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

Richard H. Bernsten
Agricultural Economics
Michigan State University
I. Key Factors that Affect Health & Nutrition

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

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

- **Social factors**: trends in urbanization, housing, sanitation, hunger & malnutrition, education, poverty, unemployment, and environmental conditions
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 (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: (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 (WRI, 2005-2010) (Fig. 2)
  ✓ N. America—79 yrs
  ✓ S. America—73 yrs
  ✓ S-Saharan Africa—51 yrs
  ✓ Europe—75 yrs
  ✓ Asia (exc. M.E)—70 yrs
  ✓ M.E. & N. Africa—69 yrs
Country & Gender (male/female) (World Bank, 2006)

- Highest: Japan M=79, F=86 yrs
- US: M=75, F=81 yrs  
  **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 Africa)
- Impact of higher income & technological progress  
  (Figure) (Fig. 1.9)

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


- Perinatal causes (birth-related) 23%
- Pneumonia 20%
- Diarrhea 15%
- Malaria 11%
- Measles 5%
- HIV/AIDS 4%
- Other 22%

Why?

✓ Malnutrition--a major contributing factor, associated with 53% of child deaths, makes kids more vulnerable

✓ Many of these cause of death are easily preventable/curable
So what’s the problem?
C. Maternal Mortality (def: deaths/100,000 births)
   o Incidence
      ✓ About 500,000/yr, 99% in LDCs
      ✓ Rate varies by region (World Bank, 2004) (Map/Fig)
         o SS Africa—921/100,000 o S. Asia 564/100,000
         o LAC--183/100,000 o E. Asia 117/100,000
         ➢ High income—14/100,000 o Low income--684
         ➢ Note—US now 17/100,000, but in 1900=850/100,000

   o Lifetime Risk (Figure)
      ✓ North America—less than 0.03% lifetime risk
      ✓ Sub-Saharan Africa—6% lifetime risk of death in childbirth

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

   o 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)
Prevention & Treatment

“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

- 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  (cartoon)

- 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 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-7min. (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)
o 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

o 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](https://www.who.int)—“Integrated Management of Childhood Illness”)
     - Health education
     - Prompt recognition of symptoms and rapid treatment, including oral rehydration for diarrhea
     - Immunization, breast feeding (not Similac)
     - Monitor kids health

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
- 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 (Photos)
     - 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
V. Strategies For Improving Health & Nutrition

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
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
- Rural health clinics, rather that 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)
Figure 2  Life Expectancy, by Regions, 1950-2000

Figure 1.9 Life expectancy and income per capita for selected countries and periods

Life expectancy (years)

Income per capita (1991 international dollars)
Figure 3  Infant Mortality, by Regions, 1950-1995

Source: James Fox, op. cit., 16.

Return to p. 5
Regional Trends in Infant Mortality

Annual number of deaths to infants under age 1 per 1,000 live births

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>World</td>
<td>102</td>
<td>26</td>
</tr>
<tr>
<td>Africa</td>
<td>143</td>
<td>9</td>
</tr>
<tr>
<td>Asia</td>
<td>110</td>
<td>57</td>
</tr>
</tbody>
</table>


Child Mortality, by Region

Children Under 5, 2000

Deaths per 1,000 live births

<table>
<thead>
<tr>
<th>Region</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>163</td>
</tr>
<tr>
<td>Eastern Mediterranean</td>
<td>101</td>
</tr>
<tr>
<td>Southeast Asia</td>
<td>87</td>
</tr>
<tr>
<td>Western Pacific</td>
<td>40</td>
</tr>
<tr>
<td>Americas</td>
<td>30</td>
</tr>
<tr>
<td>Europe</td>
<td>24</td>
</tr>
<tr>
<td>World</td>
<td>82</td>
</tr>
</tbody>
</table>

Note: Regions are those used by the World Health Organization (see www.who.int).

© 2003 Population Reference Bureau
Lifetime Risks to Mothers

Risk of Dying of Maternal Causes or of Losing a Newborn*

Percent chance

- **Africa**: 20
- **Asia/Pacific**: 9
- **Latin America**: 5

* Lifeline risk that a woman will die of maternal causes  
* Lifetime risk that a woman will lose a newborn*

* Deaths to babies between birth and 28 days.
* Note: Based on most recent available rates.

© 2004 Population Reference Bureau
## The 10 leading causes of death by broad income group, 2004

### Low-income countries

<table>
<thead>
<tr>
<th>Condition</th>
<th>Deaths in millions</th>
<th>% of deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower respiratory infections</td>
<td>2.94</td>
<td>11.2</td>
</tr>
<tr>
<td>Coroary heart disease</td>
<td>2.47</td>
<td>9.4</td>
</tr>
<tr>
<td>Diasthoal diseases</td>
<td>1.81</td>
<td>6.9</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>1.51</td>
<td>5.7</td>
</tr>
<tr>
<td>Stroke and other cerebrovascular diseases</td>
<td>1.48</td>
<td>5.6</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>0.94</td>
<td>3.6</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>0.91</td>
<td>3.5</td>
</tr>
<tr>
<td>Neonatal infections</td>
<td>0.90</td>
<td>3.4</td>
</tr>
<tr>
<td>Malaria</td>
<td>0.86</td>
<td>3.3</td>
</tr>
<tr>
<td>Prematurity and low birth weight</td>
<td>0.84</td>
<td>3.2</td>
</tr>
</tbody>
</table>

### High-income countries

<table>
<thead>
<tr>
<th>Condition</th>
<th>Deaths in millions</th>
<th>% of deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coroary heart disease</td>
<td>1.33</td>
<td>16.3</td>
</tr>
<tr>
<td>Stroke and other cerebrovascular diseases</td>
<td>0.76</td>
<td>9.3</td>
</tr>
<tr>
<td>Trachea, bronchas, lung cancers</td>
<td>0.48</td>
<td>5.9</td>
</tr>
<tr>
<td>Lower respiratory infections</td>
<td>0.31</td>
<td>3.8</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>0.29</td>
<td>3.5</td>
</tr>
<tr>
<td>Alzheimer and other dementias</td>
<td>0.28</td>
<td>3.4</td>
</tr>
<tr>
<td>Colon and rectum cancers</td>
<td>0.27</td>
<td>3.3</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>0.22</td>
<td>2.8</td>
</tr>
<tr>
<td>Breast cancer</td>
<td>0.16</td>
<td>2.0</td>
</tr>
<tr>
<td>Stomach cancer</td>
<td>0.14</td>
<td>1.8</td>
</tr>
</tbody>
</table>
My country, 'tis of thee

Sweets & Obesity

Land of my food that's fried

Land where I'd rather ride

No wonder why we're getting wide

Of thee I sing
Crude Death Rate for Infectious Diseases --- United States, 1900-1996

Source: U.S. Centers for Disease Control and Prevention, Notifiable Diseases,
Leading Causes of Death in Children Under 5 in Developing Countries

Deaths attributable to undernutrition

- Pneumonia: 20%
- Diarrhea: 15%
- Malaria: 11%
- Measles: 5%
- HIV/AIDS: 4%
- Perinatal: 23%
- Other: 22%

Source: WHO, 2003
Child Malnutrition Measures, by Region

Children Under 5, Most Recent Data Available, 1995-2001

Percent

<table>
<thead>
<tr>
<th>Region</th>
<th>Underweight (abnormally low weight for age)</th>
<th>Wasting (abnormally low weight for height)</th>
<th>Stunting (abnormally low height for age)</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Asia</td>
<td>15</td>
<td>45</td>
<td>10</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>10</td>
<td>40</td>
<td>29</td>
</tr>
<tr>
<td>Middle East/ North Africa</td>
<td>6</td>
<td>22</td>
<td>14</td>
</tr>
<tr>
<td>East Asia/ Pacific</td>
<td>4</td>
<td>21</td>
<td>17</td>
</tr>
<tr>
<td>Latin America/ Caribbean</td>
<td>2</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>CEE/CIS* and Baltic States</td>
<td>4</td>
<td>16</td>
<td>7</td>
</tr>
</tbody>
</table>

* Central and Eastern Europe and the Commonwealth of Independent States (former Soviet Union).

© 2003 Population Reference Bureau
SMALL-POX IS PREVENTED BY VACCINATION

SMALLPOX Prevalls to an Alarming Extent in some parts of the State of Illinois at the present time.

Smallpox is a cold weather disease. Spreading as it has during the autumn months, it may be epidemic throughout the State before winter is over; causing much suffering, perhaps death, great loss, financial and business loss in every city, town, and village.

You may catch the disease at any moment by coming in contact with a smallpox patient or a person who has been exposed to the disease, or with any article of clothing or merchandise which has come from infected premises, or even by receiving a letter from a house where there is smallpox.

The experience of a century has taught that vaccination is a safe and positive preventive of smallpox.

No harm can result from a vaccination properly performed by a physician, with a live vaccine which may be obtained in any balanced drug store.

WHY NOT GET VACCINATED?

Physicians, Nurses, and Attendants in smallpox hospitals, who have been properly vaccinated, never caught smallpox. Their sole protection is vaccination. Let it be YOURS.

REMEMBER

That you may contract a contagious and fatal case of smallpox from a very mild case.

That in one locality in this State 10 deaths occurred among 56 persons afflicted with smallpox; in another, 13 among 56.

That even if you recover from smallpox, the disease may leave you with scarred beauty.

That if you contract smallpox, it means quarantine and isolation for several weeks, danger to your family and friends, loss of time and loss of business.

That a proper decapsulation is a safe, certain and absolute preventive against smallpox.

GET VACCINATED!

For additional information concerning vaccination and smallpox, address:

THE STATE BOARD OF HEALTH
Springfield, Illinois
Malaria Burden

- Disease Burden

  - 300-500 million clinical cases per year
    - 80% of cases in Africa
  - 1 million deaths per year
    - > 90% of deaths in Africa
  - Disability from severe form of the disease
  - 40 million DALYs lost annually
Roll Back Malaria

Goal:
Halving the global burden of disease associated with malaria within ten years through massive increase in availability of existing interventions, and focused investment in new products.

Means:
A global movement, backed by a range of partners, with high quality support from WHO.

Return to p. 13
A global view of HIV infection

Estimated adult (15–49) HIV prevalence (%) for countries in 2007

Go to next page
### Regional HIV and AIDS statistics and features, 2007

<table>
<thead>
<tr>
<th>Region</th>
<th>Adults &amp; children living with HIV</th>
<th>Adults &amp; children newly infected with HIV</th>
<th>Adult prevalence (15–49) [%]</th>
<th>Adult &amp; child deaths due to AIDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-Saharan Africa</td>
<td>22.0 million [20.5 – 23.6 million]</td>
<td>1.9 million [1.6 – 2.1 million]</td>
<td>5.0% [4.6% – 5.4%]</td>
<td>1.5 million [1.3 – 1.7 million]</td>
</tr>
<tr>
<td>Middle East &amp; North Africa</td>
<td>380 000 [280 000 – 510 000]</td>
<td>40 000 [20 000 – 66 000]</td>
<td>0.3% [0.2% – 0.4%]</td>
<td>27 000 [20 000 – 35 000]</td>
</tr>
<tr>
<td>South and South-East Asia</td>
<td>4.2 million [3.5 – 5.3 million]</td>
<td>330 000 [150 000 – 560 000]</td>
<td>0.3% [0.2% – 0.4%]</td>
<td>340 000 [230 000 – 450 000]</td>
</tr>
<tr>
<td>East Asia</td>
<td>740 000 [480 000 – 1.1 million]</td>
<td>52 000 [29 000 – 84 000]</td>
<td>0.1% [&lt;0.1% – 0.2%]</td>
<td>40 000 [24 000 – 63 000]</td>
</tr>
<tr>
<td>Latin America</td>
<td>1.7 million [1.5 – 2.1 million]</td>
<td>140 000 [88 000 – 190 000]</td>
<td>0.5% [0.4% – 0.6%]</td>
<td>63 000 [49 000 – 98 000]</td>
</tr>
<tr>
<td>Caribbean</td>
<td>230 000 [210 000 – 270 000]</td>
<td>20 000 [16 000 – 26 000]</td>
<td>1.1% [1.0% – 1.2%]</td>
<td>14 000 [11 000 – 16 000]</td>
</tr>
<tr>
<td>Eastern Europe &amp; Central Asia</td>
<td>1.5 million [1.1 – 1.9 million]</td>
<td>110 000 [87 000 – 180 000]</td>
<td>0.8% [0.6% – 1.1%]</td>
<td>58 000 [41 000 – 68 000]</td>
</tr>
<tr>
<td>Western &amp; Central Europe</td>
<td>730 000 [580 000 – 1.0 million]</td>
<td>27 000 [14000 – 49 000]</td>
<td>0.3% [0.2% – 0.4%]</td>
<td>8000 [4800 – 17 000]</td>
</tr>
<tr>
<td>North America</td>
<td>1.2 million [760 000 – 2.0 million]</td>
<td>54 000 [96000 – 130 000]</td>
<td>0.6% [0.4% – 1.0%]</td>
<td>23 000 [9100 – 55 000]</td>
</tr>
<tr>
<td>Oceania</td>
<td>74 000 [66 000 – 93 000]</td>
<td>13 000 [12 000 – 15 000]</td>
<td>0.4% [0.3% – 0.5%]</td>
<td>1000 [&lt;1000 – 1400]</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>33 million [30 – 36 million]</strong></td>
<td><strong>2.7 million [2.2 – 3.2 million]</strong></td>
<td><strong>0.8% [0.7% – 0.9%]</strong></td>
<td><strong>2.0 million [1.8 – 2.3 million]</strong></td>
</tr>
</tbody>
</table>

The ranges around the estimates in this table define the boundaries within which the actual numbers lie, based on the best available information.
Growth of the AIDS Epidemic

People With HIV/AIDS, Cumulative Regional Totals

Millions

- Highly Industrialized*
- Sub-Saharan Africa
- South and East Asia
- Latin America/Caribbean
- Eastern Europe, other**

*North America, Europe (except Eastern Europe), Japan, Australia, and New Zealand.
**Eastern Europe, Central Asia, Middle East, and North Africa.


People Living with HIV, by Region

Distribution, 2005

- Sub-Saharan Africa 63%
- North America 3%
- Western and Central Europe 2%
- Eastern Europe and Central Asia 4%
- Caribbean 1%
- Oceania <1%
- East Asia 2%
- South and South-East Asia 20%
- North Africa and Middle East 1%

Note: Total exceeds 100 percent due to rounding.

© 2006 Population Reference Bureau
...AND PLEASE
DON'T FORGET THIS
BILOGICAL
THREAT...

AIDS
AFRICA
Map of HIV Prevalence in Sub-Saharan Africa

Adults (ages 15-49) with HIV/AIDS

- 20.1% - 39.0%
- 10.1% - 20.0%
- 5.1% - 10.0%
- 1.1% - 5.0%
- 0.0% - 1.0%
- Data unavailable / not in region


© 2003 Population Reference Bureau
Lifetime risk of AIDS death for 15-year-old boys, assuming unchanged or halved risk of becoming infected with HIV, selected countries.
HIV Demographics, Africa
Composition of the Population Living with HIV, 2005

Sub-Saharan Africa

- Children: 8%
- Men: 38%
- Women: 54%

Rest of the World

- Children: 2%
- Men: 69%
- Women: 31%

© 2005 Population Reference Bureau

Percent of adults (15+) living with HIV who are female
1990–2007

Return to p. 15
Increase in Children Orphaned by AIDS

Sub-Saharan Africa
Millions of children under age 18

<table>
<thead>
<tr>
<th>Year</th>
<th>Orphans</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>0.6</td>
</tr>
<tr>
<td>1995</td>
<td>3.0</td>
</tr>
<tr>
<td>2000</td>
<td>8.5</td>
</tr>
<tr>
<td>2003</td>
<td>12.3</td>
</tr>
<tr>
<td>2010</td>
<td>18.4</td>
</tr>
</tbody>
</table>

Note: Estimate of children who lost at least one parent to an AIDS-related cause.

Children Orphaned by AIDS in Sub-Saharan Africa
Distribution of Orphans, by Country, 2005

- South Africa: 10%
- Kenya: 10%
- Tanzania: 10%
- Zimbabwe: 10%
- Zambia: 6%
- Nigeria: 8%
- Uganda: 9%
- Democratic Republic of Congo: 6%
- Malawi: 5%
- Mozambique: 4%
- Côte d’Ivoire: 4%
- Cameroon: 2%
- Rwanda: 2%
- Other: 14%

© 2006 Population Reference Bureau

Return to p. 16
AIDS’ Effect on African Agriculture

Agricultural Labor Force Lost to HIV/AIDS, 1985-2020 (Projected)

Percent

- Namibia: 26
- Botswana: 23
- Zimbabwe: 23
- Mozambique: 20
- South Africa: 20
- Kenya: 17
- Malawi: 14
- Uganda: 14
- Tanzania: 13

AIDS’ Effect on Life Expectancy in 2010

Projections for Selected Countries

Life expectancy at birth, in years

HIV/AIDS Prevention and Care Continuum

HIV Infection  Onset of AIDS  Death

Uninfected  Living  Living with AIDS  Terminally ill

Prevention: behavior change, STI management, universal precautions
Postexposure prophylaxis
Voluntary counseling and testing

Provide psychosocial support to patients and families
Support orphans and vulnerable children
Prevent and treat opportunistic infections
Prevent mother-to-child transmission

Provide home-based care
Administer antiretroviral therapy
Provide palliative care

Source: Family Health International.

© 2003 Population Reference Bureau
EAT WELL
STAY HEALTHY

GIVE CHILDREN BOILED WATER

Return to p. 21
BREASTFEED FOR HEALTHY CHILDREN

DPT
POLIO
MEASLES
BCG
YELLOW FEVER
CSM
IMMUNIZE YOUR CHILDREN

Return to p. 21
Every 22 minutes, someone somewhere around the world is killed or maimed by a landmine.

Return to p. 23
Country: Number of landmines

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of Landmines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angola</td>
<td>10-15 million</td>
</tr>
<tr>
<td>Afghanistan</td>
<td>9-10 million</td>
</tr>
<tr>
<td>Egypt</td>
<td>22 million</td>
</tr>
<tr>
<td>Cambodia</td>
<td>8-10 million</td>
</tr>
<tr>
<td>Kuwait</td>
<td>5-10 million</td>
</tr>
<tr>
<td>Latin America</td>
<td>0.3-1 million</td>
</tr>
<tr>
<td>Mozambique</td>
<td>2 million</td>
</tr>
<tr>
<td>Somalia</td>
<td>1 million</td>
</tr>
<tr>
<td>Republic of former Yugoslavia without Kosovo</td>
<td>6 million</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>3.5 million</td>
</tr>
</tbody>
</table>
International Campaign to Ban Landmines

Return to p. 23
Figure 4. Interventions to deal with malnutrition and infection. Reprinted with permission from Reference 3.
Return to p. 23
Effect of AIDS on Life Expectancy 2015-2020

Projections for Selected Countries
Life expectancy at birth, in years

<table>
<thead>
<tr>
<th>Country</th>
<th>With AIDS</th>
<th>Without AIDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesotho</td>
<td>69</td>
<td>39</td>
</tr>
<tr>
<td>Malawi</td>
<td>63</td>
<td>46</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>67</td>
<td>42</td>
</tr>
<tr>
<td>Belize</td>
<td>72</td>
<td>76</td>
</tr>
<tr>
<td>Haiti</td>
<td>58</td>
<td>65</td>
</tr>
<tr>
<td>Cambodia</td>
<td>62</td>
<td>66</td>
</tr>
</tbody>
</table>


© 2006 Population Reference Bureau
Skilled Care at Delivery and Maternal Deaths

Regional Comparisons, 1996-2004

<table>
<thead>
<tr>
<th>Region</th>
<th>Percent of births assisted by skilled attendants</th>
<th>Number of maternal deaths per 100,000 live births</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-Saharan Africa</td>
<td>42</td>
<td>940</td>
</tr>
<tr>
<td>South Asia</td>
<td>36</td>
<td>560</td>
</tr>
<tr>
<td>Middle East and North Africa</td>
<td>76</td>
<td>220</td>
</tr>
<tr>
<td>Latin America and the Caribbean</td>
<td>87</td>
<td>190</td>
</tr>
<tr>
<td>East Asia and the Pacific</td>
<td>86</td>
<td>110</td>
</tr>
<tr>
<td>Central, Eastern Europe/Baltics/CIS*</td>
<td>93</td>
<td>64</td>
</tr>
</tbody>
</table>

* Commonwealth of Independent States (former Soviet Union).

© 2006 Population Reference Bureau
Effect of AIDS on Child Mortality

Selected Countries in Sub-Saharan Africa, 2002-2005
Deaths of children under age 5 per 1,000 live births

How DDT Helped Curb an Epidemic

Three provinces in South Africa became a case study in how drug and pesticide resistance, weather, political turmoil, and HIV/AIDS can accelerate malaria. Cases rose in the mid-1980s when refugees arrived with the disease, then spiked in the late 1990s, especially after DDT use ended in 1996. Renewed DDT spraying in 2000 and new drugs helped turn the tide.

Sources: South African Medical Research Council, Cases: South Africa National Department of Health, Richard Trau, Africa Fighting Malaria.

How DDT Helped Curb an Epidemic

Causes of maternal death

- Severe bleeding (haemorrhage) 25%
- Infections 15%
- Eclampsia 12%
- Obstructed labour 8%
- Unsafe abortion 13%
- Other direct causes 8%
- Indirect causes 20%

Guinea-worm disease is characterized by the emergence of a female worm (60–100 cm long) from a blister usually, but not solely, located on the lower leg. The pain from the blister becomes so excruciating that the leg feels like it is on fire, compelling the infected person to plunge it into cold water to relieve the burning sensation. This action ruptures the blister, causing the worm to release thousands of larvae (baby worms). Larvae reach the infective stage after being ingested by tiny crustaceans, or copepods, also called water fleas.

People swallow the infected water-fleas when drinking contaminated water. This action kills the water-fleas but liberates the infective larvae, which penetrate the wall of the intestine and migrate throughout the body as they mature and reproduce. The fertilized female worms migrate under the skin tissues until they reach the lower limbs, forming a blister or swelling from which they eventually emerge to pierce the skin.

The migration and emergence of the worm may take between 10 to 14 months after infection.
Number of people receiving antiretroviral drugs in low- and middle-income countries, 2002–2007

![Graph showing number of people receiving antiretroviral drugs by region from 2002 to 2007.]

Figure 5.2 Source: Data provided by UNAIDS & WHO, 2008.
Total annual resources available for AIDS 1986–2007

Notes: [1] 1988–2000 figures are for international funds only; [2] Domestic funds are included from 2001 onwards

FIGURE 19
Number of people receiving antiretroviral drugs in low- and middle-income countries, 2002–2007

Source: Data provided by UNAIDS & WHO, 2008.
Return to p. 17
GUIDE TO MAJOR HUMAN DISEASES

Definitions

*Epidemic*—a situation in which there are many cases of a disease in a localized area

*Pandemic*—a situation in which there are many cases of a disease in many areas, an epidemic that is geographically widespread, multiple epidemics

*Disease types*: 1) infectious diseases, 2) non-infectious diseases, 3) nutritional diseases

1) Infectious Diseases

<table>
<thead>
<tr>
<th>VECTOR (spread by)</th>
<th>DISEASE NAME</th>
<th>CAUSE</th>
<th>TREATMENT/PREVENTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insects Bite</td>
<td>Malaria</td>
<td>protozoa</td>
<td>pill/ avoid bites, repellant</td>
</tr>
<tr>
<td>Mosquito</td>
<td>Yellow Fever</td>
<td>virus</td>
<td>vaccine</td>
</tr>
<tr>
<td>Dengue Fever</td>
<td>Encephalitis</td>
<td>virus</td>
<td>oral rehydration/repellant</td>
</tr>
<tr>
<td>Filaria</td>
<td>Sleep/Sickness/Chagas</td>
<td>protozoa</td>
<td>antibiotic</td>
</tr>
<tr>
<td>Fly</td>
<td>River Blindness</td>
<td>worm</td>
<td>antibiotic</td>
</tr>
<tr>
<td></td>
<td>Trachoma</td>
<td>bacteria</td>
<td>antibiotic</td>
</tr>
<tr>
<td></td>
<td>Leishmaniasis</td>
<td>worm</td>
<td>antibiotic</td>
</tr>
<tr>
<td>Flea</td>
<td>Plague (rat)</td>
<td>bacteria</td>
<td>antibiotic</td>
</tr>
<tr>
<td>Water Borne/Poor Sanitation</td>
<td>Dyentery</td>
<td>amoeba/bacteria</td>
<td>antibiotic/boil water</td>
</tr>
<tr>
<td></td>
<td>Typhoid</td>
<td>bacteria</td>
<td>vaccine</td>
</tr>
<tr>
<td></td>
<td>Cholera</td>
<td>bacteria</td>
<td>antibiotic, oral rehydration/boil water</td>
</tr>
<tr>
<td></td>
<td>Hepatitis A</td>
<td>virus</td>
<td>rest/boil water</td>
</tr>
<tr>
<td></td>
<td>Guinea Worm Disease</td>
<td>worm</td>
<td>antibiotics/let water stand</td>
</tr>
<tr>
<td></td>
<td>Schistosomiasis (snail)</td>
<td>blood fluke</td>
<td>antibiotic/avoid swimming</td>
</tr>
<tr>
<td>Dirt</td>
<td>Tetanus</td>
<td>bacterial toxin</td>
<td>sterile conditions/vaccine</td>
</tr>
<tr>
<td>Air Borne</td>
<td>TB</td>
<td>bacteria</td>
<td>antibiotic</td>
</tr>
<tr>
<td></td>
<td>Polio</td>
<td>virus</td>
<td>vaccine</td>
</tr>
<tr>
<td></td>
<td>Measles</td>
<td>virus</td>
<td>vaccine</td>
</tr>
<tr>
<td></td>
<td>Leprosy</td>
<td>bacteria</td>
<td>antibiotics</td>
</tr>
<tr>
<td>Sexual Contact/Needles/Blood</td>
<td>HIV/AIDS</td>
<td>virus</td>
<td>antibiotics/safe sex</td>
</tr>
<tr>
<td></td>
<td>Hepatitis B</td>
<td>virus</td>
<td>vaccine</td>
</tr>
</tbody>
</table>

2) Non-Infectious Diseases (lifestyle related)
   Cancer, circulatory diseases

3) Nutritional Deficiencies (lack of a specific foods in the diet)
   PEM/malnutrition (lack of calories/protein), vitamin A deficiency, iron deficiency, iodine deficiency