


Foundations of Global Health

Introduction to Global Health



Part 2:
Health Determinants,
Measurements & Trends
The People Paradox

*"Health is not valued till sickness comes."
Dr. Thomas Fuller*

Learning Objectives

- Describe the determinants of health & define important health indicators
- Discuss the differences between morbidity, disability, and mortality
- Discuss the concepts of, Health Adjusted Life Expectancy (HALE), Disability Adjusted Life Years (DALYs), and the burden of disease
- Describe the leading causes of death in low-, middle-, and high-income countries
- Describe demographic transition (People Paradox)

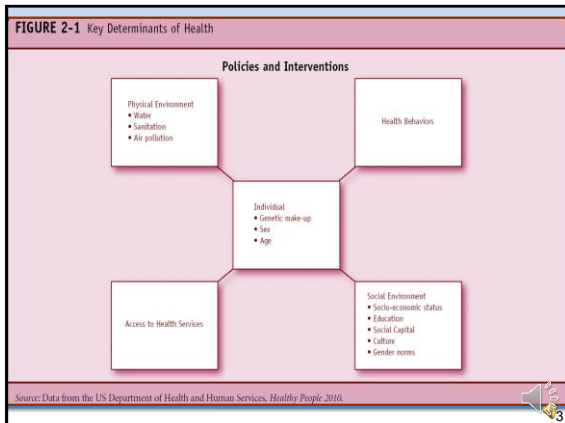


TABLE 2-1 Key Health Status Indicators

Infant Mortality Rate—The number of deaths of infants under age 1 per 1000 live births in a given year

Life Expectancy at Birth—The average number of years a newborn baby could expect to live if current mortality trends were to continue for the rest of the newborn's life

Maternal Mortality Ratio—The number of women who die as a result of pregnancy and childbirth complications per 100,000 live births in a given year

Neonatal Mortality Rate—The number of deaths to infants under 28 days of age in a given year per 1000 live births in that year

Under Five Mortality Rate (Child Mortality Rate)—The probability that a newborn baby will die before reaching age five, expressed as a number per 1000 live births.

Source: Haupt A, Kane TT. Population Handbook. Washington, DC: Population Reference Bureau; 2004; World Bank. Beyond Economic Growth Student Book: Glossary. <http://www.worldbank.org/dpweb/english/beyond/global/glossary.html>. Accessed April 15, 2007.

Measuring the Burden of Disease

- HALE (Health-Adjusted Life Expectancy) - Number of years to be lived in the equivalent of good health
- DALY (Disability Adjusted Life Year) -Measure of premature deaths and losses due to illness and disabilities in a population

TABLE 2-4 The Ten Leading Causes of the Burden of Disease in Low- and Middle-Income Countries by Region, 2001

East Asia and Pacific		Europe and Central Asia	
Rank	Percentage of total DALYs	Rank	Percentage of total DALYs
1. Cardiovascular disease	25.0	1. Ischemic heart disease	15.9
2. Perinatal conditions	5.4	2. Cardiovascular disease	10.8
3. Chronic obstructive pulmonary disease	5.0	3. Unipolar depressive disorders	3.7
4. Ischemic heart disease	4.1	4. Self-inflicted injuries	2.3
5. Unipolar depressive disorders	4.1	5. Hearing loss, adult onset	2.2
6. Tuberculosis	3.1	6. Chronic obstructive pulmonary disease	2.0
7. Lower respiratory infections	3.1	7. Tracheitis, bronchitis, and lung cancer	2.0
8. Road traffic accidents	3.0	8. Osteoarthritis	2.0
9. Cataracts	2.8	9. Road traffic accidents	1.9
10. Diarrheal diseases	2.5	10. Poisonings	1.9

Latin America and the Caribbean		Middle East and North Africa	
Rank	Percentage of total DALYs	Rank	Percentage of total DALYs
1. Perinatal conditions	6.0	1. Ischemic heart disease	6.6
2. Unipolar depressive disorders	5.0	2. Perinatal conditions	6.3
3. Violence	4.9	3. Road traffic accidents	4.6
4. Ischemic heart disease	4.2	4. Lower respiratory infections	4.5
5. Cardiovascular disease	3.8	5. Diarrheal diseases	3.9
6. Endocrine disorders	3.0	6. Unipolar depressive disorders	3.1
7. Lower respiratory infections	2.8	7. Congenital anomalies	3.1
8. Alcohol use disorders	2.8	8. Cardiovascular disease	3.0
9. Diabetes mellitus	2.7	9. Vision disorders, age-related	2.7
10. Road traffic accidents	2.6	10. Cataracts	2.3

South Asia		Sub-Saharan Africa	
Rank	Percentage of total DALYs	Rank	Percentage of total DALYs
1. Perinatal conditions	9.2	1. HIV/AIDS	16.5
2. Lower respiratory infections	6.4	2. Malaria	10.3
3. Ischemic heart disease	6.3	3. Lower respiratory infections	6.8
4. Diarrheal diseases	5.4	4. Diarrheal diseases	6.4
5. Unipolar depressive disorders	3.6	5. Perinatal conditions	5.8
6. Tuberculosis	3.4	6. Malaria	3.9
7. Cardiovascular disease	3.2	7. Tuberculosis	2.3
8. Cataracts	2.3	8. Road Traffic Accidents	1.8
9. Chronic obstructive pulmonary disease	2.3	9. Pertussis	1.8
10. Hearing loss, adult onset	2.0	10. Protein-energy malnutrition	1.5

Source: Adapted with permission from The World Bank, Lopez AD, Mathers CD, Murray CL. The Burden of Disease and Mortality by Condition: Data, Methods, and Results for 2001. In: Lopez AD, Mathers CD, Ezzati M, Murray CL, eds. Global Burden of Disease and Risk Factors. New York: Oxford University Press; 2006:11.

The Global Burden of Disease

- Low- and middle-income countries:**
 - Non-communicable diseases (54%)
 - Communicable diseases (36%)
 - Injuries (10%)
- High-income countries:**
 - Non-communicable diseases (87%)
 - Injuries (7.5%)
 - Communicable diseases (5.7%)

FIGURE 2-8 The Burden of Disease by Group of Cause, Percent of Deaths, 2001

Source: Data with permission from The World Bank, Lopez AD, Mathers CD, Murray CJL. The burden of disease and mortality by conditions, methods, and results for 2001. In: Lopez AD, Mathers CD, Ezzati M, Jamison DT, Murray CJL, eds. *Global Burden of Disease and Risk Factors*. New York: Oxford University Press, 2006.

Deaths and Disease within Countries Vary By

- Gender
- Ethnicity
- Socioeconomic Status

Trends

- **Life expectancy has improved** in all regions of the world since 1990, except in Europe and Central Asia and in Sub-Saharan Africa
- **Communicable diseases** will continue to be very important to the burden of disease in **South Asia** and **Sub-Saharan Africa**

Source: World Health Organization, 2006.

World Population Growth

- In 1804, population first reached the 1 billion mark
- Within 200 years, world's pop increased again 6 fold!
 - In 1999, population passed 6 billion
 - Population expected to double (to 11-12 billion) again within 50 years!
- Population explosion is unprecedented
- Raises concerns about the carrying capacity of the earth
 - Heightened demands for energy, food, & water

Rate of growth has slowed..

- Population growth slowing
 - Influenced by fertility rates
 - family planning services
 - increased mortality due to infectious diseases (especially HIV/AIDS)
 - military conflicts
- Annual birth rates at 132 million
 - 97% occur in the developing world (middle to low-income nations)
- Net gain of 2.4 people per sec (+ 206,000 per day)

Time Unit	Births	Deaths	Net Gain
Year	131,995,514	64,145,139	74,989,375
Month	11,000,000	5,345,000	6,200,000
Day	882,962	519,516	296,444
Hour	36,832	21,646	12,457
Minute	614	361	208
Second	10.2	5.8	2.4


Source: U.S. Census Bureau, International Data Base


People Paradox: Impact on the World

- Humans are dominant species on planet
- 3 Dimensions:
 - Absolute population count
 - Population density
 - Level of industrial & technological organization
- Greater level of development = more impact on environment (global warming, acid rains)

Population Size

- Influenced by 4 factors
 - Births
 - Deaths
 - Immigration
 - Emigration





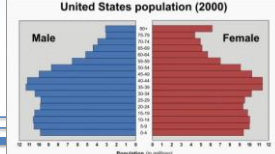
Check out the link below for a daily update on the US census!


<http://www.census.gov/population/www/popclockus.html>

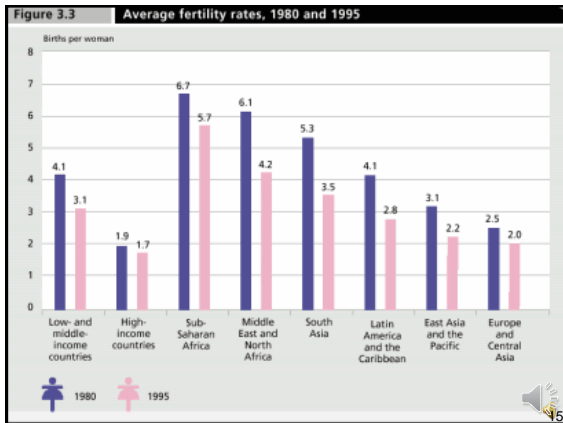
Replacement Births

- Strive for magical 2 child family
 - Higher standard of living
 - Affordable education
 - Improved nutrition
 - Improved access to health care
- Replacement births only

Popularized magical 2 child family-one boy child & one girl child. The birth of a male child is extremely important in many societies, as it is believed that he will be able to provide for his parents as they age.








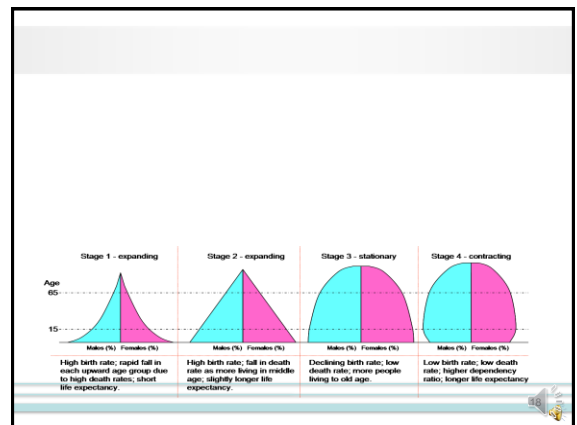
Population Momentum

- Population continues to grow even with less than replacement births
- Due to large proportion of young people entering reproductive years
- Absolute number of people increases



Demographic Transition

- Oldest population theory (1930s)
- Changes in fertility based on economic development
 - **Stage 1:** high mortality & birth rates
 - **Stage 2:** lower mortality rates, high birth rates (societal conditions improve)
 - **Stage 3:** birth rates decline & become close to mortality rates
 - **Stage 4:** mortality & birth rates oscillate in close proximity to each other (population in balance!)



People's Republic of China

- 22% of world's population in China
- Strict family planning policies
 - Promote late marriage, healthy births
 - One couple, one child rule
 - Rural families to have 2 children, with spacing
- Likely to experience growth because of population momentum (30% of pop under 15 years old)

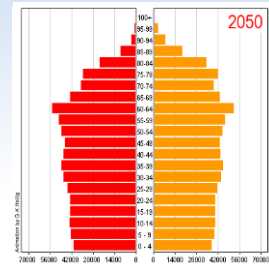


(AFP Photo) - China's population growth is stabilizing, but with gender imbalance, as male children are preferred.



China: Population Momentum

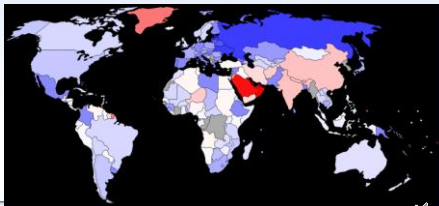
- Population pyramid change from 1950-2050
- Family planning (one child) policy implemented
- Population growth will stabilize
- BUT large aging population



Son Preference

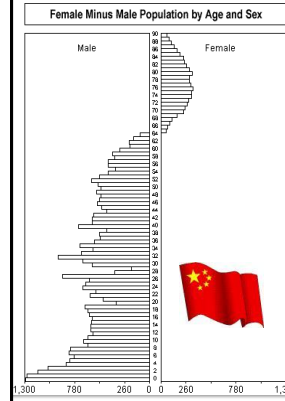
- Sex-selective abortion (female)
- Female infanticide

Sex ratio in total population
More women (blue) vs more men (red)



China's Missing Girls

- Population pyramid of female minus male population by age
 - Almost all age groups (except those over 64) have larger male than female population
 - Especially of concern is the substantial "surplus" of males
 - Phenomenon is known as "missing girls"
- Strong preference for male births in the Chinese and most other Asian societies



People Paradox

- Young vs. Old countries
 - Most developed nations have a large elderly population
 - Most developing nations will experience a large population increase, as substantial proportion entering reproductive years
- Age of a country will influence health systems, resource management, and energy use
- Population management is extremely important to maintain political stability
- Family planning & education is critical



Practice Questions

- Name 4 determinants that impact individual health
- Define infant mortality rate, life expectancy at birth, maternal mortality rate, under 5 mortality rate. Which indicator measures overall quality of life?
- Name 4 specific examples of why population growth has slowed. What factors affect population growth?
- Define replacement births & population momentum.
- Describe the 4 demographic transition stages.
- Why are missing girls linked to cultural beliefs?



In Summary...

- A number of factors influence health status
- Risk factors are central to health and to addressing health concerns
- Cardiovascular disease is now the leading cause of death worldwide
- The poorest countries have a relatively larger burden from communicable diseases than from non-communicable diseases
- Demographic & epidemiological transition important to predict health challenges in a population
- Population growth, aging populations, sex ratio/son preference will influence health outcomes in future

