Public Health Intervention Strategies

- Biologic; e.g., vaccines
- Behavioral – individual, community
- Political – lobbying
- Structural – laws and regulations
Biological Strategies

- Immunizations
- Prophylaxis
- Improved nutrition
- Mother and child health programs
- Microbicides
- Improved sanitation
- Improved water quality (including oceans, etc.)
Behavioral Strategies

- Promote good health habits; e.g., exercise, diet
- School health programs
- Promote immunization programs and other interventions
- TV, radio and media public health messages
- Promote safe sexual behavior
Political Strategies

• Lobby legislators
• Promote healthy, safe communities
• Promote and enforce appropriate health laws and regulations
• Promote universal access to health care, especially preventive care
• Improve standard of living (e.g., housing)
• Reduce poverty
Structural Strategies (1)

- Monitoring and surveillance of diseases and health hazards
- Safe drinking water
- Safe waste disposal
- Regulations to protect workers
- Regulate driving (e.g., speed limits, auto and road safety)
- Legislation and regulations for safety; e.g., occupational, vehicular, roads, etc.
Structural Strategies (2)

- Laws to ban smoking, require helmets, etc.
- Regulate air and water quality (ocean, lakes, waterways)
- Enforcement of health and safety laws
- Establish safe communities and parks
- Establish universal medical access
- Taxation (e.g., cigarettes, alcohol)
- Regulation of drugs and food (FDA)
Using Anxiety as a Public Health Tool

<table>
<thead>
<tr>
<th>Level of Anxiety</th>
<th>Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too little</td>
<td>No action</td>
</tr>
<tr>
<td>Sufficient</td>
<td>Appropriate action</td>
</tr>
<tr>
<td>Too much</td>
<td>Fatalism and no action</td>
</tr>
</tbody>
</table>
Isolation and Quarantine

- Isolation of cases (e.g., SARS, Ebola)
- Quarantine of exposed individuals (e.g., yellow fever, SARS, H1N1)
- Culling (murder) of diseased flocks, herds (e.g., H5N1)
Eradication

- Smallpox
- Polio?
- Measles?
- Dracunculus
Figure 1. Global Distribution of Wild-Type Poliomyelitis Cases, January 1, 2010–June 1, 2010.

WPV1 and WPV3 denote cases of wild-type poliovirus types 1 and 3, respectively. The total number of cases is 254. Data are from the WHO Global Poliomyelitis Eradication Initiative.

Modlin JF. Focus on research: The bumpy road to polio eradication. NEJM 362(25):2347, 2010
Figure 2. Current Outbreaks of Circulating Vaccine-Derived Poliomyelitis.

The abbreviation cVDPV denotes circulating vaccine-derived poliovirus, and cVDPV2 and cVDPV3 denote types 1 and 3, respectively. Data are from the WHO Global Poliomyelitis Eradication Initiative.

Modlin JF. Focus on research: The bumpy road to polio eradication. NEJM 362(25):2348, 2010

**Abbreviation:** SIA = supplementary immunization activity.
Improved Standard of Living (1)

• Less crowding decreases respiratory spread (e.g., TB)

• Better quality of food (fresh and uncontaminated decreases gastrointestinal diseases)

• Year-round access to vegetables and fruit (eliminates vitamin deficiency diseases such as beri beri)
Improved Standard of Living (2)

- Refrigeration allows fewer preserved foods (salted or chemically modified), which may reduce some cancers
- Improved nutrition
- Promotion of education
- Reduced poverty
- Better methods of primary, secondary, and tertiary prevention (structural, behavioral, and medical)
Objectives of Vaccination

- Prevent infection
- Prevent disease
- Prevent transmission
Requirements for a Vaccine

- Must be safe
- Should be easy to administer (e.g., nasal spray, oral)
- Must elicit a protective immune response
- Must stimulate both humoral and cellular immunity
- Must protect against all variants of the agent
- Must provide long-lasting immunity
- Must be practical to produce, transport and administer (e.g., lyophilized)
Vaccines - Sociopolitical Considerations

- Cost of development – federal government and/or private industry?
- Responsibility for liability – federal government, industry, or insurance companies?
- Priorities for funding and distribution of vaccine
- Appropriateness and acceptability of vaccine for target population(s)
Primary Issues for Vaccine Evaluation (1)

- Safety
- Availability to appropriate target population(s) (covert vs. overt)
- Cost
- Liability
Primary Issues for Vaccine Evaluation (2)

- Evaluation/testing procedures (animal models?)
- Level of efficacy against infection
- Level of efficacy against transmissibility
- Level of efficacy against clinical disease
- Acceptability
Innovative Strategies

Smallpox eradication

(search and contain)
Popular Opinion Leader Model (targeting of natural leaders in a social group)

• Examples
  – Gay bars
  – Markets in Fuzhou, China
  – Dormitories in St. Petersburg, Russia
Community Intervention

- Getting the community to recognize the problem
- Getting the community to accept responsibility and implement change
- Changing community norms (e.g., smoking, condoms)
- Co-opt business marketing strategies
Legislative Change

• Requires political will

• To be effective, also requires enforcement (e.g., smoking prohibition, seat belt laws, maximum highway speeds, safety regulations, pollution laws)

• Requires constant vigilance (e.g., repeal of motorcycle helmet laws, weakening pollution laws, and environmental protection)
Need for Evaluation of Intervention Strategies

- Some logical interventions are unsuccessful
- Continuation of ineffective interventions prevents implementation of other potentially successful interventions, and wastes money and personnel
- Elements of evaluation
Elements of Evaluation (1)

• Are the appropriate risk groups and areas identified and targeted (e.g. HIV/AIDS vaccine)?

• Is the intervention strategy culturally and economically appropriate and acceptable to the target group and the community? (e.g., township health workers in China and changes in blood collection strategy)
Elements of Evaluation (2)

- How is the effectiveness of the intervention strategy measured (process variables (e.g., number of vaccine recipients) vs. outcome (e.g., reduction in incidence of disease))?
- Is the existing public health system and community structure a part of the evaluation scheme?
- Is the strategy cost-effective?
- Can the intervention be scaled up?
TAKE-HOME MESSAGES

• Sleep 7-8 hours per night
• Eat breakfast
• Brush your teeth
• Take the bus, save the environment
• Cultivate a social network, promote your community
• Exercise regularly, use the stairs, not the elevator
• Drive safely
• Don’t do it – BUT if you must, wear a condom
• Be kind to your professor!
GO FORTH AND INTERVENE!