Definitions

• **Public Health** (IOM 1988)
  “What we, as a society, do collectively to ensure the conditions in which people can be healthy”
Definitions (cont.)

• Health
  – the condition of being sound in body, mind, or spirit
  – a flourishing condition or well being; not just the absence of disease
  or
  – “a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity” (WHO, 1948)

Definitions (cont.)

• Disease
  – trouble or a condition of the living animal or plant body or one of its parts that impairs the performance of a vital function
Definitions (cont.)

• Safe
  – free from harm or risk
  – zero risk

• Risk
  – possibility of loss or injury, peril
  – the probability of such loss

Question

What are the top 3 public health issues in your country?
Traditional Public Health Approach

1. Identify the problem
2. Identify and characterize the parameters governing the problem
3. Design appropriate PH interventions
4. Implement and evaluate the interventions

Traditional PH Approach

1. Identify the problem
   ✓ Cancer deaths
   ✓ Unintentional injuries
2. Identify and characterize the parameters governing the problem
   ✓ Smoking
   ✓ Automobile crashes
3. Design appropriate PH interventions
   ✓ Anti-smoking communication campaigns
   ✓ Lower-tar cigarettes
   ✓ Traffic laws
4. Implement and evaluate the interventions
The “Right” First Question

What criteria do you use to identify an important public health issue?

Another Possible Approach
(resulting from this new first question)

1. Identify the health parameters of importance
2. Identify the problems most impacting the health parameters
3. Identify and characterize the parameters governing the problem
4. Design appropriate PH interventions
5. Implement and evaluate the interventions
Health Effects

- Adverse vs. beneficial
- Acute vs. delayed onset
- Clinical vs. subclinical
- Transient (reversible) vs. chronic (irreversible)
- Local vs. systemic

Health Status

- Mortality
- Morbidity
- Life expectancy
- Functional status and capacity
- Quality of life
Health Indicator

• A variable, susceptible to direct measurement, that reflects the state of health of persons in a community.

• Examples:
  – Mortality rates
  – Incidence rates
  – Prevalence rates
  – Disability days

Ross Browson et al
Evidence-Based Public Health

Choices of Metric for “Mortality”

• Mortality rate = fraction of deaths in a population
• Years of potential life lost = difference between expected age of death and actual age of death, summed across all deaths
• Disability-adjusted life years = YPLL, weighted for the severity of the disability during life, summed across all deaths
• Quality-adjusted life years = length of life, “discounted” by quality of life expected with different health states, summed across all lives
Crude Death Rate vs. YPLL

Table 3–12. Estimated Years of Potential Life Lost (YPLL) Before Age 65 Years and Mortality Rates per 100,000 Persons, By Cause of Death, United States, 1989 and 1990

<table>
<thead>
<tr>
<th>Cause of Death (ICD–9 Codes)</th>
<th>YPLL for Persons Dying in 1989</th>
<th>YPLL for Persons Dying in 1990</th>
<th>Cause-Specific Crude Death Rate, 1990</th>
</tr>
</thead>
<tbody>
<tr>
<td>All causes (total)</td>
<td>12,339,045</td>
<td>12,083,228</td>
<td>861.9</td>
</tr>
<tr>
<td>Unintentional injuries (E800–E849)</td>
<td>2,335,335</td>
<td>2,147,004</td>
<td>37.3</td>
</tr>
<tr>
<td>Malignant neoplasms (140–208)</td>
<td>1,832,039</td>
<td>1,839,900</td>
<td>201.7</td>
</tr>
<tr>
<td>Suicide/homicide (E950–E976)</td>
<td>1,402,524</td>
<td>1,520,760</td>
<td>22.5</td>
</tr>
<tr>
<td>Diseases of the heart (390–398, 402, 404–429)</td>
<td>1,411,399</td>
<td>1,349,027</td>
<td>28.9</td>
</tr>
<tr>
<td>Congenital anomalies (740–759)</td>
<td>660,346</td>
<td>644,651</td>
<td>3.3</td>
</tr>
<tr>
<td>Human immunodeficiency virus infection (042–044)</td>
<td>585,992</td>
<td>644,245</td>
<td>9.6</td>
</tr>
<tr>
<td>Prematurity (765, 766)</td>
<td>487,749</td>
<td>415,636</td>
<td>5.5</td>
</tr>
<tr>
<td>Sudden infant death syndrome (798)</td>
<td>363,393</td>
<td>347,713</td>
<td>2.2</td>
</tr>
<tr>
<td>Cerebrovascular disease (430–438)</td>
<td>237,896</td>
<td>244,366</td>
<td>57.9</td>
</tr>
<tr>
<td>Chronic liver disease and cirrhosis (571)</td>
<td>233,472</td>
<td>212,707</td>
<td>18.2</td>
</tr>
<tr>
<td>Pneumonia/influenza (480–487)</td>
<td>164,832</td>
<td>165,534</td>
<td>31.3</td>
</tr>
<tr>
<td>Diabetes mellitus (250)</td>
<td>145,501</td>
<td>143,250</td>
<td>19.5</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease (490–496)</td>
<td>135,507</td>
<td>127,464</td>
<td>35.5</td>
</tr>
</tbody>
</table>


Population Attributable Risk

\[ PAR = \frac{P_e (RR - 1)}{1 + P_e (RR - 1)} \]

- \( P_e \) = proportion of population exposed
- \( RR \) = relative risk (ratio of disease or death rate among exposed to unexposed)
- \( PAR \) depends on both \( P_e \) and \( RR \)

Ross Brownson et al
**Another Possible Approach**

1. Identify the health parameters of importance
   - Crude or adjusted mortality rates
   - YPLL, DALY, QALY
   - Incidence or prevalence

2. Identify the problems most impacting the health parameters
   - Cancer, heart disease

3. Identify and characterize the parameters governing the problem
   - Exposures, behaviors

4. Design appropriate PH interventions

5. Implement and evaluate the interventions

---

**Healthy People 2010**

**Categories of Health Indicators**

- Physical activity
- Overweight and obesity
- Tobacco use
- Substance abuse
- Responsible sexual behavior
- Mental health
- Injury and violence
- Environmental quality
- Immunizations
- Access to health care
Healthy People 2020
Categories of Health Indicators

- Access to health services
- Clinical preventive services
- Environmental quality
- Injury and violence
- Maternal, infant, and child health
- Mental health
- Nutrition, physical activity, and obesity
- Oral health
- Reproductive and sexual health
- Social determinants
- Substance abuse
- Tobacco

Healthy People 2020
Leading Health Indicators

- 26 indicators organized under 12 categories
- Examples:
  - Access to Health Services
    - Persons with medical insurance
    - Persons with a usual primary care provider
  - Environmental Quality
    - Air Quality Index (AQI) exceeding 100
    - Children aged 3 to 11 years exposed to secondhand smoke

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Determinants of Health

• “determinant” - “any factor, whether event, characteristic, or other definable entity, that brings about a change in a health condition, or other defined characteristic” [Last]

• Proximal (direct, immediate) or distal (indirect, remote, underlying)

• Categories:
  – Physical, social, economic, and political environment
  – Biological constitution and behavior
  – Availability and effectiveness of health services

Determinants of Health Status

• Natural environment
  – Natural env agents, weather

• Human modification of the natural env
  – Air and water pollution, waste

• Social, economic, and political “environment”
  – SES, urbanization

• Biological composition
  – Gender, ethnicity, age, immune status

• Individual behavior
  – Diet, physical activity, sexual behavior
Strategies to Improve Health

• Protecting the physical environment
  – Env engineering, laws and regulations
• Providing a healthful economic and social environment
  – Education, jobs
• Enhancing biological composition
  – Disease screening, immunization
• Promoting healthy behavior
  – Health education
• Providing effective health care
  – Home care, national health care system

The Determinants of Health

• Genetic predispositions
• Age and sex
• Race
• Physical determinants
• Biological determinants
• Behavioral determinants
• Social determinants
• Cultural determinants
• Spiritual determinants
• Medical care
  • Interactions and multifactorial causation
Factors Determining Health

• Individual biology (including genetics)
• Individual behaviors
• Physical environment
• Social environment

✓ Individual biology and behaviors are not “environment” (although the environment can influence behaviors)
The Social Environment

• The groups to which we belong

• The neighborhoods in which we live
  – more than sum of individuals living there
  – features can alter social support & ties, social capital, patterns of social integration & cohesion
  – due to such features as SES, public services, behavior, & culture

• The organization of our workplaces

• The policies we create to order our lives
  – Can have influences on the individual level and population (contextual) level

A Provocative View: PH Problems Mainly Determined by Individual Behaviors

• Tobacco use
  
• Alcohol and drug use

• Diet

• Physical activity

✓ Not “environment”
✓ Mainly “voluntary”

Role of addiction
“Behavior” vs. “Environment”

- Smoking vs. ETS (second-hand smoke)
- Fatty diet vs. pesticides in food
- Individual vs. community SES

- Trickier examples:
  - individual cell phone use vs. cell tower exposure
  - walking vs. driving

Socio-Ecological Models
These Socioecologic Models Indicate Levels (or Geographic Scale) of Intervention

- Individual
- Interpersonal
- Organizational
- Community
- Public policy

Healthy People 2020 Overarching Goals

- Attain high-quality, longer lives free of preventable disease, disability, injury, and premature death.
- Achieve health equity, eliminate disparities, and improve the health of all groups.
- Create social and physical environments that promote good health for all.
- Promote quality of life, healthy development, and healthy behaviors across all life stages.

But, what problems should we focus on?
Basic Priority Rating (BPR)

\[ BPR = \frac{[(A + B)C]}{D} \]

- A = size of problem
- B = seriousness of problem
- C = effectiveness of intervention
- D = propriety, economics, acceptability, resources, legality (PEARL)


How Do We Balance Current vs. Future “Importance” of a PH Problem?

Priority Rank


Ross Brownson et al
The 10 Essential PH Services (CDC)

• Monitor health status to identify community health problems
• Diagnose and investigate community health problems and health hazards
• Inform, educate, and empower people about health issues
• Mobilize community partnerships to identify and solve health problems
• Develop policies and plans that support individual and community health efforts (continued)

• Enforce laws and regulations that protect health and ensure safety
• Link people to needed personal health services and assure the provision of health care when otherwise unavailable
• Assure a competent public health and personal health care workforce
• Evaluate effectiveness, accessibility, and quality of personal and population-based health services
• Research for new insights and innovative solutions to health problems
The 10 Essential PH Services

Public Health Practice Paradigm

Communication

Risk Assessment
- Biological Mechanisms
- Epi & Biostat

Risk Management
- Law & Policy
- Behavioral+ Engineering

Evaluation