Epidemiology of Hearing Loss Study (EHLS)

Funded by the National Institute on Aging
EHLS

- Began in 1993
- Participants in the BDES (n=3753; 83%)
- Examinations every 5 yrs
  - Additional examinations and interviews for some groups
What didn’t we know in 1993?

- Number of people with hearing impairments
- Severity of impairments
- Risk of developing a hearing impairment
- How often is there continuing deterioration
- Why does hearing worsen with aging
- Does the middle ear stiffen with aging
- How many people have regular hearing care
What have we learned from Beaver Dam?

• Hearing impairments are common
  ➢ 21% of 48-59 yrs
  ➢ 90% of 80+ yrs

• Most are mild or moderate
  ➢ Only 3% with severe hearing impairments

• 60% had not had a hearing test in 10 yrs

• 15% of people with hearing impairments used hearing aids

• Not due to middle ear changes
What have we learned from Beaver Dam?

• Risk of developing a hearing impairment
  ➢ About 1 in 25 people each year

• Risk of worsening
  ➢ About 1 in 10 people each year
Why do hearing impairments develop?
Clues from Beaver Dam

- Older age
- Men more than women
- Education
- Occupation
- Smoking
- Atherosclerosis
- Obesity
- Higher pulse rate
- Inflammation
- Diabetes
- Genetic Factors
Protective Factors

• HDL-cholesterol
• Exercise
• Statins and NSAIDS?
Cigarettes can be deadly.

What?

Tobacco is considered addictive

Pardon?

Smoking is carcinogenic

I can't hear you...

They're right. Cigarettes do hasten deafness...
Other studies of hearing

• National Health and Nutrition Examination Survey
• Nörd-Trøndelag Study
• Blue Mountains Eye Study
• Jacksonville Heart Study
• Hispanic Community Health Study
Olfactory impairments

• Added in 1998 at the request of NIA
• No other population-based studies of olfactory impairment in the US
• San Diego Odor Identification Test
Olfactory impairments: What we’ve learned from Beaver Dam

• Olfactory impairment is common (25%)
• Risk is high
  ➢ About 1 in 40 people each year
• Risk factors
  ➢ Age, diabetes, heavy alcohol consumption, deviated septum, nasal polyps
  ➢ Exercise and statins protective
Cognitive Impairment

• Olfactory impairment
• Inflammation
• Atherosclerosis
What’s next for EHLS?

Hearing, olfaction and cognitive impairments

Understand the effects of:

– Changes in inflammation
– Changes in large and small blood vessels
– Changes in medications
Beaver Dam Offspring Study

NIH AG021917 – Funded by the National Institutes of Health
In the Year 2030

• 69 million hearing impaired adults age 45+
  (58 million will be untreated)

• 3 million new cases each year
Prevalence of Hearing Loss by age 60

BDES/EHLS Cohort Born 1902-1946
What will sensory aging be like for people born in the last half of the 20th century?

EHLS born before 1947
Offspring born 1920s-1990s
Generational Differences

Born in the 1920s

- 106,521,537 people
- Life expectancy:
  - Male 53.6, Female 54.6
- Average annual earnings $1236
- It took 13 days to reach CA from NY
- Great Depression, WWII

Born in the 1960s

- 177,830,000 people
- Life expectancy:
  - Male 66.6, Female 73.1
- Average annual earnings $4743
- Space travel - Armstrong and Aldrin
- Civil rights, Vietnam
Health-related changes: 1960s to 1990s

↓ Serious childhood infections (immunizations & antibiotics)
? Nutrition
↓ Smoking
↓ Cholesterol
↓ Hypertension
↑ Obesity and sedentary lifestyles
↓ Household sizes
↓ Noisy jobs

New exposures: plastics, adhesives, medications, Ipods, etc.
Beaver Dam Offspring Study (BOSS)

- Two cohorts span most of the 20\textsuperscript{th} century
  - From 1902 to 1992
- Most of the “children” are ages 30-65 yrs
- 76% live in Wisconsin
Aims

• How many people have impairments or disorders?
  – Hearing, Vision, Olfaction and Taste

• Why do these occur?
  – genetic, lifestyle, and vascular factors

• How to prevent sensory disorders and have healthy aging?
Beaver Dam Offspring Study Investigators

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Status Report

Families:
  83% of agreed to let us contact children
  8.7% refused
  If you haven’t been contacted, please let us know

Offspring:
  12% have refused
  If you haven’t been contacted, please let us know
  If you haven’t been examined, please schedule
<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Age (yrs)</td>
<td>48</td>
</tr>
<tr>
<td>Men</td>
<td>44%</td>
</tr>
<tr>
<td>Diabetes</td>
<td>6%</td>
</tr>
<tr>
<td>Hypertension</td>
<td>35%</td>
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<tr>
<td>Smokers</td>
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<td>Current</td>
<td>16%</td>
</tr>
<tr>
<td>Past</td>
<td>29%</td>
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</tbody>
</table>
BOSS Sneak Preview

Vision: 20/20

Hearing impairments:
  17% 50-59 yrs
  28% 60-69 yrs

Olfaction:
  9% 60-69 yrs

Taste: 30 FP per person; Range=6-62
What’s next?

- Complete examinations next spring
- Complete laboratory analyses
- Analyze data
- Publish results
Thank You, Beaver Dam, for the first 20 years!

Better Health for Future Generations

Please join us for refreshments