WEEK 7: HOW CAN LDC IMPROVE HEALTH & NUTRITION?
F-2010

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I. Key Factors that Affect Health & Nutrition

- **Economic prosperity**: trends in economic growth & development vs. economic stagnation
  
  *Why*

- **Population-related factors**: trends in population growth, fertility rate, migration/refugees, and age composition
  
  *Why*

- **Social factors**: trends in urbanization, housing, sanitation, hunger & malnutrition, education, poverty, unemployment, and environmental conditions
  
  *Why*
II. Global Health Trends: Three Key Indicators

A. Life Expectancy (def. Life expectancy at birth)—a key mega-indicator

- Steady improvement—now 67 yrs worldwide \(\text{(WRI, 2005-2010)}\)
  - Due to both national and international efforts:
    - Investments in health, sanitation, water systems
    - Medical interventions—vaccines, antibiotics
    - Health campaigns—smallpox, polio
    - Economic development, rising incomes

- But large differences between: \(\text{(World Bank, 2006)}\)
  - Poor/rich countries, >20 year difference!!!
    - High income--79 yrs (M=76, F=82)
    - Low income--57 yrs (M=56, F=58)

  Regional of the world, 28 year gap \(\text{(WRI, 2005-2010)}\)
  - N. America—79 yrs
  - Europe—75 yrs
  - S. America—73 yrs
  - Asia (exc. M.E)—70 yrs
  - S-Saharan Africa--51 yrs
  - M.E. & N. Africa—69 yrs

- Country & Gender (male/female) \(\text{(World Bank, 2006)}\)
  - Highest Japan M=79, F=86 yrs
  - US: M=75, F=81 yrs \textbf{Note}—US in 1900=47 yrs
  - Successful LDCs China: M=70, F=74 yrs; Indonesia: M=66, F=70 yrs
  - India: M=63, F=66 yrs
  - Lowest Zambia: M=41/=42 yrs, Similar=(Angola, Mozambique, Sierra Leone, Dem. Rep. of Congo
  - Huge life expectancy difference (= 40 yrs) between least & most developed countries largely due to
    - Infant/child (<5 yrs.) mortality rates
    - Civil conflict (Sierra Leone, Congo)
    - AIDS in recent years (Southern Arica)
    - Impact of higher income & technological progress

- Threats to continued progress?
  - New world health threats?
    - Examples?
  - Threats to continued investments in improving world health?
    - Examples?
B. Infant (<1 yr) & Child < 5 yrs) Mortality (def: death/1,000 births)

- **Large reduction** in all regions !!! (Fig. 3+Child)
  - Infant mortality decline, by region, 1965-70 vs 2000-05
    - World: -54%  DCs: -31%
    - Africa: -61%  Asia: -47%  LAC: -35%

- **But much regional variation** in infant/child mortality rates (rates)
  - Child (<5 yr) mortality/1,000) (World Bank, 2006)
    - World: 72
    - High income countries: 7  Low income countries: 135

- And large variation in child mortality among counties (World Bank, 2006)
  - Highest: Sierra Leone (270), Niger (253)
  - Lowest: Singapore (3), W. Europe & Japan (4-5)
  - Interesting!: China (24) vs. India (76)
  - USA ranks 17th (8/1,000 births)
  - **Note:** In 1900, the US’s infant mortality rate=165

  **Why?**

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- **Causes of Child (<5 yrs) Deaths in LDCs**

  **Leading Causes, Worldwide** (WHO, 2003) (Figure)
  - Perinatal causes (birth-related) 23%
  - Pneumonia 20%
  - Diarrhea 15%  **Why?**
  - Malaria 11%
  - Measles 5%
  - HIV/AIDS 4%  (Figure)
  - Other 22%

  - **Malnutrition**—a major contributing factor, associated
    with 53% of child deaths, makes kids more vulnerable  (Figure)

- Many of these cause of death are **easily preventable/curable**
  - So what’s the problem?
C. Maternal Mortality (def: deaths/100,000 births)

- **Incidence**
  - About 500,000/yr, 99% in LDCs
  - Rate varies by region (World Bank, 2004)
    - SS Africa—921/100,000
    - S. Asia  564/100,000
    - LAC—183/100,000
    - E. Asia  117/100,000
    - High income—14/100,000
    - Low income—684
  - **Note**—US now 17/100,000, but in 1900=850/100,000

- **Lifetime Risk**
  - North America—less than 0.03% lifetime risk
  - Sub-Saharan Africa—6% lifetime risk of death in childbirth

- **Contributing factors (LDCs)**
  - Lack of prenatal care
  - Lack of delivery care
  - Lack of post-maternal care
  - Compounded by poor maternal nutrition

D. Big Differences in Health Indicators Within Countries

III. Leading Causes of Death

A. Causes of Death in Low vs High-Income Countries (All Ages, 2004)

<table>
<thead>
<tr>
<th>Cause</th>
<th>Poor (%)</th>
<th>Rich (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower respiratory infections</td>
<td>11.2</td>
<td>3.8</td>
</tr>
<tr>
<td>Coronary heart disease</td>
<td>9.4</td>
<td>16.3</td>
</tr>
<tr>
<td>Diarrheal diseases</td>
<td>6.9</td>
<td>NA</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>5.7</td>
<td>NA</td>
</tr>
<tr>
<td>Stroke related</td>
<td>5.6</td>
<td>9.3</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>3.6</td>
<td>3.5</td>
</tr>
<tr>
<td>TB</td>
<td>3.5</td>
<td>NA</td>
</tr>
<tr>
<td>Neonatal infections</td>
<td>3.4</td>
<td>NA</td>
</tr>
<tr>
<td>Malaria</td>
<td>3.3</td>
<td>NA</td>
</tr>
<tr>
<td>Prematurity and low birth weight</td>
<td>3.2</td>
<td>NA</td>
</tr>
<tr>
<td>Cancer (lung, colon, stomach, breast)</td>
<td>NA</td>
<td>13.0</td>
</tr>
<tr>
<td>Alzheimer &amp; other dementia</td>
<td>NA</td>
<td>3.4</td>
</tr>
<tr>
<td>Diabetes</td>
<td>NA</td>
<td>2.8</td>
</tr>
</tbody>
</table>

Discussion

- Key causes of death in DCs? (Cartoon) (US: Historical causes)
- Key causes of death in LDCs?

**Note** Rich vs. Poor Country differences…future for LDCs? Globesity?
IV. Major Health/Disease Threats in LDCs Today

A. Examples of successes!

- Smallpox (only disease to ever be eradicated!) (Photos)
  - Traditional vaccination used in W. Africa/Turkey (Speckled Monster)
  - Modern vaccine invented in early 1800s (US/Europe)
  - In 1970s, WHO launched worldwide campaign, eradicated in 1979

- Polio--Major WHO campaign is having success
  - Mainly affect children under 5 year of age
  - WHO’s Global Polio Eradication Initiative launched in 1988
  - Cases have fallen by 99%--from 350,000 in 1988 to 1,997 in 2006
  - Eradicated in all but 4 countries (vs 125 countries in 1988)
  - Still hot spots in Afghanistan, Nigeria, India, and Pakistan
  - Projected to be eradicated worldwide by 2009 (Photos)

- Guinea Worm (6 countries in Sub-Saharan Africa)
  - Larva enter body, develops into a worm, causes pain/ulcers (Fig.)
  - Cases have fallen by 99%--from 3.5 million (1980s) to 4,619, countries with epidemics fell from 20 to 6 (Map, Photos)
  - Funded by Gates Foundation--$2.8 million, Carter Center
    - Filter water
    - Educational campaign (expect to be eradicated by 2009)

B. New & Emerging Infectious Disease

- 1970s--great optimism about conquer infectious diseases
- Today—renewed concern

- Interrelated mix of contributing factors responsible—development?
  - Ecological changes
    (e.g., global warming, land use changes)
  - Human factors
    (e.g., war, sexual behavior, IV drug use, overcrowding)
  - International travel & commerce
    (e.g., travel,H1N1; global markets—China’s tainted milk)
  - Technological & industrial factors
    (e.g., food processing--US, salmonella in hamburger, livestock handling, organ transplants)
  - Microbial changes
    (e.g., antibiotic & pesticide resistance)
  - Breakdown of public health measures
    (e.g., sanitation, vaccination, insect control)
C. Major Infectious Diseases in LDCs

- Definitions
  - Epidemic—many cases of a disease in a localized area (1%)
  - Pandemic—multiple geographically dispersed epidemics

- Key Diseases in LDCs & Method of Transmission
  
  **Note:** US & Europe had most of these problems 100 yrs ago!
  
  - Diarrhea/dysentery—*water/food* borne bacteria
  - Typhoid/cholera—*water/food* borne bacteria
  - Tuberculosis & bronchitis—*airborne* bacteria
  - HIV/AIDS—*sexual contact*, contaminated blood
  - *Malaria, river blindness, yellow fever, sleeping sickness, dengue fever*—*vector/insect* borne

- **Biggest danger to you** if you visit a developing country?

D. Major Health Threats & Initiatives

1. *Malaria* Resurgence (good aspects, slowed colonialism in Africa?)

- **Extent of the Problem** (*life cycle*)
  - Causes chills/high fever => death if not treated
  - 1 million die annually (91% in SSA, 85% kids <5 yrs) *(Figure)*
  - 350-500,000 new cases each year, mostly young children
  - 50% world’s population (109 countries) at risk *(Fig/Photo)*
  - “Airport” malaria—a new problem in Europe & the US *(Photo)*
  - Major economic impact in SS Africa, reduces GDP by 1.3%
  - Control accounts for 40% of public health spending in SSA

- **Contributing Causes of resurgence**
  - Global climate change
  - Drug resistance (chloroquine & S/P) *(Figure)*
  - Human migration/civil conflicts
  - Deteriorating health systems
  - Ban on DDT spraying, controversial *(Silent Springs)* *(Figure)*
  - Insecticide resistance in mosquitoes
  - Ignored until recently (failed 1950s-1970s campaign)
1. Malaria

- **Prevention & Treatment** *(Figure)*
  - "Rollback Malaria"—WHO led Global Malaria Action Plan *(WWW)*
  - Prevention *(insecticidal treated bed net/$10, home spraying)*
  - Preventive treatment (pill, $0.27) for pregnant women
  - Early diagnosis (testing) & treatment
  - Research to develop a vaccine (Gates foundation)
  - Return to spraying DDT (South Africa)
  - **Goal:** Universal coverage, decrease cases/deaths by 70% by 2015
  - **Funding:** Donors committed $11.7 billion (2010-2012) to Global Fund to combat TB, AIDS & malaria

2. HIV/AIDS *(UNAIDS)*

   **Extent of the Problem** *(Table/Figure)*
   - First diagnosed in 1981
   - **2008:** 33 million infected, 2 m. deaths, 2.7 m. new cases
   - Recent success—stabilizing, deaths declining *Why?* *(Figure)*

   - More people have died of AIDS (25 million) than all wars!
   - Low/middle income countries= >96% cases
   - Countries with **most HIV Cases** (2007)
     - Total number of people affected since 1981 = 60 million
     - South Africa—5.6 million, Nigeria—2.6 million,
     - India—2.4 million, Mozambique—1.5 million,
     - Tanzania—1.4 million, Zimbabwe—1.3 million,
     - Ethiopia—1.0 million, Russia—0.9 million, China—0.7 million
   - Countries with **highest HIV Rates**, 2007 (15-49 years)
     - Swaziland—26%, Botswana—24%, Lesotho—23%,
     - South Africa—18%, Zambia—15%, Zimbabwe—15%,
     - Namibia—15%

   **Note:** US—0.6%
Sub-Saharan Africa most threatened today

- Two thirds (67%) of world’s cases (23 million)
  - 72% of AIDS deaths, 91% of new infections among kids (2008)
- Rapid increase in cases, high rates in several countries (Figure)
- >17 million have died, leading cause of death in SS Africa
- Projected lifetime risk high (Figure, UNAIDS)
- Shift in cases from elites to marginalized people (recent trends)
  - Urban to rural
  - Rich to poor
  - Men to women (60%), higher than rest of world Why? (Fig.)
  - Older to younger female
    - 2/3 new cases are 15-19 year females,
    - 3/4% of infected 15-24 year old are female

Direct & Indirect Impacts

- Increased health costs for government & families
- Less government $ for other investments
- Reduced future GDP
- Lost wages & loss of skilled labor (e.g., South Africa)
- Wives left without husbands’ income
- Orphans-grandparent-led families (>19 m. orphans, 95% Africa) (Fig)
- Loss of farm labor, farmland abandoned (satellite photos) (Figure)
- Undermined educational system, school attendance (e.g., Kenya)
- Life expectancy—fall to <40 yrs. in 11 African countries by 2012 (Fig)
Factors Contributing to Rapid Spread in in SS Africa (pandemic)

- Characteristic of the virus—long incubation period
- Customs—multiple partners, “sugar daddies” (photo), early marriage
- Gender inequality
  - Women can’t say “no” to sex w/o condoms
  - Limited economic opportunities
- Economic patterns—seasonal migration to jobs/prostitution, then return home to infect wife
- Limited HIV health awareness, low level of education
- Weak medical systems & high cost of treatment
- Reluctance to be tested, due to social stigma
- High rates of other STDs—increasing vulnerability to HIV
- Large rural populations—hard to reach
- Some governments have been slow to respond, denied its existence

Prevention & Treatment—Some Initiatives

- Government commitment/political will is critical to success
- Provide HIV education at schools/clinics), target the public via tradition/modern media (soaps, Soul City-7 min. (Photo)
- Provide free access to condoms ($14/year) (Photo)
- Treat other STDs immediately
- Provide voluntary testing/counseling (Photo)
- Prevent mom to child transmission (treat at birth)
- Provide support for widows & orphans (FAO-Kenya, 3 min.)
- Provide universal & free access to anti-retroviral drugs (Figure)
- Provide funding, support research to develop a vaccine (Figure)

WHO: Continuum of care (Figure)
Some Successful Initiatives

- Behavioral modification (social marketing) **most important**
  - Kenya (KICOSHEP program) -- targets slum kids with education, testing, counseling, positive living classes; uses “soap operas” to educate about prevention, treatment
  - Zambia (HEART program) -- promotes abstinence among youth via songs, TV commercials, radio adds, posters
  - Senegal -- enlisted religious leaders, encouraged youth to delay sex/use condoms, targeted prostitutes with safe-sex campaigns & testing
  - Uganda -- President spoke out, launched an awareness campaign, opened Africa’s 1st voluntary testing/counseling centers
  - Sub-Saharan Africa -- efforts to increase economic opportunity for women, pass legislation to ban/modify traditional customs (bride price), say no to “sugar daddies” campaigns, promote ABC (abstinence, be faithful, condoms)

- **But** must also increase access to treatment
  - Brazil/Thailand -- cut cost of treatment by making generic drugs and distributes them free; forced drug price reductions
  - Botswana -- launched Africa’s 1st universal drug treatment program (cost = $7-10,000/patient/yr), >90% adherence rate
  - US recently committed $15 billion for AIDS treatment/relief -- but criticized for emphasis on abstinence

- **Moral Issue** Facing DCs & Drug companies
  - Generic drug costs $300/yr vs $10-12,000/year for patented drug
  - LDCs wanted right to make/import generics when facing a national health epidemic (HIV/AIDS, TB, malaria), but US (via WTO) threatened sanctions for voiding drug patent
  - Recently, drug countries were pressured to allow manufacturing in LDCs (e.g., Brazil, Thailand) for sale in LDCs, reducing drug prices
3. Childhood Diseases
   - **Extent of the Problem**
     - Today, 50% of childhood deaths (4.9 million) due to diarrhea, pneumonia, malaria, and measles
   - **Prevention & Treatment** (**WHO**—“Integrated Management of Childhood Illness”)
     - Health education *(Photo)*
     - Prompt recognition of symptoms and rapid treatment, including oral rehydration for diarrhea *(Photo)*
     - Immunization, breast feeding (not Similac) *(Photo)*
     - Monitor kids health *(Photo)*

4. Maternal Mortality & Perinatal Conditions (before to just after birth)
   - **Extent of the Problem**
     - 500,000 women die each year
     - 50 million women suffer from pregnancy-related conditions
     - Accounts for 1/5 of childhood deaths
   - **Prevention & Treatment** (**WHO**—“Integ. Mgt. of Pregnancy/Childbirth”)
     - Provide anti-natal & post-natal care *(Photo)*
     - Delivery by trained birth attendant
     - Treat birth-related complications
     - Promote family planning & treat STDs

5. Tuberculosis
   - **Extent of the Problem**
     - 1.7 million die, 8 million new cases each year
     - 1/3 of the world’s population has latent TB
     - Poorest must vulnerable
     - Growing drug resistance
   - **Prevention & Treatment** (**WHO**—“DOTS”—80% success rate)
     - Government commitment to sustained control
     - Insure early detection
     - Provide access to drugs
     - Supervise treatment for 6-9 months
6. **Tobacco--Related Diseases**
   - **Extent of the Problem**
     - 1.1 billion smokers, most living in LDCs (80%)
     - 5 million deaths/year, 10 million by 2020 (70% in LDCs)
     - Tobacco firms target LDC/youth--sponsor teams, free cigarettes
   - **Prevention**
     - WHO treaty ("Framework Convention for Tobacco Control")
       Requires strict regulations on marketing/labeling, higher taxes
     - Ratified by 100 countries but not the U.S.
     - Thailand—banned public smoking, can’t display tobacco products, gruesome packages

7. **Landmines**
   - **Extent of the Problem**
     - 24,000 civilians killed per year, many more maimed
     - 100 million landmines in 64 countries
   - **Prevention**
     - NGO-sponsored treaty to ban landmines, ratified by 136 countries, but not the U.S.

8. **Gun-Related Death--Latin America**
   - Leading cause of death among people 15-44 yrs.
   - Facilitated by the Cold War—Russian/US introduction of weapons into C. America
   - Violence sustained by extreme poverty =>gangs involved in drugs, arms trade, human trafficking

9. **Water/Food-borne Diseases**
   - **Examples?**
   - **Prevention**
     - Education
     - Clean drinking water/water treatment (50% in 2005)
       Non-health related benefits: saves women’s time, increases girls’ school attendance, reduces price of water for the poor
     - Proper human waste disposal/latrines
       India--“pay-as-you-go” community toilets
Health Is a Key Social Goal: Governments should give priority to *The attainment by all peoples of a level of health permitting them to lead socially & economically productive lives.* (WHO)

A. LDCs Must give priority to:

- **Investing in improving** sanitation, water treatment, health systems *but this will be difficult*
  - Health budget = < $20/capita in many poor LDCs
  - Constraint: debt crisis, national poverty

- **Building stronger partnerships** between government and
  - NGOs (e.g., India),
  - UN agencies (e.g. UNAIDS, WHO, UNICEF, UNDP, UNESCO)
  - Private sector
  - DCs

V. Strategies For Improving Health & Nutrition

- Promoting health education and inexpensive interventions
  - Boiling water, constructing latrines
  - AIDS awareness, condom use
  - Breastfeeding
  - Immunization ($15/child)—DPT, polio, measles
  - Oral rehydration (diarrhea, salt+sugar+water)

- **via**
  - Media: Soap operas (India), plays/songs (Sub-Saharan Africa)
  - Traditional healers (Sub-Saharan Africa)
  - Religious leaders (Asia, Sub-Saharan Africa)
  - Barefoot/community health workers (China, Brazil)

- **Making the Home the 1st Hospital**—2008 WHO Initiative
  - Emphasize *primary* care, not "hospital" care
  - Focus on marginalized groups
  - Barefoot doctors/rural health workers *(Photo)*
  - Rural health clinics, rather than hospitals

- **Provide the sick greater access to drugs** (malaria, anti-retrovirals)
Examples of National/NGO-based/Local Initiatives

- Peru—“conditional transfer program ($30/month)
- India—provide health care in slums, promote building of “loos”
- Worldwide—invest in safe water (50% now have piped water)

B. Health Threats Can Not Be Solved Solely by Health Interventions

- Health problems have many interrelated causes
- Need broad ranging interventions

C. DC Can Help by Providing More International Assistance

- Entwined world (H1N1 virus, malaria)
- A hopeful sign—US & Europe’s new commitment to funding AIDS prevention/treatment
  (e.g., Bush Administration committed $48 billion to combat AIDS, TB, and malaria over next 5 years, 2009-2014)