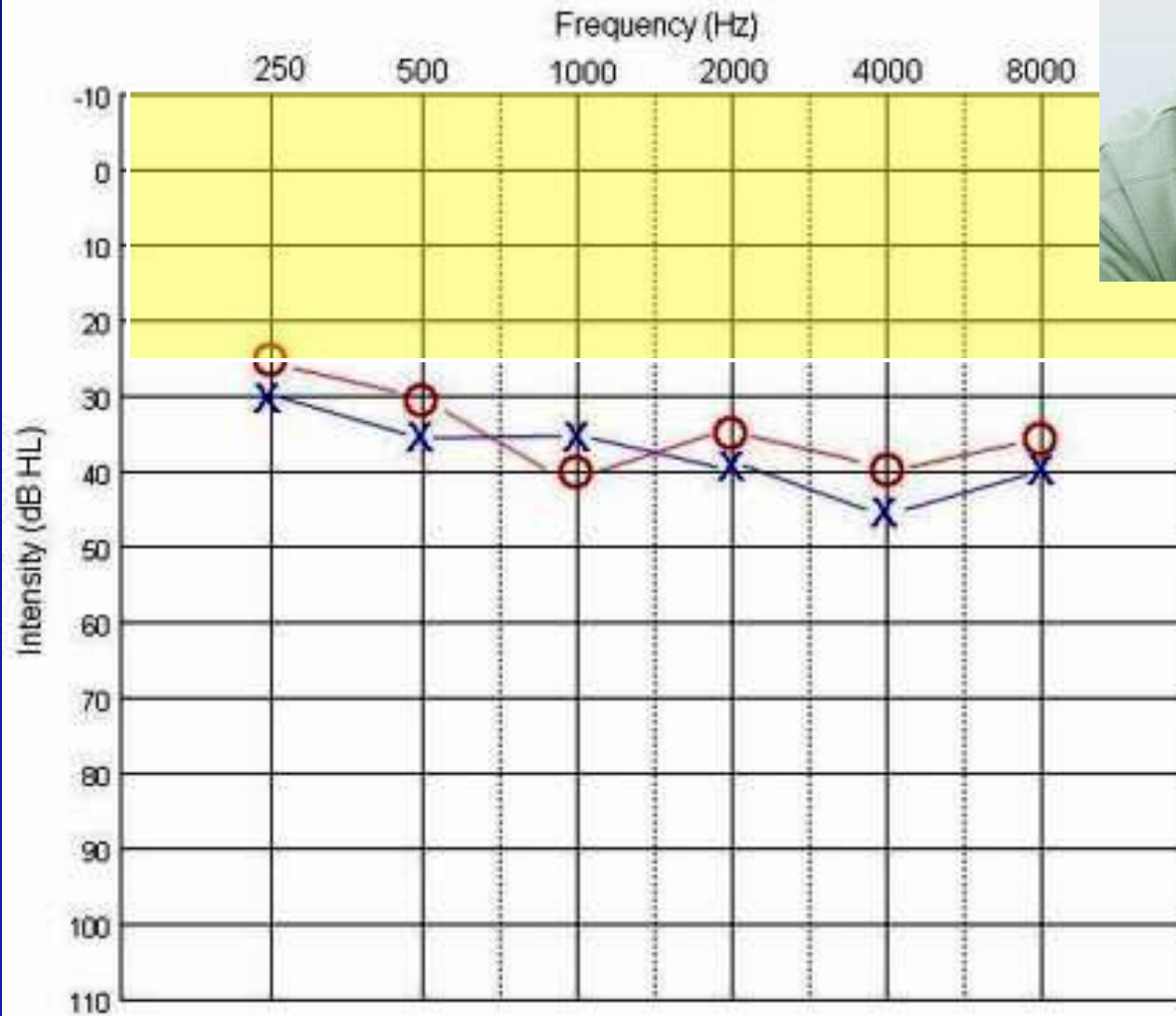
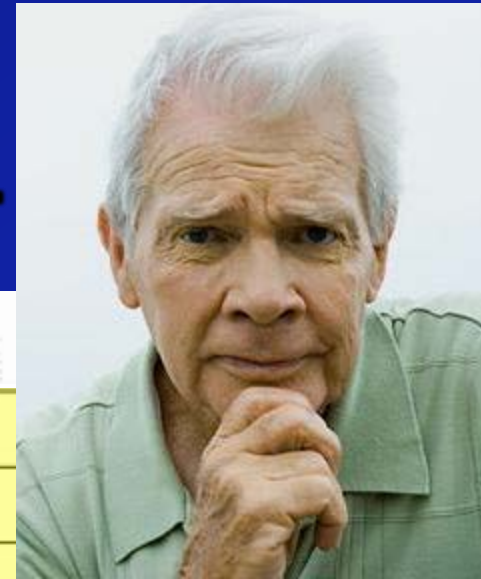
- **United States** (Arch Int Med, 2012)
 - 26.7M adults $\geq$ 50 years with hearing loss
 - 3.8M use hearing aids
 - **Overall rate of HA use: 14.2%**
- **England and Wales** (NICE Report, 2000)
 - 8.1M with hearing loss
 - 1.4M use hearing aids
 - **Overall rate of HA use: 17.3%**

Age-Related Hearing Loss (ARHL)

Basic Public Health Questions

- What are the consequences of ARHL for older adults?
- What are the options for treating ARHL and what is their impact on older adults?
- How can ARHL be effectively addressed in the community?

John Smith, 12 y.o.



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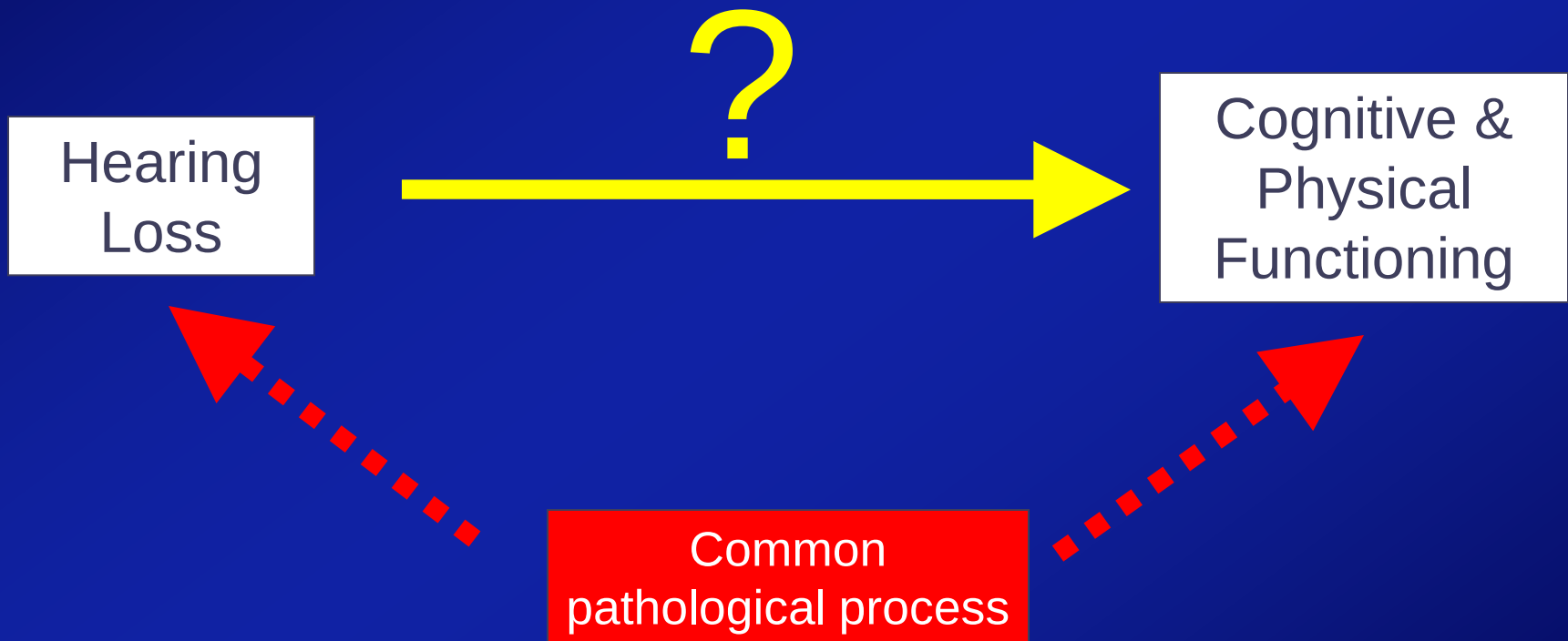


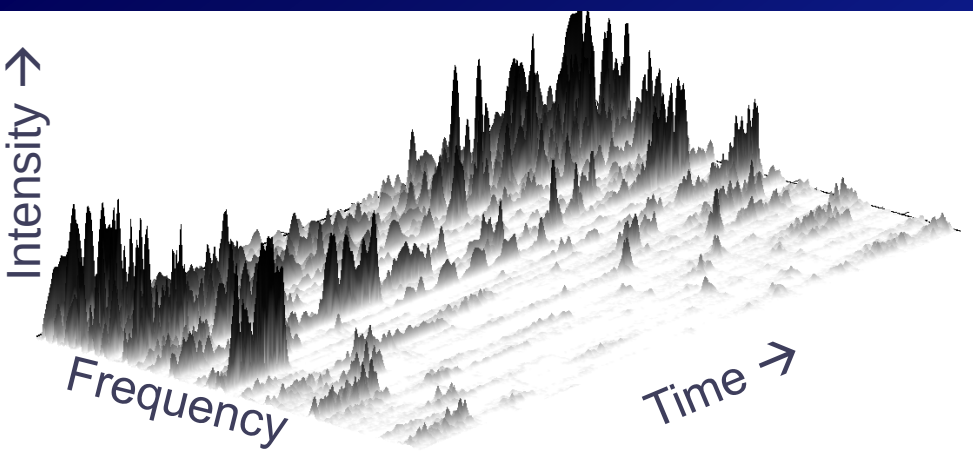
Healthy Aging



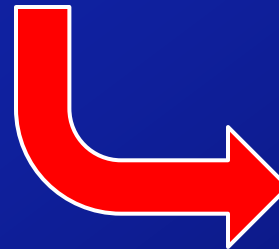
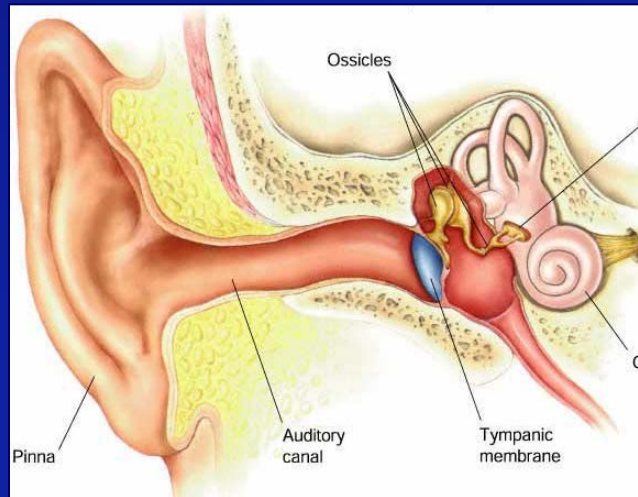
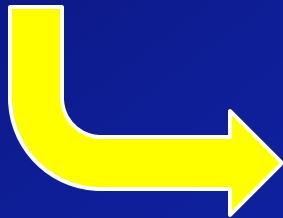
Hearing Loss & Healthy Aging

Common Cause or *Modifiable Risk Factor*





“Sunday”



Principles of Auditory Physiology

#1 *Hearing depends on **peripheral transduction** & **central processing** of sound*



Principles of Auditory Physiology

#2 *Auditory functioning can be measured at multiple levels*

Subjective Hearing & Communicative Function

Central Auditory Measures (Speech in Noise, Dichotic Listening)

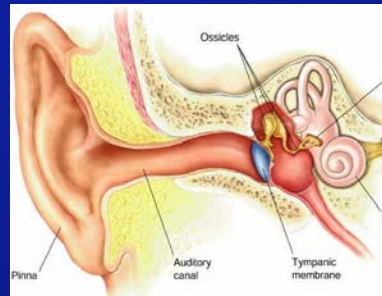
Speech Discrimination Score

Pure Tone Audiometry

Otoacoustic Emissions

Peripheral cochlear function

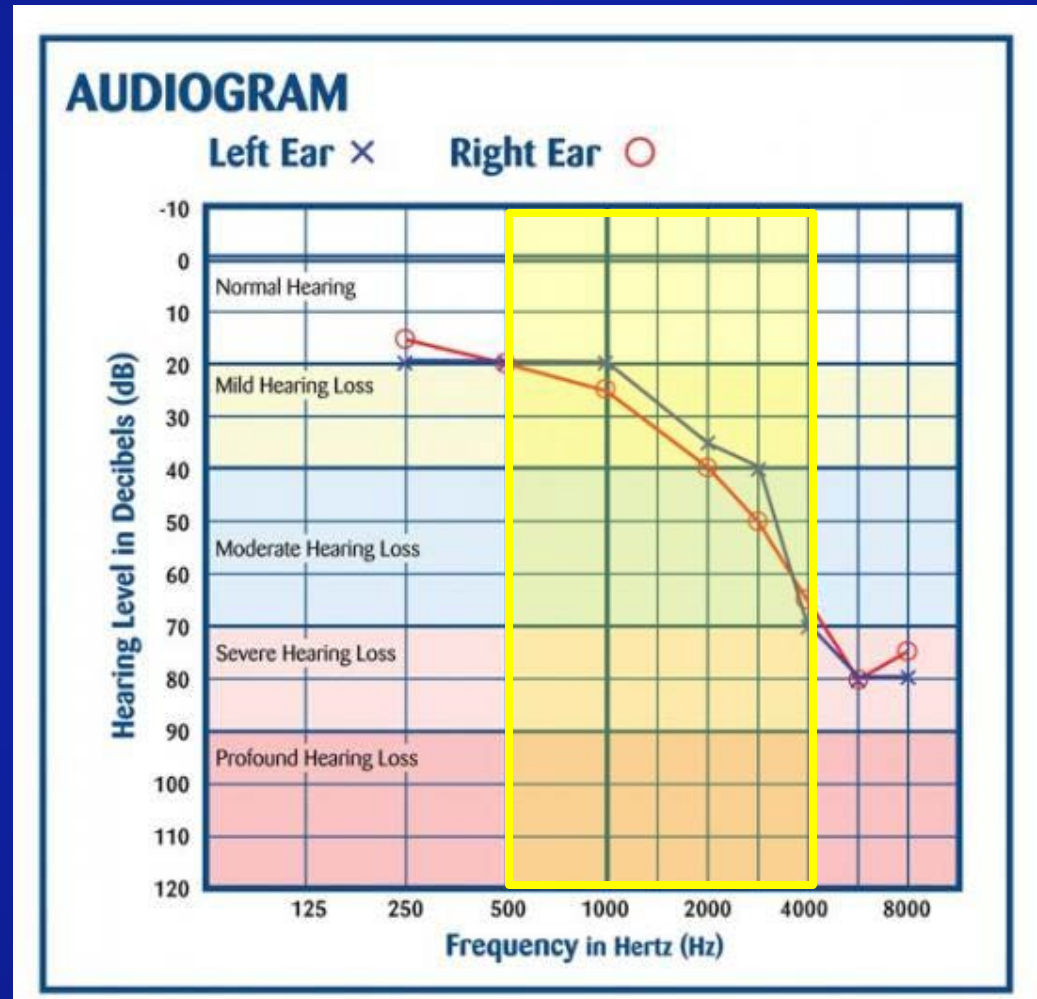
Central Cortical Function

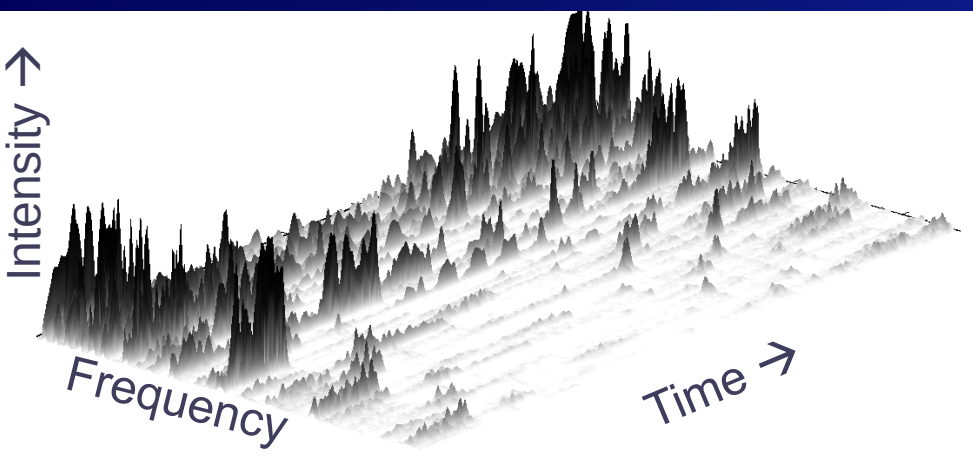


Principles of Auditory Physiology

#3 “Hearing loss” reflects impairments in *peripheral cochlear function* that can be assessed with audiometry

PTA = Pure tone average of 0.5, 1, 2, & 4 KHz tones

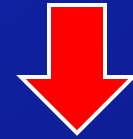




**Hearing Loss &
Cochlear impairment**

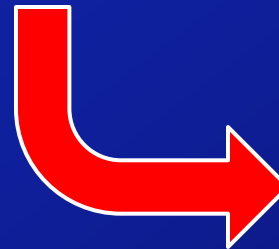
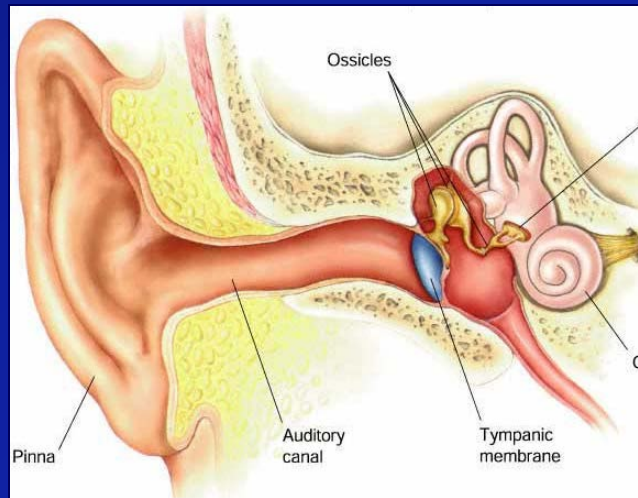
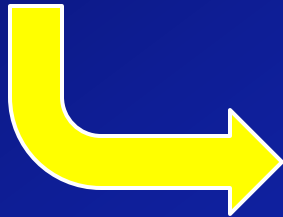


**Decreased hearing
sensitivity & poor
frequency resolution**



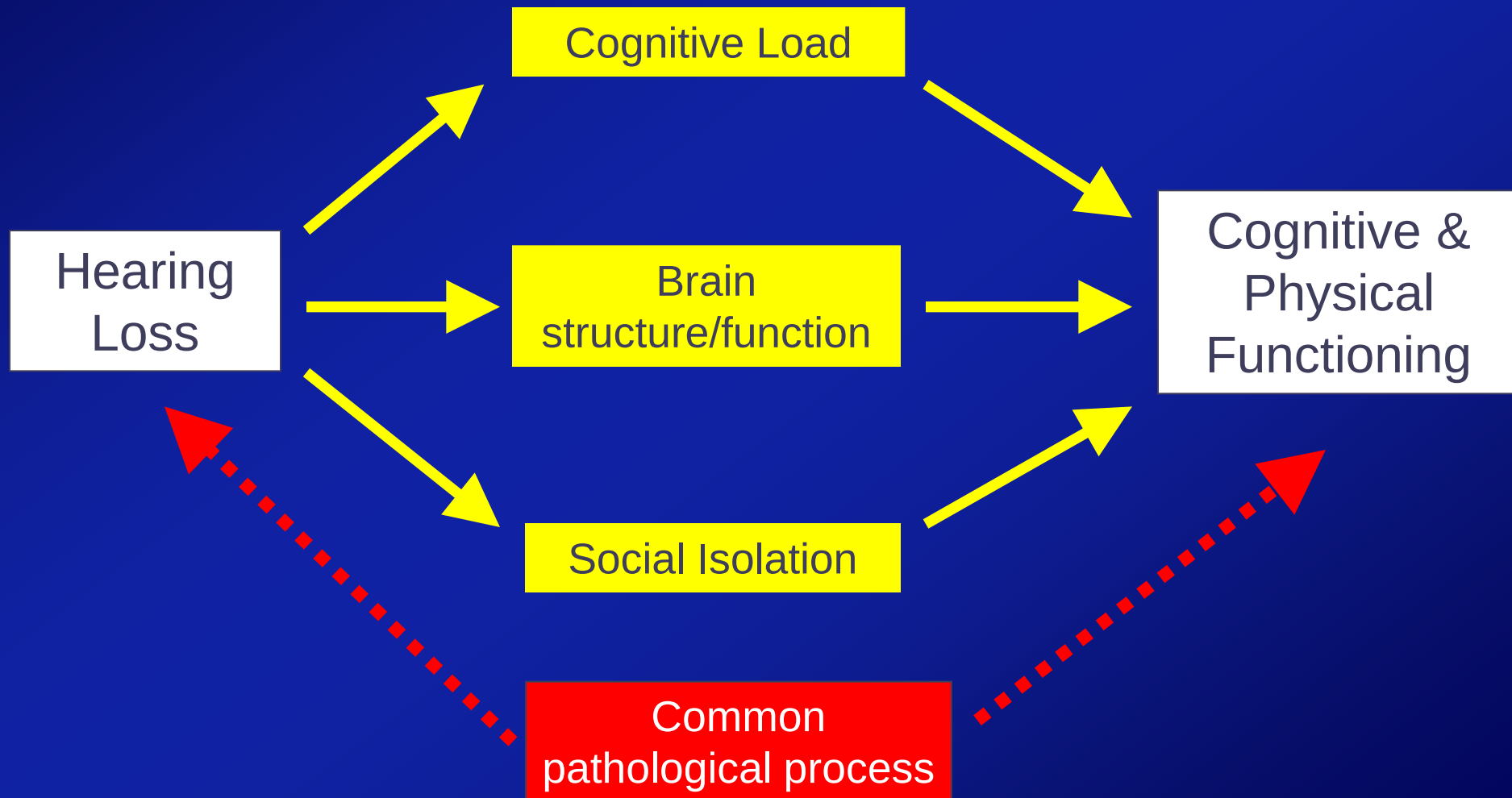
“Effortful listening”

“Sunday”



Hearing Loss & Healthy Aging

Common Cause or Modifiable Risk Factor



Age-Related Hearing Loss (ARHL)

Basic Public Health Questions

- What are the consequences of ARHL for older adults?
- **What are the options for treating ARHL and what is their impact on older adults?**
- How can ARHL be effectively addressed in the community?

Options for Addressing ARHL

Topics to be Discussed

- Education & Counselling
 - Hearing needs assessment
 - Rehabilitative strategies
- Hearing health care workforce
 - Audiologists, Hearing aid dispensers, Community health workers
- Hearing technologies
 - Hearing aids vs. PSAP's
 - Hearing loop systems & Hearing assistive devices

Age-Related Hearing Loss (ARHL)

Basic Public Health Questions

- What are the consequences of ARHL for older adults?
- What are the options for treating ARHL and what is their impact on older adults?
- **How can ARHL be effectively addressed in the community?**

How can ARHL be effectively addressed in the community?

Topics to be Discussed

- Understanding & approaching hearing loss in the context of healthy aging
 - Collaborative strategies for research, education, & awareness
- Delivery models of hearing health care & insurance coverage
 - Developing accessible models of care
 - 3rd party reimbursement
- Innovations in hearing technologies
 - Developing affordable & innovative technologies
 - Open wireless standards

Present Status of ARHL in Society

- Inconsequential, poorly understood, & stigmatized
- Technology & models of care not meeting needs of many individuals

Current insights
into importance of
hearing to healthy
aging

Rapid progress in
technology &
wireless
connectivity

Aging society
with baby
boomers

**Workshop
Catalyzes
Change**

Approaching ARHL in Context of Healthy Aging

- Optimal hearing understood to be critical for daily functioning
 - Expanded, transparent options for hearing health care
 - Coverage for hearing health care services