Learning objectives

1. Anticipate effects of aging and economic development on the health of global populations
2. Become aware of the ramifications of the shift to predominately Type 2 chronic non-communicable diseases in developing countries
3. Understand how demands for care of dependent people will effect nations economically
4. Consider how these changes will influence personal medical careers
Definition of Population Aging

- ‘Older person’ refers to 60 years and above
- ‘Population aging’ is the process by which older persons become a proportionally larger part of a country’s or region’s total population.
  - Also called ‘demographic aging’, this process leads to changes in the age structure of a population, and to a higher median age
Some Positive Associations with Economic & Social Development

- Decreasing need to have children to insure that some will survive
- Less physically demanding lifestyles
- Greater access to food and other consumer products
- Better education and job opportunities
- Greater mobility in the society
- Longer life span expectations
Some Negative Associations with Economic & Social Development

- Increasing prevalence of diseases of affluence
- Growing production of pollutants
- Fewer local family care givers
- Susceptibility to brain drain of medical personnel
- Greater proportion of lives lived with multiple organ failures and disabilities
- Costlier medical care systems
Shortage of Health Care Workers

- Health workers per 1000 population per WHO
  - North America 10.9
  - Europe 10.4
  - South and Central America 2.8
  - Asia 2.3
  - Sub-Saharan Africa 0.98

- Community physicians can be lost to emigration, but also to movement from rural to urban settings, from public to private sectors, and from general practice to specialty practice.
Demographic Factors Driving Population Aging

- Fertility declines
  - Have greatest effect and happens most rapidly in the less developed countries
- Mortality and life expectancy improvement
  - Leads to population aging at a later stage
- Migration
  - Urbanization of the older population
  - Emigration is a relatively minor factor
Fertility Effects

- The world Total Fertility Ratio (TFR) was about 6.0 children per woman in the 1700 & 1800’s
- It dropped from 5.0 in 1950 to 2.7 in 2000
- For the period 2000 - 2005 it was 1.1 in Spain, 2.1 in US and 2.8 in Central America
- The conventional replacement level is 2.1 children per woman
Rectangularization of Population Age Structures

- Historically, population distributions by age have been triangle shaped with younger age groups forming the large base.
- As populations ‘develop’ economically the smaller succeeding generations cause the age distributions to become more rectangular in shape.
Population USA vs. Honduras 2005

United States: 2005

Honduras: 2005

Source: U.S. Census Bureau, International Data Base.
Population USA vs. Honduras 2015

Source: U.S. Census Bureau, International Data Base.
Population USA vs. Honduras 2050

United States: 2050

Honduras: 2050

Source: U.S. Census Bureau, International Data Base.
Some Socioeconomic Effects of Population Aging

- The dependency ratio (= persons per 100 persons 15-64 years) increases due to increased number of older dependents in developed countries.
- Those developing countries delayed in the demographic transition can potentially benefit economically from their larger proportion of working age adults.
- Lower pay for workers in developing countries causes shifts of labor intensive production there.
- Results in more elderly living in institutions rather than independently or with families.
- Increases costs of government-supported care.
Living Arrangements Of Older Persons

• In developing nations few (7%) of elderly live alone compared with 25% in developed countries
• Currently nursing home care is rarely available
• In developing countries it is typical for multigenerational families to live together
Population Aging in the More and Less Developed Regions

• The number of people over 60 is currently increasing at a much higher rate (2.9%) in the less developed than in more developed nations (0.9%).
• By 2045-2050 the population 60+ will be growing 18 times faster in the developing nations than in the developed world.
• 70% of the elderly over age 80 will be in less developed countries by 2050 (it was 43% in 2000)
World Dependency Ratios 1950 - 2050

World dependency ratios, 1950-2050

Per 100 persons 15-64 years

Total dependency ratio
Child dependency ratio
Old-age dependency ratio

- Total dependency ratio
- Child dependency ratio
- Old-age dependency ratio
Dependency in Less Developed Regions

Dependency ratios of the less developed regions, 1950 - 2050

Per 100 persons 15-64

- Total dependency ratio
- Child dependency ratio
- Old-age dependency ratio

GHEC
Dependency in More Developed Regions

Dependency ratios of the more developed regions, 1950 - 2050

- Per 100 persons 15-64
- Total dependency ratio
- Child dependency ratio
- Old-age dependency ratio
Dependency in Least Developed Countries

Dependency ratios of the least developed countries, 1950 - 2050

- Total dependency ratio
- Child dependency ratio
- Old-age dependency ratio

Per 100 persons 15-64
Delayed Demographic Transition as a Productivity Opportunity

• Countries with a delayed demographic transition to older populations and decreased fertility rates have:
  – A relatively higher proportion of productive workers
  – Less likelihood of workers needing to leave the workforce to be caregivers.

• At the end of the transition, the number of workers per person either under age 15 or over 65 is reduced.

• Most developed countries have already passed through their maximum productivity years and have increasing dependency ratios.
Challenges of Population Aging

- Shifting age structures from young to older
- Shifting fertility, mortality and migration patterns
- Increasing prevalence of obesity with age except in the least developed countries
- Increasing female proportion of population
- The burden of care-giving falls predominately on women resulting in lost employment and pension rights
- Increasing prevalence of chronic disease and disability
Risk Factors for Chronic Diseases

• Personal
  • Overweight/obesity (diet & lack of exercise)
  • Lifestyle (sexual exposures, recreation)
  • Tobacco use
  • Alcohol and drug use

• Community
  • Pollution and infectious disease exposure
  • Work, traffic and conflict hazards
  • Social stressors
The Obesity Epidemic

• Causes of the obesity epidemic
  • Decreased need to expend calories in daily activities
  • Increased access to food calories
• Obesity in developed and in developing countries is increasing rapidly
• Obesity predisposes to several chronic diseases

In 1974 obesity was present in 7.3% of highly educated women & 24.9% of poorly educated.

In 2000 obesity was found in 29.9% of highly educated women & 37.8% of poorly educated.

Thus, higher socioeconomic status no longer appears to be protective against obesity in developed countries.
Overweight/obesity in U.S. and Honduras 2005

BMI / Overweight / Obesity - prevalence - BMI ≥ 25 kg/m²
2005

Country ISO Alpha Code

HND

USA

Prevalence (%)

0 10 20 30 40 50 60 70 80 90 100

Males

Females
Overweight/obesity in U.S. and Honduras 2015

BMI / Overweight / Obesity - prevalence - BMI ≥ 25 kg/m²
2015

Country ISO Alpha Code

- HND
- USA

Prevalence (%)
WHO STEPS* Risk Factor Surveillance Program for Developing Countries

- Step 1: Questionnaire obtains subjective information, e.g., habits & socioeconomics
- Step 2: Collects physical measurement data, e.g., height, weight, waist size, blood pressure
- Step 3: Collects lab results such as glucose and cholesterol
- Country or organization can work to level supported by their resources

*WHO STEPwise approach to Surveillance (STEPS)
Predominant Non-Communicable Diseases (NCDs)

- Cardiovascular disease
- Diabetes
- Cancer
- Chronic respiratory disease
- Neuropsychiatric diseases
- Other causes of disability
Epidemiological Transition to NCDs

• With socio-economic development….
  • the major causes of death and disability shift from Group I (malnutrition, perinatal and infectious diseases) to Group II (non-communicable diseases)
• During the transition…..
  • the developing nations face the double burden of Group I & II diseases and often the triple burden of Group III injuries (due to violence, workplace risks, etc.)
Disability Adjusted Life Years

- One DALY is defined as 1 year of healthy life lost.
- The measured burden of disease is the gap between a country’s health and that of a normative global reference population with high life expectancy lived in full health.
- Years lived with disability (YLD) is the estimate of years of unhealthy life.
- Compared with simply listing a patient’s diseases and functional limitations the DALY represents the cost of their incapacity to society.
Life Expectancy Predictions

• Traditionally we have determined life expectancy (LE) at a particular age for populations and subgroups
• Healthy life expectancy (HALE) determines predicted years of healthy life before the high morbidity period as death is approaching
• Lost healthy years as a percentage of LE (LHE%) reflect those unhealthy years
Aging and Disability

- Functional disability increases with age and is closely associated with chronic disease
- Limitations in ADL’s (activities of daily living) are much more prevalent after age 85
- There are conflicting opinions about whether disability rates are declining for people over 65
- Increases in disability free years or “active life expectancy” would achieve the desired compression of morbidity
Will Disability Decline or Increase

• Many indicators suggest that disability is declining in the U.S.
  – Decreasing nursing home populations and of reports of dependence and functional impairment
  – Possibly due to: better medical care, healthier behavior, use of aids, improving socioeconomic status, less disease exposure

• An OECD study of 12 developed countries confirmed this for 5, including the U.S.
  – But the results for the other countries were mixed.
Benefits of Exercise

- Aerobic activity and resistance training improve symptoms of depression
- In sedentary older adults, randomized trials showed that exercise programs improved aerobic capacity, strength, balance and flexibility
- A beneficial effect on disability (improved ADL and Instrumental ADL capabilities) has not yet been sufficiently substantiated.
- In developing countries, it is likely that continuing some traditional sources of exercise will help preserve ADL function in their elderly.
Needed Societal Changes

- Economic equity to reduce excessive individual stress
- Reincorporating healthy levels of exercise into daily life
- Realigning incentives to promote healthy diets
- Minimizing accident and toxin exposures
- Emphasizing quality of latter years over quantity
- Maintaining public health gains against infectious diseases and accidental injuries
- Widely available preventive and primary care
Trends Promoting These Changes

• Health systems’ recognition of adverse effects of obesity and air pollution from fossil fuels
• Rise in transportation costs due more expensive fuels
• Development of crops which thrive without insecticides
• Appreciation of benefits of local production of food
• Collaborations to lower costs of medicines and vaccines
• Recognition of ill effects of rapid urbanization
• Building communities that encourage exercise and socialization as part of life of all age groups
Will Population Aging Similarly Effect the Developing Countries?

- Will they have the resources to manage Type 2 chronic disease to prevent disabilities?
- Will most of their elderly be able to access them?
- Will family be available to support their aging members?
- Will Type 1 and 3 diseases be controlled to prevent their contributions to disability and dependence?
Summary

• Population aging has produced challenges in developed countries and will have even more daunting effects in developing countries.

• As developing countries’ economies improve and people live longer, non-communicable chronic disease and related disability may become increasingly prevalent.

• During the transition a triple burden will afflict the population as these Type II diseases overlap with Type I and III diseases.

• These countries will be very challenged to supply the medical resources needed to treat the elderly and disabled during this period.
Credits

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