Infections in the Elderly
Christine Nutty, Infection Advice Inc
A Webber Training Teleclass

Infections in the Elderly

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Infection Advice, Inc.

Hosted by
Jim Gauthier

www.webbertraining.com

Objectives

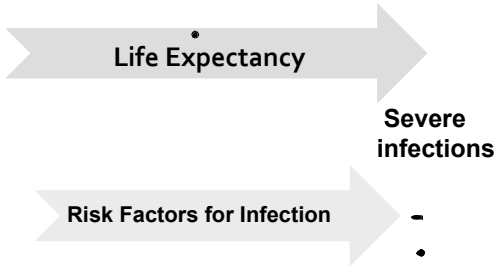
Upon completion of this presentation, the participant will:

- Name 3 common infections seen in the elderly
- Describe 3 changes associated with aging which cause the elderly to be more prone to infection
- List 3 symptoms the elderly person may exhibit which may indicate a potential infection

Overview on Elderly Infections

- Aging process – how organs and systems change
- Immunity of the elderly
- Symptoms of infection in elderly
- Common infections
- Risk factors for infection in elderly
- Life expectancy around the world
- Predictions for the future

Biology of Aging: Senescence



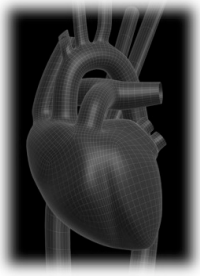
The Aging Process

Body changes

- Cardiovascular
- Endocrine
- Gastrointestinal
- Hematopoietic
- Eye
- Immunological
- Kinesthetic Sense
- Musculoskeletal
- Neurological
- Pulmonary
- Skin
- Smell and Taste
- Urinary

The Aging Process

- **Cardiovascular-**
  - Heart valves and blood vessels become thick and rigid
  - Aerobic capacity -decreased oxygen delivery
  - Infarcted areas: decreased tolerance for physical activity
  - Heart rhythm: arrhythmias, rapid, bundle branch blocks
  - Hypertension: hypertrophy, CVAs



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The Aging Process

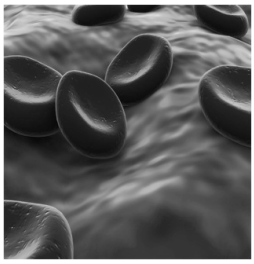
- **Endocrine**
  - Decreased hormones
  - Decreased efficacy of hormones on target tissues
  - Decreased insulin response to glucose
  - Lack of glucose control affects cellular healing and repair

The Aging Process

- **Gastrointestinal**
  - Digestive enzymes
  - Intestinal motility
  - Normal intestinal flora
  - Mucous production
  - Swallowing disorders
  - Scarring from surgeries
  - Dietary changes
  - Constipation

The Aging Process

- **Hematopoietic**
  - Decreasing marrow activity
  - Decreasing formation of red blood cells
  - Anemia



Section 1: The Aging Process

- **Eye**
  - Decreased tears
  - Decreased lysozymes
  - Decreased blink reflexes (e.g., CVA, Bell's Palsey)
  - Scarring from injury or surgeries
  - Diseases – syphilis, cataracts, glacoma

The Aging Process

- **Kinesthetic Senses**
  - Receptors in joints/muscles lose ability to function and control balance
  - Falls occur more frequently

(One is aware of the positions of legs and arms and can perceive the movement of a limb and its direction.)

The Aging Process

- **Musculoskeletal**
  - Decreasing muscle mass
  - Energy and endurance
  - Bone density
  - Thickness and resiliency of cartilage
  - Erosion on articular surfaces (osteoarthritis)
  - Scars from surgery or trauma
  - Stress from obesity or malnutrition

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The Role of Muscles in Infection

"Reservoirs of metabolic fuels"
- Glycogen Depleted
- Amino acids are released – required for
  - New white cells
  - Antimicrobial proteins
  - Immune proteins (cytokines)
  - Immunoglobulins (antibodies)
  - Molecules for tissue healing
  - Antioxidant molecules to handle free radical stress (glutathione)

M. Schmidt *Beyond Antibiotics: Living in a World of Emerging Infections…2009*

Muscle Facts

- **Loss of 10% lean body mass results in decreased immune function- strongly linked to survival**
- **Contain toll-like receptors – recognize bacteria and release cytokines that shut down muscle protein synthesis**

M. Schmidt (2009) Beyond Antibiotics: Strategies for Living in a World …

Muscle Facts

- **50% of women over 65 who break a hip never walk again**
- **Muscle mass of young healthy male = 77-110 lbs (35-50 kg.)**
- **Elderly female less than 30 lbs (14 kg.)**
- **Muscle represents 40% of body weight but 50-75% of all body protein**

M. Schmidt (2009) Beyond Antibiotics: Strategies for Living in a World …

The Aging Process

- **Neurological**
  - Gradual loss of neurons – cognitive impairment
  - Cerebral Vascular Accidents:
    - Thromboembolic
    - Hemorrhagic
    - Residual damage
  - Dementia(50% have inf.)
  - Parkinson's
  - Alzheimer's
  - Depression, psychological disorders

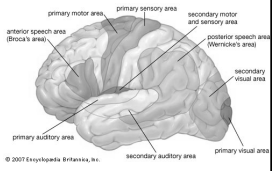


Image: Encyclopedia Britannica 2006

The Aging Process

- **Pulmonary**
  - Weakening intercostal muscles
  - Decreasing PO_2
  - Decrease mucous and foreign material clearance due to decreases in ciliary transport system
  - Decreased gag reflex – increased aspiration
  - Increased esophageal reflux
  - Underlying diseases-seizure, CV, malignancy, or Cardiopulmonary

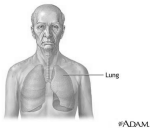
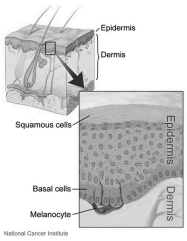


Image: Cancer. About.com

The Aging Process

- **Skin**
  - Thinning of layers – decreased barrier protection from injury
  - Fewer sweat glands/ thermoregulation of heat
  - Decreased sebaceous glands
  - Decreased elasticity
  - Impaired cell-mediated immune response



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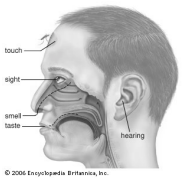
The Aging Process

- **Smell and Taste**
  - Decreased senses making food less appealing, decreased appetite, weight loss
  - Loss of taste buds:
    - sweet and salty tastes first
    - bitter and sour remain longer



The Aging Process

- **Urinary**
  - Decreased renal function
  - Loss of muscle strength necessary for urination
  - Bladder obstructions
    - Benign Prostatic Hypertrophy
    - Prostate Cancer
    - Bladder tumors
  - Lack of sphincter control

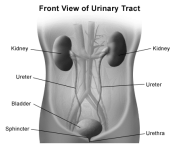


Image: Methodist Hospital System, Houston, TX

The Aging Process

- **Immunological**
  - Atrophy of thymus affects T cell lymphocyte function
  - Decreased antibody production caused by activity of:
    - T cell helper
    - B cell function

Characteristics: Immunity of the Elderly

Diseases – no vaccination or not immune
- Diphtheria
- Tetanus
- Poliomyelitis
- Hepatitis A
- Hepatitis B
- Influenza
- TB

Elderly more at risk for Malaria,
Elderly should not receive Yellow fever vaccine

Characteristics: symptoms of infection

Normal

- **Fever**
- **Chills**
- **Tachycardia**
- **Vomiting**
- **Leukocytosis**

Elderly
- **Poor temperature response**
- **Confusion**
- **Fatigue**
- **Decreased appetite**
- **Incontinence**
- **Change in ability to perform AODL**
- **Pain description altered**
- **Increased Resp. rate**
- **Falls**
- **Weight loss**

Effect of Fever

- Elderly fever response may be lacking or inappropriate
- Low grade or moderate fevers (up to 101° F or 38° C) may have beneficial effect
- High fevers may be sign of overwhelming infection (over 101° F or 38° C)

- Hypothermia associated with higher rates of surgical site infections

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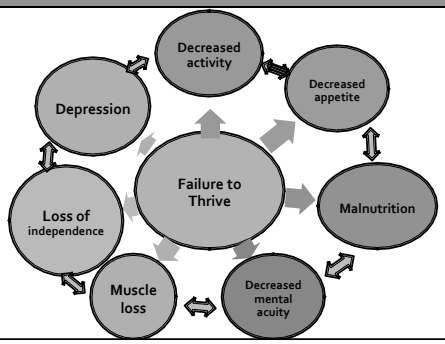
Cascade of Effects



Common Infections of the Elderly

Infectious diseases account for 1/3 of all deaths in people 65 years and older.

- Pneumonia
- Influenza, RSV
- Skin – Zoster, MRSA, VRE
- Urinary Tract Infections
- Sepsis

- Death due to seasonal flu – 80-90% are elderly

Risk Factors for Infections in Elderly

- Implantable devices – invasive devices
- Multiple medications
- Mental changes
- Healthcare contacts
- Long term care stays – 15% have infections at any time
- Comorbid diseases
- Lack of febrile responses
- Decreased mobility

Risk Factors for Infections in Elderly

- Altered Pharmacokinetics of antimicrobials
- Atypical presentation leading to delayed diagnosis & treatment
- Environment/ Trauma
- Genetics
- Malnutrition
- Reduced immune response

Life Expectancy Around the World

To understand the elderly around the world:

- Life expectancy
- Health care
- Common diseases
- Living conditions

Percent of Population Over 65

Regions with % over 65 years of age:

Australia	13.5%
Asia	2 - 9% (Japan 22%)
Russia	14%
Middle East	2.5 - 10%
North Atlantic	13 - 20% (Ger & It 20%)
North Am.	13 - 15%
Central Am.	4 - 11%
South Am	4 - 11%
Africa	0.9 – 5% (UAE 0.9%)

CIA World Factbook – www.cia.gov

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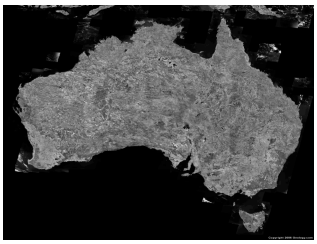
Life Expectancy

- Australia
- Asia
- Russia
- Middle East
- North Atlantic
- North America
- Central America
- South America
- Africa

Australia & New Zealand

- **Life expectancy 80-82 years**
- Infectious disease risk low



ASIA

World-atlas.com

•**Life Expectancy 45-86 years**
•Shortest: Afghanistan 45 yrs,
•Longest: Israel females 83 years,
Japan females 86 years

Infectious Disease Risk: High to Very High
•Food/Water-Bact diarrhea, Hep A & E, Typhoid fever, Leptospirosis
•Vector-Dengue fever, Chikungunya, Malaria, Japanese encephalitis

Russia

Life Expectancy:
- **Males 60 years**
- **Females 73 years**

Infectious Diseases Risk
Intermed:
- F/W-Bacterial diarrhea
- V-Tickborne encephalitis

Middle East

Life Expect : 70-81 years

Encyclopedia Britannica

Infectious Diseases Risk
Low – Intermed (Iran & Iraq only)
F/W-Bacterial diarrhea, Hep A, Typhoid fever
V-Crimean Congo hemorrhagic fever (Iran), Malaria (Iran)

North Atlantic Countries

World-Atlas.com

Life Expectancy: 73 – 81 years
Infectious Diseases Risk
Low-Intermed:
•F/W-Bact diarrhea, Hep A
•V-Tickborne encephalitis

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North America

World-Atlas.com

Life Expectancy
78-81 years

Infectious Disease Risk
Low

Central America

Life Expectancy **70-77 years**

Infectious Disease Risk = Intermed with High in Guatemala

Infectious Diseases :
F/W-Bacterial diarrhea, Hep A, Typhoid fever, Leptospirosis
V- Dengue fever, Malaria

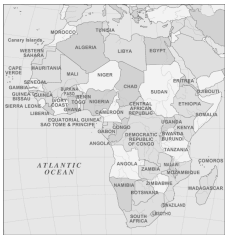
South America

Life Expectancy
67-77 years

Major infectious disease risk =
Interm to Very High
F/W- Bacterial diarrhea, Hep A, Typhoid fever, Leptospirosis
V-Dengue fever, Malaria, Yellow fever

Travel.NationalGeographic.com

AFRICA



Infectious Diseases Risk:
Intermed to Very High

F/W-Bacterial & Protoz. diarrhea, Hep A & E, Typhoid fever, Schistosomiasis
V-Malaria, Dengue fever, Plague, African trypanosomiasis, Yellow fever, Rift Valley fever, Chikungunya
Animal-Rabies
Resp-Meningococcal Meningitis, TB

Life Expectancy 38-76 years

Countries with Highest HIV/ AIDS Risk

Highest HIV Prevalence:

Botswana 23.9%	2 Million population
South Africa 18%,	49 Million
Zimbabwe 15.3%,	11 Million
Zambia 15.2%	12 Million

People Living With AIDS

- South Africa 5.7 Mil, 49 Million
- Nigeria 2.6 Mil 149 Million

Deaths due to AIDS

South Africa 350,000	Russia 40,000
India 310,000	China 39,000
Nigeria 170,000	Cameroon 39,000
Kenya 150,000	Thailand 30,000
Zimbabwe 140,000	Burma 25,000
Congo 100,000	Sudan 25,000
Tanzania 96,000	Vietnam 24,000
Ethiopia 67,000	US 22,000
Zambia 56,000	Ukraine 19,000
	Brazil 15,000

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Future Predictions and Implications

Speculated Population Growth in Persons Over 60

Major area	Population in Millions Age >60			% over 60
Year	1950	2000	2050	2050
World	205	606	1907	20
Developed regions	95	232	394	29
Less developed regions	110	375	1514	17
Africa	12	40	183	11
Asia	95	322	1191	19
Europe	66	147	222	27
Latin Am/ Carib	10	42	184	21
N. America	21	51	117	28
Oceania	1	4	11	25

United Nations 2003

Numbers of Elderly

Population in Millions of Elderly >80			
	1950	2000	2050
World	14	69	377
Developed regions	9	37	113
Less developed regions	5	32	265
Africa	1	3	20
Asia	4	29	224
Europe	6	21	60
Latin Am/Carib	1	5	38
N. America	2	10	33
Oceania	0	1	3

United Nations 2003

Characteristics: Elderly Well-being

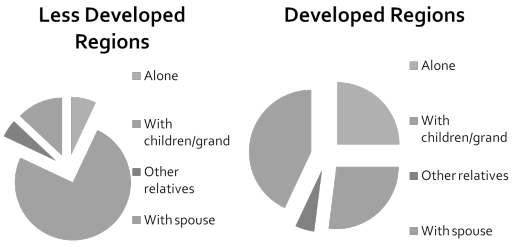
UN report showed:

1. Co-residence with children [over 25]… was associated with relatively high levels of material well-being in most developing countries.

2. In the poorest countries, older persons living alone tend to constitute an especially disadvantaged group-the poorest of the poor.

Living Arrangements of Older Persons Around the World (2005) United Nations

Characteristics of Elderly: Elderly persons who live alone:



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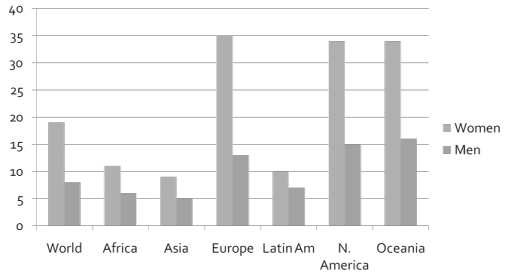

Living Arrangements of Older Persons Around the World (2005) United Nations

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Elderly Alone

- 1 out of every 7 elderly – live alone
  - 60 Mil are women
  - 30 Mil are men
- 19% of older women live alone
- 8 % of older men live alone

Living Arrangements of Older Persons Around the World (2005) United Nations

So What Does All This Mean?

The elderly population have special risks related to infectious diseases.

The elderly population is going to increase in proportion to other age groups.

More and more will be alone or homeless.

Homeless and Elderly

This is Lou--
His teeth look like the jagged remnants of an old cemetery. His nose, he says, has been broken so badly and so often that the nasal passages have collapsed. He runs a bony finger from his nose's bridge to the tip. It serves only decorative purposes now, he says.

San Francisco Chronicle Sept 2, 2004

What should we do next?

- Look at our own countries and those less developed.
- Analyze risk issues related to the elderly
- Make sure that your actions and decisions take into account the special needs of the elderly.
- Think about the future
  - **Shelter**
  - **Food**
  - **Safety**
  - **Healthcare & Medicine**

Thank you!

The Next Few Teleclasses

01 Apr. 10	Microbial Control of Electronic Medical Equipment Speaker: Dr. Charles John Palenik, Indiana University School of Dentistry
08 Apr. 10	Simple Precautions – Simplifying Infection Control Speaker: Dr. Jim Hutchinson, Health Care Corporation of St. John's
13 Apr. 10	(Free Teleclass) Improvement in Healthcare Settings Around the World and the "SAVE LIVES: Clean Your Hands" Initiative Speaker: Claire Kilpatrick, World Health Organization
15 Apr. 10	HPV Infection and Newer Vaccines: An Update Speaker: Dr. Sotirios Tsiodras, University of Athens Medical School, Greece
20 Apr. 10	(Free Teleclass) Voices of the IPS Speaker: Infection Prevention Society Board Members & Guests
21 Apr. 10	(South Pacific Teleclass) MRSA – The Patient Experience Dr. Ruth Barratt, New Zealand
22 Apr. 10	Influenza in the Hospital – Who Gets it From Whom Speaker: Dr. Allison McGeer, Mount Sinai Hospital, Toronto

www.webbertraining.com.schedulep1.php

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