2 Disease Burdens and Economic Impacts

2.5 Immune Disorders, Viral, Bacterial, Microbiological, Infectious and Parasitic Diseases
66 The Impact of Infectious Diseases on the Development of Africa

A. Boutayeb

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Abstract: Despite the success of vaccination programs for polio and some childhood diseases, other diseases like HIV/AIDS, malaria, tuberculosis, acute respiratory infections and diarrheal disease are causing high mortality rates in Africa. However, mortality figures give only a partial measure of the toll asked by infectious diseases, and the global burden includes also health impact measured by disabilities, deformities, loss of productivity, care and treatment caused by a multitude of diseases like lymphatic filariasis, leishmaniasis, schistosomiasis, sleeping sickness and others. The impact of infectious diseases can be traced according to economic performance of African countries, showing that 34 out of 53 countries are classified as low-income economies. The disease burden is, however, more devastating since it affects all components of human development, including income, health and education.

The impact of infectious diseases on African countries is no longer a crisis only for the healthcare sector, but presents a challenge to all sectors. It has the potential to reverse those gains made in human development in the last few years. Consequently, beyond health issues, these diseases should and must globally be seen as a development concern, affecting education and knowledge acquisition, income and social status, productivity and economic growth and other direct and indirect components of human development such as gender equality and human rights.

For health strategies to be successful, international solidarity and public-private partnerships are needed to tackle the problems of shortage and lack of treatments, resistance and the need for new drugs, vaccines and diagnostic procedures. However, the output of international initiatives will remain limited without the national and local implication.

List of Abbreviations: AIDS, Acquired Immune Defense System; CVD, Cardio Vascular Disease; DALY, Disability Adjusted Life Years; DNDi, The Drug for Neglected Diseases Initiative; DOTS, Directly Observed Therapy Strategy; FAO, Food and Agriculture Organization; FIND, The Foundation for Innovative New Diagnostics; GAVI, Global Alliance for Vaccines and Immunization; GDI, Gender-related Development Index; GDP, Gross Domestic Product; GEM, Gender Empowerment Measure; GFATM, Global Fund to Fight AIDS, Tuberculosis and Malaria; HDI, Human Development Index; HHVI, The Human Hookworm Vaccine initiative; HIV, Human Immunodeficiency Virus; HPI, Human Poverty Index; MDG, Millennium Development Goals; MMV, The Medicines for Malaria Ventures; ND, Neglected Disease; SARS, Severe Acute Respiratory Syndrome; STD, Sexually Transmitted Disease; TB Alliance, The Global Alliance for Tuberculosis Drug Development; UNAIDS, United Nations AIDS; UNDP, United Nations Development Program; WHO, World Health Organization; YLD, Years Lived with Disability; YLL, Years of Life Lost

1 Introduction

Infectious diseases continue to be the major causes of mortality in Africa. Well known existing, emerging and re-emerging diseases like malaria, tuberculosis, HIV/AIDS, cholera, meningitis, hepatitis, schistosomiasis, lymphatic filariasis, sleeping sickness, Ebola, SARS and others are causing suffering and mortality to a wide population in developing countries in general, and in Africa in particular (WHO, 2003a).

Beyond mortality statistics, different methods can be considered to quantify the burden of disease expressed in terms of socio-economic costs such as productivity losses, care and treatment, hospitalization and handicap. In order to overcome the specific problems of each
country, the most used method is the approach that measures the global burden of disease in terms of Disability Adjusted Life Years (DALYs) which is a combination of Years of Life Lost (YLL) through premature death, and Years Lived with Disability (YLD). Thus, DALY is thought of as one lost year of healthy life (Mathers et al., 2007) (Table 66-1).

Worldwide, nations are economically classified into two groups as developed and developing countries according to their level of development. Sometimes, a third group is specified as least developed countries. Using the per capita income, the World Bank has introduced four levels of income, namely: high-income, higher-middle-income, lower-middle-income and lower income (World Bank, 2003). Considering a broader definition of development that supplement income by other components like levels of health and education, the United Nations have developed five main composite indices to measure the average achievements in basic human development (human development index (HDI)), gender-related development index (GDI), human poverty indices (HPI-1 and HPI-2) and the gender empowerment measure (GEM). HDI is the most used index giving a summary measure of human development, allowing a yearly comparison between countries around the world and indicating the relative ranking evolution in time of each country. HDI is a three dimensional composite index obtained as a mean of three indicators weighed equally: health (life expectancy at birth), standard of living (GDP per capita) and education (literacy and enrolment) (UNDP, 2006).

In this chapter, we consider the impact of infectious diseases on the development of African countries, showing that, beyond health issues, these diseases should and must globally be seen as a development concern, affecting education and knowledge acquisition, income and social status, productivity and economic growth and other direct and indirect components of human development such as gender equality and human rights.

### 2 The Burden of Infectious Diseases in Africa

According to the World Health Organization report (WHO, 2003b), it has been estimated that, in 2002, nearly 60% of the 57 million total reported deaths in the world and approximately 47% of the global burden of disease is attributable to chronic diseases and cardiovascular diseases.
(CVDs) in particular. Deaths caused by non communicable diseases dominate the mortality statistics in five out of six regions of the World Health Organization. The exception is Africa where deaths caused by HIV/AIDS, malaria, tuberculosis and other communicable diseases are predominant (Figure 66-1).

2.1 Major Infectious Diseases

With malnutrition as a common contributor, the five biggest infectious killers in Africa are acute respiratory infections, HIV/AIDS, diarrhea, malaria and tuberculosis, responsible for nearly 80% of the total infectious disease burden and claiming more than 6 million people per year. In five out of six WHO regions, the burden of non communicable disease is greater than that of communicable diseases. The exception is Africa where communicable diseases are predominant (Figure 66-1).

Despite the success of vaccination programs for polio and many childhood diseases, malaria, tuberculosis, HIV/AIDS and others are still out of control in the majority of African countries. Children remain at high risk. Indeed, in 2002, of the 57 million deaths reported worldwide, 10.5 million deaths were among children of less than 5 years of age, of which 98% were in developing countries in general and in Africa in particular (WHO, 2003a, b, 2004, 2005) (Table 66-3). Consequently, while life expectancy at birth reached 78 years for women in developed countries, it fell back to less than 46 years in sub-Saharan Africa.
### Table 66-2

Deaths by causes in WHO regions, estimates for 2002, in thousands (WHO, 2003b)

| Cause                              | Communicable diseases, maternal and perinatal conditions and nutritional deficiencies | Non communicable diseases | Injuries |
|------------------------------------|--------------------------------------------------------------------------------------|---------------------------|---------|
| WHO regions                        |                                                                                      |                           |         |
| Africa                             | 7779                                                                                  | 2252                      | 747     |
| The Americas                       | 875                                                                                   | 4543                      | 540     |
| Eastern Mediterranean              | 1746                                                                                  | 2030                      | 391     |
| Europe                             | 567                                                                                   | 8112                      | 803     |
| South-East Asia                    | 5730                                                                                  | 7423                      | 1467    |
| Western Pacific                    | 1701                                                                                  | 9000                      | 1231    |
| World                              | 18416                                                                                 | 33424                     | 5188    |
| % of total deaths                  | 32.3%                                                                                 | 58.6%                     | 9.1%    |

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This figure shows the predominance of communicable diseases in Africa by opposition to the rest of the world where non communicable diseases are prevalent.

### Table 66-3

Leading causes of deaths in children in developing countries in 2002 (WHO, 2003a)

| Condition                      | Numbers (in thousands) | % of all deaths |
|-------------------------------|------------------------|-----------------|
| Perinatal conditions          | 2375                   | 23.1%           |
| Lower Respiratory Infections  | 1856                   | 18.1%           |
| Diarrheal diseases            | 1566                   | 15.2%           |
| Malaria                       | 1098                   | 10.7%           |
| Measles                       | 551                    | 05.4%           |
| Congenital anomalies          | 386                    | 03.8%           |
| HIV/AIDS                      | 370                    | 03.6%           |
| Pertussis                     | 301                    | 02.9%           |
| Tetanos                       | 185                    | 01.8%           |
| Protein-energy malnutrition   | 138                    | 01.3%           |
| Other causes                  | 1437                   | 14.0%           |
| Total                         | 10263                  | 100%            |

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Lower respiratory infections, malaria, diarrhea, measles, AIDS and other infectious diseases are the leading causes of child mortality in developing countries and in Africa in particular. They affect life expectancy and human development of African countries in general.
2.1.1 HIV/AIDS

The number of people affected by HIV/AIDS is exponentially increasing, passing from 10 million cases in 1990 to more than 25 million cases in 1996 and reaching 42 million in 2002 (Figure 66-2). Around 75% of all cases are taking place in Africa.

Figure 66-2
HIV/AIDS cases have skyrocketed. In 12 years time, the number of cases affected by HIV/AIDS worldwide has increased more than four-fold. In 2002, about three-quarter of all cases occurred in Sub-Saharan Africa. Reproduced by kind permission of UNDP.

In 2005, 38.6 million [33.4–46.0] people were living with HIV worldwide, 4.1 million [3.4–6.2] became newly infected and 2.8 million [2.4–3.3] lost their lives to AIDS. If the present trend is maintained, by 2020 AIDS will have caused more deaths than any other disease epidemic in history. Moreover, beyond mortality figures and beside the disease considered as a public health challenge, HIV/AIDS is becoming a real problem of development. In Africa and especially in countries with high prevalence of HIV/AIDS, devastating consequences are already strikingly apparent not only on health systems and health indicators but also in terms of income and productivity, education and knowledge, human rights and gender equality (UNAIDS, 2006). Nearly 80% of the 3 million global deaths from HIV/AIDS that occurred by the end of 2002 were in sub-Saharan Africa, dramatically cutting life expectancy and leaving a legacy of millions of orphans. Seven countries had a prevalence of HIV over 20% (UN, 2004).
2.1.2 Diarrheal Disease

It is well known that diarrhea is among the leading causes of mortality and morbidity in children in developing countries generally and in Africa particularly. Using different methods and sources of information, several authors have attempted to evaluate the burden of this disease. Despite the differences existing between estimates, they all show a declining trend in mortality figures but a relatively stable morbidity. (Rohde and Northrup, 1976; Snyder and Merson, 1982; NVD, 1986; Bern et al., 1992; Murray et al., 2001; Kosek et al., 2003; WHO, 2003a) (Table 66-4).

### Table 66-4
Disease burden due to diarrhea worldwide

| Authors                      | Deaths per year | Period covered and data used in the review                        |
|------------------------------|-----------------|------------------------------------------------------------------|
| Rohde and Northrup (1976)    | 5 million       | Author’s data, 1976                                              |
| Snyder and Merson (1982)     | 4.6 million     | Review of data published between 1954 and 1979                   |
| NVD-US Institute of Medicine (1986) | 3.5 million | Based on published data and field experience                     |
| Bern et al (1992)            | 3.3 million     | Using data published between 1980 and 1990                       |
| Murray et al (2001)          | 1.4 million     | Data analysis in 2000                                            |
| Kosek et al (2003)           | 2.5 million     | Using data published between 1992 and 2000                      |
| WHO (2003a)                  | 1.9 million     | Report: Global defence against the infectious disease threat, data 2001 |

Various estimates provided by different authors who have tempted to evaluate the disease burden caused by diarrhea diseases. They all show a declining trend in mortality but morbidity remains relatively stable.

2.1.3 Malaria

The WHO statistics indicate that malaria claims more than 1 million lives a year. Beyond mortality, the disease affects more than 300 million every year with a high handicapping rate. Children, pregnant women and vulnerable people in general are the most exposed. Moreover, malnutrition and other diseases like pulmonary infections constitute favourable environment for the spread of malaria. Countries in tropical Africa bear the brunt of malaria, accounting for more than 90% of all cases occurring worldwide each year (Ruxin et al., 2005).

2.1.4 Tuberculosis

Tuberculosis is among the top ten causes of global mortality (Dye, 1999; Borgdorff et al., 2002). It has been estimated that approximately one-third of the world’s population is infected with tuberculosis bacillus, and that each year 8 million people develop tuberculosis disease and about 2 million die of the disease. Once more, the highest incidence rates are found in Africa and South-East Asia. The HIV/AIDS epidemic and multi-drug resistance have worsened the tuberculosis situation over the last two decades. Tuberculosis is a leading killer of people with
HIV, and 80% of tuberculosis patients are HIV positive in countries with high prevalence of HIV (Dye, 1999; Ruxin et al., 2005; Laxminarayan et al., 2007) (Table 66-5). However, despite the importance of weakened immunity due to HIV/AIDS, the global reductions in immunity caused by malnutrition, diabetes, co-infections, drug use, alcoholism, and the stress of poverty an migration could be as great if no greater than those caused by HIV/AIDS (Currey et al., 2007).

Table 66-5
The 22 countries the most affected by tuberculosis (Laxminarayan et al., 2007)

| Number of countries by region | Total Deaths | HIV + deaths | Excluding HIV + deaths |
|-------------------------------|--------------|--------------|------------------------|
| Africa (9 countries)          | 609986       | 444289       | 201760                 |
| Asia (9 countries)            | 987231       | 81826        | 888859                 |
| South America (3 countries)   | 74209        | 7148         | 69061                  |
| Europe (1 country)            | 34144        | 2902         | 31242                  |
| Total (22 countries)          | 1705612      | 536162       | 1205513                |

African countries are the most affected by the co-infections of HIV and tuberculosis

2.1.5 Respiratory Infections

According to WHO estimates, Respiratory infectious diseases were the first cause of mortality from infectious diseases in 2001, responsible for nearly 4 million deaths. In 2002, lower respiratory infections caused nearly 2 million deaths in children, ranking at the second leading cause. In Africa, this disease caused more than one million deaths and nearly 33 million DALYS in 2002.

2.1.6 Preventable Sexually Transmitted Diseases

Worldwide, in 1999, preventable sexually transmitted diseases (STD) caused about 350 million infections in the population aged 15–49. However, in the era of AIDS and the high level of politicisation and priority given to HIV, other sexually transmissible diseases may receive less attention. For instance, North African countries are known to have high prevalence of STD and relatively low prevalence of HIV/AIDS (Boutayeb, 2006).

Although tools of prevention have been available for decades, congenital syphilis is still endemic in many African countries. In 1999, there were some 4 million cases of syphilis among adults in sub-Saharan Africa compared to 4 million cases in south and south-east Asia and 3 million cases in Latin America and the Caribbean (Berman, 2003; Hawkes et al., 2003; Peeling and Ye, 2003; Schmid, 2003).

2.1.7 Neglected Diseases

Beyond mortality figures, the health impact of a number of infectious diseases can be measured by severe and permanent disabilities and deformities affecting approximately 1 billion people in the world and causing millions of DALYS. Africa is particularly concerned
with these diseases. Indeed, lymphatic filariasis, leishmaniasis, schistosomiasis, sleeping sickness, dengue, Chagas disease, Buruli ulcer and others are responsible for impaired childhood growth, mental retardation, blindness, amputation and diverse disability conditions (Derouich and Boutayeb, 2006; Boutayeb, 2007; See details in the chapter The Burden of Neglected Diseases in Developing Countries of this book).

3 Impact of Infectious Diseases on the Development

3.1 Sectorial Impact

3.1.1 Impact on Health Indicators

In Africa, respiratory diseases, HIV/AIDS, diarrhea, malaria, tuberculosis and other infectious diseases are directly affecting health and demographic indicators such as mortality rates, life expectancy, and sex and age distributions. In particular, millions of healthy years are amputated from African populations due to infectious diseases (Figure 66-3). Globally, in

Figure 66-3

Loss of life expectancy due to HIV/AIDS. From 2000 to 2005 Zimbabwe, Botswana, Swaziland and Lesotho have lost respectively 35, 28, 28 and 24 years in life expectancy due to HIV/AIDS. Reproduced by kind permission of UNDP
1995–2000, 38 African countries had a mean life expectancy of 47 years, representing tens of years of loss attributable to infectious diseases.

In the most affected countries by HIV/AIDS, life expectancy declined by 12.1 years during the period 1995–2000 and it is expected to decline by 29.4 years by 2010–2015. More generally, deaths and especially infant mortality are ravaging sub-Saharan Africa (Table 66-6). The impact of infectious diseases on health indicators affects individuals, households, communities and the whole nation (hospitalisation, healthcare, orphan hood). In sub-Saharan Africa, HIV/AIDS and related diseases are mobilizing more than half of all hospital beds. In some countries, 30%–50% of hospital admissions and around 50% of out-patient visits are due to malaria which is also responsible for more than 30% of hospital deaths. Many African countries have lost a large part of their healthcare workforce due to AIDS and other infectious diseases. In other countries, midwives and health workers are affected by infectious diseases (UN, 2004).

Table 66-6
Estimated and projected impact of HIV/AIDS on mortality indicators in the seven most affected countries in Africa

|                                | 1995–2000 | 2010–2015 |
|--------------------------------|-----------|-----------|
| Life expectancy at birth (years) |           |           |
| Without AIDS                   | 62.3      | 67        |
| With AIDS                      | 50.2      | 37.6      |
| Absolute difference             | 12.1      | 29.4      |
| Number of deaths (millions)     |           |           |
| Without AIDS                   | 3         | 3         |
| With AIDS                      | 5         | 10        |
| Absolute difference             | 2         | 6         |
| Infant mortality rate (per 1000) |           |           |
| Without AIDS                   | 55.4      | 40.7      |
| With AIDS                      | 66.1      | 54.6      |
| Absolute difference             | 10.2      | 13.9      |
| Child mortality rate (per 1000) |           |           |
| Without AIDS                   | 80.2      | 56.9      |
| With AIDS                      | 108.8     | 100.2     |
| Absolute difference             | 28.6      | 43.3      |

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In Africa in general and in the most affected countries in particular, HIV/AIDS is seriously affecting life expectancy, rates of mortality and child mortality. If the current trend is not reversed or at least stabilised then African countries will be exposed to a catastrophe.

3.1.2 Impact on Economic Indicators

Worldwide, about 2 billion people have inadequate or no access to life-saving treatments. More than 80% of these deprived people are living in developing countries where infectious diseases constitute serious impediments to economic development by reducing productivity,
setting aside saving possibilities and slowing economic growth in general. In many African countries, the quasi totality of public health expenditure is a consequence of infectious diseases. For instance, in tropical rural areas with limited access to preventive and curative health facilities, malaria can have devastating consequences on agriculture households by a simple episode that coincides with a plantation or harvest season. It is estimated that malaria costs Africa more than US$12 billion a year, slowing its economic growth by 1.3% annually (Bartram et al., 2005). Contrary to the majority of diseases, HIV/AIDS kills and disables adults in the best productive part of their lives, affecting business, investment, industry and agricultural sustainability. African agriculture labour force is particularly affected (Figure 66-4).

Figure 66-4
Reduction in African agriculture labour force due to HIV/AIDS, as estimated in 2000 and projected for 2020 (UNAIDS, 2006). If the present trend is maintained, by 2020, HIV/AIDS will have caused more than a 25% reduction in agriculture labour force in some African countries. Reproduced by kind permission of UNAIDS

Sleeping sickness is having devastating consequences on the development in Africa. It causes over 3 million livestock deaths each year and an annual loss of US$4.5 billion in agriculture. Similarly, gains following lymphatic filariasis elimination are expected to approach US$4 billion per year. More globally, infectious diseases are reducing families’ income and slowing economic growth as indicated by the recent report released by the World Bank on tuberculosis control, showing that besides deaths, tuberculosis costs more than US$3.3 billion annually in lost productivity though important economic benefit is at hand (Laxminarayan et al., 2007) (Table 66-7).

At the moment, it is difficult to estimate precisely the real economic impact that infectious diseases are having on the whole African continent. However, many studies have attempted to evaluate the disease burden case by case or country by country. In the case of HIV/AIDS, the cost was estimated to be between 11.7 and 35.1% of the GNP in Africa
3.1.3 Impact on Education

As stressed in the Millennium Development Goals, education is essential for human development and needs to be enhanced especially in sub-Saharan African countries. Unfortunately, malaria, tuberculosis, HIV/AIDS and infectious diseases in general, are reversing the trend towards the achievement of universal primary education in most African countries. In Africa, less than 65% of children are enrolled in primary school and thousands of enrolled children will prematurely leave school under the pressure of infectious diseases, including orphans, disabled, impoverished and those who withdraw to look after ill members of their families (UNICEF, 2005; UNAIDS, 2006; UNESCO, 2007) (Table 66-8). During the period 1999–2004, orphaned children represented 12.3% of all children under age 18 in sub-Saharan Africa and the percentage of child labour reached 41% in West and Central Africa (UNICEF, 2005). More globally, these diseases are seen to have a four-fold impact on education. They affect the cognitive ability of children, the capacity of teachers, the upbringing of families and the efficiency of staff and managers. For instance, HIV prevalence among South African

| Table 66-7 |
| Costs and Economic Benefit of TB Control Strategies in Sub-Saharan African countries, in billions of dollars (2006–2015) (Laxminarayan et al., 2007) |

| Sustained DOTS (relative to no DOTS) | Costs | Benefits | Ratio |
|-------------------------------------|-------|----------|-------|
| Africa                              | 12.24 | 129.44 [112.81–146.07] | 11 [9–12] |
| Africa High HIV+                     | 9.45  | 97.59 [85.83–109.35]   | 10 [9–12] |
| Africa Low HIV+                      | 2.79  | 31.85 [26.89–36.80]    | 11 [10–13] |
| High Burden African countries        | 7.70  | 81.06 [71.34–90.77]    | 11 [9–12] |

African countries can make important economic benefits by controlling TB through a sustained DOTS strategy. The ratio between benefit and cost can be greater than 10 (Macroeconomics, 2001). Other figures were given by different organisms like the World Health Organization (WHO, 2003b), The European Parliament (2005), The World Bank (World Bank, 2003), and UNAIDS (UNAIDS, 2006).

| Table 66-8 |
| Impact of orphanhood on school attendance among 10–14 years-olds (%) (UNAIDS, 2006) |

| Percentage in school | West: 9 countries | Central: 6 countries | Eastern: 9 countries | Southern: 10 countries | All: 34 countries |
|----------------------|-------------------|----------------------|----------------------|------------------------|-----------------|
| Non-orphan           | 67                | 75                   | 70                   | 88                     | 74              |
| Orphan               | 58                | 69                   | 54                   | 84                     | 69              |
| Double orphan        | 57                | 58                   | 49                   | 80                     | 64              |
| Ratio double versus non orphan | .86    | .94                  | .72                  | .90                    | .87             |

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In African countries, orphan children are more likely to miss school than others
teachers reaches 21% among those aged 25–34 and 13% among those aged 35–44, whereas in the Zambian school system, over 60% of teacher absence is due to HIV/AIDS (illness, care for ill family members, family funeral, etc.) (UNAIDS, 2006).

Malaria is the leading cause of mortality in the under-five African children. Consequently, it affects the education capacity of African countries. Similarly and on top of high mortality figures, with a median of 3.2 episodes per child-year, diarrhea is highly affecting school attendance.

3.2 Global Impact on Economic and Human Development

As indicated in the previous sections, infectious diseases are globally affecting economic and human development of African countries. Malaria is responsible for 10% of Africa’s disease burden and the current GDP is thought to be 32% lower than it would have been without malaria. Consequently, in Africa, malaria is seen both as a disease of poverty and a cause of poverty. The devastating impact of HIV/AIDS is recognised in the majority of national human development reports as stressed in the South Africa human development report 2003 (South Africa, 2003), the Zimbabwe human development report 2003 (Zimbabwe, 2003) and the Malawi human development report 2005 (Malawi, 2005). These reports give details of the impact of HIV and AIDS on household welfare, orphaned children, the extended family, educational and health sectors, agricultural production, business and public service delivery. They also stress that HIV/AIDS and its far-reaching consequences mean that the disease is no longer a crisis only for the healthcare sector, but presents a challenge to all sectors. It has the potential to reverse those gains made in human development in the last few years.

Economically, 34 African countries belong to the lower-income group, 12 are lower-middle-income countries, only eight countries are classified as higher-middle-income and no African country has reached the high-income level.

Sadly and more interestingly, it can be seen from the UNDP report 2006 (UNDP, 2006) that infectious diseases are affecting all components of human development (HD) in African countries. Indeed, no African country belongs to the “High HD” group, almost all of the “Low HD” countries at the bottom of the index table are in sub-Saharan Africa, and the remaining African countries occupy uncomfortable places among the “Medium HD” group.

Moreover, in 15 years (1990–2006), the most affected African countries by infectious diseases in general and by HIV/AIDS in particular have lost tens of places in the human development ranking.

In 2001, the Commission on Macroeconomics and Health provided empirical evidence on how investing in health can achieve economic development and poverty reduction. It was estimated that eight million lives per year could be saved by essential interventions against infectious diseases and nutritional deficiencies by 2010, resulting in economic benefits adding up to more than US$360 per year by 2015. In the same spirit, the United Nations (UN) Millennium Summit adopted in 2001 the Millennium Development Goals (MDGs) by fixing eight goals to be reached in 2015. Preventing the spread of HIV/AIDS, tuberculosis, malaria, and other infectious diseases is one of the goals. However, mid-way, most African countries, have made little (if any) headway in preventing and controlling infectious diseases like HIV/AIDS, malaria, tuberculosis, diarrhea, respiratory disease and a multitude of the so-called neglected diseases. Opposite to that, wars and conflicts are financed at the expenses of disease control as it can be sadly noticed from the amount of US$7 billion that African governments dedicated to military spending in 1999 (Mashelkar, 2005).
4 Conclusions

In African nations, millions of people live with less than $1 a day and on fragile and often remote rural ecosystems, most of them lack access to basic health services and safe drinking water. Moreover, many countries, being heavily indebted, affect less than 1% of the national global budget to health, and few governments are putting science, technology and innovation at the centre of their strategies.

Considering the treatment cost of communicable and chronic diseases, and the level of poverty, the most affected countries are unable to cope with the burden of disease. For health strategies to be successful, international solidarity and public-private partnerships are needed to tackle the problems of shortage and lack of treatments, resistance and the need for new drugs, vaccines and diagnostic procedures. In this direction, several programmes have already been launched such as the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFFATM), Global Alliance for Vaccines and Immunization (GAVI), The medicines for Malaria Ventures (MMV), the Global Alliance for TB Drug Development (TB Alliance), The Human Hookworm Vaccine initiative (HHVI), the Foundation for Innovative New Diagnostics (FIND), the Drug for Neglected Diseases Initiative (DNDi), Stop TB, Roll back Malaria, etc. However, this global strategy is insufficient without the national and local implication. Health decision makers, non governmental organizations (NGOs), research institutions, community groups and individuals must join their efforts in order to attenuate the incidences of specific diseases, control the spread of epidemics and development of complications, and optimise the health management of human and material resources.

Stressing that treatment has been the most neglected element in developing countries where almost 6 million people will die from AIDS in the near future if they do not receive treatment, the WHO report 2004 calls for a comprehensive HIV/AIDS strategy that links prevention, treatment, care and long-term support. The objective fixed by WHO and its partners to provide 3 million people in developing countries with antiretroviral therapy by the end of 2005 was far to be reached, suggesting that more effort and efficient measures are needed. It is also hoped that combined efforts between donor nations and affected countries will provide the US$2–3 billion per year required to scale up the response against malaria in endemic areas. Similarly, although 16 million patients have been treated so far with the WHO-recommended directly observed therapy strategy (DOTS), yet more than half of those affected by tuberculosis still do not have access to this treatment, especially those living in the Nine African countries the most affected by tuberculosis. However, an indisputable economic benefit is predicted from a sustained DOTS and global plan strategy as indicated by the World Bank report (Laxminarayan et al., 2007). A recent cost-benefit analysis by WHO showed that achieving the global MDG target in water and sanitation would bring substantial economic gain in both health and other benefits (consequences of reduction in diarrheal episodes): each $1 invested would yield an economic return between $3 and $34 depending on region. The health-related costs avoided would reach $7.3 billion per year, and the annual value of adult working days gained as a result of less illness would be almost $750 million.

Last but not least, tens of thousands of deaths can be avoided in Africa, and billions of dollars saved by reducing the impact of respiratory diseases and the so-called neglected diseases such as schistosomiasis, intestinal helminth infections, trachoma, dengue and others.

Meanwhile, by the dawn of the third millennium, a Japanese woman can expect to receive, on average, care and medications worth about US$550 per year and much more if needed. Whereas, a woman in the least developed African countries can expect, on average, medicines
worth about US$3 per year. Consequently, a woman in sub-Saharan Africa is 100 times more likely to die in pregnancy or childbirth than is a woman in Western Europe.

**Summary Points**

- Infectious diseases are causing about 15 million deaths annually with more than 80% in Africa
- Low-income economies is the group of countries where the annual per capita income is less than 600 dollars
- Tuberculosis is the second leading infectious disease, causing about 2 million deaths every year
- Malaria is responsible for one million deaths annually almost exclusively happening in Africa
- HIV/AIDS, appeared about 25 years ago, this disease has become a real development problem, causing about 3 million deaths annually, responsible for more than 7% of the global disease burden (DALYs)
- Diarrheal disease is the third leading cause of child mortality, killing about 1.5 million children every year
- Respiratory Diseases constitute the second killer of children with nearly two million deaths annually
- Neglected Diseases is the name given to a multitude of diseases, including lymphatic filariasis, leishmaniasis, schistosomiasis, sleeping sickness, dengue, Chagas disease, Buruli, ulcer, trachoma and others
- Infectious diseases are reducing life expectancy in many African countries. For instance, the reduction due HIV/AIDS is between 25 and 35 years in Botswana, Swaziland and Zimbabwe
- The economic cost of HIV/AIDS is estimated to be between 11.7 and 35.1% of the GNP in Africa
- Sleeping sickness is having devastating consequences on the development in Africa. It causes over 3 million livestock deaths each year and an annual loss of US$4.5 billion in agriculture
- Malaria costs Africa more than US$12 billion annually

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