Objectives

- Review US Aging demographics and Define Healthy Aging
- Identify Ways to Practice Preventive Medicine and Healthy Brain Aging
- Review Alzheimer’s Disease and Management
Life expectancy reaches all-time high

Declines in death rates from most major causes have pushed Americans’ life expectancy to a record 77.6 years.

Estimated life expectancy, 1943-2003

<table>
<thead>
<tr>
<th>Year</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>1943</td>
<td>60.6</td>
<td>65.3</td>
</tr>
<tr>
<td>1950</td>
<td>62.9</td>
<td>68.8</td>
</tr>
<tr>
<td>1960</td>
<td>67.1</td>
<td>71.4</td>
</tr>
<tr>
<td>1970</td>
<td>69.6</td>
<td>74.6</td>
</tr>
<tr>
<td>1980</td>
<td>71.8</td>
<td>75.5</td>
</tr>
<tr>
<td>1990</td>
<td>74.2</td>
<td>77.6</td>
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</table>

By race and gender, 2003

<table>
<thead>
<tr>
<th>Race</th>
<th>Male</th>
<th>Female</th>
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<tbody>
<tr>
<td>White</td>
<td>75.4</td>
<td>80.5</td>
</tr>
<tr>
<td>Black</td>
<td>69.2</td>
<td>76.1</td>
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</tbody>
</table>

SOURCE: Centers for Disease Control and Prevention

US: Number of Older Americans

Total number of persons age 65 or older, by age group, 1900 to 2050, in millions

Note: Data for the years 2000 to 2050 are middle-series projections of the population.
Reference population: These data refer to the resident population.
Source: U.S. Census Bureau, Decennial Census Data and Population Projections.
What do these have in common?
Leading Causes of Death, age 65+, NCHS

<table>
<thead>
<tr>
<th>Cause</th>
<th>Rate per 100,000</th>
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<tbody>
<tr>
<td>Heart disease</td>
<td>5848.7</td>
</tr>
<tr>
<td>Cancer</td>
<td>1795.6</td>
</tr>
<tr>
<td>Stroke</td>
<td>1568.4</td>
</tr>
<tr>
<td>Pneumonia/flu</td>
<td>734.4</td>
</tr>
<tr>
<td>Alzheimer’s Dementia</td>
<td>659.0</td>
</tr>
<tr>
<td>Chronic respiratory disease</td>
<td>640.1</td>
</tr>
<tr>
<td>Diabetes</td>
<td>315.6</td>
</tr>
<tr>
<td>Renal disease</td>
<td>274.2</td>
</tr>
<tr>
<td>Accidents</td>
<td>269.9</td>
</tr>
<tr>
<td>Sepsis</td>
<td>212.9</td>
</tr>
<tr>
<td>All Causes</td>
<td>15,321.5</td>
</tr>
</tbody>
</table>

National Vital Statistics Report
Healthy, Successful Aging Definition

“Successful aging is multidimensional, encompassing the avoidance of disease and disability, the maintenance of high physical and cognitive function, and sustained engagement in social and productive activities.”


Psychosocial Factors in Healthy Aging

- Social support systems
- Lifelong learning
- Stress reduction
- Engagement in meaningful activity
Aging: Body Changes Examples

- Reduced
  - Max O$_2$ consumption
  - Max cardiac output/stroke volume
  - Thermoregulation
  - Immune responses
  - Decreased joint flexibility (articular cartilage)
  - High frequency hearing loss
  - Glomerular filtration rate
  - Bladder compliance and capacity

- Increased
  - Systolic blood pressure and peripheral resistance
  - Bone Resorption
  - Lung residual volume/capacity

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Longevity and successful aging - What can we do right now?

- Recognize the potential for healthy, successful aging and review preventive medicine
- Identify ways to preserve memory

Exercise: The Real Fountain of Youth

- Reduction in
  - Coronary Artery Disease and stroke (effect of blood pressure, cholesterol, diabetes)
  - Colon cancer
  - Osteoporosis
  - Diabetes, Obesity
  - Depression
  - Dementia
- Improvement in muscle mass, balance, strength, sleep
Annual Screening

- Height and weight
  - 15% of Medicare-eligible are obese (BMI > 30). Perhaps 35% overweight
  - Obesity is an important risk factor for mortality
- Blood Pressure
- Cholesterol
- Vision, especially diabetes, hypertension

Further Screening

- Mammography: every 1-2 years
- Colonoscopy after age 50
- Abdominal ultrasound for males 65-75 who ever smoked.
- Bone density, females 65 and older
- Diabetes
- Cognitive Status
- Falls
Immunizations

- Annual influenza for > 65. Exclusion egg allergy
- Pneumococcal. One dose after 65. If received before 65 and > 5 years, another dose necessary
- Td booster every 10 years, once Tdap
- Zoster vaccine one dose > 60

Healthy Brain Aging

- Exercise, nutrition, weight management
- Control Blood Pressure, cholesterol, glucose, secondary prevention of stroke
- Intellectual challenge, emotional resilience, social integrated lifestyle
- Reduce risk head injury, reduce risk hazardous exposure
- Optimal sleep, limit alcohol, smoking cessation

What Happens in the Brain when we learn new information?

“Cognitive Reserve”

How is information transmitted between brain cells?
What are normal changes in brain function with aging?

- Longer time to learn new information
- Difficulty multi-tasking
- Words more often at the “tip of the tongue”
- Mild decreases in memory that don’t interfere with daily life or work

What are the different types of memory and some of the other important areas of cognitive function?

- Executive function
- Visual spatial function
- Language
- Long term memory
- Short term memory
- Working memory
- Procedural Memory
- Semantic
- Episodic Memory
What can be done to live with normal aging changes?

- Pay attention, take notes
- Rehearse – remember names like a politician does
  - Concentrate on the person you’re meeting – try to make a connection between the person and the name
  - Repeat his or her name as many times as possible in your initial conversation
- Reduce distractions
  - Focus on one thing at a time
  - Give the item you want to learn or remember your full attention
- Organize your life
  - Put important papers in a file, Use a medication organizer, Keep a calendar, electronic

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What is dementia?

- Impairment in cognitive (brain) function (memory and at least one other area) that interferes with daily life
- Activities of Daily Living

Alzheimer’s Disease

- Alzheimer’s Disease (AD) affects about 5 million Americans
- Most are 65 and older with prevalence reaching near 50% at age 85 and older
- AD patients typically live with AD about 7-10 years after diagnosis

Alzheimer’s Dementia is Often Undetected in Busy Private Practices


Two Thirds of Dementia Cases Remain Undetected in Primary Care Practice

Hypothetical Course of Age Related Changes in One Individual’s Brain

Brain Aging is gradual
- Decline in Cognition and Metabolism
- Accumulation of Plaques and Tangles
Neurofibrillary Tangles and Amyloid Plaques in Alzheimer’s disease

- Alzheimer’s disease
  - Likely caused by deposition of abnormal proteins in the brain

![Neurofibrillary Tangles and Amyloid Plaques](image)

Diagnostic Criteria for Alzheimer’s Disease (1)

- Multiple Cognitive Deficits manifested by both:
  - Memory impairment
  - 1 (or more) of the following: aphasia, apraxia (purposeful movements), agnosia (recognize object with senses), disturbance in executive functioning.
- Significant impairment in social or occupational functioning representing a decline from a previous level of functioning
- Gradual onset and progressive cognitive decline
Diagnostic Criteria for Alzheimer’s Disease (2)

- Cognitive deficits are NOT due to any of the following:
  - Other central nervous system conditions that cause progressive deficits in memory and cognition
  - System condition known to cause dementia
  - Substance induced conditions

- Deficits
  - Other central nervous system conditions that cause progressive deficits in memory
  - Do not occur exclusively in delirium
  - Disturbance is not accounted by another access one disorder

Are there any treatable causes of dementia?

- Vitamin B12 deficiency
- Thyroid disease
- Depression
- Syphilis
- HIV
What are the risk factors for developing dementia?

- Alzheimer’s disease
  - Age, Family history (rare early onset mutations presenilin genes and APP gene), APOE*4 gene, Down’s Syndrome
  - Possibly
    - Other genes
    - Head trauma
    - Lower educational achievement
    - Late-onset depression
- Multi-infarct dementia which can contribute to Alzheimer’s
  - High blood pressure
  - High cholesterol
  - Diabetes
  - Smoking

What are protective factors for dementia?

- Alzheimer’s disease - there is no definite protective factor, but the following are possible protective factors
  - Intellectual activity
    - Board games
    - Playing musical instruments
    - Crossword puzzles, Reading
    - Learning new things such as
      - Languages
      - Complex dance steps
  - Physical Activity
  - Antioxidants
  - Nonsteroidal anti-inflammatory drugs
  - Statins (cholesterol lowering drugs)
Suggested Clinical Approaches

- Screen for both depression and cognitive impairment in older adults
- Determine risk factors
- Check for potential medical causes and risks (e.g., cardiovascular and endocrine)
- Continue to monitor for emerging depression when treating dementia or emerging dementia when treating depression

Summary of Assessment

- History (family members, caregivers) (rate of onset, physical illness)
- Neurological and general PE
- Mental Status Exam
- Functional Exam
- Laboratory Assessment
- Brain Imaging
Biomarkers being studied

- CSF and blood measures of tau, amyloid, and signaling proteins
- Brain imaging
  - Structural MRI or CT
  - Spect/PET
  - Functional MRI during cognitive challenges
What are the consequences of dementia?

- Loss of independence
- Falls
- Disability
- Death
- Cost to patient
- Cost to family/caregivers
- Cost to society

Currently Available Medications for Alzheimer’s

- Donepezil
- Galantamine
- Rivastigamine
- Memantine
Status of Other Available Treatments

- Statins
  - Epidemiological associates with lower AD risk\(^1\)
- Antihypertensives
  - Antihypertensives (potassium sparing diuretics may reduce Alzheimer’s risk)\(^2\)
  - May only have effect in people with HTN
- Estrogen
  - Women’s Health Initiative trial of premarin showed higher dementia rates in hormone treated group\(^3\)


Supplement Treatments

- Curcumin
  - Antiamyloid and anti-inflammatory properties
  - Lack of bioavailability may explain negative trial results\(^1\)
- Omega 3 Fatty acids
  - Antioxidant and antithrombotic may be protective
  - Delayed rate of cognitive decline in placebo controlled trial for mild to moderate AD\(^2\)
- Gingo Biloba
- Phosphatidyl Serine
  - Short term in age related memory loss

Age Related Changes that Affect Drug dosing

- Reduced GI, renal and liver function
- Lower albumin levels
- Increased fat/muscle ratio
- Increased receptor site sensitivity for many drugs
- Polypharmacy leading to drug drug and drug disease interactions

Some Strategies for Dementia

- Educate caregivers, “creative engagement”- encourage individual expression and to strengthen social connections.
- Optimize sensory input, identify underlying precipitants of troublesome behavior
- Employ familiar surroundings, keep daily activities routine
- Use clock and calendars to maximize orientation, read out loud
**Prevention Goal, Delay Symptom Onset**

![Graph showing cognitive function vs. age for non-demented and demented individuals with and without intervention.]

**Prevention Strategies**

**Can We Prevent Alzheimer’s Disease?**

- If the term “prevent” is taken to meet “cure”, then the answer is no.
- Although true prevention is an ideal goal, intermediary targets are feasible.
  - Delaying onset and slowing progression of the degenerative process might be more reasonable.
Summary

- US population demographics are shifting
- Take an active role and practice preventive medicine
- Systematic approach to AD diagnosis and treatment involves patient evaluation, family members, and testing
- Both pharmacologic and lifestyle benefit brain health and dementia course
  - Improve quality of life/brain healthy activities to stave off AD symptoms

Resources

- www.niapublications.org
  - This takes you right to the listing of publications of the National Institute on Aging ready for download. Most publications can be ordered in free print version.
- www.alz.org
  - The Alzheimer's Association has many services and resources for people with dementia and their caregivers. Programs include “Safe-Return” bracelets, legal and financial counseling, support groups, courses for dementia caregiving, and much more.
- Here is the link for the KP-SSF Memory Clinic videos
  - http://mydoctor.kaiserpermanente.org/ncai/facilities/region/southsanfrancisco/area_master/departments/memoryevaluation.jsp
- www.newlifestyles.com
  - This website allows you look up information about just about any medical and community service an older person might need (home care, hospice, assisted living, etc.) by city, state or by zip code. This is a free service and can be especially helpful when you are involved in caring for someone who lives far away.
Effect of Nutrients to Decrease the Development of Cognitive Impairment

USPSTF: Interventions for 65+

- Counseling
  - Substance Use
    - Tobacco cessation
    - Avoid alcohol/drug use while driving, swimming, etc.
  - Diet and Exercise
    - Limit fat & cholesterol, maintain caloric balance
    - Emphasize grains, fruits and vegetables
    - Adequate calcium intake
    - Regular physical activity
What is Advance Care Planning?

- Process of planning for future care
- Exploring patients’ goals and values
- Identifying proxy decision-maker(s)
- Proper documentation
- Assessment of decisional capacity
  - Relates to specific decision: some patients with dementia will have capacity for ACP discussion

USPSTF: Interventions for 65+

Counseling

- Injury Prevention
  - Lap/should belts
  - Motorcycle and bicycle helmets
  - Fall Prevention
  - Safe storage removal of firearms
  - Smoke detector
  - Set hot water heater to <120-130 F
  - CPR training for household members

- Dental Health
  - Regular visits to dental care provider
What are the 2 most common causes of dementia in the United States?

- Multi-infarct dementia
  - 15 - 25% of all dementia cases
  - Caused by “mini strokes”

Today, 65 year olds should plan for 15 (men) – 20 (women) years after retirement.
Falls

- Each year 30-40% of community individuals age >65 and about 50% of residents of long-term care facilities experience a fall
- Rarely due to single factor
  - Risk Factors: age, functional decline, gait & balance, cognitive, sensory, neurologic, musculoskeletal, foot disorder, medications, hypotension, acute illness