

AGING AND EPIDEMIOLOGY OF INFECTIONS

Pre-antibiotic Era

- **Infections: Major cause of death and disabilities in U.S. until mid-20th century**
- **Smallpox, tuberculosis, diphtheria, cholera, typhoid fever, typhus, plague (deaths)**
- **Scarlet fever, rheumatic fever, measles, mumps, syphilis and poliomyelitis (deaths and disabilities)**

AGING AND EPIDEMIOLOGY OF INFECTIONS

Pre-antibiotic Era (2)

- Life expectancy in U.S. at birth in 1900
 - female: 47 years
 - male: 45 years
- Elderly population 65+
 - 3-4% total population

AGING AND EPIDEMIOLOGY OF INFECTIONS

Impact of Germ Theory

- Antisepsis
- Antibiotics
- Immunization
- Sanitation
- Public health

AGING AND EPIDEMIOLOGY OF INFECTIONS

Impact of Germ Theory (2)

Reduced childhood mortality

- Life expectancy in U.S. at birth 2002
 - female: 79 years
 - male: 74 years
- Elderly population 65+
 - 13% of total population (36 million)

AGING AND EPIDEMIOLOGY OF INFECTIONS

Impact of Germ Theory (3)

Increase in old-old population

- Life expectancy at 65+ & 75+

	<u>65+</u>	<u>75+</u>
males	15 yrs	9 yrs
females	19 yrs	14 yrs

AGING AND EPIDEMIOLOGY OF INFECTIONS

Impact of Germ Theory (4)

Changes in top 10 Causes of Deaths in U.S.

- Heart disease
- Cancer
- Stroke
- Pneumonia

AGING AND EPIDEMIOLOGY OF INFECTIONS

Impact of Germ Theory (5)

However, worldwide:

- Infections account for 30-35% of all deaths
- TB infects 30% of world population

AGING AND EPIDEMIOLOGY OF INFECTIONS

Impact of Aging on Infections

- **Physiological Changes of Aging**
 - **Immune changes: ↑ infection risks (e.g., TB)**
 - **Other organ changes: ↑ infection risks (e.g., UTI)**
- **Age-related diseases (e.g., cancer, dementia): ↑ infection risk (e.g., pneumonia, UTI)**

AGING AND EPIDEMIOLOGY OF INFECTIONS

Impact of Aging on Infections (2)

Common infections by age

Young

STD

HIV

URI

Pharyngitis

Elderly

UTI

Pneumonia

Skin/soft tissue

TB

AGING AND EPIDEMIOLOGY OF INFECTIONS

Impact of Aging on Infections (2)

Common infections by age (cont'd)

Young

Bronchitis

UTI (women)

Meningitis (Viral)

Elderly

Intraabdominal

Bone/Joint

Endocarditis

Meningitis (Bacterial)

AGING AND EPIDEMIOLOGY OF INFECTIONS

Impact of Age (3)

Differences in Microbial Etiology by Age

Infection

Young

Old

Pneumonia

S. pneumoniae

S. pneumoniae

Mycoplasma

Gram-negative bacilli

UTI

E. coli (80%)

E. coli (60%)

AGING AND EPIDEMIOLOGY OF INFECTIONS

Impact of Age (4)

Differences in Microbial Etiology by Age (2)

Infection

Young

Old

Meningitis

Viral

Bacterial

Bacterial meningitis

S. pneumoniae

S. pneumoniae

N. meningitides

Gram-negative bacilli

Listeria

AGING AND EPIDEMIOLOGY OF INFECTIONS

Impact of Age (5)

Mortality by age

Pneumonia = 3 times higher in old

Pyelonephritis = 5-10 times higher in old

Tuberculosis (non-HIV) = 10 times higher in old

AGING AND EPIDEMIOLOGY OF INFECTIONS

Impact of Age (5)

Mortality by age (cont'd)

Bacterial meningitis = 2 times higher in old

Infective endocarditis = 2 times higher in old

Sepsis = 2-3 times higher in old

AGING AND EPIDEMIOLOGY OF INFECTIONS

Impact of Aging on Infections

- **Institutionalization (nursing homes)**
 - B Aspiration pneumonia**
 - B Catheter-related UTI**
 - B Infected pressure ulcer**