A few remarks about mortality and health

1) Mortality – death – easy to measure
2) Morbidity – diseases -- more difficult to measure
3) Mortality has implication for population size, growth, age structure
4) Today, mortality is an imperfect picture of the health status of a population.
5) Unlike fertility, the preference for lower mortality is universal, not cultural.
Causes of Death

1) Group 1 – Infectious and parasitic diseases (communicable diseases)
   a. Due to external agent: virus or bacterium
   b. Also includes maternal diseases, perinatal and nutritional deficiencies

2) Group 2 – degenerative or chronic diseases (non communicable diseases)

3) Group 3 – external injuries
   a. Deaths not due to disease
### Examples of properly completed medical certifications

**CAUSE OF DEATH (See instructions and examples)**

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
<th>Timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>32. PART I.</td>
<td>Enter the chain of events—diseases, injuries, or complications—that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology. DO NOT ABBREVIATE. Enter only one cause on a line. Add additional lines if necessary.</td>
<td>Minutes</td>
</tr>
<tr>
<td>IMMEDIATE CAUSE (Final disease or condition resulting in death)</td>
<td>[ \text{a. Rupture of myocardium} ] Due to (or as a consequence of): [ \text{b. Acute myocardial infarction} ] Due to (or as a consequence of): [ \text{c. Coronary artery thrombosis} ] Due to (or as a consequence of): [ \text{d. Atherosclerotic coronary artery disease} ]</td>
<td>6 days</td>
</tr>
<tr>
<td>Sequentially list conditions, if any, leading to the cause listed on line a. Enter the UNDERLYING CAUSE (disease or injury that initiated the events resulting in death) LAST.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PART II.** Enter other significant conditions contributing to death but not resulting in the underlying cause given in PART I.

- Diabetes
- Chronic obstructive pulmonary disease
- Smoking

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>33. WAS AN AUTOPSY PERFORMED?</td>
<td>Yes □ No □</td>
</tr>
<tr>
<td>34. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH?</td>
<td>Yes □ No □</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>35. DID TOBACCO USE CONTRIBUTE TO DEATH?</td>
<td>Yes □ No □</td>
</tr>
<tr>
<td>36. IF FEMALE:</td>
<td>Not pregnant within past year □ Pregnant at time of death □ Not pregnant, but pregnant within 42 days of death □ Not pregnant, but pregnant 43 days to 1 year before death □ Unknown if pregnant within the past year</td>
</tr>
<tr>
<td>37. MANNER OF DEATH</td>
<td>Natural □ Homicide □ Accident □ Pending investigation □ Suicide □ Could not be determined</td>
</tr>
</tbody>
</table>

Source: US Department of Health and Human Services, CDC, NCHS
Epidemiologic Transition

1) Definition (associated with Omran)

2) Demography, population health, epidemiology

3) Focus not only on mortality but also on morbidity

4) Stages
   a. Age of pestilence and famine
   b. Age of receding pandemics
   c. Age of degenerative & man-made diseases
   d. Age of delayed degenerative diseases?
## Change in levels of mortality

<table>
<thead>
<tr>
<th></th>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Stage 3</th>
<th>Stage 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDR</td>
<td>30-50</td>
<td>≈30</td>
<td>&lt;20</td>
<td>≈10</td>
</tr>
<tr>
<td>e0</td>
<td>30</td>
<td>50</td>
<td>65-70</td>
<td>70+</td>
</tr>
</tbody>
</table>
Features of epidemiologic transition

1) Decrease in volatility
   a. “Crisis” and “background” mortality both high in past

2) Shift in causes of death

3) Shift in age pattern of mortality

4) Favors women over men

5) Emergence of socioeconomic differentials
Decline in mortality crises

Fig. 3.1 Annual changes in crude death rates 1720-1920: (a) France and England, (b) Sweden, (c) Norway and Finland
Change in cause of death

Diagram showing the change in cause of death with respect to mortality rates. The x-axis represents the epidemiologic transition, and the y-axis represents mortality rates. The green line indicates non-communicable disease, showing a decrease in mortality rates, while the black line indicates infectious disease, showing an increase in mortality rates. The graph illustrates the transition from high mortality due to infectious diseases to low mortality due to non-communicable diseases.
Continued decline in death due to degenerative diseases

**Figure 25. Death rates for leading causes of death for all ages: United States, 1950-2002**

*Notes: Rates are age adjusted. Causes of death shown are the five leading causes of death for all ages in 2002. CLRD is chronic lower respiratory diseases. Starting in 1999, data were coded according to ICD-10. See Data Table for data points graphed and additional notes.*

*Source: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System.*

Change in age patterns of death
Age distribution of death

1) Shift from young ages to older ages
2) Reflects changing causes of death
3) Increased survivorship
4) Major implications for population growth
Trends in sex differences in life expectancy

Nordic countries

Anglo-Saxon countries

Source: Jaques Vallin - George Myers Memorial Lecture
Growing SES differentials

Figure 3 Estimated annual death rates by age at death, sex, and educational attainment among white persons aged 55-84 years, United States, 1960 and 1971-84. Source: Feldman et al. (1989).

SES differentials in the U.S. have widened over time, especially among males, and especially among males ages 65-74.
FIGURE 10.4. Risk of death by education level, U.S. adults, 1991 to 1995. Note: Referent is 17 years or more of education. Demographic controls include age, sex, race, and marital status. Socioeconomic and health status controls include income, employment status, and health status. Source: Rogers, Hummer, and Nam (2000).
Explanations

1) Economic development – e.g., housing
2) Advances in medical, scientific technology
3) Improved sanitation and hygiene
4) Improved food supply and nutrition
Variation in Epidemiologic Transition

1) Early vs. later transitions
   a. Role of SES improvements vs. technological improvements.
   b. Endogenous vs. exogenous change
   c. Relative economic circumstances
Recent trends

1) Regional variation
   a. Africa and AIDS
   b. Eastern Europe/Russia – East-West Gap

2) US and other developed countries
   a. Smoking
   b. Obesity