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## **WORLD POVERTY, HUNGER, AND DISEASE**

### **PART 2**

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Poverty, hunger, and disease have been harsh and often cruel realities from the very beginning of recorded human history. Most of humankind even today live in the shadow of the four horsemen of the apocalypse: war, famine, pestilence, and death. And we've known for more than 150 years – for certain ever since the Great Irish Famine of the 1840s – that hunger and famine engender disease that in the extreme leads to death in massive numbers, cutting life short for many of its victims. This report which addresses world hunger and disease is Part 2 of a three-part report. Part 1 covered world poverty; Part 3 speaks to causes and remedies.

### **Global Hunger**

The key facts regarding global hunger are reducible to these: 852 million persons worldwide go to bed hungry; 25,000 of them die every day; one child dies of hunger and malnutrition every five seconds. In the developing world in 2000-2002, approximately 1 of every 6 persons was undernourished<sup>1</sup> (see Table 1). In Eritrea an estimated 73 percent of the population were suffering undernourishment, followed closely by the Congo where 71 percent were undernourished, and Burundi where 68 percent were similarly afflicted.

The number of hungry persons decreased by 27 million during the early 1990s but increased at the rate of four million per year in the late 1990s. China and India were largely responsible for the significant gains achieved in the early 1990s. However, the rate of progress in China slowed appreciably in later years and at the same time in India the numbers who were undernourished actually increased by 18 million. Every day, the World Food Programme has 20 planes in the sky, 5,000 trucks on roads and 40 ships at sea delivering food aid around the world.

The problem of hunger is most severe in sub-Saharan Africa where 33 percent of the population of 620 million live in conditions of undernourishment. Countries outside sub-Saharan Africa where at least one-third of the population is malnourished include Cambodia, Armenia, Tajikistan, Haiti, North Korea, Mongolia, and Yemen. Smallholder farming

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<sup>1</sup> Undernourishment is measured on the basis of the average amount of food available per person, the extent of inequality regarding access to that food, and the minimum number of calories required for the typical person [FAO, p.14].

communities account for one-half of the world's hungry people. Twenty percent live in rural areas and are landless, another 20 percent live in urban areas, and 10 percent depend on herding, fishing or forest resources for their livelihoods. Most vulnerable of all are children under age five, women of childbearing age, mothers of babies, and persons who are sick or infirm [FAO, pp. 4, 6, 25, 34-36; WFP, pp.1, 6].

### Infant Mortality and Life Expectancy

*Infant Mortality.* Infant mortality and life expectancy are two key though crude indicators of the human toll taken by disease (see Table 2). Throughout the entire world, infant mortality has fallen from 96 deaths per 1,000 live births in 1970 to 56 deaths per 1,000 live births in 2002. In the least developed countries, the rate has fallen from 150 to 99. In high-income countries there were 5 deaths per 1,000 live births in 2002 compared to 22 per 1,000 in 1970. In low-income countries the death rate in 2002 was nearly 16 times higher than in high-income countries. For a baby born in Sierra Leone, the country with the highest infant mortality in 2002, the risk of dying in infancy was 33 times greater than for a baby born in high-income countries [HDR, pp.168-171].

*Life Expectancy.* For all humankind, life expectancy at birth has improved from 59.8 years in 1970 to 66.9 years in 2002 (see Table 2). As with infant mortality there are vast differences from place to place, especially as to income level. In high-income countries, life expectancy increased to 78.4 years in 2000-2005, an improvement of 6.8 years since 1970-1975. At the same time, life expectancy in low-income countries also improved, increasing by 10.5 years to 59.2 years in 2000-2005. Among least developed countries, life expectancy stood at 50.7 years in 2000-2005, up from 43.8 years in the early 1970s. Several countries, however, have experienced actual *declines* in life expectancy between 1970-1975 and 2000-2005: Bulgaria, Russia, Belarus, Ukraine, Armenia, Namibia, Botswana, Swaziland, Uganda, Zimbabwe, Kenya, Rwanda, Tanzania, Ivory Coast, Zambia, Malawi, Congo, Central African Republic, Mozambique, Burundi, and Sierra Leone. Life expectancy in 2000-2005 ranged from 81.6 years in Japan to 32.4 years in Zambia. In the case of Zambia, life expectancy between 1970-1975 and 2000-2005 dropped by 17.3 years [HDR, pp.168-171].

### Global Diseases

*Infectious Diseases.* Our attention in the following is drawn to infectious diseases to the exclusion of others such as multiple sclerosis, muscular dystrophy, cancer, ALS, and cardiovascular diseases in the main because 10.9 million persons died of infectious and parasitic diseases in 2002 making those diseases the third leading cause of death worldwide. The death toll from the leading cause of death around the world -- cardiovascular diseases -- was 16.7 million. Another 13.6 million died of cancer. Specifically, we focus on six infectious diseases which the World Health Organization (WHO) identifies as major killers worldwide: pneumonia, diarrhoeal diseases, HIV/AIDS, tuberculosis, malaria, and hepatitis. Upwards of 14 million persons worldwide died in 2002 from these six diseases (see Table 3) [WHO 2004, pp. 120-125].

***Pneumonia.*** Pneumococcal pneumonia worldwide strikes down roughly 3.9 million persons every year. An estimated 2 million children under age 5 die every year from acute respiratory infections, with 75 percent of those deaths occurring among children below the age of one. The elderly too are at risk of acquiring pneumonia as are others with chronic health conditions such as sick cell anemia, heart disease, and AIDS.

Pneumococcal pneumonia is caused by bacteria which invade the lungs, and when these bacteria invade the bloodstream or the tissues and fluids surrounding the brain and spinal cord -- which happens in about 30 percent of the cases -- the result is meningitis. Vaccines to prevent the onset of pneumococcal pneumonia are safe and effective. However, misdiagnosing this condition as a viral respiratory infection instead of a bacterial infection, which does happen because the two present similar clinical symptoms, and treating it with an antibiotic accelerates drug resistance. The World Health Organization estimates that an antibiotic is required in only 20 percent of all acute respiratory diseases [NIAID2001b, pp.1,3; WHO2000a, ch.4; CDC2003, p. 1; NIAID2004, p. 1; NCAI, p. 1; WHO2004a, p. 120 ].

***Diarrhoeal diseases.*** Included among these diseases are three major killers: typhoid, cholera, and dysentery. Contaminated water and food are the chief means by which these diseases are spread. In 2002, more than 1.8 million persons were killed by diarrhoeal diseases. Cholera kills one percent of infected persons in communities with well-established diarrhoeal disease control programs. Otherwise, the fatality rate can run as high as 50 percent. Three oral cholera vaccines are available and are known to be safe, effective, and immunogenic. A vaccine to prevent typhoid fever is available by injection but is not 100 percent effective.

Multi-drug resistance is a serious problem in the treatment of diarrhoeal diseases. The bacteria which causes Shigella dysentery, for example, is resistant to almost every drug available. This bacteria is highly virulent, killing both adults and children at times in a matter of days in the absence of treatment. At the moment a single drug, ciprofloxacin, is the only viable medication for treating this disease. It is just a matter of time before dysentery develops resistance, and the drug becomes ineffective. Persons infected with cholera have been responding well to treatment with antibiotics, notably tetracycline. Even so, cholera and typhoid are known to develop resistance quite easily. One strain of typhoid linked to salmonella already is resistant to third-line drugs. Typhoid is a relapsing disease which can kill up to ten percent of those who become infected [WHO2000a, ch.4; WHO2003, p.273; WHO2000d, p. 1-2; NLM/NIH, p. 1; WHO2004a, p. 120 ].

***HIV/AIDS.*** Unlike malaria, tuberculosis, and pneumonia which have devastated humankind for centuries, HIV (human immunodeficiency virus) was first identified in 1983. HIV destroys the immune system, exposing the victim to multiple opportunistic infections and certain types of cancers. AIDS (acquired immune deficiency syndrome), the disease which results from HIV, is fatal and at present there is no vaccine available. Unprotected heterosexual intercourse is the principal mode of transmission of the virus. Other modes include unprotected penetrative intercourse between men, intravenous drug injection, unsterile needles shared by drug users, and blood transfusion.

More than 20 million lives have been taken by AIDS since the start of the epidemic. The death toll in 2002 due to AIDS was 2.8 million. An estimated four million children worldwide have been infected with the virus. Approximately 5 million are newly infected every year, and as many as 46 million persons worldwide are actively infected with the virus. Most of those in low-income countries who are actively infected are unaware that they have acquired the virus. Every year, about 700,000 newborns contract the virus from their mothers either during pregnancy, labor and delivery, or breastfeeding. About 14 million children, mostly in Africa, have lost one or both parents to AIDS; by 2010 this number is projected to reach 25 million.

Hardest hit by HIV/AIDS is Africa where one in twelve is actively infested. Life expectancy at birth in Africa is 48 years; without HIV/AIDS it would have been 54 years. In the southern part of the African continent, life expectancy has been shortened by 13 years to 43. Included among the economic consequences of the HIV/AIDS epidemic are reduced GDP growth, increased incidence of poverty, wasted investment in human capital, and a long-term decline in investment and savings. There is some evidence that institutional breakdown in Africa has affected agricultural services, judiciaries, police forces, educational systems, and health services [WHO 2004a, chapter 1].

*Tuberculosis.* Tuberculosis is a bacterial disease which is transmitted by tiny particles suspended in the air and which in general affects the lungs but can trigger disease in every organ of the body. Current vaccines are relatively ineffective against adult pulmonary TB and treatment is becoming increasingly difficult because more than 50 million persons worldwide are infected with multi-drug-resistant (MDR) strains of tuberculosis. The drugs which are effective in treating resistant forms of tuberculosis are more than 100 times more expensive than the first-line drugs used in the treatment of non-resistant forms of the disease. Even so, 40-60 percent of patients with MDR-TB die with these second-line drugs which is approximately the same outcome for non MDR-TB patients who are not treated.

Upwards of 3 million persons worldwide die each year from tuberculosis. Approximately 8.8 million persons are infected every year, or one person per second. The total number of persons actively infected worldwide is estimated at two billion. In Africa the single most important factor contributing to the increase in the incidence of TB is HIV. Worldwide an estimated 10 million persons are infected with TB and HIV; the primary cause of death in these co-infected persons is TB.

MDR-TB is particularly dangerous in crowded hospitals where patients with immune-system suppression have been admitted and are being treated (as with AIDS patients), because it puts at risk the very persons who normally provide the required health care. MDR-TB develops, is transmitted, and spreads across a population beset by war, poverty, overcrowding, mass migration, and breakdown of health-care providing institutions [NIAID2001a, pp.30,32; WHO2000a, ch.4; NIAID2002b, pp. 1, 4; WHO2004b, pp. 2, 4; WHO2004a, p. 120].

***Malaria.*** Malaria is the most common and deadly parasitic disease in the world, occurring in much of the tropical world and some of the subtropical world. It is very common in sub-Saharan Africa. About 40 percent of the world's population live in places where malaria is transmitted.

Malaria is caused by four kinds of parasites. These parasites are picked up by a mosquito from the blood of an infected human, are reproduced in the gut of the mosquito, and are passed to other humans through the mosquito's salivary glands. About 1-3 percent of those who become infected with the parasite *P. falciparum* do not survive.

Estimates as to the number of African children alone who are infected every year vary from 400 million to 900 million. Estimates of the number of all persons who die as a result of malaria infection worldwide range from 1.3 million to 2.7 million. Breman supports the larger of the two estimates, and asserts that more than 75 percent are African children. He projects a doubling of the death toll over the next 20 years if intervention is not more effective. Malaria is the fourth leading cause of death among children in developing countries.

Malaria is resistant to chloroquine -- the former preferred treatment of choice. This problem is further compounded by the emergence of insecticide-resistant mosquitoes. Two other antimalarial drugs are used today: quinine and artemisinin. Both derive from plants which for centuries have been noted for their medicinal values.

An analysis of the economic toll taken by malaria in Africa over the last 35 years suggests that GDP is 32 percent lower than it otherwise would have been. In the context of the U.S. economy, this is equivalent to a GDP loss of US\$ 100 billion annually. Gallup and Sachs assert that there is a strong linkage between malaria and poverty. Specifically, controlling for tropical location, colonial history, and geographical isolation, countries in which malaria thrives had incomes in 1995 which were one-third the incomes of countries not afflicted by this disease, whether or not those countries were African. Ecological conditions which provide support to the breeding sites of the disease-carrying mosquito more so than poverty determine the intensity of malaria [Breman, p. 1; Gallup and Sachs, p.85; WHO2002, introduction; NIAID2002a, quick facts; CDC2004, pp. 1-2; MFI, FAQ's; WHO2004a, p. 120].

***Hepatitis.*** Both hepatitis B and C are transmitted by means of contaminated blood and injection drug use. Additionally, hepatitis B (HBV) is contracted through sexual intercourse and other close contact. Hepatitis C (HCV) also may be contracted through sexual contact in persons already infected with HIV. Safe and effective vaccines for children and adults are available that provide long-term protection against the development of HBV, but there is no approved treatment for acute HBV. There is no vaccine available for HCV. Both viruses kill by attacking liver cells where they trigger liver failure and other complications. However, with HCV progression to serious liver damage may take 20-30 years. Because HCV shares the same transmission routes as HIV, co-infection is common. Medical management of persons who are co-infected is complicated by immune suppression, potential drug interactions and toxicities,

other forms of liver disease and a lack of information about the safety and outcomes of various treatment modalities.

An estimated 350 million persons worldwide are infected with HBV and approximately 103 thousand die every year from HBV complications. Though HBV is 100 time more infectious than HIV, 95 percent of all infected adults recover spontaneously.

Worldwide an estimated 170 million persons are actively infected with HCV and 3-4 million are newly infected every year; 54 thousand die each year from HCV. It was not known until 1988 that HCV causes inflammation of the liver and it was 1992 before an antibody test was available. The death rate among HCV-infected persons is less than three percent. About one-half of all liver transplants in the United States are performed on patients with end-stage HCV. Reinfection does occur after transplant surgery and may lead to progressive liver disease [HF1b, p. 1; HF1a, p. 1; HF1c, pp. 1-2; WHO2000b, p.1; Sulkowski, p.204; WHO2004a, p. 120; WHO2000c, p. 1; HF1d, pp.1- 2]

Table 3 summarizes the most recently available information on the number of persons newly infected, actively infected, and killed worldwide by these six infectious diseases.

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**Table 1. Proportion of Population Undernourished by Region and Year**

	<i>1990/92</i>	<i>1995/97</i>	<i>2000/02</i>
<b>Developing World</b>	<b>20</b>	<b>18</b>	<b>17</b>
<b>Asia &amp; Pacific</b>	<b>20</b>	<b>17</b>	<b>16</b>
<b>East Asia</b>	<b>16</b>	<b>12</b>	<b>11</b>
<b>Southeast Asia</b>	<b>18</b>	<b>14</b>	<b>13</b>
<b>South Asia</b>	<b>26</b>	<b>23</b>	<b>22</b>
<b>Latin America&amp;Caribbean</b>	<b>13</b>	<b>11</b>	<b>10</b>
<b>Near East &amp; North Africa</b>	<b>8</b>	<b>10</b>	<b>10</b>
<b>Near East</b>	<b>10</b>	<b>13</b>	<b>13</b>
<b>North Africa</b>	<b>4</b>	<b>4</b>	<b>4</b>
<b>Sub-Saharan Africa</b>	<b>36</b>	<b>36</b>	<b>33</b>
<b>Central Africa</b>	<b>36</b>	<b>53</b>	<b>55</b>
<b>East Africa</b>	<b>46</b>	<b>46</b>	<b>40</b>
<b>Eritrea</b>	<b>ina</b>	<b>68 *</b>	<b>73 *</b>
<b>Southern Africa</b>	<b>48</b>	<b>45</b>	<b>40</b>
<b>Mozambique</b>	<b>66 *</b>	<b>58</b>	<b>47</b>
<b>West Africa</b>	<b>21</b>	<b>17</b>	<b>16</b>

**\*: highest incidence of undernourishment in the world.**

**Source: FAO, *The State of Food Insecurity in the World 2004*.**

**Table 2. Infant Mortality and Life Expectancy by Region and Development Status**

	<i>Infant Mortality Per 1,000 Live Births</i>		<i>Life Expectancy at Birth Years</i>	
	<i>1970</i>	<i>2002</i>	<i>1970/75</i>	<i>2000/05</i>
Entire World	96	56	59.8	66.9
All developing countries	108	61	55.5	64.7
Least developed countries	150	99	43.8	50.7
Arab States	128	48	51.9	66.4
East Asia & Pacific	84	32	60.5	69.9
Latin America & Caribbean	86	27	61.1	70.6
South Asia	129	69	49.8	63.3
Sub-Saharan Africa	139	108	45.2	46.1
Central-Eastern Europe & CIS	34	18	69.2	69.6
High Income	22	5	71.6	78.4
Middle Income	85	30	62.9	70.1
Low Income	126	80	48.7	59.2
Sierra Leone	206	165 **	35.0	34.2
Zambia	109	108	49.7	32.4 *

\*: shortest life expectancy in the world.

\*\* : highest infant mortality in the world.

Source: UNDP, *Human Development Report 2004*.

**Table 3. Estimated Number of Persons Newly Infected, Actively Infected, and Killed:  
Six Infectious Diseases**

	<i>Newly Infected per Year</i>	<i>Actively Infected</i>	<i>Deaths per Year</i>
Lower respiratory tract (chiefly pneumonia)			3.9 million <sup>a</sup> (2002)
Diarrhoeal diseases			1.8 million <sup>a</sup> (2002)
HIV/AIDS	5.0 million <sup>a</sup> (2003)	34-46 million <sup>a</sup> (2004)	2.8 million <sup>a</sup> (2002)
Tuberculosis	8.8 million <sup>b</sup> (2002)	2.0 billion <sup>e</sup> (latest estimate)	1.6 million <sup>a</sup> (2002)
			1.8 million <sup>b</sup> (2002)
			3.0 million <sup>e</sup> (latest estimate)
Malaria	400-900 million <sup>f</sup> (latest estimate: African children alone)		1.3 million <sup>a</sup> (2002)
			2.7 million <sup>f</sup> (latest estimate)
Hepatitis C	3-4 million <sup>c</sup> (latest estimate)	170 million <sup>c</sup> (latest estimate)	54 thousand <sup>a</sup> (2002)
Hepatitis B		350 million <sup>d</sup> (latest estimate)	103 thousand <sup>a</sup> (2002)
<b>TOTAL: Infectious and Parasitic Diseases</b>			<b>10.9 million<sup>a</sup></b> (2002)

Sources: <sup>a</sup> WHO, *World Health Report 2004*.

<sup>b</sup> WHO, *Tuberculosis*, Fact Sheet 104, revised March 2004.

<sup>c</sup> WHO, *Hepatitis C*, Fact Sheet 164, revised October 2000.

<sup>d</sup> WHO, *Hepatitis B*, Fact Sheet 204, revised October 2000.

<sup>e</sup> NIAID, *Tuberculosis*, March 2002.

<sup>f</sup> NIAID, *Malaria*, September 2002.

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