Healthy Futures Summit

Age-Related Sensory & Cognitive Impairments: Identifying Opportunities for Prevention

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Disclosure: Phonak (Warrenville, IL) is contributing hearing aids for use in the ACHIEVE Study

SCHOOL OF PUBLIC HEALTH
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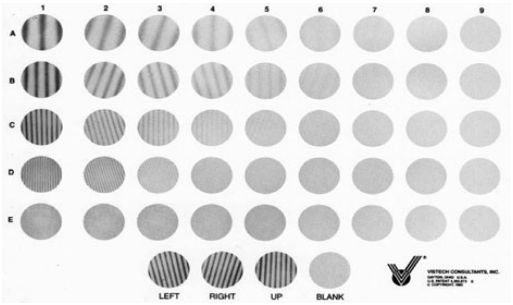
Epidemiology of Age-Related Sensory Impairments 1

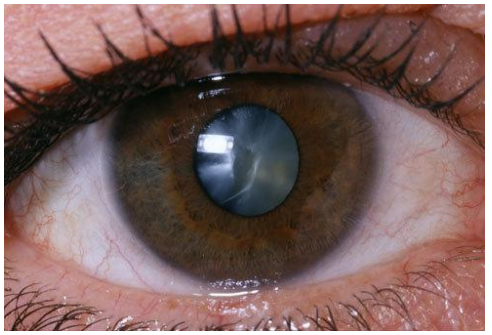
Sensory Impairments and Cognitive Function 2

Introduction to the ACHIEVE Study 3

Some Common Age-Related Sensory Impairments

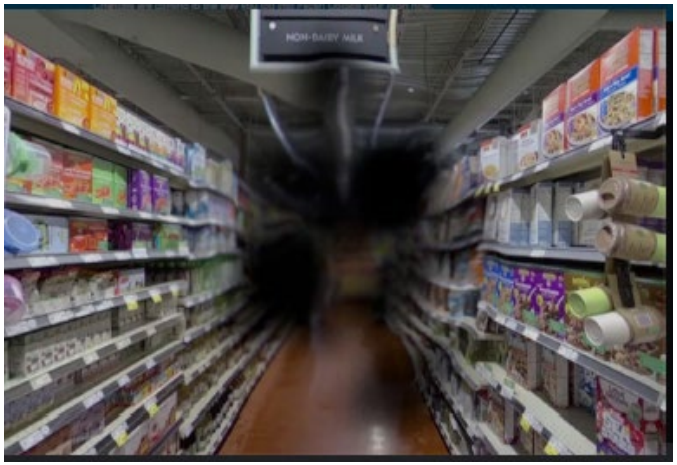


Reduced contrast sensitivity



Cataract

Hearing loss

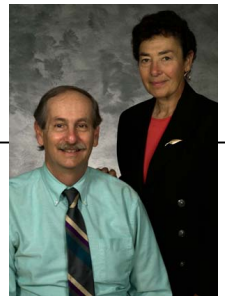


Macular degeneration

Major Community-Based Studies of Age-Related Sensory Impairments

Beaver Dam Eye Study (BDES)
N=4926
1988-present

vision,
vascular disease



Ron & Barbara Klein

Epidemiology of Hearing Loss Study (EHLS)
N=3753
1993-present

hearing, olfaction,
cognitive function,
vascular disease

Karen Cruickshanks

Beaver Dam Offspring Study (BOSS)
N=3296
2005-present

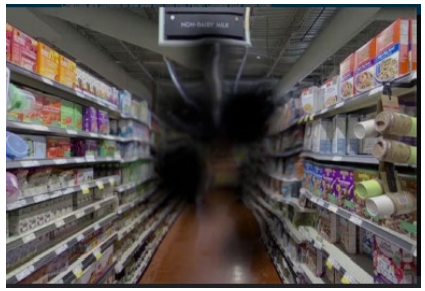
vision, hearing, olfaction,
taste, cognitive function,
vascular disease

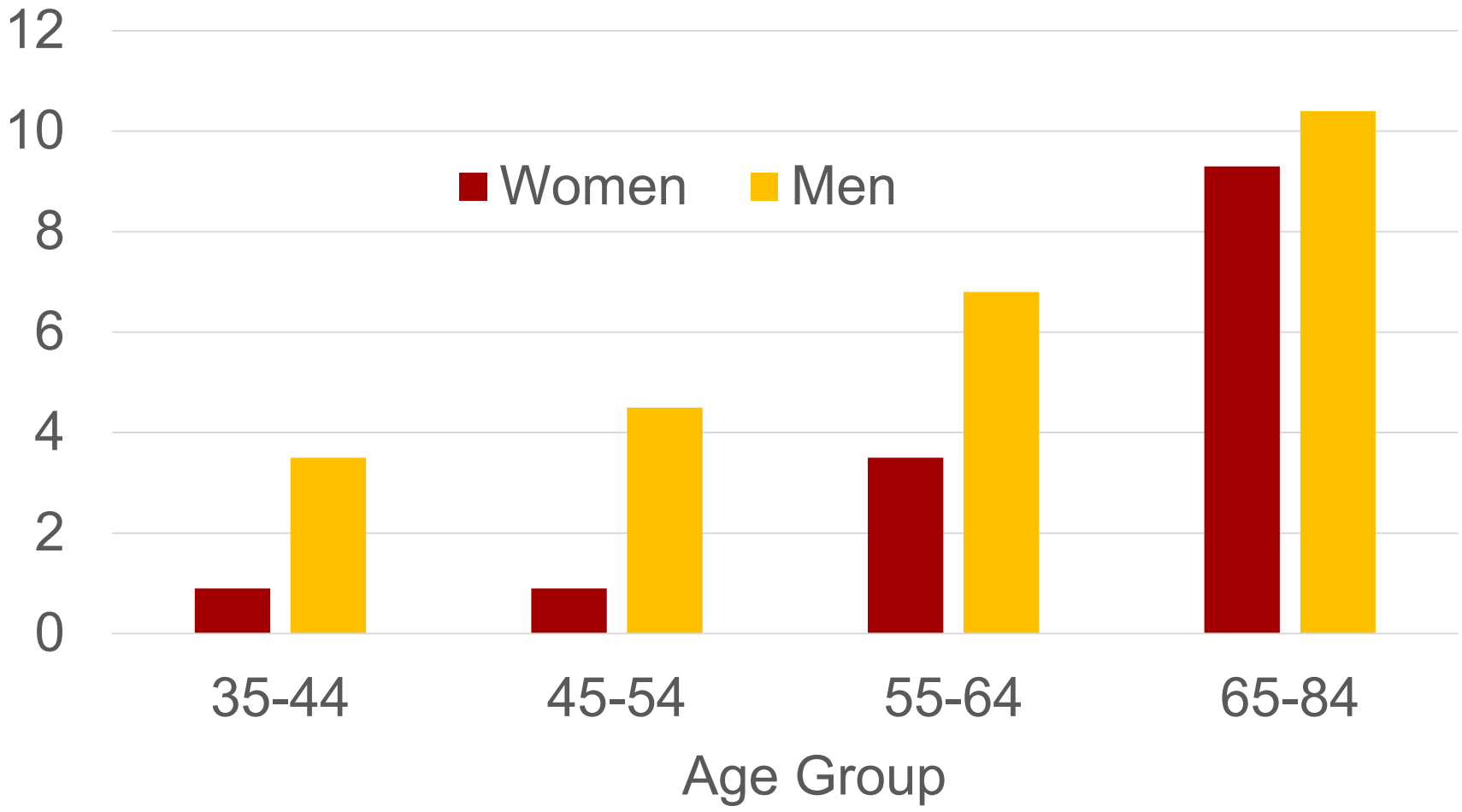
Prevalence of Hearing Impairment by Age: EHLS & BOSS

Age Group, years	EHLS		BOSS	
	No.	%	No.	%
45–49	99	15.2	529	9.1
50–54	615	17.1	476	13.0
55–59	532	25.6	370	23.5
60–64	513	37.8	171	24.6
65–69	543	49.4	70	30.0
70–74	510	60.4	28	50.0

Zhan W et al., Am J Epidemiol 2009; 171: 260-266

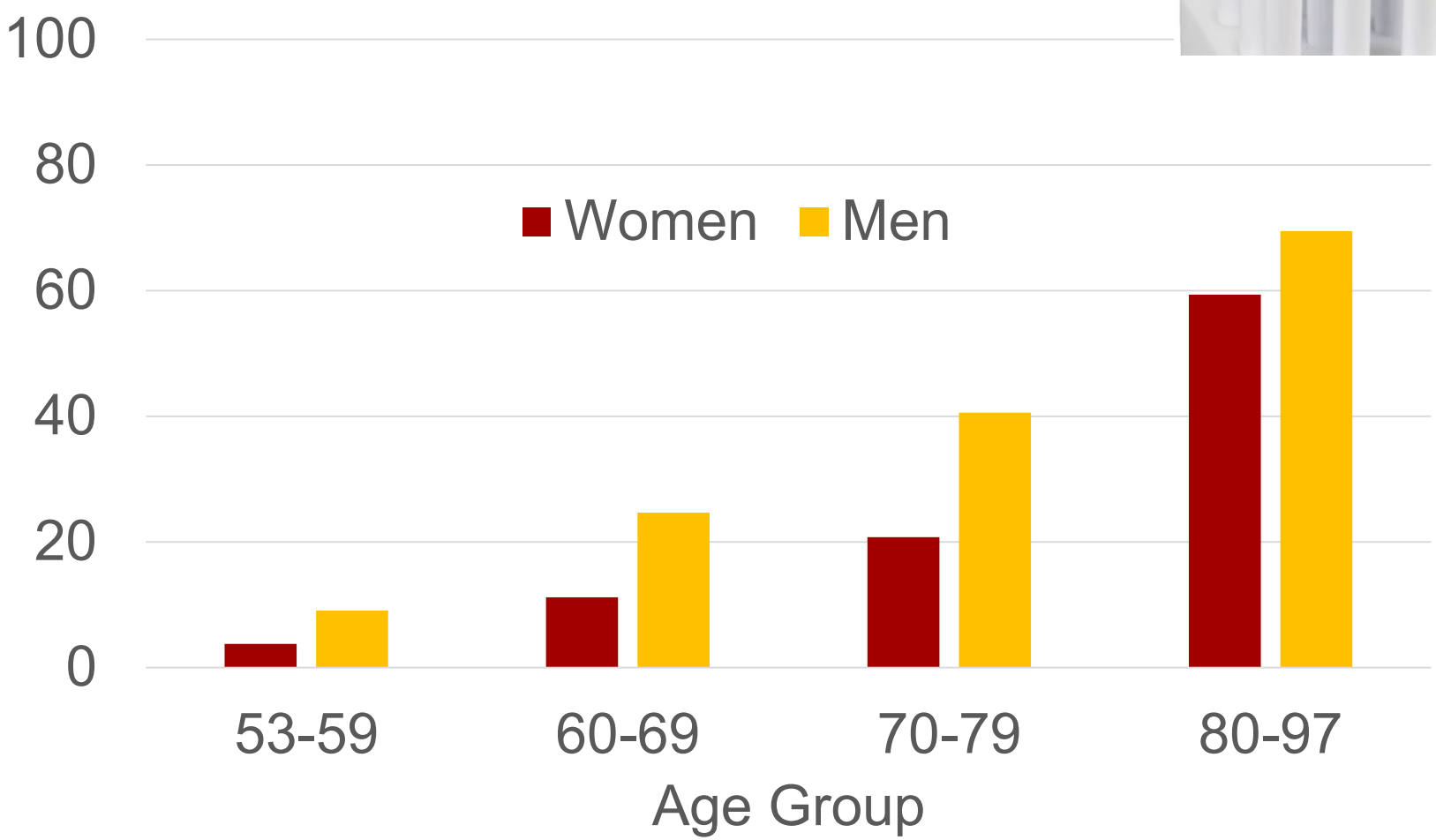
Prevalence of Macular Degeneration (%) by Age and Sex: BOSS





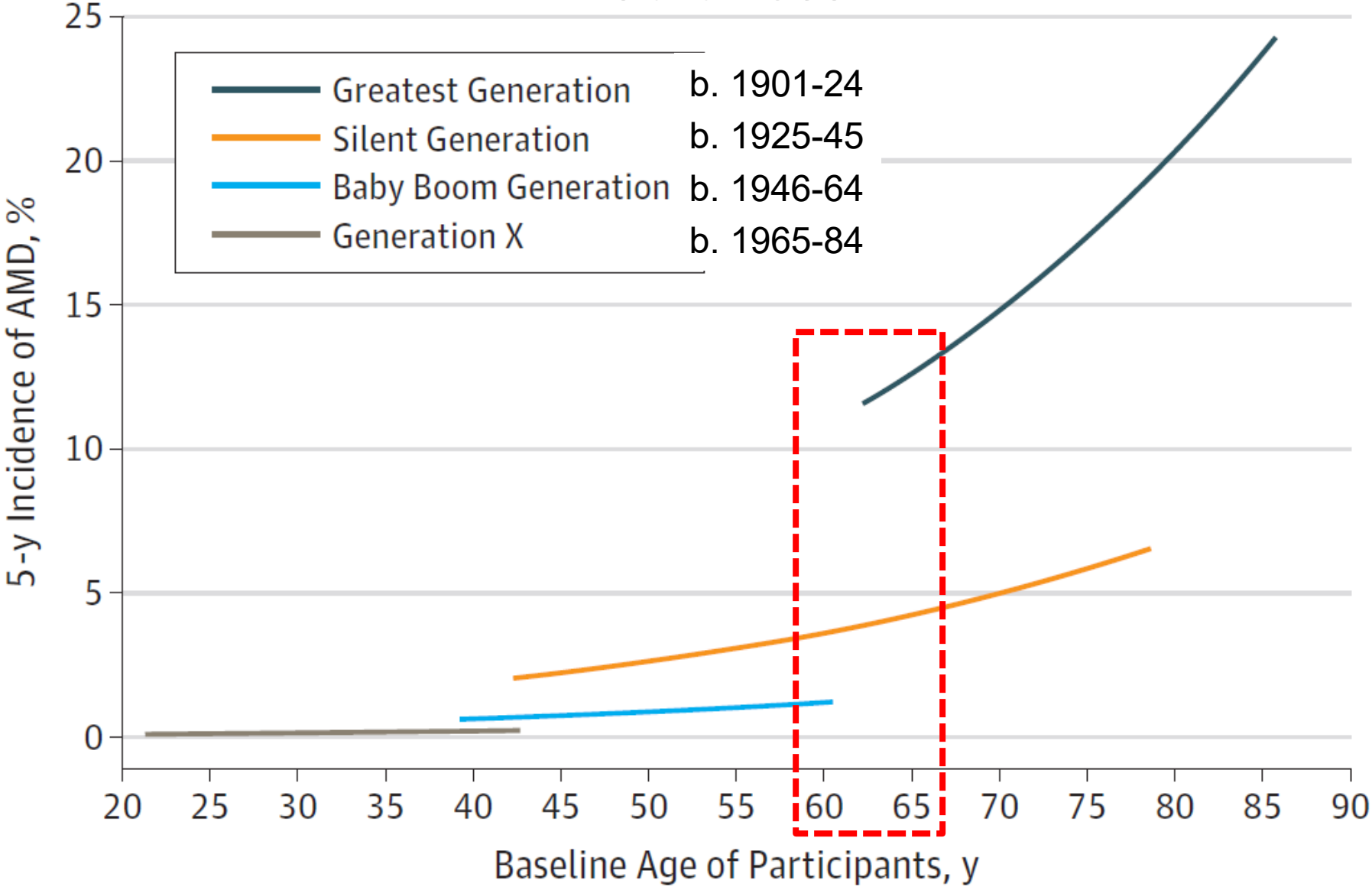
Klein R et al., Arch Opthalmol 2010; 128: 750-758

Prevalence of Olfactory Impairment (%) by Age and Sex: EHLS



Murphy C et al., JAMA 2002; 288: 2307-2312

Incidence of Macular Degeneration by Age & Generation: BDES and BOSS



Cruickshanks KJ et al. JAMA Ophthalmol 2017; 135: 1417-1423

Epidemiology of Age-Related Sensory Impairments: Key Findings of Beaver Dam Studies

- Incidence rates of age-related sensory impairments (hearing, vision, olfaction) have declined 20 to 30% per generation
- Rates of macular degeneration have declined 60% per generation
- What can we take away from these findings?
  - Sensory impairments need not be considered an inevitable consequence of aging
  - These impairments have modifiable causes that (in aggregate) have become more favorable in more recent generations
  - There are considerable opportunities for prevention if we can identify and address these modifiable causes

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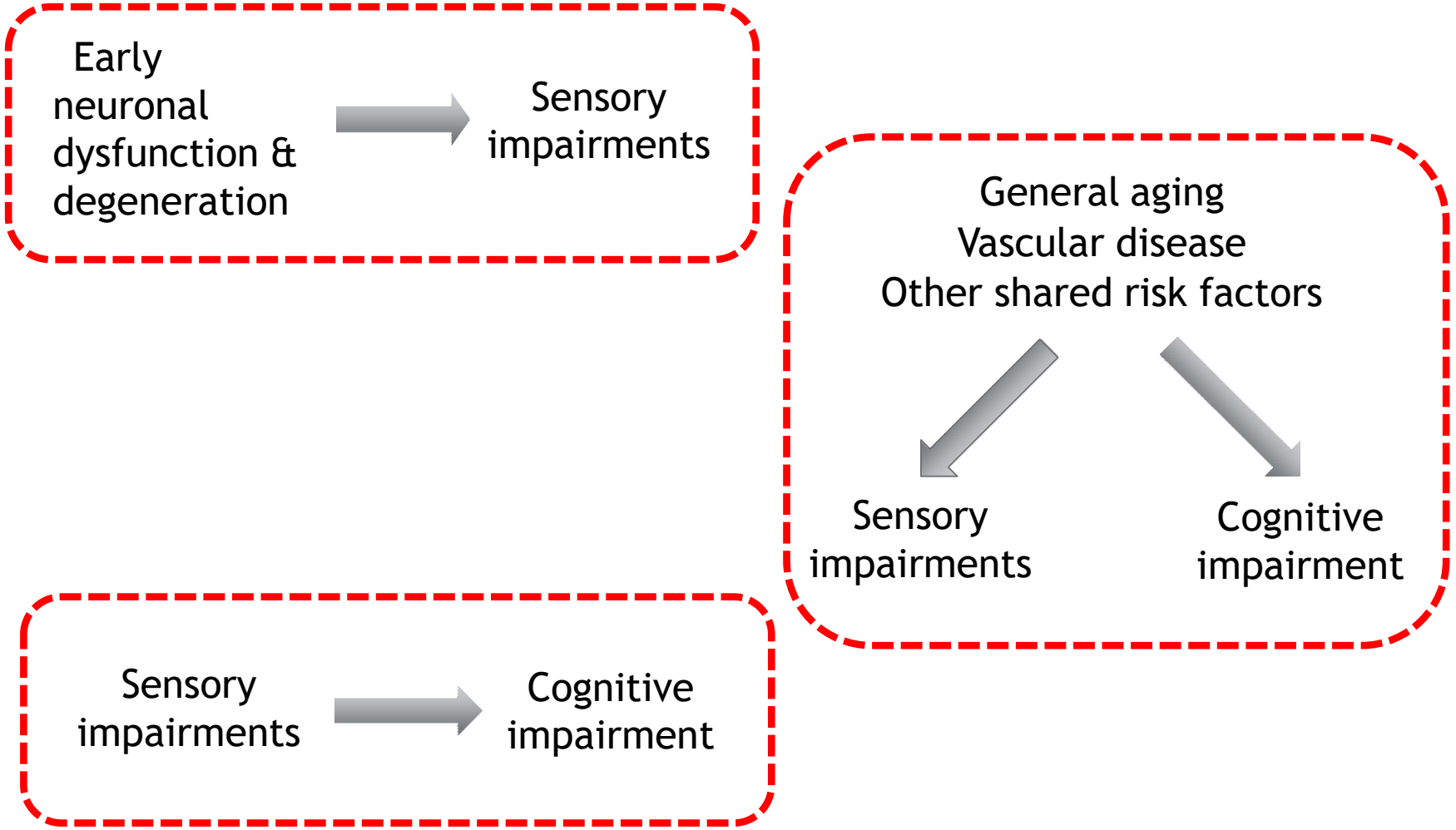
Age-Related Sensory Impairments and 10-Year Risk of Cognitive Impairment: EHLS

Sensory Impairment	Age, Sex, Education Adjusted	Multivariable Adjusted[a]
	Hazard Ratio (95% Confidence Interval)	
Hearing	1.96 (1.16–3.29)	1.90 (1.11–3.26)
Vision	1.85 (1.15–2.97)	2.05 (1.24–3.38)
Olfaction	4.02 (2.58–6.28)	3.92 (2.45–6.26)

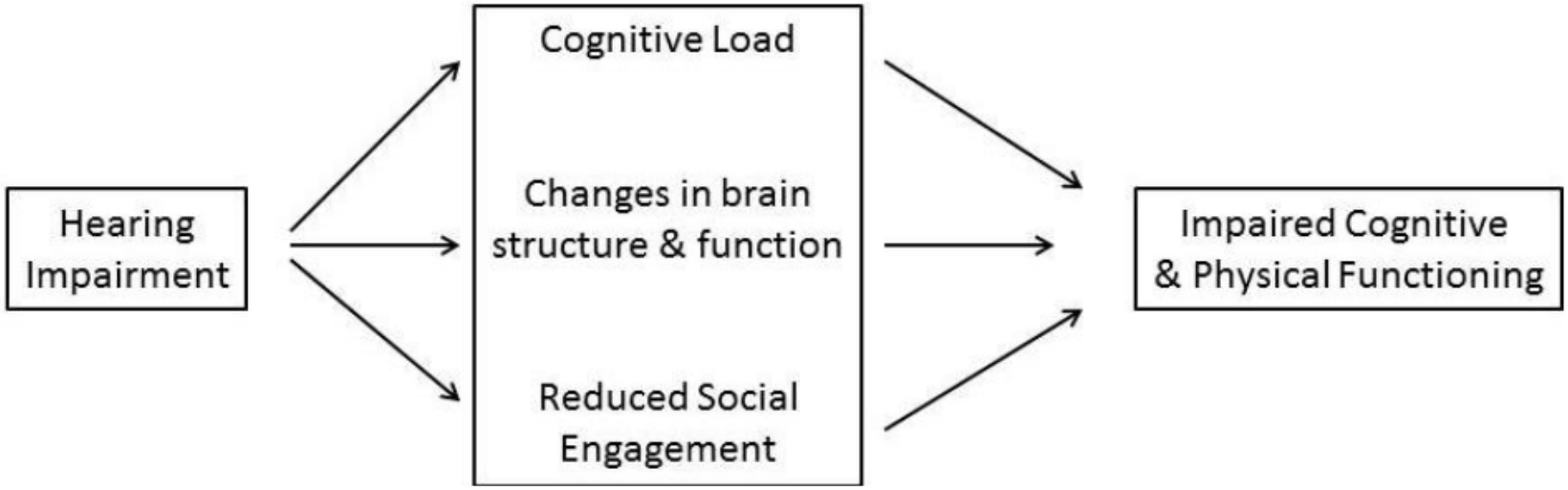
[a]Model adjusted for age, sex, education, smoking status, body mass index, exercise, alcohol consumption, hypertension, diabetes mellitus, number of high inflammatory markers, non-high-density lipoprotein cholesterol, mean intima-media thickness, frailty score, longest held job, cold or stuffy nose, nasal polyps, deviated septum, allergies, head injury, stroke or transient ischemic attack, and epilepsy.

Fischer ME et al. *JAGS* 2016; 64: 1981-1987

Why are Age-Related Sensory Impairments and Cognitive Impairment Related? Some Possibilities...



Does Age-Related Hearing Loss Increase Rates of Cognitive Decline?



Aging & Cognitive Health Evaluation in Elders (ACHIEVE) Study

2017-2022

Randomized, controlled trial designed to test two different treatments that may promote healthy aging and cognitive health in older adults

Funded by the National Institute on Aging (R01AG055426)

www.achievestudy.org

ACHIEVE
HEALTHY AGING

ACHIEVE Study Design

Pre-screening (telephone)

Screening visit

Baseline visit (randomization)

(N~490)

(N~490)

Hearing Loss Program
4 visits

Successful Aging Education Program
4 visits

Follow-up to assess 3-year changes (6 visits)

Cognitive function

Quality of life

Social/ leisure activities

Daily functioning

Mobility

Brain structure (MRI)

ACHIEVE Locations and Eligibility Criteria

Participating Sites:

- George W. Comstock Center, Hagerstown, MD (field site)
- University of Mississippi Medical Center, Jackson, MS (field site)
- University of Minnesota, Minneapolis, MN (field site)
- Wake Forest University, Winston-Salem, NC (field site)
- University of North Carolina, Chapel Hill, NC (coordinating center)
- University of Pittsburgh, PA (successful aging education program)
- University of South Florida, Tampa, FL (hearing loss program)
- Mayo Clinic, Rochester, MN (MRI reading center)

Main Eligibility Criteria:

- Age 70-84 years
- Cognitively normal
- Mild to moderate hearing impairment
- Have not used a hearing aid in the last year
- Willingness to be randomized, adhere to the protocol, complete 12 visits

Acknowledgments

BOSS:

- Karen Cruickshanks, U of Wisconsin
- Mary Fischer, U of Wisconsin
- Carla Schubert, U of Wisconsin
- Nathan Pankratz, U of Minnesota
- Mary Rachel Stimson, U of Minnesota

ACHIEVE (Local Staff):

- Lisa Miller, Coordinator
- Liz Anderson
- Kerry Witherell
- Luanne Welch
- Sarah Aguilar
- Soni Uccellini
- Kate Teece
- Matt Waggenspack
- Debbie Ng
- Sandy Potter
- Kristina Foyt
- Taia Strachan