What It Means to Grow Old: Physical Changes that Accompany Aging

Sponsored by the Geriatric Education Center of Pennsylvania Consortium (GEC-PA) (Penn State University, University of Pittsburgh, & UPMC) Penn State Site in collaboration with Hershey Medical Center/College of Medicine

Prepared by Dr. Noel Ballentine, Dr. David Gill, Linda Shumaker, RN-BC, MA, and Carol Gold, PhD
Aging

The progressive, generalized impairment of function resulting in a loss of adaptive response to stress and a growing risk of morbidity and mortality.
“Despite it’s attendant problems and shortcomings aging appears to be the only way to live a long time.”

Auber (1782-1871) French composer
Theories of Aging

- Genetic
  - Aging is controlled by genes
  - Programmed senescence
Theories of Aging

• Wear and tear
  – Environmental factors result in cumulative damage to molecules and cells
  – Protective and repair mechanisms fail
Theories of Aging

- Inflammatory response
  - The balance between
    - pro-inflammation (naturally selected to keep people alive until reproduction) versus
    - modulators of the inflammatory response (necessary to reduce collateral damage)
  - affects longevity
Demographics of Aging: The Crisis Emerging

• In 2006, 37 million people age 65 and over lived in the United States, accounting for just over 12 percent of the total population.

• The baby boomers (1946-1964) are coming! The older population in 2030 is projected to be twice as large as in 2000, growing from 35 million to 71.5 million and representing nearly 20 percent of the total U.S. population.

Federal Agency Forum on Age Related Statistics, (agingstats.gov)
Demographics of Aging: The Crisis Emerging

• The oldest old is the fastest growing segment of the population. The U.S. Census Bureau projects that the population age 85 and over could grow from 5.3 million in 2006 to nearly 21 million by 2050.

• Some researchers predict that death rates at older ages will decline more rapidly than is reflected in the U.S. Census Bureau’s projections, which could lead to faster growth of this population!
U.S. Population 65 and Over: 1940 to 2060

Source: U.S. Bureau of the Census
Population Pyramid of the U.S. in 2000 and 2030

Source: U.S. Bureau of the Census
An Older, More Diverse Population!

Population age 65 and over, by race and Hispanic origin, 2006 and projected 2050

- Non-Hispanic white alone: 81% (2006), 61% (2050)
- Black alone: 9% (2006), 12% (2050)
- Asian alone: 3% (2006), 8% (2050)
- All other races alone or in combination: 1% (2006), 3% (2050)
- Hispanic (of any race): 6% (2006), 18% (2050)

Note: The term “non-Hispanic white alone” is used to refer to people who reported being white and no other race and who are not Hispanic. The term “black alone” is used to refer to people who reported being black or African American and no other race, and the term “Asian alone” is used to refer to people who reported only Asian as their race. The use of single-race populations in this report does not imply that this is the preferred method of presenting or analyzing data. The U.S. Census Bureau uses a variety of approaches. The race group “All other races alone or in combination” includes American Indian and Alaska Native, alone; Native Hawaiian and Other Pacific Islander, alone; and all people who reported two or more races.

Reference population: These data refer to the resident population.
An Older, More Diverse Population!

- In 2006, non-Hispanic whites accounted for 81 percent of the U.S. older population. Blacks made up 9 percent, Asians made up 3 percent, and Hispanics (of any race) accounted for 6 percent of the older population.
- Projections indicate that by 2050 the composition of the older population will be 61 percent non-Hispanic white, 18 percent Hispanic, 12 percent black, and 8 percent Asian.
An Older, More Diverse Population!

- The older population among all racial and ethnic groups will grow
  - The older Hispanic population is projected to grow the fastest, from just over 2 million in 2005 to 15 million in 2050
  - The older Asian population is also projected to experience a large increase from just over 1 million in 2006 to almost 7 million in 2050.
What would be the best plan to address the emerging health care needs of older individuals in light of the population growth of baby boomers?

Focus on prevention and beneficial evaluations and therapies to reduce disability, morbidity and mortality in older adults.
Potential Negative Effects Society Places on the Aged

- Aging as an illness
- Loss of autonomy
- Loss of individuality
- Isolation
- Deprivation of intimacy
- Dependency issues
Normal Aging

Individual and age-related differences –
Baltimore Longitudinal Study
Normal Aging

- Aging is **NOT** an illness
- Slowing of the body’s functions
- Impact of chronic illness
- Physiological changes that accompany aging may alter the way an individual responds to stress and disease
Physical Changes Related to Aging

• Many physiologic changes are not related to aging or disease states but to individual differences, e.g.:
  • Some 100 year old marathon runners have no arthritis or cartilage loss
  • Many 80 year old men and women frequently engage in normal sexual expression
  • There is no reason to necessarily expect pulmonary, cardiac, intestinal, renal reserve to degenerate simply because of aging
  • While the incidence of dementia increases with age cognitive decline is a disease not normal aging
Physical Changes Related to Aging Muscular and Skeletal Systems

• Decreased muscle compared to fat
  • Sarcopenia
  • Associated frailty (responds to exercise)

• Osteoporosis
  • Extremely common especially with risk factors
    • Caucasian, thin, fair, nicotine, alcohol, chronic low calcium intake, decrease sun exposure and exercise
  • Treatment with multiple pharmacologic agents
    • Must include Calcium, Vitamin D, exercise
Physical Aging

Muscular/Skeletal Changes

- Degenerative joint disease (Osteoarthritis) – increases with age
- Variety of causes, e.g., mechanical, heredity, metabolic
- Joint replacement is increasingly common (overused?)
- Advice: “Do not replace unless absolutely necessary
- Accidental injuries: serious, often preventable
  - A healthy 65 year-old has a greater risk of losing independence from an accidental injury than illness
- Safe ambulation is key
  - Evaluation of ambulatory dysfunction is critical
  - Rehabilitation (physical therapy) is effective
- Preventative measures!
  - Exercise
  - Gait training
Physical Aging

Cardiovascular Changes

- Atherosclerosis increases in older persons
- Coronary Artery Disease (CAD) most common cause of death in Americans
  - Treatable by risk factor modification – even older old benefit
  - Exertional chest pain or severe dyspnea - cardinal symptom
Physical Aging

• Cardiovascular Changes
  – Congestive heart failure
    • Common cause of hospitalization
    • Responds well to aggressive treatment
  – Atrial fibrillation
    • 15% over 65 years old, increased frequency with age
    • Anticoagulation avoids embolic complications
Physical Changes Related to Aging Pulmonary

• Generally no non-disease related pulmonary changes are expected in elders. There is an increased incidence of COPD related to exposures, mostly cigarette smoking.

• Elders have a higher risk of pneumonia
  – Pneumonia vaccination indicated at age 65 for all, for high risk patients earlier, with a booster at 65
  – Influenza carries greater risk, vaccination helpful
Physical Aging

Gastrointestinal Changes

• There are no physiologic changes in the digestive tract specifically related to aging.
• The incidence of colon cancer increases continuously after age fifty such that a sixty-five year-old has a much higher chance of developing the preventable disease.
• Constipation is a common complaint of elders, usually related to diet or drug therapy.
• Diverticular disease appears more common in older persons.
Physical Aging

Gastrointestinal Changes

- The GI tract contains lymphocytes that contain IgA, a major component of the immune system.
  - GI system represents the largest mammalian immune organ.
  - Decreases in immune function related to the GI changes may account for the increased observed infections in older persons.
- Oral health and dental disease affect the digestive tract directly.
Physical Changes Related to Aging

Reproductive/Urinary system

• Urinary incontinence
  • Especially in post menopausal women
    • Treatable – at least 50% improvement 50% of the time
    • Prompted voiding, Kegel exercises, pharmaceuticals

• Benign prostatic hyperplasia
  • Prostate enlargement resulting in obstructive and irritative symptoms – frequency, dribbling, nocturia
  • Pharmacologic treatment preferable, minimally invasive procedures and surgery available
Physical Aging

Urinary System Changes

• There is an age related decline in renal function
• While many older persons are going around with only 25% of the renal function they had at twenty, they have plenty of reserve
• The problem - many drugs are removed by the kidney and thus dosing reduction is necessary in older persons.
Physical Aging

• Reproductive System Changes
  • Sexuality is important and maintained in many older persons
  • Dyspareunia common in postmenopausal women
    • Estrogen either topical or systemic is essential to vaginal integrity and health
    • Topical lubricants are helpful
  • Erectile dysfunction is common
    • Safely treatable with pharmacological agents
Physical Aging

• Endocrine System
  • Age-related decline in reserve is normal; however, except under very stressful conditions, usually never manifests as overt disease
  • Notable exception is reproductive capacity, which ceases around age 52 for women - menopause
  • Diabetes mellitus
  • Thyroid dysfunction
    – Family history important
    – Treatment is highly effective
Physical Aging

Skin Changes

– The most visually apparent indication of aging
– Three functions of the skin
  • Protective barrier – prevents microbe invasion, UV harm, thermal injury
  • Immunologic functions – fighting infection
  • Cosmesis – first impressions!
– Many skin ailments, particularly skin cancer, increase with age – UV protection essential.
Physical Aging

Sensory Changes

• Auditory
  – Third most major disability in elders
  – 39% of 75 year olds have hearing impairment
  – There are major psychosocial implications
    – Diminished socialization
    – Sensory deprivation
  – Early treatment more effective than later treatment
Physical Aging

• Sensory Changes
  – Visual
    • Cataracts, glaucoma, macular degeneration
    • Not preventable
    • 1 of 9 over 65 year-olds and 1 of 4 over 85 year-olds visually impaired
    • Severely limits ADLs, socialization and self esteem
    • Feared more than any other physical impairment
  – Olfactory
    • Most common sensory disturbance in the elderly
    • Seriously affects sense of taste, thus appetite
Physical Changes

Sleep

• As we age we spend less time in deep sleep ("slow wave sleep"), but REM sleep (the time when we dream) does not change.

• It also takes longer to get to sleep as we age and older adults awaken more frequently at night.
As a person ages, we can detect changes on examination that include a harder time relaxing a person’s muscles, decreased reflexes, and a decreased threshold to vibration. None of these changes should affect a person’s ability to function.

Other neurologic changes have been found to predict future neurologic disease and are not considered “normal”.

Physical Aging

Neurological
Physical Changes Related to Aging Neurologic

• Degenerative diseases
  – Dementia, esp Alzheimer’s disease
    • Incidence doubles every five years after 65.
    • Current therapy limited, caregiver support effective
  – Parkinson’s disease
    • Often accompanied by treatable depression
    • Often accompanied by dementia
    • Aggressive pharmacologic treatment is effective
• Dementing disorders will become a major health care dilemma as the aging population increases and large numbers of demented patients will require chronic care – economic and ethical considerations difficult
Normal Cognitive Changes in the Aged

• Changes in intelligence

• Normal age-related memory changes

• Attentional changes in the aged
Cognitive Changes

“Mom, you just aren’t as flexible as you used to be.
  – Can be normal
  – Mental flexibility and abstract reasoning decline with age

“I am just not as fast at things anymore”
  – Can be normal
  – Processing speed slows with age

“I get distracted so easily”
  – Can be normal

“I just am not as smart as I used to be”
  – Not normal
  – Comprehensive knowledge should remain intact
Cognitive Aging

Cognitive Changes

“It’s normal to be forgetful at my age”

– Not normal until well past your 70’s
– Even if a person feels forgetful after their 70’s, this still should not affect how they live their life.

From Small, et. al. Neurology. 1999. Circles are ages 60-69, triangles are ages 70-93. Lower is worse.
Cognitive Changes

“I can’t think of the word—it’s on the tip of my tongue”

- Can be normal
- Difficulty with naming (especially people’s names) is normal, but other parts of language should not change

From Small, et. al. Neurology. 2009. Circles are ages 60-69, triangles are ages 70-93. Lower is worse.

From Small, et. al
Cognitive Reserve Hypothesis?

- Some people with more “cognitive reserve” are able to withstand more brain changes associated with disease (often Alzheimer’s disease changes) – they maintain good cognitive functions and have less risk of dementia as they age.
Approach to the Elderly Patient

• Diversity is the hallmark of older adults, not homogeneity

• Good functional status and quality of life are everything.
Caring for Older Individuals

“Everyone wants to grow old... no one wants to be old”.
Caring for Older Individuals

• Caveats to remember
  – Older individuals don’t complain
    • “I just don’t want to bother ...”
      – The doctor
      – My daughter
      – The neighbors”
    • “It doesn’t hurt that bad”
    • “It’s my nerves”
Caring for Older Individuals

• Caveats to remember (cont.)
  – Altered presentation of illness
    • Lack of fever
    • Depression as somatic complaints
    • Mono-symptomatic hypothyroidism
  – Ageism
    • Aging is not a disease process
    • Disease is not necessarily a part of aging
    • Aging is universal process
Homeostenosis

- Normal age related declines in fct lead to a loss of fct reserve and increased risk of morbidity and mortality. ↑

DEATH

ICU/RESPIRATOR ETC
The Cascading Effects of Age-Related Changes

- Physiological changes that accompany aging may alter the way an individual responds to stress and disease
  - Delirium
  - Adverse drug reactions
  - Psychiatric Illness
  - Psychological Stress
  - Behavioral/ Mental Changes
  - Sensory deprivation
  - ADL functioning
  - Frailty risk factors
The Concept of Frailty

• Interactive effects of aging, disease and abuse

• Phenomena of disuse
Successful Aging

• Reduce risk of disease and disability

• Maintain mental and physical function

• Stay engaged with life
Successful Aging

- Nutrition
- Exercise
- Socialization/staying connected
- Avoid accidental injuries
- Care with meds
  - Patient considerations
  - Physician considerations
- Careful with interventions
- Plan ahead
Successful Aging

• Stay mentally active
  – Stay curious and involved – commit to lifelong learning
  – Read, write, work crosswords, memory games or other puzzles
  – Attend lectures or plays
  – Enroll in courses at a local college, community center or adult education
  – Play games
  – Garden
Successful Aging

• Remain Socially Active
  – Stay active in the workplace
  – Volunteer with community groups and causes
  – Join bridge clubs, senior centers or other social groups

– Travel

The Alzheimer’s Association Maintain Your Brain
Successful Aging

• Adopt a Brain Healthy Diet
  – Manage your weight
  – Reduce foods high in fats and cholesterol
  – Increase your intake of foods high in antioxidants and Omega-3 fatty acids

• Stay Physically active

The Alzheimer’s Association Maintain Your Brain
What it Means to Grow Old

• Reduce risk of disease and disability
• Take care of your health
  ▪ Eat nutritious meals
  ▪ Sleep
  ▪ Exercise regularly
  ▪ Regular medical checkups
• Stay engaged with life
  ▪ Maintain social contacts
  ▪ Volunteer
  ▪ Travel
Resource Guide

• Educate yourself
• Stay local
• Question everything
• Let one resource lead you to another
• Utilize support groups and other families as resources
Old man take a look at my life, I'm a lot like you were.

Neil Young
“Pearls” for Providing Care

• Take a good history!
• Think “Medical First” for any change in functioning!
• Drug histories at each visit!
• Ensure fluid intake – thirst decreases as we age!
• All tests are invasive!
• Always use the “what will it change?” question!
• Determine patient and family expectations
• Most often an explanation is as valuable as a test or a prescription – Talk, Explain and Educate!
• Remember quality of life is paramount!!
Providing Care to Older Adult

- Talking and listening
- Respect
- Careful observation
- Support and education of caregivers
- Decisions regarding care should be thoughtful
- Transition can be difficult - pay attention!!!!
Providing Care to Older Adults Cont.

• Be aware of limitations
• Education!
• Consistency
• Ensure adequate discharge planning and follow-up
• “Medical Homes”
• Inter—professional Approach
Providing Care to Older Adult (Cont.)

• Meet the needs and preferences of patients – “patients are more active, prepared and knowledgeable participants in their care” (JAMA, May 2009)

• Having a consistent “healing” relationship with a personal physician significantly improved health outcomes, according to above study.

• Whole person orientation (holistic health focus)

• Quality and safety are hallmarks
Providing Care to Older Adult (Cont.)

• Focus on Prevention and “prompt” attention to emerging problems
• Enhance access
• Use Inter-professional, Collaborative Approach
  – Where care is coordinated and/or integrated
  – Emphasize wellness and prevention
  – Ensure open communication between patient, family and community resources
  – Ensure ALL community players are at the table
Final Points....

• The demographics of aging will compel most of us to spend the majority of our time caring for older adults.

• Whether we want to or not it is imperative that we become skilled at:
  – Recognizing “aging” education as a need for all individuals
  – Providing support and education for family and professional caregivers
  – Providing thoughtful medical care
  – Promoting quality of life issues for older adults

• NOT one discipline can adequately manage the care and resources needed to care for this growing population -- a truly Inter-Professional approach is needed!
“To know how to grow old is the master work of wisdom, and one of the most difficult chapters in the great art of living.”

Henri Frederic Amiel
Resources

• National Institutes of Health - Medline Plus – www.medlineplus.gov
• National Institutes of Health Senior Health – www.nihseniorhealth.gov
• Centers for Disease Control and Prevention Health Aging - www.cdc.gov/aging
• Alzheimer’s Association – www.alz.org
• Older Women’s League - http://www.owl-national.org
• Family Caregiver Alliance – www.caregiver.org
• Geriatric Mental Health Foundation – www.gmhfonline.org
• Positive Aging Resource Center – www.positiveaging.org
• Hartford Foundation for Geriatric Nursing “Try This” - http://hartfordign.org/Resources/Try_This_Series/
Hartford Institute for Geriatric Nursing
(www.ConsultGeriRN.org)

Best Practices in Nursing Care to Older Adults

TRY THIS series:

- Fulmer SPICES: An Overall Assessment Tool for Older Adults
- Katz Index of Independence in Activities of Daily Living (ADL)
- The Kayser-Jones Brief Oral Health Status Examination
- The Transitional Care Model (TCM): Hospital Discharge Screening Criteria for High Risk Older Adults
TRY THIS series:

- The Pittsburgh Sleep Quality Index (PSQI)
- Fall Risk Assessment for Older Adults: The Hendrich II Fall Risk Model
- Assessing Nutrition in Older Adults
- Urinary Incontinence Assessment in Older Adults – Transient
- Urinary Incontinence Assessment in Older Adults – Established
- Hearing Screening in Older Adults: A Brief Hearing Loss Screener