

India-Africa Partnership in Health Care Accomplishments and Prospects

T C James | Prativa Shaw | Payel Chatterjee | Deepti Bhatia



RIS
Research and Information System
for Developing Countries

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Foreword

Ambassador Shyam Saran
Chairman, RIS



The health sector assumes special importance in India-Africa development cooperation. It is the major component of the broad-ranging collaborative effort envisaged under the rubric of India-Africa cooperation in social development and capacity building. India is playing a crucial role in extending healthcare cooperation to the African region to fight the scourge of fatal diseases like HIV/AIDS, malaria, TB, and pandemics.

Apart from the traditional trade and investment route, India has taken some major initiatives in the health care sector in Africa through the Pan-Africa e-Network Project (PAENP). Medical practitioners at the patient end locations in Africa can consult on-line with Indian medical specialists in various disciplines and specialties selected by African Union for its Member States. India's is the third largest pharmaceutical formulation supplier to Africa.

As both Indian and African economies are poised to grow rapidly in the coming decades, healthcare expenditure per capita would also go up considerably, demanding more healthcare services than at present. The crux of Sustainable Development Goal 3 and Agenda 2063 is to ensure good health and wellness for all citizens. India by sharing these concerns and its contemporary experience for meeting health care needs in a developing country context can fruitfully extend cooperation to Africa in the achievement of these goals.

The present *Report on India-Africa Partnership in Health Care: Accomplishments and Prospects* brought out by RIS is a significant contribution for analyzing the issues involved in and chalking out the way forward for promoting health care cooperation between India and Africa. I am certain it will be a valuable reference for policy makers and practitioners.

A handwritten signature in black ink, reading "Shyam Saran". The signature is fluid and cursive.

Shyam Saran

New Delhi
17 October 2015

Preface

Prof. Sachin Chaturvedi

Director General, RIS



India-Africa development cooperation has consolidated around the theory of development compact that includes elements like trade and investment, technology, capacity building, lines of credit and concessional finance. The health sector over the years has become a vital component of the process of promoting India-Africa partnership across all the five modalities mentioned above. This is largely within the 'Mission Approach' followed by India as part of its South-South Cooperation. India-Africa engagement in health sector has been growing at a rapid pace in areas like export of high quality low-priced Indian pharmaceuticals, setting up of manufacturing units, creating healthcare infrastructure facilities within Africa, medical tourism, telemedicine, capacity building, traditional medicine, etc.

India-Africa development cooperation in healthcare sector assumes added importance in view of the Sustainable Development Goal 3 that calls for ensuring healthy lives and promoting well-being for all in age-groups. India's vast experience in tackling similar issues can be replicated significantly in the African region. India can also be a more effective partner for supply of quality medicines at concessional rates for fighting diseases like HIV/AIDS, TB, malaria, etc.

Over the years RIS has been engaged in providing policy research inputs for promotion of India-Africa cooperation in various sectors, including healthcare. The present study by Prof. T.C. James, Prativa Shaw, Payal Chatterjee and Deepti Bhatia of RIS is being brought out keeping in view the upcoming India-Africa Forum Summit (IAFS, New Delhi, 2015). It covers areas like status of health sector in Africa, disease burden, international cooperation in the health sector in Africa, Indian partnership and its impact, role of India in improving access to healthcare, and opportunities for development cooperation between India and Africa. We sincerely hope that it would be found useful by all the stakeholders across the board.

A handwritten signature in black ink, appearing to read 'Sachin Chaturvedi', with a long horizontal flourish underneath.

Sachin Chaturvedi

New Delhi

17 October 2015

I. Introduction

The decades immediately following the end of Second World War, saw major political changes in Africa and Asia with countries gaining independence from colonial regimes and establishing nation states. Most of the newly independent countries opted for a socialist pattern of society and economy. However, since the 1990s there have been major changes in the economic policies in that the countries shifted from high reliance on public sector for bringing improvements in economy towards economic liberalism encouraging private entrepreneurships. The development cooperation approaches also changed accordingly from fully state funded projects to state facilitated cooperation programmes involving private players. India-Africa interactions have remained at the core in terms of a framework of ideas and services; however, these adopt a multi-pronged approach that involves economic, political, even security interests and developmental needs of both sides.

It is interesting to reflect how these new developments have translated into certain strategic interests that are shaping Indian development cooperation policy towards Africa. On the one hand, Africa has emerged as an important market for Indian goods and services and, on the other hand, as a vital element in India's quest for energy security. Africa has large land and mineral resources with vast tracts of unutilised arable land. India has large well educated population which looks forward to gainful economic and service activities. The substantial growth of Indian service sector also places it in a position to have mutually beneficial development cooperation activities with Africa which has less population but remains in need of large service sector.

In the decades following India's independence, the principle of South-South cooperation, particularly in the context of the non-aligned movement, has been at the forefront of India's foreign policy towards Africa. Now, India and Africa are prepared more than ever to re-establish economic and political relationships to promote their mutual interests. Furthermore, India's recent experience in reducing its aid dependency while moving in the direction of becoming one of the leading emerging economies in the world has played a central role in its foreign policy towards and partnership with Africa. The Government of India attaches great importance to economic relations as the basis of renewed India-Africa engagement.

Since the 1990s, there have also been major national and international efforts and programmes to improve the health status of populations in developing and least developed countries. Africa with about 11 per cent and India with approximately 17.6 per cent of the world population are the two major focus areas of such programmes as general improvement in public health in these two regions will bring in major rewards in global productivity. The focussed efforts towards achievement of the Millennium Development Goals (MDGs), of which health related goals formed important areas, have yielded

significant results in both Africa and India. As presented in the following sections, the Infant Mortality Rates (IMRs), Maternal Mortality Rates (MMRs) and incidence of deaths due to HIV/AIDS, Malaria and Tuberculosis have reduced considerably in both the regions. The noteworthy success of the MDGs have now prompted the world community to set new targets in health and other social indicators to be achieved 15 years hence in the form of Sustainable Development Goals (SDGs). Although only one Goal is specifically on health, many other goals have serious implications for health sector.

India, however, along with committing itself to the SDGs, has set its own agenda in health care. It has announced “the attainment of the highest possible level of good health and well-being, through a preventive and promotive health care orientation in all developmental policies, and universal access to good quality health care services without any one having to face financial hardship as a consequence” as its goal in the Draft National Health Policy 2015.

The key policy principles for achieving this goal are equity, universality, patient-centred quality care, inclusive partnerships, pluralism, subsidiarity, accountability, professionalism, integrity & ethics, continuous adaptation and affordability. Some of the major programmes envisaged are for reduction of maternal mortality, achievement of single digit neonatal mortality and stillbirth rates through a careful community based intervention, universal immunisation, population stabilization, women’s health and gender mainstreaming, integrated disease surveillance programme, control of tuberculosis, HIV/AIDS, leprosy elimination, vector borne disease control, effective prevention and therapy of non-communicable diseases, better mental care, and disaster preparedness.

Realising the potential of Indian traditional systems of medicine in health care is also one of the major programmes .

At the same time, Africa has also, after much internal discussion set its health agenda referred to as Agenda 2063 . Healthy and well-nourished citizens with long life spans are source of the goals of this agenda. It clearly lays down that by 2063, “every citizen will have full access to affordable and quality health care services” and

- Africa would have rid itself of all the neglected tropical diseases; put in place systems for significantly reduced non-communicable and lifestyle changes related diseases and reduced to zero deaths from HIV/AIDS, Malaria and Tuberculosis.
- The African population will be a healthy and well nourished, enjoying a life expectancy of above 75 years.
- All barriers to access to quality health for women and girls would be non-existent.

The Indian and African health agenda are reflective of the importance that the parties are giving to achievement of universal health care in the most feasible time frame. These new goals have to be taken into consideration in the formulation of development cooperation activities in the coming decades.

In this study, our focus is on India-Africa development cooperation in the health sector, including in drugs and pharmaceutical products, which yields social and economic dividends. While, taking

measures to improve its own health care system, enhancement of health care in Africa has been one of the goals of India's development cooperation with African countries.

The section II of the study deals with the status of health sector in Africa. Section III talks about the disease burden. Section IV is on international cooperation in the health sector in Africa. Section V focuses on the Indian partnership and its impact. In section VI the role of India's trade with Africa in improving access to healthcare is discussed while Section VII outlines the way forward for India-Africa cooperation. The last section comes out with the recommendations and possible action plans.

II. Status of Health Sector in Africa

Africa consists of 11 percent of world population but has a share of 24 per cent in the disease burden. As shown in the Table 1 below, Africa faces major challenges in the health sector particularly in the form of health workforce including shortage of doctors, nurses, pathologists and all classes of healthcare professional. For the period of 2007-13, density of physician and nursing personnel was 2.7 and 12.4 respectively, which is quite low compared to the world. Also, there is a huge shortage of all forms of healthcare infrastructure. The density of psychiatric beds stood at 3.4 in 2014 which is very low as compared to 22.9 globally.

Africa's average expenditure on health was 4.82 per cent of GDP in 1995 which improved to 6.03 per cent of GDP in 2013, but considering the disease burden and low GDP it is insufficient to tackle the health care needs. Sierra Leone, Lesotho, Rwanda and Liberia are spending more than 10 per cent of the GDP in health sector, which is higher than the world's average of 9.9 per cent in 2013. As per data for that year, South Sudan, Eritrea, Equatorial Guinea, Democratic Republic of Congo, Chad, Mauritania, Angola, Gabon, Nigeria, and Central African Republic are the countries who are spending less than 4 per cent of GDP in health sector. Out of 54 countries, 42 are having higher out-of-pocket health expenditure than the remaining world in 2013. Population of the 29 countries of Eritrea, Libya, Mali, Djibouti, Egypt, Algeria, Chad, Sudan, Congo, Rep., Nigeria, Cameroon, South Sudan, Ghana, Mauritius, Mauritania, Ethiopia, Central African Republic, Gabon, Togo, Sao Tome and Principe, Niger, Burkina Faso and Madagascar met more than 80 per cent of their health expenditure from their own pockets, in 2013. (More details are provided in Table A1-A2 in Annexure).

Table 1: Current Status of Health Workforce, Health Infrastructure and Technology of Africa and World

Parameter	Indicator	Year	Africa*	World
Density of Health Workforce(per 10,000 population)	Physicians	2007-13	2.7	13.9
	Nursing& Midwifery Personnel		12.4	28.6
	Density Personnel		0.5	2.8
	Pharmaceutical Personnel		0.8	4.5
	Psychiatrists		<0.05	0.2
Density of Health Infrastructure and Technologies	Hospitals	2013	0.8	
	Psychiatric Beds	2014	3.4	22.9
	Computed Tomography	2013	0.4	
	Radiotherapy	2013	0.1	1.8
	Mammography	2013	7.4	

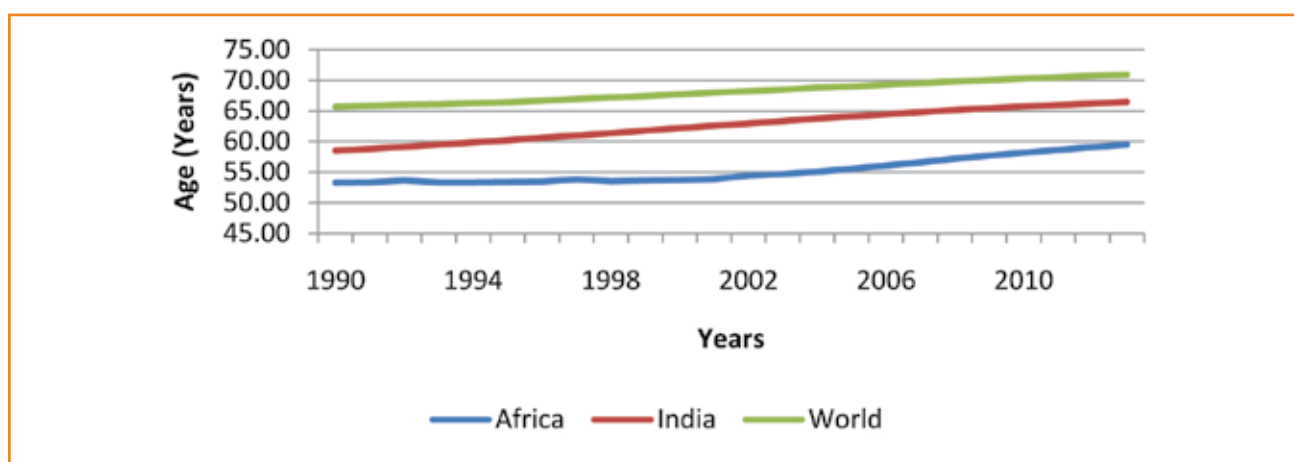
* Since data for all 54 countries are not available, WHO African Region has been taken which excludes Djibouti, Egypt, Libya, Morocco, Somalia, Sudan and Tunisia.

Source: World Health Statistics 2015.

Life Expectancy

For a child born in the African region, healthy life expectancy is 59 in 2013 which is very low compared to the world which is at 71. Figure 1 depicts the life expectancy at birth in Africa, India and world. Africa is expected to have a life expectancy of 70 years by 2060. Sierra Leone, Botswana, Swaziland, Lesotho and Democratic Republic of Congo have the lowest life expectancy in Africa in 2013. Libya, Cope Verde, Mauritius, Seychelles, Tunisia, Egypt, and Algeria have a higher life expectancy than India (Country-wise analysis is given in Table A3 of the Annexure).

Figure 1: Life Expectancy at Birth, Total (years)

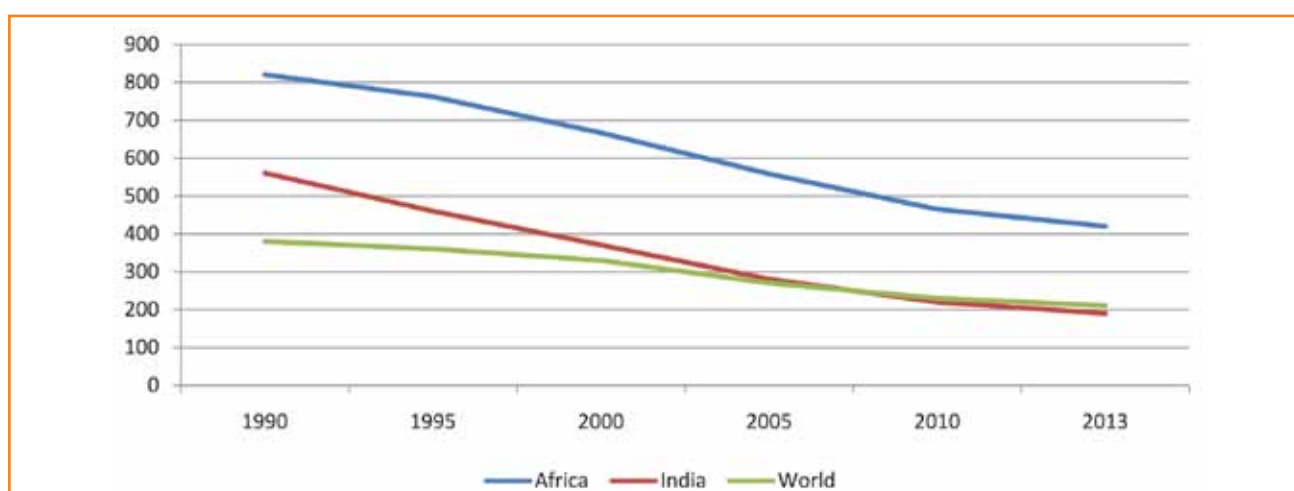


Source: WDI Database.

Maternal Mortality

As the current statistics show the Maternal Mortality Rate (MMR) per 100,000 live births was 821 in 1990. This has significantly improved to 420 in 2013. Among the top highest 20 countries with maternal mortality ratio in the world, 19 are in Africa. In 2013, the maternal mortality rate in Sierra Leone stood at an alarming rate of 1100. Angola, Liberia and Rwanda have shown noteworthy improvement, from 1100, 1100, and 1000 in the year 2000 to 460, 640 and 320 in 2013, respectively (Detailed country wise statistics is given in Table A4 of the Annexure).

Figure 2: Maternal Mortality Ratio (per 100,000 live births)

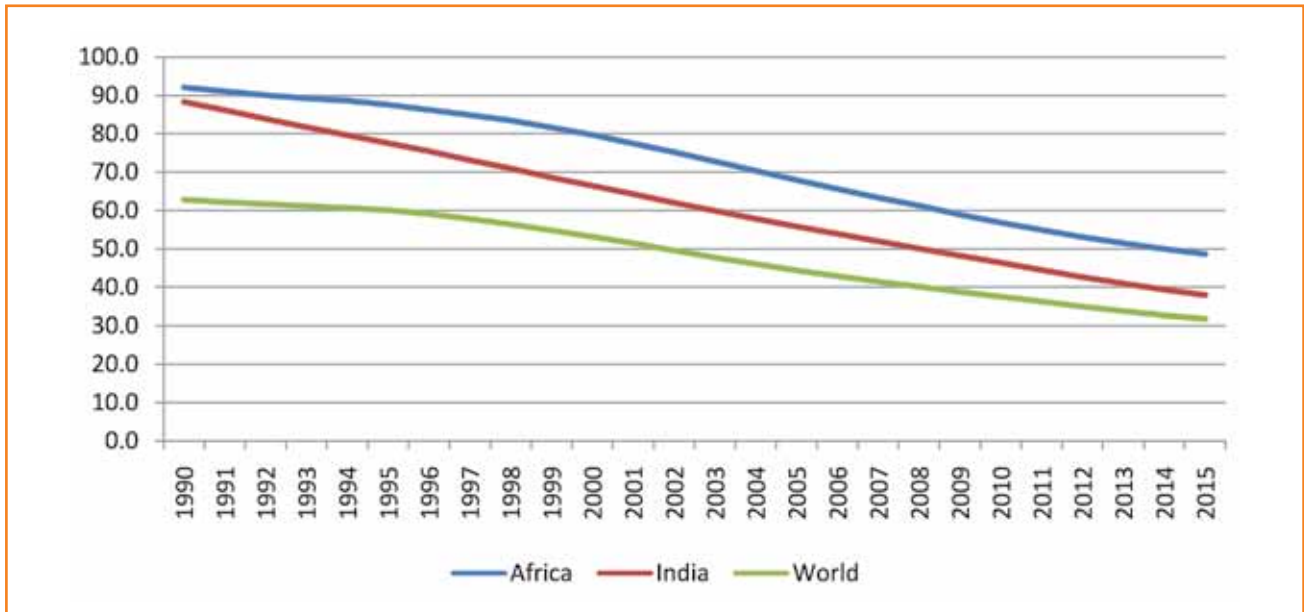


Source: WDI Database.

Infant Mortality Rate (IMR)

Angola, Central African Republic, Sierra Leone, Somalia, Chad, Congo, Dem. Rep, Mal, Nigeria, Lesotho, Equatorial Guinea, Cote d'Ivoire, Mauritania, Benin, Guinea, Guinea-Bissau, Burkina Faso, South Sudan, Cameroon, Mozambique, Niger, Comoros, Burundi, Djibouti, Liberia and Togo have a very high infant mortality rate ranging from 98.8 to 53.6 per 1000 live births in 2014. Libya, Seychelles, Mauritius, Tunisia, Egypt, Cape Verde, Algeria and Morocco have a better infant mortality rate than the world in 2014 (for more details see Table A5 in Annexure).

Figure3: Infant Mortality Rate (per 1,000 live births)



Source: WDI Database.

Neonatal Mortality Rate (NMR)

Africa has the highest neonatal death rate which is very evident from the statistics that Africa's neonatal mortality rate per 1000 live birth in 1990 was 44.7 which has reduced to 30.5 in 2013, but it needs to reach the global standard which is 20 in 2013.

III. Disease Burden

Major diseases that hamper the lives of African people, on the one hand, are the communicable diseases like HIV/AIDS, Malaria, Tuberculosis, Ebola and, on the other hand, are the non-communicable ones such as hypertension, stroke, heart failure, chronic respiratory diseases, cancer, etc. Apart from communicable and non-communicable diseases there are some neglected tropical diseases (NTD) such as guinea-worm, Buruli ulcer and human African trypanosomiasis which are found mainly on the African continent. Among 47 countries of WHO Africa region are endemic for at least one NTD and 36 of them are co-endemic for at least five of these diseases.

Though progress towards eradication has been impressive, HIV/AIDS, Malaria and Tuberculosis continue to be major scourges in Africa. Deaths linked to malaria and HIV/AIDS have fallen by 33 per cent and 30 per cent, respectively since 2000-2004, with TB deaths declining by more than a third since 1990. Diabetes cases as of now are 12.1 million (with possibility of many undiagnosed cases) and expected to rise to 24 million by 2030.

Considering the gigantic difficulties confronting African people in their healthcare systems, several major reforms will be needed continent-wide to ensure their viability in the long term, shifting the focus of healthcare delivery from curing to preventive care and keeping people healthy. To achieve these targets and goals Africa has set their Agenda 2063 which ensure every citizen would have full access to affordable and quality health care services. This can be achieved by giving local communities more control over healthcare resources, improving access to healthcare via mobile technologies, tightening controls over medicines, medical devices, and improving their distribution, reducing reliance on international aid organisations to foster development of more dependable local supplies and extending universal health insurance coverage to the poorest Africans. Technologies such as telemedicine and that related to mobile-phone have become the dominant means of delivering healthcare advice and treatment in future.

Most Infectious Communicable Diseases in Africa

HIV/AIDS

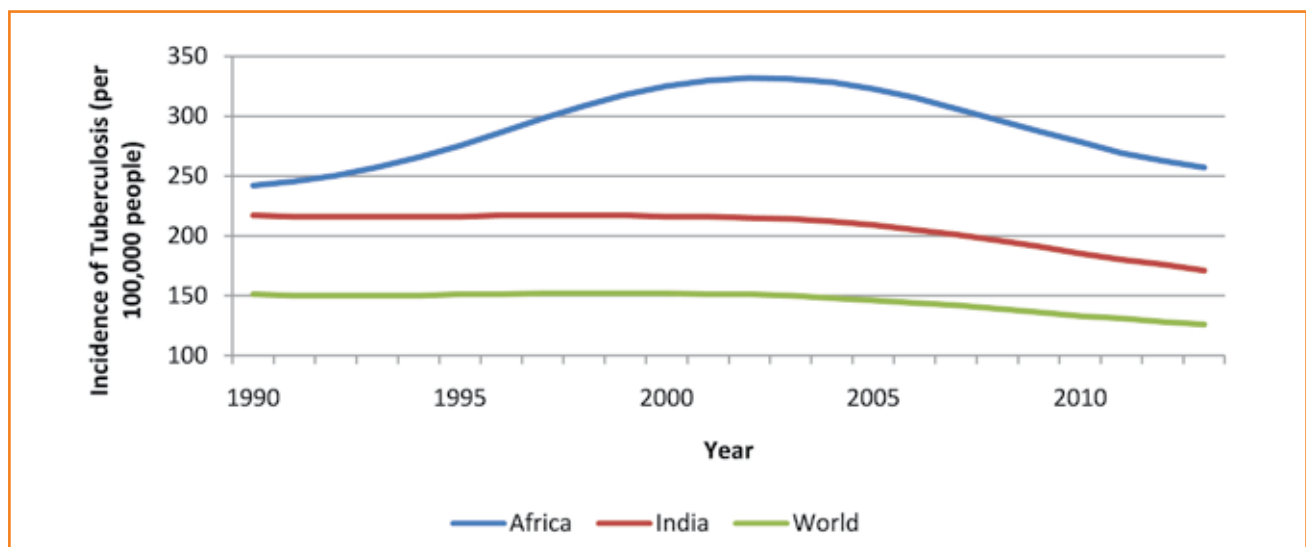
Though more than 70 per cent of the African people were affected by HIV/AIDS in 2012, there are empowering signs that the HIV/AIDS scourge is backing off. HIV prevalence rates are much higher in women than men, with the largest differences being seen in the age group 15–24 years. Prevalence tends to be higher in urban than in rural areas, although this difference is less in southern Africa. HIV is still spreading in the region with 1.6 million new infections reported in 2012. Young people aged 15–24 years accounted for almost half (42 per cent) of new infections reported worldwide and almost 80 per cent of these were living in Sub-Saharan Africa. Since 2001, population living with HIV has risen by 12 per cent in the region. Until recently, Ghana had a high level of mother-to-child HIV transmission. In 2010,

the country committed to scaling up prevention of mother-to-child transmission (PMTCT), setting as its goal “to ensure a generation free of AIDS and to eliminate mother-to-child transmission of HIV by 2015”. Possible improvements depend on the usage of standardised and simplified treatment protocols and decentralised service delivery models to deliver treatment to large number of HIV positive adults and children. The uptake of antiretroviral therapy (ART) has also improved substantially, with 63 per cent of pregnant women living with HIV receiving ART in 2012 compared with 34 per cent in 2009. This has led to a decline of 37 per cent in new HIV infections among children between 2009 and 2012.

Tuberculosis

Tuberculosis is a major problem worldwide with 1.3 million new cases recorded in 2012, of which 27 per cent occurred in the African Region. Although the prevalence of tuberculosis was high in 2012 (303 per 100,000 population), this is a significant improvement over 1990 when it was 404 per 100,000). The number of people with multidrug-resistant tuberculosis being treated has increased fivefold since 2008; only about 57 per cent of people with this type of tuberculosis were receiving treatment at the end of 2012. Measures to control intervention of TB are expansion of the basic package that underpins the Stop TB Strategy of Directly Observed Treatment Short-Course (DOTS), resulting in an increased number of countries achieving tuberculosis treatment success rates of 85 per cent, implementation of WHO paediatric tuberculosis guidelines, leading to improved detection and notification of all forms of tuberculosis in children, improved diagnostics, resulting improved case detection, and detection and treatment of multidrug-resistant and extensively drug-resistant tuberculosis.

Figure 4: Trend of Tuberculosis in Africa, India & World from 1990-2013



Source: WDI Database

Malaria

Malaria remains a major global health problem and the WHO African Region is one of the severely affected regions in the world. In 2012, there was an estimated 207 million cases of malaria worldwide, 80 per cent of them in the African region. The malaria mortality rate has decreased by over 50 per cent in children in the past 12 years. This reduction is projected to reach 68 per cent by 2015, due to improved availability and use of insecticide-treated nets, diagnosis-based treatment with artemisinin-based combination therapy, engagement of communities in malaria control, and strengthening capacity

in vector control for malaria. (See country-wise statistics on HIV, Tuberculosis and Malaria in Table A6-A8 in Annexure)

Ebola Virus

Ebola virus is raging through western Africa, causing the most severe, complex and devastating outbreak seen in the four decades since this virus emerged first in 1976 in Yambuku, a village along the River Ebola in The Democratic Republic of Congo. The destruction it has wreaked can be measured not only in the mounting toll of human lives lost, but in economies stalled and communities paralysed by fear and panic. Progress made by countries in strengthening their national public health laboratories capacities and the networking of laboratories at regional level have led to early detection of emerging dangerous pathogens such as Ebola and Marburg viruses, and enabled a better, more effective response. There has been a significant progressive decrease in the number of cases and deaths recorded during Ebola virus disease outbreaks over the past 30 years.

The importance of early detection was underscored by the ongoing epidemic of Ebola virus disease in Guinea, Liberia and Sierra Leone. In March 2014, Guinea notified WHO about cases of Ebola virus disease. The cases were initially confined to rural Guinea with the epicentre being Gueckedou. What started as a rural outbreak has spread to Conakry, the capital of Guinea, as well as across the borders into Liberia and Sierra Leone. The current Ebola virus disease outbreak has surpassed all other outbreaks in terms of cases, deaths and geographic spread across Guinea, Liberia and Sierra Leone. As of 19 October 2014, the cumulative number of cases attributed to Ebola virus disease in the three countries stands at 9,936, including 4,877 deaths.

Non-Communicable Diseases (NCDs)

The region has not escaped the global epidemic of NCDs. WHO estimates that deaths from NCDs are likely to increase globally by 17 per cent over the next 10 years. African region will experience a 27 per cent increase that is 28 million additional deaths from these conditions, which are projected to exceed deaths due to communicable, maternal, prenatal, and nutritional diseases combined by 2030. Current statistics for communicable disease is given in the Table A9 in Annexure.

Some African countries such as Mauritius, Namibia and Seychelles NCDs cause over 50 per cent of all reported adults deaths. The four main risk factors for major NCDs are usage of tobacco, physical inactivity, intake of excessive alcohol and unhealthy diet. Cardiovascular diseases such as hypertension, stroke, heart failure and diseases of the coronary are increasing in African region and have become a major public health problem. World's highest prevalence of hypertension (38.1 per cent among males, 35.5 per cent among females) with some countries (e.g. Cape Verde, Mozambique, Niger, Sao Tome and Principe) reporting prevalence rates of 50 per cent or higher. Asthma prevalence is rising in Africa possibly due to increased urbanization and air pollution- 23 per cent has been reported in urban South Africa. Cancer is one of the severe NCDs which has affected the African region. Most common cancers among women are breast, cervical, stomach, lung, colorectal cancers. Breast cancer incidence rates show marked inequalities between rich and poor countries. Although the highest incidence is seen in more developed regions, mortality rates are relatively much higher in less-developed countries due to late detection and poor access to treatment facilities.

In case of men, prostate and liver cancers are common. As per the WHO estimation in 2008, 5 per cent deaths due to cancer are mainly from Burkina Faso, the Democratic Republic of Congo, Mali, Niger, Sierra Leone, Zimbabwe and Algeria. Other NCDs which are affecting ordinary people in Africa are sickle cell disease, mental and neurological disorders, and road injuries. In March 2014, WHO elevated the risk assessment of international spread of polio from the central Africa, particularly from Cameroon, to be very high. A new exportation event from Equatorial Guinea demonstrates that the risk of international spread from central Africa remains very high (for the statistics on Polio immunization coverage refer to Table A10).

IV. International Cooperation in the Health Sector in Africa

The World Health Organisation is actively engaged in the African region. It took initiatives in bringing together global partnerships to involve actively in health programme such as Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund). Established in 2002, the Global Fund is an international public-private financing mechanism and not an implementing agency. However, the Global Fund partners with countries and implementing agencies aim to improve health outcomes. A case in point is its partnering with others in Malawi in 2005 to strengthen human resources to optimize the implementation of interventions related to Millennium Development Goals 4, 5 and 6 relating to child mortality, maternal health and HIV/AIDS, malaria and other diseases, respectively. Between 2005 and 2009, health worker density increased by 66 per cent from 0.87 to 1.44 per 1000 populations and, using the Lives Saved Tool, an evaluation of four indicators (antenatal care; skilled birth attendance; administration of Nevirapine for prevention of mother-to-child transmission of HIV; and fully immunized children) showed that 13,187 additional lives were saved due to their increased coverage in Malawi.

Gift from Africa is a joint initiative of the Global Fund and Friends of the Global Fund Africa. The campaign invites private sector leaders from the continent to come together on the global stage and invest in the fight against the three diseases (AIDS, Tuberculosis and Malaria) in Africa. This campaign was announced at the Global Fund MDG Summit event in September 2010, with initial pledges of US\$ 3 million from Access Bank Plc, Anglo American South Africa, Cirrus Oil of Ghana, Old Mutual of South Africa, and United Against Malaria (Nando's, MTN and Standard Bank). It has been able to raise US\$ 5 million from the African private sector to support the Global Fund.

Friends of the Global Fund Africa (Friends Africa) are a Pan-African organization which works to mobilize strategic political and financial support for the fight against AIDS, TB and Malaria through education, multi-sectoral advocacy and documentation. The organization targets every sector that can aid in overcoming the three pandemics, including civil society, the private sector and government while addressing the participation of all levels of society spanning influential African lawmakers/parliamentarians to vulnerable community members all over the continent.

Partnership for Maternal Newborn & Child Health (PMNCH) is the global health partnership launched in September 2005 to accelerate efforts towards achieving MDGs 4 and 5 which relate to child and maternal mortalities. It is the result of the merger of three existing partnerships: Partnership for Safe Motherhood and Newborn Health, Child Survival Partnership and Healthy Newborn Partnership.

Roll Back Malaria (RBM) Partnership is the global platform for coordinated action against malaria

launched in 1998. The initiative is composed of a multitude of partners, including countries endemic with malaria, bilateral and multilateral development partners, the private sector nongovernmental and community based organizations, etc. RBM's strength is to form effective partnership both globally and nationally. Partners work together to scale up malaria control efforts at country level and coordinate their activities to avoid duplication and ensure optimal use of resources. Objective of RBM partnership is to reduce malaria morbidity and mortality by reaching universal coverage and strengthening health systems globally especially LDCs.

President's Malaria Initiative (PMI) launched in 2005 focuses on expanding coverage of four highly effective malaria prevention and treatment interventions to the most vulnerable populations i.e. pregnant women and children less than 5 years of age. These interventions are insecticide-treated mosquito nets, indoor residual spraying with insecticides, intermittent preventive treatment for pregnant women and prompt use of artemisinin-based combination therapies after malaria has been diagnosed.

V. Indian Partnership and Its Impact

Engagement of Indian Pharmaceutical Firms in Africa

Indian engagement has been growing at accelerated pace in the sunrise sector of healthcare and medicine through export of high-quality but low-priced Indian pharmaceuticals to African countries, the setting up of business partnerships with hospitals in Africa and the medical tourism of Africans to India.

Investment: India's Outward FDI (OFDI) in the manufacturing sector especially in pharmaceuticals in Africa has shown an uneven annual distribution during the period of 2008 to 2014 as can be seen in the table below.

Table 2: India's Outward FDI to Africa in Pharmaceutical Industry

Year	Outward FDI (USD Million)
2008	50.90
2009	7.04
2010	5.06
2011	16.84
2012	9.46
2013	88.86
2014	67.40

Source: RBI Monthly Data on Outward FDI from India 2008-2014.

In the year 2008, OFDI was US\$ 50.90 million but it has drastically declined to US\$ 5.06 million in 2010 due to the global economic recession. Recently, we have witnessed a significant rise in OFDI, reaching the peak in 2013. Indian firms are investing mainly in Egypt, Ethiopia, Kenya, Mauritius, Mozambique, Nigeria, South Africa, and Tanzania. Some of the major Indian pharmaceutical joint ventures or subsidiaries manufacturing or trading in Africa are Cipla Ltd., Ranbaxy Laboratories, Dr Reddy's laboratories, Glenmark Pharmaceuticals, IPCA Laboratories, Parentearl Drugs, Emcure Pharmaceutical Ltd., Aurbindo Pharama Ltd., J B Chemicals, Cadila Healthcare, Lupin Ltd., and Intas Pharmaceutical Ltd. We list below some development initiatives of the major Indian pharmaceutical firms to promote healthcare facilities in Africa .

Cipla, the largest generic Indian firm, has taken the initiative to reduce the cost of HIV/AIDS treatment by bringing down the cost of Antiretrovirals (ARVs) below one dollar per day. This initiative is called Cipla's Dollar a Day Treatment Programme. In 2011, this initiative had taken place in four African countries - Cameroon, Kenya, Lesotho, Zambia. Cipla aggressively targeted the AIDS market in Africa by offering drugs at much lower cost than the US and European companies. Cipla offered a triple-therapy

drug cocktail to African nations for approximately \$600, undercutting the first round of discounts by the transnational drug producers. Cipla also extends an innovative 'Mother-Baby Pack' for preventing mother-to-child transmission of HIV/AIDS in collaboration with UNICEF and other partners. The Mother-Baby Pack contains the entire range of anti-retroviral drugs and antibiotics required by an HIV infected mother starting from the 14th week of pregnancy until the 6th week after delivery.

Dr Reddy's Laboratories focussed on key therapeutic areas like Central Nervous System (CNS) and Primary Care. The company has commenced operations in South Africa through Triomed who were holding registration for two products, OMEZ (Omeprazole) and CIFLOC (Ciprofloxacin).

Indian pharmaceutical firm Ranbaxy Laboratories has launched the drug Synriam, which it claims will prove a more efficient and simpler treatment for malaria and has cured, according to it, more than one million patients in India since its launch in April 2012. Ranbaxy has filed new drug applications for marketing Synriam in many African countries. They operate in 52 countries in the African continent and the Middle East. Africa is an important market for Ranbaxy and the company continues to invest substantially in the region. The Company is strengthening its manufacturing capacities in Nigeria and progress continued on the construction of a greenfield oral solid dosage and liquids facility in that country. The company started work on a green field manufacturing facility in Egypt in end 2012 with a capacity to produce 50 million tablets per year.

IPCA Laboratories exports branded and generic formulations as well as Active Pharmaceutical Ingredients (APIs) to 30 African countries. The company markets branded formulations in countries like Uganda, Ghana, Ivory Coast, Burkina Faso, Zimbabwe, Sudan, Tanzania, Kenya, Ethiopia and Nigeria through dedicated field force. The company is expanding its branded formulations business in the African continent through expansion of field force and geographical coverage and increase in the number of branded formulations marketed. The company is also continuously filing new formulation dossiers for registration in African countries. During the year 2013-14, its exports of formulations and APIs to Africa were of the value Rs. 566.34 crore.

Cadila Healthcare is also a major player in the African generic drug market. Subsidiary companies of Cadila working in Africa are Zydus Healthcare S.A. (Pty) Ltd (South Africa), Simayla Pharmaceuticals (Pty) Ltd (South Africa) and Script Management Services (Pty) Ltd (South Africa).

J. B. Chemcials and Pharmaceuticals Ltd. (JBCPL) is another leading Indian pharmaceutical company which manufactures and markets a diverse range of pharmaceutical formulations, herbal remedies and APIs. JBCPL exports to many countries worldwide with a strong presence in South Africa. In 2006, it made a major strategic investment of \$ 5.1 million in Biotech Laboratories (Pty) Ltd of South Africa. South Africa holds good growth potential, and with the large marketing reach of Biotech, both JBCPL and Biotech expect to expand and strengthen their presence in the African region.

Lupin Ltd. is a major generic pharmaceutical player in South Africa. Lupin's South African subsidiary Pharma Dynamics has consistently performed and became the fourth largest generics company and 12th largest pharmaceutical company in the South African market. It remains the largest company in the cardiovascular segment. Pharma Dynamics launched six new products and remains focused on the central nervous system (CNS) and over-the-counter segments within the South African market.

Government of India Initiatives

Focus Africa Programme

In 2002, the Government of India launched an integrated programme named as 'Focus Africa' to boost up bilateral trade and investment between India and Africa. This initiative specifically focused on seven major trading partners of the Africa, namely, Nigeria, South Africa, Mauritius, Kenya, Ethiopia, Tanzania and Ghana which contribute around 69 per cent of India's total bilateral trade. In April 2003, the programme was broadened to cover 17 more countries in Africa, namely, Angola, Botswana, Mozambique, Zambia, Zimbabwe, Namibia, Senegal, Ivory Coast, Uganda, Madagascar, Seychelles, Egypt, Tunisia, Sudan, Algeria, Libya and Morocco. Major products for exports are broadly identified as textiles, drugs & pharmaceuticals, machinery & instruments, transport equipments and telecommunication and IT. The programme-supplemented LoC (Lines of Credit) was extended to Tanzania, and Mozambique, Zambia, Uganda, Kenya, Seychelles, Mauritius, Zimbabwe and Ghana .

Team-9 Initiative

In order to enhance India's commercial relations with Western African Region, the Government of India proposed Techno-Economic Approach for Africa India Movement (TEAM9 Initiative) in 2004. Burkina Faso, Chad, Cote d'Ivoire, Equatorial Guinea, Ghana, Guinea-Bissau, Mali, Senegal and India are the participating nations in this Initiative. This Initiative focuses on providing opportunity for education and training in terms of transfer of technologies in crucial sectors including pharmaceutical and healthcare. Priority sectors in these eight countries have been identified and would be financed out of USD 500 million LoC.

Pan Africa e-Network and Health Sector

Apart from the traditional trade and investment route, India took some initiatives in the health care sector in Africa recently through the Pan African e-Network Project (PAENP) conceived by the late Dr A P J Abdul Kalam in 2009. This was launched on 26 February, 2009 with a project cost of Rs. 5420 million. The project envisages setting up of an e-network connecting Indian institutions with 53 countries of Africa through satellite and fibre optic links, and providing tele-education and telemedicine services to them. The existing commitment on India side is to maintain the facilities created in each country for a period of five years after commissioning them.

The project has been commissioned in 48 countries that have signed the agreement with Telecommunications Consultants India Limited (TCIL) for participating in it. The list of the countries is presented below:

Western Africa	Benin, Burkina Faso, Cape Verde, Cote d'Ivoire, The Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo; 15 out of 15
Eastern Africa	Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Mauritius, Rwanda, Seychelles, Somalia, Sudan, Tanzania and Uganda, South Sudan; 14 out of 14.
Middle Africa	Burundi, Cameroon, Central African Republic, Chad, Congo, DRC, Gabon and Sao Tome and Principe; 8 out of 9.
Northern Africa	Egypt, Mauritania and Libya 3 out of 6.

Southern Africa	Botswana, Lesotho, Malawi, Mozambique, Namibia, Swaziland, Zambia and Zimbabwe; 8 out of 10.
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Tele-medicine(TM)

Under this project, medical practitioners at the Patient End Location in Africa can consult on-line the Indian medical specialists in various disciplines/specialities selected by African Union for its Member States. Any doctor from any of the remote locations can refer the patient`s medical records to any of the Super Specialty Hospital and have a Tele-Medicine video session for live diagnosis and advice by the doctors on a scheduled time in association with the provider, Super Specialty Hospital, and the receiver and the Remote Tele-Medicine centre.

Patient consultation centres have already been set up in the following 12 Indian Super Speciality Hospitals: All India Institute of Medical Sciences (AIIMS), New Delhi; Amrita Institute of Medical Sciences, Kochi; Apollo Hospitals, Chennai; CARE Hospital, Hyderabad; Escorts Heart Institute and Research Centre, New Delhi; Fortis Hospital, NOIDA; Narayana Hrudayalay, Bengaluru; Sri Ramchandra Medical Centre, Chennai; Moolchand Hospital, New Delhi; HCG, Bengaluru; Dr Bala Bai Nanavati Hospital, Mumbai; Sanjay Gandhi Institute of Medical Sciences, Lucknow.

These twelve Indian Super Speciality Centres have been connected to 49 (out of 53 envisaged) Patient-End Hospitals (PEs) in African countries, viz. Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic (CAR), Chad, Comoros, Cote d'Ivoire, Djibouti, D.R.Congo, Egypt, Eritrea, Ethiopia, AU-Ethiopia, Gabon, The Gambia, Ghana, Guinea Bissau, Kenya, Liberia, Libya, Lesotho, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Republic of Congo, Rwanda, Republic of Guinea, Sao Tome & Principe, Senegal, Seychelles, Sierra Leone, Somalia, South Sudan, Sudan, Swaziland, Tanzania, Togo, Uganda, Zambia and Zimbabwe. India has set up Tele-medicine centres in four of the Regional Super Specialty Hospitals of Africa in Nigeria, Republic of Congo, Mauritius and Egypt. A fifth one is in the process of being set up in Senegal. As per information available, so far 460 Tele-Medicine consultations have taken place.

At present, the Tele-Medicine consultations are regularly being conducted from these Super-Specialty Hospitals in India to the African countries on need basis.

The Tele-Medicine network also provides continuing medical education (CME) services based on the selected Super Specialty disciplines in the medical courses offered by the Indian and AU Regional Super Specialty Hospitals as a certificate and diploma course as per the AU requirement. Regular CME sessions have been started from 22 April 2009 from SSHs. The CME calendar up to June 2014 was posted at Pan-African e-Network Website www.panafricanenetwork.com. Up till 31 May 2014, 3724 CME Sessions in English and 444 CME Sessions in French were held from Indian Super Specialty Hospitals.

Medical Tourism

For want of expertise in medical services, finance and governance, health infrastructure in Africa is facing problems. India is one of the top destinations for medical tourism due to favourable climatic conditions, availability of herbal medicines and high quality super speciality hospitals. Traditional and alternative medicines like Ayurveda, Naturopathy, Yoga, and Homeopathy facilitate medical tourism.

India known mostly for its cost-effective medical treatments along with high standards in cardiology, orthopaedics, nephrology, oncology and neuro-surgery, is suitable for an average African customer who can't afford to purchase high-end products from the West. Share of African tourist arrival in India was 3.95 per cent in 2013, out of which 14.2 per cent tourists came for medical treatment, mainly from Nigeria, Tanzania, Kenya, Sudan, Mauritius, Egypt and South Africa.

Table 3: African Tourist Arrival in India for Medical Treatment in the year 2013

Africa Region	Foreign Tourist Arrivals (Numbers)	Medical Treatment (per cent)
Nigeria	34522	42.4
Tanzania	23345	18.5
Kenya	40484	9.2
Sudan	8778	9.1
Mauritius	27418	5.1
Egypt	15062	1.1
South Africa	58023	0.9
Others	67639	13.9
Total	275271	14.2

Source: India Tourism Statistics 2013

To connect international patients seeking healthcare in India, Apollo Hospitals one of the leading medical service providers has joined hands with Emirates airlines. Under this partnership, patients coming to Apollo hospitals from the Middle East and Africa including Ethiopia, Ghana, Kenya, Nigeria, Senegal, South Africa, Tanzania, Uganda, Zambia and Zimbabwe, Cote d'Ivoire can avail of the special fares .

Hospitals and Health Centres in Africa

Indian entities have also been engaged in setting up health infrastructure facilities within Africa. In 2003, Apollo group of Hospitals was the first private hospital to offer its consultancy services to hospitals in West Africa, Ghana and Nigeria. Apollo has been the project consultant for setting up a 100-bed multi-speciality hospital in Ghana.

In 2009, a joint venture between Vision Care Centre of Zambia and Appasmy Associates of India launched Vision Care Appasamy Eye Hospital in Lusaka for providing both minor and major eye services locally.

There have also been some sporadic efforts at the local Indian embassy levels. The first-ever Free Eye Care Camp for Ethiopians was held at the Embassy of India in Addis Abeba on 13 December 2014. An Indian Medical Professionals Forum and an India Education Forum were established by the Embassy under its patronage to coalesce interests and consolidate the presence of the diverse Indian community.

India's Development Cooperation Instruments

There are two development cooperation instruments through which India extends development assistance. The first is India's Aid and Technical Assistance Programme, which is primarily managed

by the Ministry of External Affairs, and the second is lines of credit (LOCs), which were managed by the Department of Economic Affairs (DEA), in the Ministry of Finance (MOF), until 2003-04. After 2003-04, this system was changed as the GOI stopped signing any credit agreements directly with the recipient country. Instead, it began to extend lines of credit through the Export-Import (EXIM) Bank of India. All LOCs are now managed by the EXIM Bank.

Line of Credit (LoC) is one of the main instruments of India's development assistance to least developed and developing countries in recent years. During the last decades, 214 LoCs aggregating US\$ 13280.12 million have been allocated, of which USD 7535.39 million were allocated for African Countries and US\$ 5741.73 million was sanctioned to non-African countries. During the period 01 April to 31 January 2015, 14 LoCs amounting to US\$ 2272.61 million have been sanctioned. The allocation to Africa during this period is US\$ 881.17 million, including US\$ 200 million for Mauritius for equity participation in a Special Purpose Vehicle for the Light Rapid Transit project, US\$ 184 million for an Hydroelectric Project in Burkina Faso, US\$ 150 million for strengthening agriculture mechanisation in Ghana, US\$ 65.68 million to Mauritania for solar diesel hybrid rural electricity project, US\$ 62.95 million to Senegal for Rice self-sufficiency programme and US\$ 45 million to Gambia for electrification expansion.

Some other initiatives at government level are presented in Box 1.

Box 1: List of Some of India's Initiatives in Terms of Development Cooperation with Africa in health sector in the recent years

Project "Save an Eye" Campaign undertaken by India Botswana Chamber of Commerce & Industry (IBCCI) in coordination with the Indian High Commission and the Botswana Ministry of Health has been commendable. IBCCI raised the funds through donations from Indian businesses and other community members for carrying out this ambitious project. A total of 1426 free eye cataract surgeries were performed on Botswana in different parts of the country, by inviting a team of doctors and paramedics from the Sankara Nethralaya, a reputable charity organization based in Chennai during the months of September and October, 2011.

Government of India (GoI) has donated 50,000 long lasting insecticide-treated mosquito nets under the Malaria control programme to the Botswana Government (Ministry of Health) in November, 2011.

India donated one million doses of FMD (Foot-and-mouth disease) monovalent vaccine worth US\$ 480,000 to Algeria to help arrest the spread of FMD disease in the country. The vaccines were handed over to the Algerian Ministry of Agriculture on 13 November 2014.

Guinea and Liberia have been severely affected by the Ebola Virus outbreak. GOI extended bilateral assistance of USD 50,000 each to Guinea and Liberia to combat the disease. In addition, GOI provided cash assistance of USD 500,000 to the WHO, a contribution of USD 10 million to UN Trust Fund for Ebola and an additional USD 2 million for purchase of protective gear to tackle EVD in the affected countries of West Africa.

The Pan Africa e-Network project in Comoros, Rwanda, Madagascar, Senegal and Sao Tome & Principe are operating successfully especially the telemedicine component as discussed earlier.

Tele-education facilities offered in collaboration with Imailaka University have benefitted 228

students of Madagascar since the start of the project. Tele-medicine facilities are also being offered in collaboration with a local clinic and free consultations and diagnosis are being given to the Malagasy patients since 2010 from top Hospitals in India. In all, 108 telemedicine consultations have been done since beginning of the project and twelve patients have undergone treatment in India using the tele-medicine facility of the project. A medical delegation from Apollo Hospital group visited Madagascar and signed a MoU in May 2014 in the field of health cooperation with the Malagasy Ministry of Public Health.

On 20 November 2014, India's Honorary Consul in Freetown formally handed over to President Mr Ernest Bai Koroma GOI's donation of medicines and medical equipments (worth US\$ 50,000) to combat the Ebola Virus disease. In addition, GOI provided cash assistance of US\$ 500,000 to the WHO, a contribution of US\$ 10 million to UN Trust Fund for Ebola and an additional US\$ 2 million for purchase of protective gear to tackle EVD in the affected countries of West Africa.

An MoU was signed between Barefoot college (also known as The Social Work and Research Centre) at Tilonia, Rajasthan and Evangelical Prebysterian Church (on behalf of Government of South Sudan) on 18 August 2014, for establishing a Regional Barefoot Training and Vocational Centre (RBTVC) in Yei province of Equatoria State, South Sudan to promote solar electrification in the villages in Yei. the Ministry of External Affairs also signed an agreement with Barefoot College for providing funds amounting to US\$ 500,000 for establishing Regional Barefoot Training and Vocational Centre (RBTVC) in South Sudan.

Source: Ministry of External Affairs, Annual Report 2014-15, GOI.

VI. Role of India's Trade with Africa in Improving Access to Health Care

Export of Pharmaceutical Products

India's Pharmaceutical firms have not been affected much by the worldwide crisis in 2008, mainly due to cost advantages in production. Indian firms have a modest performance in terms of exports. Share of pharmaceuticals in India's total exports has increased from 2.1 per cent in 2000-01 to 3.7 per cent in 2014-15. The exports of pharmaceutical products were valued at USD 11.6 billion in 2014-15. The major export destinations for India's pharmaceutical sector during 2014-15 were: USA (with a share of 32.5 per cent) followed by South Africa (4.1 per cent), UK (3.8 per cent), Russia (3.5 per cent) and Nigeria (3.3 per cent).

In this segment we have adopted the definition of pharmaceutical products including both bulks drugs and formulation based on 6-digit HS 1996 nomenclature, on the pattern of the 2012 study by Kallummal. Our analysis is limited to 404 bulk drugs and 33 formulations. In our study we have classified the African Region as per the United Nation Statistical Division. All the 54 African Countries are broadly classified into five regions: Eastern, Middle, Northern, Southern and Western Africa. Eastern Africa consists of Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Malawi, Mauritius, Mozambique, Rwanda, Seychelles, Somalia, South Sudan, Uganda, Tanzania, Zambia, and Zimbabwe. Middle Africa consists of Angola, Cameroon, Central African Republic, Chad, Congo, Democratic Republic of Congo, Equatorial Guinea, Gabon, and Sao Tome and Principe. Northern Africa consists of Algeria, Egypt, Libya, Morocco, Sudan and Tunisia. Southern Africa consists of Botswana, Lesotho, Namibia, South Africa and Swaziland. Western Africa consists of Benin, Burkina Faso, Cabo Verde, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone and Togo.

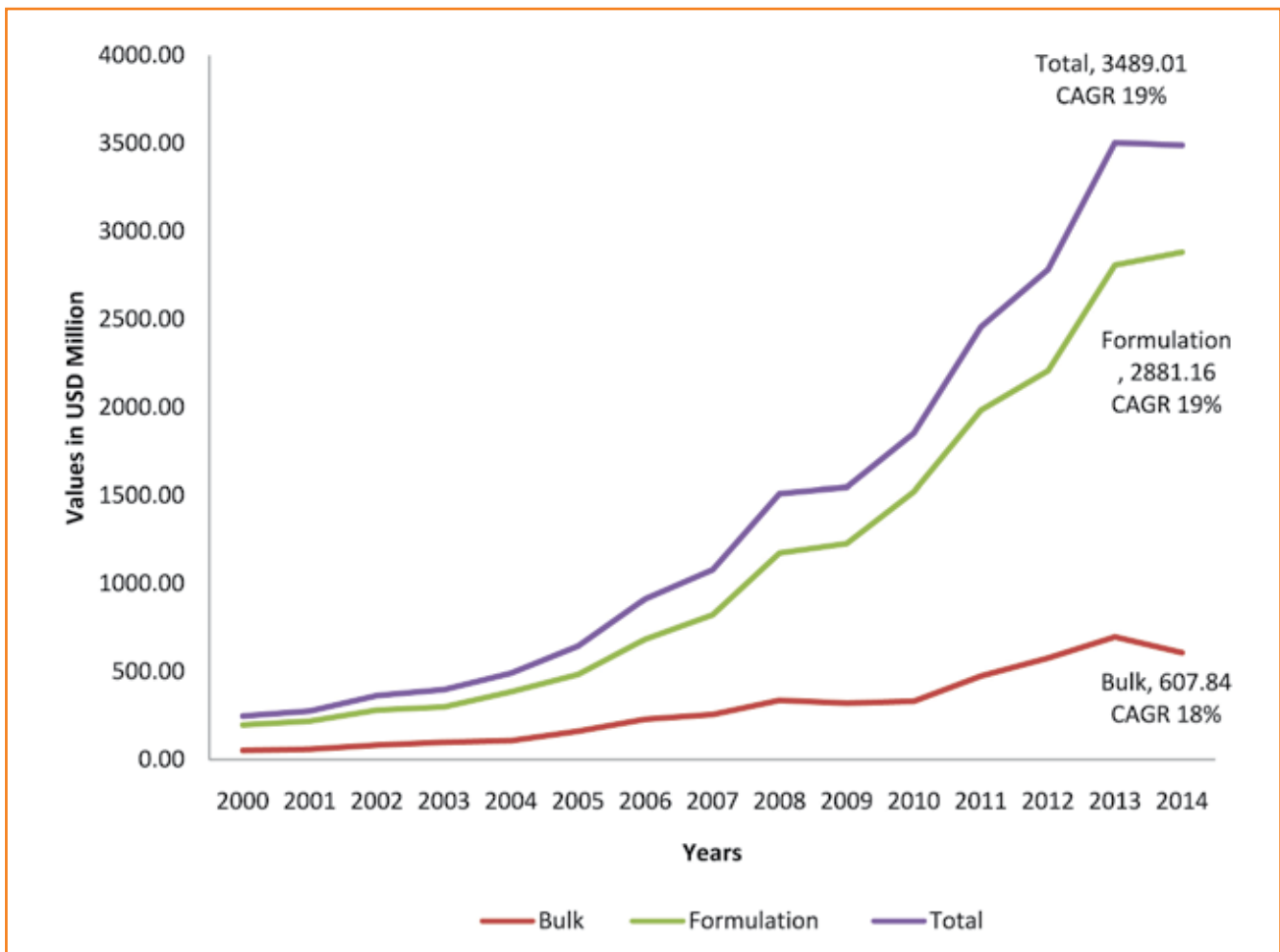
Our study infers that Africa's total pharmaceutical imports from world was US\$ 3.69 billion in 2000 which grew at a Compound Annual Growth Rate (CAGR) of 10.47 per cent in the last 15 years and reached USD 16.45 billion in 2014. Africa's total pharmaceutical imports from India is increasing significantly from US\$ 114.47 million in 2000 to US\$ 1.79 billion in 2014 at a CAGR of 20 per cent followed by China 18 per cent, US at 8 per cent and EU at 9 per cent in the span of 15 year (for details see Table A11 in Annexure). Africa's imports of total pharmaceuticals including both bulks drugs and formulations are at its peak in 2013, mainly due to Ebola outbreak in western Africa in this period.

Our analysis demonstrates that India's pharmaceutical sector plays a significant role in the African health sector. India is the third largest formulation supplier US\$ 1.39 billion in 2014 (equivalent to 13 per cent of Africa's imports of formulations) after France US\$ 1.84 billion in 2014 (17 per cent) and

Germany US\$ 1.59 billion in 2014 (15 per cent) (for more details about top ten Africa's importing partner for bulk and formulation refer to Table 2 in Annexure). India is the fourth largest bulk drug supplier in Africa with US\$ 403 million in 2014 or 6.79 per cent after China (US\$ 971 million, 16 per cent), Germany (US\$ 593 million, 10 per cent) and Australia (US\$ 493 million, 8 per cent) (Africa's top 10 importing partner for bulk & formulation are given in Table A12 in Annexure).

It is evident from our analysis that India's exports of pharmaceutical products to Africa has been significantly growing from USD 247.64 million in 2000 to USD 3.5 billion in 2014. Figure 5 reflects the growth India's exports to Africa for bulk drugs and formulation in last 15 years. Currently, India's exports of formulation to Africa are almost five times higher than that of the bulk drugs.

Figure 5: India's Pharmaceutical Exports to Africa (2000-2014)

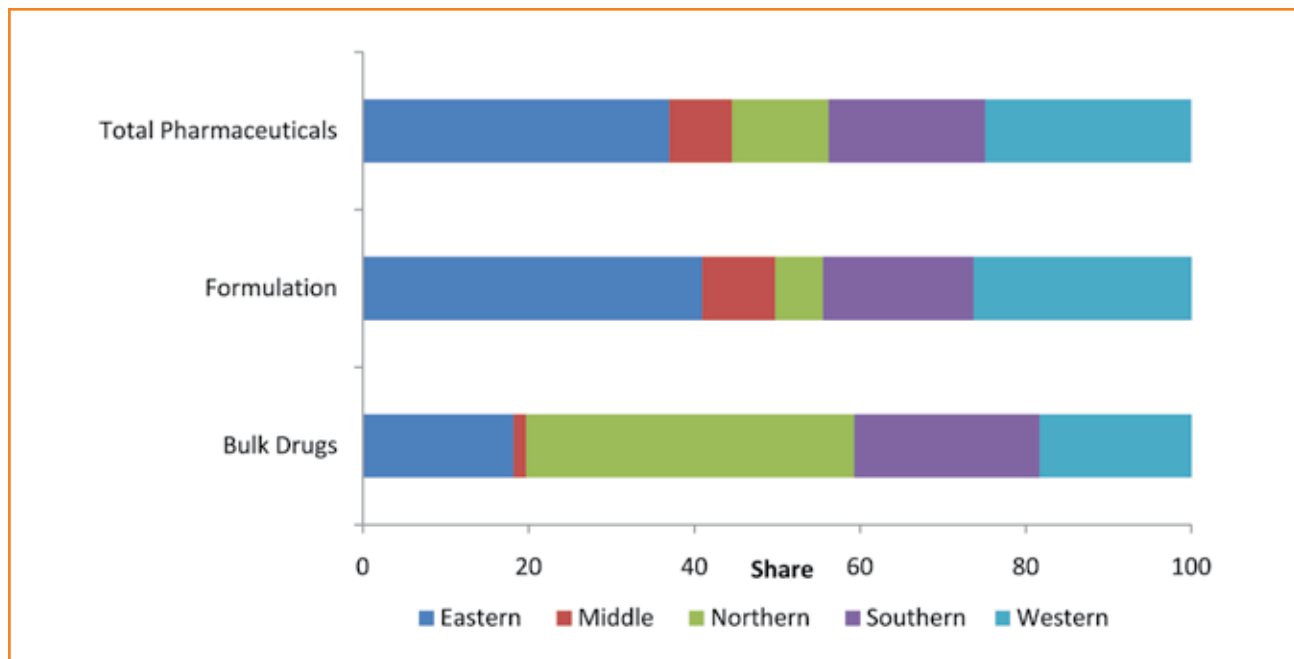


Source: WITS COMTRADE Database

Also, it is evident from the statistics that India is exporting pharmaceutical products mainly to eastern region of Africa (40 per cent) followed by western (25 per cent) and Southern (22 per cent) in 2014. In the case of bulk drugs, India is exporting mainly to northern region of Africa at around 40 per cent in 2014. Similarly, for India's exports of formulations, eastern region share is very high in 2014 while the northern region share is too low. Presence of Middle Africa in the export tables, both for bulk drugs and formulations, is very negligible. Also, India's exports of formulations to southern Africa have been declining at a significant rate in the past two years from US\$ 581.77 million in 2013 to US\$ 522.82

million in 2014. Figure 6 shows region-wise exports of India in Africa in 2014 and for further detail refer to Table A13 in the Annexure.

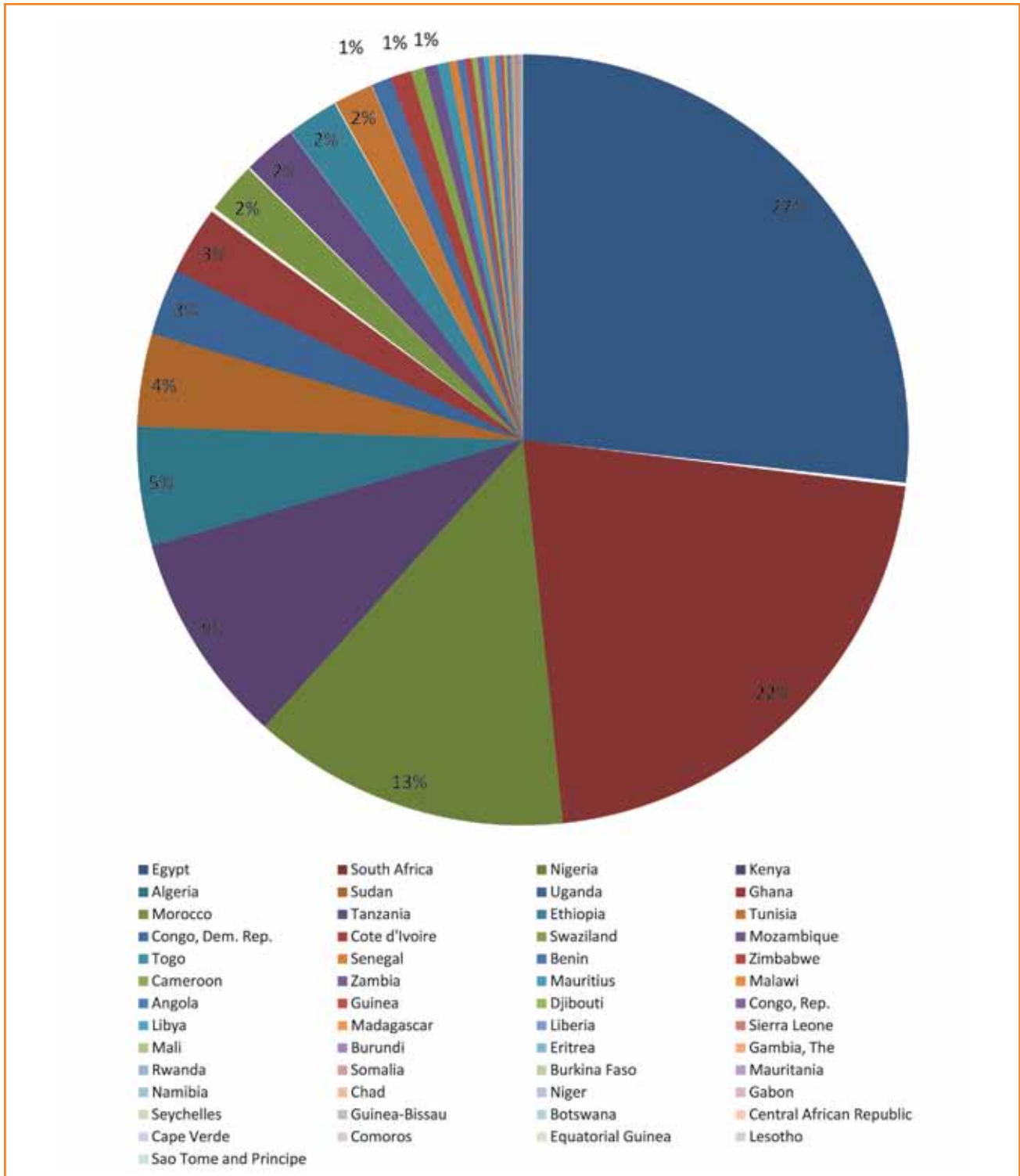
Figure 6: India's Exports of Pharmaceutical to Africa in 2014



Source: WITS COMTRADE Database

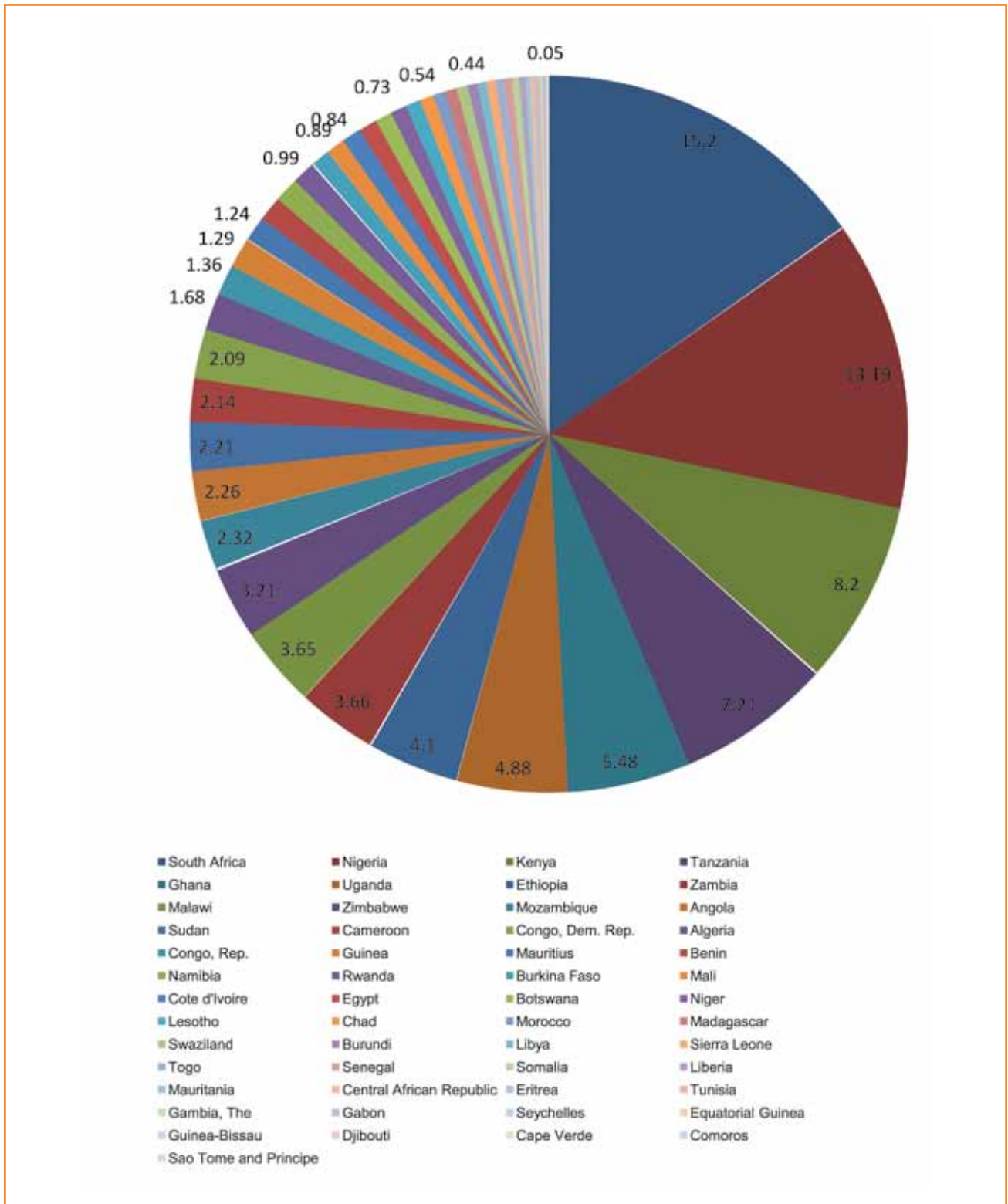
We have observed that India is exporting bulk drugs primarily to Egypt, South Africa, Nigeria, Kenya, Algeria, Sudan, Uganda, Ghana, Morocco, Tanzania, Ethiopia, and Tunisia whose share is greater than one per cent in 2014 (See figure 6). South Africa, Nigeria, Kenya, Tanzania, Ghana, Uganda, Ethiopia, Zambia, Malawi, Zimbabwe are the African countries where share of India's exports of formulation is greater than 2 per cent in the year 2014 (See figure 7). Largely, India exports vaccines, antibiotics, penicillin, medicaments of alkaloids or derivatives, medicaments of other hormones, vitamins, anaesthetic medicaments of mixed/unmixed products, adhesive dressings, wadding, gauze, first-aid kits, etc., to several African countries. (India's exports of bulk drugs and formulation to Africa are given in Table A14-A15 in Annexure.)

Figure 7: Share of India's Exports of Bulk Drugs to African Countries in 2014



Source: WITS COMTRADE Database

Figure 8: Share of India's Exports of Formulation to African Countries in 2014



Source: WITS COMTRADE Database

VII. Way Forward: India-Africa Cooperation

It can be concluded that overall the people living in the African region has improved considerably during the last 25 years or so. However, to attain the goal of health for all, envisaged both in SDG 3 and Agenda 2063, Africa would have to address the following priority areas and indicative strategies:

- Citizens enjoy long and quality health lives.
- Nutritional status of Citizens are acceptable by international standards.
- Citizens enjoy long and quality health lives.
- Expand access to affordable quality health care and services.
- Develop/implement programmes to combat communicable and non communicable diseases.
- Develop human capacity for the health sector Promote policies for sustainable financing of the health sector.
- Promote policies that will enhance access to balanced diets.
- Promotion of nutrition surveillance and intervention programmes.

Quality of health care has the potential to transform the risks of demographic and disease burdens into a demographic dividend and opportunity to transform the pharmaceutical industries. At the same time, political constraints and gap between the accessibility of health care services need to be removed. A transparent standard harmonization system should also be followed for good health of all people in Africa.

Opportunities for Development Cooperation between India and Africa

Both Indian and African economies are projected to grow fast in the coming decades. Consequent to increase in per capita GDP, health care expenditure per capita is also likely to go up considerably, thus creating market for more health care products and services than at present

Africa also needs international cooperation from all across the globe for achievement of the health goals in SDGs and also in the Agenda 2063. SDG 3 envisages ensuring healthy lives and promote well-being for all at all ages by 2030. Similarly, Goal 3 of Agenda 2063 envisages healthy and well nourished citizens by 2063. India sharing these very concerns and having contemporary experience in tackling the issues in a developing country context can fruitfully extend cooperation to Africa in the achievement of these goals.

Strengths of India in Pharmaceuticals

- **Generic manufacturing**

India's strength in pharmaceuticals is its strong generic industry. It currently manufactures over 400 bulk drugs and 10,000 formulations. These products are cost competitive with US and European products and help to reduce the medicinal prices significantly and provide larger access to affordable medicines.

- **Rich heritage of traditional medicine**

India has three major formal traditional medicine systems. These systems – Ayurveda, Siddha and Unani – are based on their own pharmacopoeias and are time tested. They are in wide use all over the country, through both formal and informal streams, and in both the public and private sectors. There is also well regulated formal education system for the India Systems of Medicine (ISMs). India has also established separate Medical Councils for these systems.

- **Large Health Service human resources (doctors, nurses)**

Thanks to comparatively early development of higher medical education institutions with English as medium, India has been producing in large numbers health personnel such as doctors and nurses. They are quite willing to emigrate to other parts of the world for service.

Possible Areas of Cooperation

- **Manufacturing**

Consequent on the Intellectual Property regime introduced in 1972, India gained considerable experience in the manufacture of generic pharmaceutical products. Indian pharmaceutical companies are quite strong in manufacturing processes. This expertise could be shared with Africa and used in the development of indigenous pharmaceutical industries in the African continent. That could contribute to Africa's goal of eradicating many of its chronic diseases.

- **Provision of health care services such as hospitals and medical education.**

India has the capability to establish super speciality and general hospitals. As already stated, some of the hospital chains have established their own hospitals in the African continent. This process could be further extended. To begin with such establishments could be in areas where India has set up other manufacturing or business facilities.

- **Policy and law**

India is one country which has negotiated the difficult path of implementing the TRIPS (Agreement on Trade Related Aspects of Intellectual Property Rights, 1994) compliant Intellectual Property Right (IPR) regime. It has drafted its IP laws, particularly the Patents Act, keeping the TRIPS flexibilities. Its provisions in the law to prevent ever greening of pharmaceutical patents are one such provision keeping in view the Doha declaration and the developing country needs. In order to prevent patenting of traditional medicine knowledge, its patent law prohibits grant of patents to inventions which are traditional knowledge. It has also drafted a sui generis law for the protection of geographical indications which provide protection for manufactured goods also such as handicrafts and handlooms as well as natural products which have medicinal values. Africa also has a strong tradition of manufacturing such

local specific products. India also enacted biodiversity legislation in accordance with the Convention on Biodiversity which protected the biological resources of the country. These resources have very high value and utilisation in the traditional medicines. Thus, it could establish a model regime for other developing countries. This expertise in policy and law making could be shared with African countries.

- **Traditional Knowledge**

Traditional medicines form the major chunk of traditional knowledge and there have been attempts in some of the developed countries to patent such knowledge. In order to prevent such misappropriation India has established a Traditional Knowledge Digital Library (TKDL). It contains entries in a patent application format. The library is in five international languages, namely, English, French, German, Spanish and Japanese. It currently has 292,662 traditional medicine entries. This library has been able to prevent grant of patents based on traditional knowledge in large number of cases. As per an earlier study done by RIS, there have been 58 cases of withdrawal of patent applications in European Patent Office, one application terminated in the UK Patent Office and one application withdrawn in the US Patent and Trademark Office, because of a prior evidence in the TKDL. Claim amendments have been made in 29 cases in various patent offices. The library is available free of charge to any patent office. Its experience in this can be shared with African countries thus contributing to their own efforts towards protection of their traditional knowledge.

- **R&D**

Large profit oriented pharmaceutical companies have very little interest in developing new medicines for the diseases that largely affect low income countries because of non-prospects of high returns. These countries themselves will have to take the initiatives in this regard and such initiatives necessarily will have to be low cost. India has a very good experience with an alternative route of drug discovery in its Open Source Drug Discovery (OSDD) programme. India could consider partnering with Africa in its innovative R&D programme the Open Source Drug Discovery project of the Council of Scientific and Industrial Research with a view to finding drugs for diseases that affect Africa most. A brief write-up on this programme is presented in the Box 2.

Box 2: Open Source Drug Discovery (OSDD)

Diseases like Tuberculosis (TB), Malaria, Leishmaniasis and other tropical diseases are rampant in developing countries of Asia and Africa. The growing disease burden due to increased resistance to existing drugs stipulates that novel drugs are needed. However, due to the lack of return on investment in these diseases, they are often neglected by pharmaceutical industry suggesting the need for new models of novel drug discovery and development. Open Source Drug Discovery (OSDD) is such an initiative by Council for Scientific and Industrial Research (CSIR) under the Ministry of Science and Technology, India. OSDD works on the principle of open access to knowledge, expertise and resources in the area of drug discovery involving a network of students, scientists from academia, industry and clinicians from India and worldwide. So far there are about 8000 registered members from 130 countries who are a part of the OSDD community. The strategy involves using crowd sourcing approaches during early stages of drug discovery followed by focused projects in late discovery, wherein participation from industry and contract research organizations (CROs) would accelerate delivery. Drug development approach involves conducting

Continued on page 28

Continued from page 27

of clinical trials followed by licensing the drug, non- exclusively to multiple generic manufacturers which would ensure affordability.

OSDD has established a drug discovery and development platform that enables taking ideas/ projects from predictions to experimental validation; lead compounds to pre clinical and clinical candidates. It has enabled this, by building a network of informaticians, biologists, chemists and others and by linking institutions and competencies and filling in the gaps in expertise and resources. It has paved way for exchange of ideas, knowledge, technology etc via an online portal. It has a Phase 2b clinical trial ongoing on multi drug resistant (MDR) TB patients for a novel three drug combination (PaMZ) in collaboration with Global Alliance for TB, which if successful would replace the current long (18-24 months) and ineffective MDR treatment. In addition, a robust and diverse portfolio of several projects at various stages of drug discovery starting from compound screening to 'hits' and 'lead' compounds has been developed by OSDD. This portfolio would mature to provide pre-clinical and clinical candidates that would help mitigate the drug resistance and burden of TB.

Courtesy: Dr Geetha Rayasam, Scientist, CSIR.

• **Clinical Trials**

Clinical trial studies are growing at exponential levels world over, with much scope. During the last 15 years, the number of clinical studies around the globe has gone up from 5635 in 2000 to 182,799 in 2014. Already in 2015, the number of studies registered is 198,340. Rising drug development costs and globalisation have led to an increase in outsourcing of clinical trial studies. Africa and India are fertile grounds for such studies with cost advantages and also concentration of a number of diseases. However, for that to happen, the two regions need to have proper regulatory mechanisms and practices of global standard.

Such trials have been conducted in most of the African countries also. However, Africa's share in the global clinical trial studies is only 0.9 per cent. At the same time, Africa has the potential to conduct more clinical trials and opportunities exist for developing additional clinical trial capacity throughout the continent. (Bairu and Chin). However, to develop those capacities the countries will have to adopt Good Clinical Trial Practices. GCP is an international (ICH) ethical and scientific quality standard for designing, conducting, recording and reporting clinical trials. Compliance with GCPs provide public assurance that the rights and safety of participants in human subject research are protected and that the data that arises from the study is credible. It also enables mutual acceptance of data among regulators.

India has developed recently detailed guidelines for bringing the clinical trial studies in the country to global standards and practices.

• **Other Possible Areas of Cooperation**

The cooperation programme can also include civil society initiatives like the Barefoot College, Ajmer, a short-term training programme for grandmothers in solar electrification of villages leading to mini solar plants available for diagnostic clinics and maternal health centres. Sharing of experiences and extending technical support to Africa to introduce low cost health care schemes such as the micro

health insurance scheme, Yeshasvini, launched by Karnataka Government, and extending access to low-cost diagnostic kits developed by the Indian Council of Medical Research could also be considered.

What India Can Offer to Africa?

- Indian firms can establish local manufacture units or Joint ventures.
- Establish a good network of supply chain management.
- Supply quality medicines at concessional rates for major diseases like HIV/AIDS, TB, Malaria, Cardiac diseases.
- May be Government can procure and supply medicines through a special agency.

VIII. Recommendations and Possible Action Points

Considering the current state of global economies, the governments will have to play the role of a facilitator than that of a doer. This could take the form of incentives. Some possible areas for such incentives are:

- Export of pharma products to Africa
- Local manufacturing in Africa by Indian firms through joint ventures; May be a Govt. Fund for technology transfer
- Setting up health care facilities including in traditional medicine by Indian firms
- Export of human resources
- Opening more telemedicine centres
- Medical tourism in India (e.g. Ayurveda and Allopathy)
- The government machinery also will have to ensure that quality of Indian pharmaceutical products is not compromised.

Government initiatives can also be for:

- Scholarships for Africa in medical and nursing colleges
- Setting up medical colleges
- Training and exchange of experts in policy and law in IPRs and also in drug regulation

On the African governments' side, faster drug marketing approval for generic pharmaceuticals, speedier measures for various clearances required for setting up new ventures in the pharmaceutical sector and also in the health care sector are required.

Indian private and public sector as well as non-governmental agencies could also consider taking initiatives in bringing together philanthropists to contribute towards Africa's determination to achieve health for all in the shortest possible period.

Such efforts would contribute towards Africa achieving its health goals in the proposed Sustainable Development Goal No. 3 of the United Nations and Africa Union's own Agenda 2063, and India will be a proud partner in Africa's efforts.

Annexures

Table A1: Health Expenditure, Total (% of GDP)

Country	1995	2000	2010	2013
World	8.68	9.11	10.13	9.94
India	4.06	4.31	3.82	3.97
Africa	4.82	4.98	5.99	6.03
Algeria	3.70	3.49	4.82	6.64
Angola	4.83	3.39	3.41	3.80
Benin	4.69	4.34	4.69	4.56
Botswana	4.19	4.74	5.64	5.43
Burkina Faso	4.30	5.13	7.16	6.41
Burundi	5.46	6.30	8.82	8.02
Cabo Verde	5.29	4.81	4.85	4.35
Cameroon	3.86	4.45	5.26	5.11
Central African Republic	3.89	4.28	3.89	3.92
Chad	5.78	6.28	3.33	3.56
Comoros	4.55	3.48	5.47	5.76
Congo, Dem. Rep.	3.25	1.45	4.49	3.51
Congo, Rep.	3.16	2.13	2.29	4.12
Cote d'Ivoire	6.39	6.21	6.87	5.70
Djibouti	3.95	5.75	8.78	8.87
Egypt, Arab Rep.	3.86	5.43	4.75	5.06
Equatorial Guinea	5.38	2.73	3.83	3.47
Eritrea	4.51	4.06	3.24	3.04
Ethiopia	3.01	4.45	4.95	5.06
Gabon	3.44	2.85	3.49	3.81
Gambia, The	3.26	3.62	5.75	5.95
Ghana	3.09	3.00	5.33	5.39
Guinea	3.53	3.46	4.55	4.69
Guinea-Bissau	6.43	4.94	7.04	5.50
Kenya	4.25	4.68	4.35	4.48
Lesotho	7.45	6.92	10.91	11.48
Liberia		5.91	11.50	10.03

Libya	3.28	3.41	3.05	4.30
Madagascar	4.12	4.98	4.98	4.23
Malawi	4.92	6.06	7.24	8.34
Mali	5.24	6.29	6.88	7.14
Mauritania	4.64	5.24	4.48	3.77
Mauritius	3.62	3.78	5.23	4.82
Morocco	3.91	4.18	5.86	6.01
Mozambique	5.30	6.16	5.98	6.79
Namibia	6.21	6.11	7.96	7.74
Niger	5.96	5.81	6.66	6.55
Nigeria	2.82	2.84	3.49	3.88
Rwanda	4.27	4.22	11.15	11.14
Sao Tome and Principe	7.64	8.86	7.07	6.90
Senegal	3.93	4.63	4.62	4.25
Seychelles	4.99	4.62	3.58	4.03
Sierra Leone	11.02	13.79	10.53	11.84
Somalia*				
South Africa	7.42	8.29	8.66	8.93
South Sudan			1.94	2.23
Sudan	3.69	3.39	6.51	6.54
Swaziland	4.96	5.26	7.96	8.44
Tanzania	3.63	3.38	7.19	7.31
Togo	4.59	5.30	7.85	8.62
Tunisia	5.86	5.40	6.66	7.08
Uganda	8.55	7.22	12.27	9.76
Zambia	4.78	6.52	4.11	5.03
Zimbabwe*				

* Data not available for Somalia and Zimbabwe.

Source: WDI.

Table A2: Out-of-Pocket Health Expenditure (% of Private Expenditure on Health)

Country	2000	2010	2013
World	43.74	45.26	46.10
India	91.81	85.55	85.88
Africa	76.54	73.19	73.3
Algeria	96.72	96.98	97.23
Angola	71.38	71.04	73.19
Benin	99.89	90.67	89.21
Botswana	36.70	11.94	12.66
Burkina Faso	94.35	73.77	82.69
Burundi	73.01	69.75	44.67
Cabo Verde	95.16	89.84	87.69
Cameroon	94.36	94.55	94.12
Central African Republic	93.01	90.45	90.49
Chad	96.20	96.68	96.68
Comoros	100.00	50.03	67.12
Congo, Dem. Rep.	56.51	61.31	69.78
Congo, Rep.	98.92	94.22	96.02
Cote d'Ivoire	78.88	76.85	76.51
Djibouti	98.53	99.22	99.22
Egypt, Arab Rep.	97.42	97.72	97.72
Equatorial Guinea	80.13	86.56	86.40
Eritrea	100.00	100.00	100.00
Ethiopia	79.17	88.50	90.62
Gabon	85.23	85.23	85.23
Gambia, The	53.74	51.96	52.69
Ghana	63.56	65.36	91.86
Guinea	87.94	87.94	87.98
Guinea-Bissau	54.75	58.20	54.36
Kenya	80.40	76.62	76.62
Lesotho	71.12	69.01	69.01
Liberia	50.34	32.95	40.60
Libya	100.00	100.00	100.00
Madagascar	76.57	86.01	80.27
Malawi	40.57	27.53	23.34
Mali	99.10	99.58	99.58
Mauritania	94.62	91.96	90.73
Mauritius	74.64	91.26	91.35
Morocco	76.58	88.34	88.34
Mozambique	40.63	17.46	11.94

Namibia	18.16	17.91	17.90
Niger	87.48	90.86	83.85
Nigeria	92.65	95.68	95.77
Rwanda	40.73	44.64	44.60
Sao Tome and Principe	76.13	87.60	84.25
Senegal	91.60	77.41	77.41
Seychelles	99.09	38.14	36.84
Sierra Leone	92.92	86.23	71.56
Somalia*			
South Africa	22.23	13.88	13.78
South Sudan		96.27	92.29
Sudan	90.98	95.50	96.12
Swaziland	42.39	42.96	41.96
Tanzania	83.47	52.43	52.12
Togo	88.20	84.57	84.57
Tunisia	80.11	81.77	86.68
Uganda	51.80	64.92	69.09
Zambia	55.60	65.71	66.75
Zimbabwe*			

Source: WDI Database.

* Data not available for Somalia and Zimbabwe.

Table A3: Life Expectancy at Birth (Years)

Country	1990	2000	2010	2013
World	65.69	67.68	70.27	70.91
India	58.53	62.16	65.69	66.46
Africa	53.28	53.70	58.18	59.48
Algeria	66.75	68.93	70.62	71.01
Angola	41.14	45.20	50.65	51.87
Benin	53.42	55.19	58.75	59.29
Botswana	62.94	50.49	46.44	47.41
Burkina Faso	49.37	50.48	55.01	56.28
Burundi	47.33	48.21	52.62	54.10
Cabo Verde	65.89	69.59	73.86	74.87
Cameroon	53.59	51.94	53.69	55.04
Central African Republic	46.05	43.69	48.10	50.14
Chad	46.35	46.69	49.77	51.16
Comoros	55.60	57.88	60.20	60.86
Congo, Dem. Rep.	47.44	46.36	48.99	49.94
Congo, Rep.	55.18	52.30	57.20	58.77
Cote d'Ivoire	52.61	46.45	49.68	50.76
Djibouti	56.66	57.01	60.29	61.79
Egypt, Arab Rep.	64.55	68.59	70.45	71.13
Equatorial Guinea	46.56	47.76	51.53	53.11
Eritrea	48.24	56.03	61.19	62.75
Ethiopia	46.94	52.24	61.47	63.62
Gabon	61.29	59.69	62.29	63.44
Gambia, The	52.22	55.17	58.13	58.83
Ghana	56.75	56.99	60.60	61.10
Guinea	49.92	51.25	55.30	56.09
Guinea-Bissau	49.07	51.45	53.56	54.27
Kenya	59.12	52.84	59.55	61.68
Lesotho	59.33	47.18	47.48	49.33
Liberia	47.20	52.41	59.43	60.53
Libya	68.56	71.97	74.79	75.36
Madagascar	51.01	58.47	63.35	64.69
Malawi	47.12	46.03	53.47	55.23
Mali	46.46	49.06	53.77	55.01
Mauritania	58.39	59.67	61.02	61.51
Mauritius	69.40	71.66	72.97	74.46
Morocco	64.68	68.14	70.17	70.87
Mozambique	43.58	47.43	49.14	50.17
Namibia	61.22	55.12	62.48	64.34

Niger	43.95	50.71	56.99	58.44
Nigeria	46.11	46.62	51.29	52.50
Rwanda	32.61	47.64	62.21	63.99
Sao Tome and Principe	61.77	63.29	65.85	66.26
Senegal	57.18	57.77	62.84	63.35
Seychelles			73.20	74.23
Sierra Leone	37.36	38.11	44.84	45.55
Somalia	45.39	50.88	54.02	55.02
South Africa	62.12	55.84	54.39	56.74
South Sudan	43.52	49.23	53.47	55.24
Sudan	55.51	57.98	61.48	62.04
Swaziland	59.35	48.66	48.35	48.94
Tanzania	50.46	49.97	59.18	61.49
Togo	55.85	53.55	55.47	56.49
Tunisia	70.31	72.60	74.60	73.65
Uganda	47.50	48.11	57.30	59.19
Zambia	43.82	41.78	54.53	58.09
Zimbabwe	59.13	43.92	53.59	59.77

Source: WDI Database.

Table A4: Maternal Mortality Ratio (per 100,000 Live Births)

Country	1990	2000	2010	2013
World	380	330	230	210
India	560	370	220	190
Africa	821	667	465	420
Algeria	160	120	92	89
Angola	1400	1100	530	460
Benin	600	490	370	340
Botswana	360	390	210	170
Burkina Faso	770	580	440	400
Burundi	1300	1000	820	740
Cabo Verde	230	84	58	53
Cameroon	720	740	640	590
Central African Republic	1200	1200	960	880
Chad	1700	1500	1100	980
Comoros	630	480	380	350
Congo, Dem. Rep.	1000	1100	810	730
Congo, Rep.	670	610	450	410
Cote d'Ivoire	740	670	750	720
Djibouti	400	360	250	230
Egypt, Arab Rep.	120	75	50	45
Equatorial Guinea	1600	790	330	290
Eritrea	1700	670	450	380
Ethiopia	1400	990	500	420
Gabon	380	330	260	240
Gambia, The	710	580	460	430
Ghana	760	570	410	380
Guinea	1100	950	690	650
Guinea-Bissau	930	840	600	560
Kenya	490	570	460	400
Lesotho	720	680	540	490
Liberia	1200	1100	680	640
Libya	31	21	15	15
Madagascar	740	550	480	440
Malawi	1100	750	540	510
Mali	1100	860	600	550
Mauritania	630	480	360	320
Mauritius	70	28	72	73
Morocco	310	200	130	120
Mozambique	1300	870	540	480
Namibia	320	270	160	130

Niger	1000	850	690	630
Nigeria	1200	950	610	560
Rwanda	1400	1000	390	320
Sao Tome and Principe	410	300	230	210
Senegal	530	480	360	320
Sierra Leone	2300	2200	1200	1100
Somalia	1300	1200	930	850
South Africa	150	150	140	140
South Sudan	1800	1200	830	730
Sudan	720	540	390	360
Swaziland	550	520	350	310
Tanzania	910	770	460	410
Togo	660	580	480	450
Tunisia	91	65	48	46
Uganda	780	650	410	360
Zambia	580	610	320	280
Zimbabwe	520	680	610	470

Source: WDI Database.

Table A5: Infant Mortality rate (per 1,000 live births) for Africa, India and World

Country	1990	2000	2010	2014	2015
World	62.8	53.1	37.5	32.6	31.7
India	88.3	66.4	46.3	39.3	37.9
Africa	91.98	79.61	56.78	49.95	48.62
Algeria	39.7	33.9	23.5	22	21.9
Angola	133.5	128.3	109.6	98.8	96
Benin	108	89.3	71	65.7	64.2
Botswana	41.8	52.4	39.8	35.6	34.8
Burkina Faso	102.5	96.2	69.7	62.2	60.9
Burundi	103.9	93.4	63.8	55.8	54.1
Cabo Verde	48.2	29.1	23.3	21.3	20.7
Cameroon	85.6	91.9	66.2	58.6	57.1
Central African Republic	115.3	113.6	101.7	93.5	91.5
Chad	115.8	105.7	93.6	86.7	85
Comoros	87.9	72.7	63.1	56.6	55.1
Congo, Dem. Rep.	119.8	107.4	84.8	76.5	74.5
Congo, Rep.	60.9	76.6	42.2	34.4	33.2
Cote d'Ivoire	104.9	99.5	76.9	68.5	66.6
Djibouti	92.7	79.7	62.2	55.8	54.2
Egypt, Arab Rep.	63	37	24.3	21	20.3
Equatorial Guinea	127.9	104.8	78.9	70.3	68.2
Eritrea	93	58.3	39.4	35	34.1
Ethiopia	121.6	89.5	50.8	42.9	41.4
Gabon	60.5	55.6	42.8	37	36.1
Gambia, The	80	63.3	51.7	48.6	47.9
Ghana	79.8	64.9	50.2	44.2	42.8
Guinea	140.8	103.1	71.2	62.8	61
Guinea-Bissau	135.5	106.9	73.4	62.4	60.3
Kenya	65.8	66.5	42.4	36.6	35.5
Lesotho	70.8	84.1	75.2	70.5	69.2
Liberia	170.1	123	65.2	54.7	52.8
Libya	35.5	24.2	14.3	11.9	11.4
Madagascar	98.1	69.7	42.1	37	35.9
Malawi	142.5	103.5	57.5	45.1	43.4
Mali	130.6	116	82.9	75.9	74.5
Mauritania	77.9	76.2	70.1	66.1	65.1
Mauritius	19.9	16.4	13.3	12.2	11.8
Morocco	63.1	42.2	28.5	24.6	23.7
Mozambique	159.7	115	71.9	58.5	56.7
Namibia	49.6	49.4	37.5	33.4	32.8

Niger	138.1	101.1	66.1	58.4	57.1
Nigeria	125.9	112	81.5	71.5	69.4
Rwanda	93.2	109.2	43.8	32.7	31.1
Sao Tome and Principe	70.5	58.5	39.8	35.5	34.6
Senegal	70.3	68.5	46.7	42.3	41.7
Seychelles	14.2	12.3	12.2	11.9	11.7
Sierra Leone	156.5	143.3	107	90.2	87.1
Somalia	108.4	105.3	97.8	87.4	85
South Africa	47.4	54	38.2	34.4	33.6
South Sudan	149.7	109.5	70.6	62	60.3
Sudan	79.9	67.8	53.3	48.8	47.6
Swaziland	56	84	59.1	45.8	44.5
Tanzania	100.4	80.3	42.4	36.2	35.2
Togo	90.2	76.2	59.3	53.6	52.3
Tunisia	44.3	26.3	14.9	12.6	12.1

Source: WDI Database.

Table A6: Prevalence of HIV, Total (% of Population Ages 15-49) in Africa, India and World

Country Name	1990	2000	2010	2013	2014
World	0.3	0.8	0.8	0.8	0.8
India			0.28		
Africa	2.1	5.7	5.1	4.9	4.8
Algeria	0.1	0.1	0.1	0.1	0.1
Angola	0.5	1.6	2.3	2.4	2.4
Benin	0.5	1.4	1.2	1.2	1.1
Botswana	6.7	29	26	25.4	25.2
Burkina Faso	3.4	2.4	1.1	1	0.9
Burundi	1.4	3.3	1.6	1.2	1.1
Cabo Verde	0.3	0.8	1	1.1	1.1
Cameroon	2.6	5.5	5.1	4.9	4.8
Central African Republic	4.4	9.6	5.2	4.5	4.3
Chad	1.3	3.3	3	2.6	2.5
Congo, Dem. Rep.	1.6	1.7	1.2	1.1	1
Congo, Rep.	3.9	5.4	3.2	2.9	2.8
Cote d'Ivoire	2.9	5.5	4	3.6	3.5
Djibouti	0.3	3	1.8	1.6	1.6
Egypt, Arab Rep.	0.1	0.1	0.1	0.1	0.1
Equatorial Guinea	0.1	1.5	6.1	6.3	6.2
Eritrea	0.5	1.8	0.9	0.7	0.7
Ethiopia	1.3	3.2	1.4	1.2	1.2
Gabon	1.2	5.5	4.7	4.1	3.9
Gambia, The	0.1	1.5	2	1.9	1.8
Ghana	1.3	2.3	1.7	1.5	1.5
Guinea	0.7	1.9	1.6	1.6	1.6
Guinea-Bissau	0.3	2.2	3.9	3.8	3.7
Kenya		9.9	5.6	5.4	5.3
Lesotho	1.2	22.5	23.3	23.4	23.4
Liberia	0.5	2.3	1.5	1.2	1.2
Madagascar	0.1	0.5	0.4	0.3	0.3
Malawi	8.8	16.6	11.7	10.5	10
Mali	1.6	1.8	1.4	1.4	1.4
Mauritania	0.2	0.8	0.8	0.7	0.7
Mauritius	0.1	0.9	1.1	1	0.9
Morocco	0.1	0.1	0.1	0.1	0.1
Mozambique	1.6	8.9	11.2	10.7	10.6
Namibia	1.6	16	14.3	16.2	16
Niger	0.3	1.2	0.7	0.5	0.5

Nigeria	1.2	3.5	3.5	3.3	3.2
Rwanda	3.8	5.3	3.1	2.9	2.8
Sao Tome and Principe	0.3	1.7	1.1	0.8	0.8
Senegal	0.2	0.7	0.7	0.6	0.5
Sierra Leone	0.1	1	1.6	1.5	1.4
Somalia	0.1	0.7	0.6	0.6	0.5
South Africa	0.4	15.7	18.4	18.8	18.9
South Sudan	0.2	2.1	2.8	2.7	2.7
Sudan	0.1	0.1	0.2	0.2	0.2
Swaziland	1.9	25.2	27.4	27.8	27.7
Tanzania	5.1	7.9	6.1	5.5	5.3
Togo	1.2	3.5	2.8	2.5	2.4
Total					
Tunisia	0.1	0.1	0.1	0.1	0.1
Uganda	13.3	7.4	6.9	7.2	7.3
Zambia	12.7	14.3	13	12.6	12.4
Zimbabwe	11.7	28.4	18	17	16.7

Source: WDI Indicators.

Table A7: Incidence of Tuberculosis (per 100,000 People) in Africa, India and World

Country Name	1990	2000	2010	2013
World	151	152	133	126
India	217	216	185	171
Africa	242	325	278	257
Algeria	64	83	87	81
Angola	207	250	304	320
Benin	127	86	69	70
Botswana	545	914	518	414
Burkina Faso	87	70	58	54
Burundi	164	290	144	128
Cabo Verde	175	160	147	143
Cameroon	110	309	260	235
Central African Republic	864	1073	431	359
Chad	96	151	151	151
Comoros	54	39	33	34
Congo, Dem. Rep.	328	327	327	326
Congo, Rep.	177	356	386	382
Cote d'Ivoire	246	367	196	170
Djibouti	626	619	620	619
Egypt, Arab Rep.	35	26	18	16
Equatorial Guinea	86	100	133	144
Eritrea	242	157	100	92
Ethiopia	369	421	268	224
Gabon	230	515	473	423
Gambia, The	128	185	178	173
Ghana	156	152	85	66
Guinea	249	228	186	177
Guinea-Bissau	255	305	372	387
Kenya	140	286	299	268
Lesotho	306	992	1119	916
Liberia	199	240	293	308
Libya	40	40	40	40
Madagascar	393	293	241	233
Malawi	335	463	218	156
Mali	76	77	63	60
Mauritania	434	250	135	115
Mauritius	28	24	22	21
Morocco	147	118	100	104
Mozambique	403	513	545	552

Namibia	404	1514	820	651
Niger	363	191	113	102
Nigeria	262	325	339	338
Rwanda	83	98	88	69
Sao Tome and Principe	135	114	96	91
Senegal	137	155	136	136
Seychelles	68	29	21	30
Sierra Leone	252	305	317	313
Somalia	286	285	286	285
South Africa	313	585	948	860
South Sudan				146
Sudan	170	144	110	108
Swaziland	275	802	1279	1382
Tanzania	228	238	174	164
Togo	47	72	72	73
Tunisia	29	25	28	32
Uganda	625	427	209	166
Zambia	716	711	463	410
Zimbabwe	302	725	635	552

Source: WDI Indicators.

Table A8: Malaria- Number of Reported Deaths in Africa and India

Country	2010	2011	2012	2013
India	1018	754	519	440
Algeria	5	1	0	3
Angola	8114	6909	5736	7300
Benin	964	1753	2261	2288
Botswana	8	8	3	7
Burkina Faso	9024	7001	7963	6294
Burundi	2677	2233	2263	3411
Cabo Verde	1	1	1	0
Cameroon	4536	3808	3209	4349
Central African Republic	526	858	1442	1026
Chad	886	1220	1359	1881
Comoros	53	19	17	15
Congo		892	623	2870
Côte d'Ivoire	1023	1389	1534	3261
Democratic Republic of the Congo	23476	23748	21601	30918
Djibouti	0	0	0	17
Egypt	2	4		
Equatorial Guinea	30	52	77	66
Eritrea	27	12	30	6
Ethiopia	1581	936	1621	358
Gabon	182	74	134	273
Gambia	151	440	289	262
Guinea	735	743	979	108
Guinea-Bissau	296	472	370	418
India	1018	754	519	440
Kenya	26017	713	785	360
Liberia	1422		1725	1191
Madagascar	427	398	552	641
Malawi	8206	6674	5516	3723
Mali	3006	2128	1894	1680
Mauritania	211	77	106	25
Morocco	2			
Mozambique	3354	3086	2818	2941
Namibia	63	36	4	21
Niger	3929	2802	2825	2209
Nigeria	4238	3353	7734	7878
Rwanda	670	380	459	409
Sao Tome and Principe	14	19	7	11
Senegal	553	472	649	815

Sierra Leone	8188	3573	3611	4326
Somalia	6	5		
South Africa	83	54	72	104
South Sudan	1053	406	1321	1311
Sudan	1023	612	618	685
Swaziland	8	1	3	4
Togo	1507	1314	1197	1361
Uganda	8431	5958	6585	7277
United Republic of Tanzania	15867	11806	7820	84009
Zambia	4834	4540	3705	3548
Zimbabwe	255	451	351	352

Source: WHO Database.

**Table A9: Cause of Death, by Communicable Diseases and Maternal, Prenatal and Nutrition Conditions
(%of total)**

Country	2000	2012	3611	4326
World	30.95	23.01		
India	39.8	27.9	72	104
Algeria	19.5	14.5	1321	1311
Angola	76.1	66.4	618	685
Benin	67	55.2	3	4
Botswana	80.7	54	1197	1361
Burkina Faso	74.8	58.4	6585	7277
Burundi	68.8	60.3	7820	84009
Cabo Verde	33.2	22.5	3705	3548
Cameroon	69.4	60.5	351	352
Central African Republic	79.4	73		
Chad	75.3	72.1		
Comoros	55.8	51.1		
Congo, Dem. Rep.	73.8	66.9		
Congo, Rep.	69.7	61.9		
Cote d'Ivoire	72.6	60.7		
Djibouti	60.8	54.8		
Egypt, Arab Rep.	18.2	10.7		
Equatorial Guinea	64.1	58.7		
Eritrea	39.1	51.8		
Ethiopia	71.3	59.5		
Gabon	61.8	56		
Gambia, The	65	59.1		
Ghana	64.9	50.7		
Guinea	71.3	61		
Guinea-Bissau	70.7	64.1		
Kenya	76	63.8		
Lesotho	67.9	64.1		
Liberia	71.5	58.2		
Libya	13.4	9.8		
Madagascar	60.9	50.5		
Malawi	80.8	65.1		
Mali	68.7	60.3		
Mauritania	65.7	60.3		
Mauritius	6.1	8.2		
Morocco	26	17.8		
Mozambique	70.2	66.1		
Namibia	63.6	46.8		

Niger	78.8	67.6		
Nigeria	73.3	65.6		
Rwanda	73.4	51.6		
Sao Tome and Principe				
Senegal	69.2	57.2		
Seychelles				
Sierra Leone	70.5	66.3		
Somalia	75.1	69		
South Africa	51.3	48.5		
South Sudan	71.2	63.4		
Sudan	62	52.8		
Swaziland	67.6	63.1		
Tanzania	71.5	57.9		
Togo	68.9	61.9		
Tunisia	14.4	10.8		
Uganda	75.3	60		
Zambia	77.1	66.7		
Zimbabwe	80.4	61.5		

Source: WDI Database.

Note: Cause of death refers to the share of all deaths for all ages by underlying causes. Communicable diseases and maternal, prenatal and nutrition conditions include infectious and parasitic diseases, respiratory infections, and nutritional deficiencies such as underweight and stunting.

Table A10: Polio (Pol3) Immunization Coverage Among 1-Year-olds (%) in Africa and India

Country name	2010	2011	2012	2013	2014
India	76	79	79	82	82
Algeria	95	95	95	95	95
Angola	92	85	88	80	81
Benin	77	77	78	71	72
Botswana	96	96	96	96	96
Burkina Faso	90	90	90	89	91
Burundi	94	95	96	96	95
Cabo Verde	99	90	94	93	95
Cameroon	83	80	85	88	86
Central African Republic	46	47	47	23	47
Chad	43	40	56	56	54
Comoros	82	85	85	82	79
Congo	72	78	79	85	90
Cote d' Ivoire	81	58	83	79	66
Democratic Republic of the Congo	76	77	76	74	79
Djibouti	88	87	81	82	78
Egypt	97	96	93	97	94
Equatorial Guinea	59	39	30	30	30
Eritrea	90	96	94	94	94
Ethiopia	69	70	70	70	75
Gabon	68	75	80	77	68
Gambia	97	95	98	96	97
Ghana	94	91	91	91	98
Guinea	62	63	63	63	42
Guinea-Bissau	78	78	78	78	78
Kenya	83	88	82	82	81
Lesotho	92	95	95	95	95
Liberia	71	77	80	75	49
Libya	98	98	98	96	94
Madagascar	70	73	71	73	73
Malawi	86	97	95	89	87
Mali	77	72	75	77	84
Mauritania	52	73	80	80	84
Mauritius	99	98	98	98	98
Morocco	99	98	99	99	99
Mozambique	73	73	73	78	78
Namibia	83	85	84	89	88
Niger	75	40	71	56	67

Nigeria	54	48	42	63	66
Romania	94	89	92	88	94
Sao Tome and Principe	98	96	96	97	95
Senegal	76	89	83	89	85
Seychelles	99	99	98	98	99
Sierra Leone	84	88	91	92	83
Somalia	49	49	47	47	47
South Africa	74	73	69	66	71
South Sudan		66	64	50	44
Sudan	90	93	92	93	94
Swaziland	89	85	92	98	98
Togo	83	85	84	84	85
Tunisia	98	98	97	98	98
Uganda	79	82	82	82	82
United Republic of Tanzania	94	88	90	91	97
Zambia	80	83	70	74	78
Zimbabwe	89	93	95	95	92

Source: WDI Database.

Table A11: Africa's Imports of Total Pharmaceutical Products from Different Countries (in USD Million)

Year	World		China			EU27			India			United States		
	Quantum	Y-o-Y	Share	Y-o-Y	Quantum	Share	Y-o-Y	Quantum	Share	Y-o-Y	Quantum	Share	Y-o-Y	
2000	3693.22		2.77		2138.30	57.90		114.47	3.10		322.74	8.74		
2001	4192.36		2.83	15.73	2504.93	59.75	17.15	151.94	3.62	32.74	320.81	7.65	-0.60	
2002	4818.02		3.08	25.29	2859.04	59.34	14.14	206.68	4.29	36.02	352.73	7.32	9.95	
2003	5834.35		3.45	35.64	3445.30	59.05	20.51	270.97	4.64	31.10	401.72	6.89	13.89	
2004	6727.00		3.17	5.89	3899.18	57.96	13.17	307.24	4.57	13.39	522.87	7.77	30.16	
2005	7700.16		3.65	31.53	4492.01	58.34	15.20	432.06	5.61	40.62	540.42	7.02	3.36	
2006	9423.42		5.26	76.72	5041.39	53.50	12.23	645.14	6.85	49.32	726.34	7.71	34.40	
2007	12159.32		5.12	25.51	6224.67	51.19	23.47	894.54	7.36	38.66	926.67	7.62	27.58	
2008	16200.57		6.19	60.93	8281.74	51.12	33.05	1311.55	8.10	46.62	1038.53	6.41	12.07	
2009	15192.89		7.21	9.27	7567.67	49.81	-8.62	1258.66	8.28	-4.03	1101.21	7.25	6.04	
2010	17985.13		6.68	9.75	8244.35	45.84	8.94	1583.35	8.80	25.80	1499.04	8.33	36.13	
2011	19351.57		7.27	17.11	9117.84	47.12	10.59	1613.94	8.34	1.93	1463.90	7.56	-2.34	
2012	19899.31		7.79	10.21	9642.62	48.46	5.76	1950.61	9.80	20.86	1343.32	6.75	-8.24	
2013	21498.58		7.79	7.96	10338.33	48.09	7.21	2559.97	11.91	31.24	1353.25	6.29	0.74	
2014	16455.67		7.40	-27.23	7933.04	48.21	-23.27	1797.55	10.92	-29.78	1073.25	6.52	-20.69	
CAGR	10.47				9.13			20.15			8.34			

Source: WITS Online Database.

Table A12: Africa's Top 10 Importing Partner for Bulk & Formulation as per Year 2014 (USD Million)

Bulk Drugs													
Countries	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
China	116.15	164.67	168.22	213.93	377.61	476.06	793.81	859.08	953.02	1111.64	1187.13	1248.20	971.46
Germany	161.62	228.86	208.12	259.79	345.40	447.09	651.39	407.80	496.02	593.73	639.89	725.38	593.50
Australia	236.97	254.18	414.31	431.69	583.39	647.41	560.77	381.36	550.28	608.34	459.71	568.45	493.15
India	62.96	82.36	73.38	125.39	173.10	214.73	323.90	319.46	408.16	432.15	594.41	674.99	403.73
Korea, Rep.	25.84	42.09	28.53	44.40	86.01	154.70	191.52	139.14	167.38	199.87	267.36	373.24	335.81
United States	216.61	221.47	245.75	262.16	398.40	470.92	456.09	419.00	553.96	545.02	509.16	409.62	307.94
France	172.35	189.43	220.22	232.55	238.76	316.80	427.60	375.89	397.30	425.16	450.41	419.09	293.78
Saudi Arabia	42.01	64.26	103.22	131.58	110.95	121.04	264.09	99.90	234.86	380.84	344.98	299.49	265.14
South Africa	120.24	109.42	140.38	110.92	176.26	172.15	213.30	172.29	202.69	415.08	259.26	260.96	171.52
Switzerland	39.52	51.60	49.20	64.10	59.06	58.30	109.19	116.50	146.61	157.82	152.97	156.31	154.32
World	2105.42	2459.75	2662.67	3058.00	4080.42	5112.82	7004.59	5766.70	7526.75	8157.40	7954.39	8318.76	5944.66
Formulation													
Countries	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
France	985.30	1149.56	1350.94	1458.26	1447.42	1835.51	2298.67	2040.24	2221.81	2252.94	2215.13	2285.67	1837.10
Germany	184.31	230.18	250.75	348.71	361.60	433.48	698.32	816.90	898.68	1151.31	1543.94	1790.02	1597.11
India	143.72	188.61	233.87	306.67	472.04	679.81	987.65	939.20	1175.19	1181.79	1356.20	1884.99	1393.83
United States	136.12	180.24	277.12	278.27	327.93	455.75	582.44	682.21	945.08	918.88	834.16	943.63	765.30
Switzerland	114.01	137.31	137.84	190.18	284.89	452.71	603.97	660.54	708.40	857.88	830.74	834.33	631.16
United Kingdom	197.12	239.83	261.76	276.36	325.01	404.85	441.56	420.54	475.60	525.09	538.39	519.10	480.61
Belgium	99.99	150.05	150.51	196.05	207.18	267.26	340.32	264.81	324.73	354.32	409.90	530.85	411.41
Denmark	82.57	99.11	151.30	155.38	263.31	249.51	377.92	455.37	364.84	460.71	558.42	584.05	408.32
Italy	104.05	111.03	150.34	184.33	205.74	253.63	313.91	358.79	408.53	428.70	447.11	450.32	359.81
South Africa	129.10	164.27	237.39	201.66	235.37	312.17	311.31	408.57	372.26	520.12	486.37	406.97	328.26
World	2712.60	3374.61	4064.34	4642.16	5343.00	7046.49	9195.98	9426.20	10458.38	11194.16	11944.92	13179.82	10511.02

Source: WITS Online Database.

Table A13: India's Exports of Pharmaceutical Products to African Region for 2013-14

African Region	Bulk						Formulation						Total Pharmaceuticals					
	2013		2014		Y-o-Y		2013		2014		Y-o-Y		2013		2014		Y-o-Y	
	Value	%	Value	%	Value	%	Value	%	Value	%	Value	%	Value	%	Value	%	Value	%
Eastern	117.76	16.92	110.66	18.19	-6.03		1106.29	39.4	1180.56	40.98	6.71		1224.05	34.93	1291.22	37	5.49	
Middle	8.1	1.15	9.07	1.49	11.9		204.55	7.28	254.06	8.82	24.2		212.65	6.07	263.12	7.54	23.73	
Northern	255.4	36.7	241.18	39.65	-5.57		165.07	5.88	166.85	5.79	1.08		420.47	12	408.03	11.69	-2.96	
Southern	190.02	27.32	135.98	22.36	-28.44		581.77	20.72	522.82	18.15	-10.13		771.79	22.03	658.8	18.88	-14.64	
Western	124.59	17.9	111.37	18.31	-10.6		750.47	26.72	756.87	26.27	0.85		875.05	24.97	868.25	24.88	-0.78	
Total	695.86	100	608.25	100	-12.59		2808.15	100	2881.16	100	2.6		3504.02	100	3489.42	100	-0.42	

Notes: Values are in USD Million.

Source: WITS Online Database.

Table A14: India's Exports of Bulk Drugs to Africa (USD '000)

Rank	Countries	2000		2013		2014	
		Value	Share	Value	Share	Value	Share
	All African Countries	50613.08	100.00	695862.85	100.00	607843.45	100.00
1	Egypt	10018.71	19.79	150754.17	21.66	162733.62	26.77
2	South Africa	9497.80	18.77	184444.39	26.51	131966.41	21.71
3	Nigeria	7261.31	14.35	84923.63	12.20	80831.67	13.30
4	Kenya	6051.06	11.96	58402.92	8.39	54089.76	8.90
5	Algeria	70.94	0.14	34850.22	5.01	30056.45	4.94
6	Sudan			27956.08	4.02	23334.18	3.84
7	Uganda	1465.37	2.90	19984.61	2.87	17912.49	2.95
8	Ghana	2292.12	4.53	19138.19	2.75	16139.43	2.66
9	Morocco	1311.13	2.59	23354.01	3.36	14188.29	2.33
10	Tanzania	3530.99	6.98	15863.18	2.28	13886.70	2.28
11	Ethiopia	1310.63	2.59	14933.50	2.15	13274.79	2.18
12	Tunisia	25.03	0.05	11507.86	1.65	10275.79	1.69
13	Congo, Dem. Rep.	60.40	0.12	2886.18	0.41	5279.95	0.87
14	Cote d'Ivoire	308.31	0.61	3475.19	0.50	5259.46	0.87
15	Swaziland			5115.76	0.74	3565.02	0.59
16	Mozambique	38.46	0.08	2017.47	0.29	3333.97	0.55
17	Togo	20.08	0.04	4005.66	0.58	2891.20	0.48
18	Senegal	64.72	0.13	5313.33	0.76	2180.27	0.36
19	Benin	230.45	0.46	1564.63	0.22	1890.47	0.31
20	Zimbabwe	1078.74	2.13	655.94	0.09	1796.00	0.30
21	Cameroon	202.96	0.40	781.41	0.11	1552.55	0.26
22	Zambia	679.26	1.34	1526.75	0.22	1507.45	0.25
23	Mauritius	1217.77	2.41	1550.07	0.22	1425.90	0.23
24	Malawi	65.59	0.13	663.71	0.10	1421.48	0.23
25	Angola	3.68	0.01	1195.48	0.17	1406.16	0.23
26	Guinea	61.62	0.12	3631.64	0.52	800.45	0.13
27	Djibouti	44.24	0.09	404.76	0.06	791.42	0.13
28	Congo, Rep.	1830.53	3.62	1654.81	0.24	784.52	0.13
29	Libya	78.77	0.16	6975.79	1.00	587.44	0.10
30	Madagascar	95.70	0.19	488.02	0.07	547.76	0.09
31	Liberia	2.02	0.00	661.87	0.10	451.69	0.07
32	Sierra Leone	6.67	0.01	609.05	0.09	410.48	0.07
33	Mali	583.31	1.15	316.09	0.05	256.15	0.04
34	Burundi	37.57	0.07	693.86	0.10	248.45	0.04

35	Eritrea			246.76	0.04	239.15	0.04
36	Gambia	11.37	0.02	98.03	0.01	120.41	0.02
37	Rwanda	19.15	0.04	227.51	0.03	92.30	0.02
38	Somalia	31.82	0.06	89.21	0.01	82.52	0.01
39	Burkina Faso	6.60	0.01	64.57	0.01	63.46	0.01
40	Mauritania			390.63	0.06	53.30	0.01
41	Namibia	169.04	0.33	37.24	0.01	47.00	0.01
42	Chad	105.51	0.21	1426.18	0.20	21.90	0.00
43	Niger	253.88	0.50	356.17	0.05	20.36	0.00
44	Gabon	5.96	0.01	147.17	0.02	11.92	0.00
45	Seychelles	40.69	0.08	10.10	0.00	5.24	0.00
46	Guinea-Bissau	8.33	0.02	33.43	0.00	4.37	0.00
47	Botswana	35.69	0.07	24.00	0.00	3.41	0.00
48	Central African Republic	166.47	0.33	2.13	0.00	0.29	0.00
49	Cape Verde				0.00		
50	Comoros	212.63	0.42	3.02	0.00		
51	Equatorial Guinea			7.89	0.00		
52	Lesotho			398.64	0.06		
53	Sao Tome and Principe						

Source: WITS COMTRADE database online accessed on 07-Sept-2015.

Note: Value for South Sudan is missing.

Table A15: India's Exports of Formulation to Africa (USD Million)

Rank	Countries	2000	2013	2014		2014	
		Value	Share	Value	Share	Value	Share
	All African Countries	197.03	100.00	2808.15	100.00	2881.16	100.00
1	South Africa	13.83	7.02	495.72	17.65	437.80	15.20
2	Nigeria	70.94	36.01	380.58	13.55	380.05	13.19
3	Kenya	13.30	6.75	218.80	7.79	236.32	8.20
4	Tanzania	11.59	5.88	139.52	4.97	207.68	7.21
5	Ghana	10.73	5.44	151.80	5.41	157.84	5.48
6	Uganda	10.86	5.51	146.56	5.22	140.72	4.88
7	Ethiopia	4.31	2.19	139.18	4.96	118.12	4.10
8	Zambia	6.90	3.50	121.98	4.34	105.43	3.66
9	Malawi	1.57	0.80	79.14	2.82	105.13	3.65
10	Zimbabwe	2.11	1.07	97.93	3.49	92.54	3.21
11	Mozambique	0.67	0.34	63.10	2.25	66.76	2.32
12	Angola	1.30	0.66	65.21	2.32	65.07	2.26
13	Sudan	0.00	0.00	60.03	2.14	63.68	2.21
14	Cameroon	3.29	1.67	32.54	1.16	61.52	2.14
15	Congo, Dem. Rep.	1.97	1.00	36.11	1.29	60.31	2.09
16	Algeria	0.97	0.49	48.13	1.71	48.32	1.68
17	Congo, Rep.	10.75	5.46	31.80	1.13	39.30	1.36
18	Guinea	4.13	2.10	27.52	0.98	37.15	1.29
19	Mauritius	3.75	1.90	32.65	1.16	35.61	1.24
20	Benin	4.55	2.31	38.63	1.38	34.03	1.18
21	Namibia	0.55	0.28	17.16	0.61	28.93	1.00
22	Rwanda	0.79	0.40	23.51	0.84	28.58	0.99
23	Burkina Faso	0.49	0.25	34.15	1.22	25.94	0.90
24	Mali	1.48	0.75	15.59	0.56	25.53	0.89
25	Cote d'Ivoire	0.93	0.47	18.31	0.65	24.14	0.84
26	Egypt	3.15	1.60	20.72	0.74	23.80	0.83
27	Botswana	0.12	0.06	39.36	1.40	21.68	0.75
28	Niger	1.15	0.58	23.95	0.85	21.00	0.73
29	Lesotho	0.06	0.03	17.57	0.63	19.74	0.69
30	Chad	0.38	0.19	26.91	0.96	17.99	0.62
31	Morocco	0.37	0.19	19.51	0.69	15.58	0.54
32	Madagascar	0.93	0.47	13.90	0.50	15.14	0.53
33	Swaziland	0.35	0.18	11.96	0.43	14.66	0.51
34	Burundi	0.27	0.14	13.30	0.47	12.54	0.44
35	Libya	0.03	0.01	14.46	0.52	11.94	0.41

36	Sierra Leone	0.47	0.24	12.17	0.43	11.86	0.41
37	Togo	0.49	0.25	12.17	0.43	11.11	0.39
38	Senegal	1.48	0.75	14.97	0.53	9.74	0.34
39	Somalia	1.67	0.85	8.02	0.29	9.17	0.32
40	Liberia	0.61	0.31	9.49	0.34	7.99	0.28
41	Mauritania	0.09	0.05	5.32	0.19	5.68	0.20
42	Central African Republic	0.04	0.02	4.77	0.17	5.17	0.18
43	Eritrea	0.00	0.00	5.19	0.18	4.32	0.15
44	Tunisia	0.09	0.04	2.23	0.08	3.53	0.12
45	Gambia, The	0.39	0.20	4.16	0.15	3.51	0.12
46	Gabon	0.07	0.03	6.13	0.22	3.12	0.11
47	Seychelles	0.17	0.09	1.99	0.07	1.67	0.06
48	Equatorial Guinea	0.02	0.01	1.05	0.04	1.51	0.05
49	Guinea-Bissau	2.06	1.04	1.39	0.05	1.09	0.04
50	Djibouti	0.59	0.30	1.33	0.05	0.65	0.02
51	Cape Verde	0.01	0.01	0.30	0.01	0.21	0.01
52	Comoros	0.22	0.11	0.18	0.01	0.19	0.01
53	Sao Tome and Principe	0.00	0.00	0.04	0.00	0.07	0.00

Source: WITS COMTRADE database online accessed on 07-Sept-2015.

Note: Value for South Sudan is missing.

Table A16: UN and Sustainable Development Goals (SDGs)

Following the conclusion of the MDGs, the UN adopted a new set of development goals referred to as Sustainable Development Goals, which are to be achieved by 2030.

There are 17 goals which include:

1. End poverty in all its forms everywhere,
2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture,
3. **Ensure healthy lives and promote well-being for all at all ages,**
4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all,
5. Achieve gender equality and empower all women and girls,
6. Ensure availability and sustainable management of water and sanitation for all,
7. Ensure access to affordable, reliable, sustainable and modern energy for all,
8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all,
9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation,
10. Reduce inequality within and among countries,
11. Make cities and human settlements inclusive, safe, resilient and sustainable,
12. Ensure sustainable consumption and production patterns,
13. Take urgent action to combat climate change and its impacts,
14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development,
15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss,
16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels, and
17. Strengthen the means of implementation and revitalize the global partnership for sustainable development.

Specific targets have also been laid down for every goal.

As evident from the above the SDG-3 is directly related to the health and well being. However, other goals that also relate to the health sector are Goal 2, 5, 6, 7.

Endnotes

¹The Millennium Development Goals were eight international development goals that were established in the Millennium Summit 2000 by the United Nations Organisation setting the targets to be achieved by 2015. These eight goals were: 1. to eradicate extreme poverty and hunger, 2. to achieve universal primary education, 3. to promote gender equality, 4. to reduce child mortality, 5. to improve maternal health, 6. to combat HIV/AIDS, malaria, and other diseases, 7. to ensure environmental sustainability, and 8. to develop a global partnership for development. To achieve these goals specific targets within each goal were also later laid down.

²For details, please see Annexure Table A 16.

³Available at <http://www.mohfw.nic.in/showfile.php?lid=3014>. Accessed on 14 October, 2015.

⁴ibid.

⁵Details available at <http://agenda2063.au.int/>

⁶The African Regional Health Report 2014, WHO “The Health of the people”.

⁷The African Regional Health Report 2014, WHO “The Health of the people”.

⁸The African Regional Health Report 2014, WHO “The Health of the people”.

⁹The African Regional Health Report 2014, WHO “The Health of the people”.

¹⁰The African Regional Health Report 2014, WHO “The Health of the people”.

¹¹http://www.who.int/csr/don/2014_6_25_polio/en/

¹²http://www.theglobalfund.org/en/news/2010-11-10_Gift_from_Africa_Private_Sector_summit_in_Rwanda_raises_USD_2_Million_for_the_Global_Fund_to_Fight_AIDS_Tuberculosis_and_Malaria/

¹³PMI is an interagency initiative led by the U.S. Agency for International Development (USAID) and implemented together with the U.S. Centers for Disease Control and Prevention (CDC) of the U.S. Department of Health and Human Services (HHS).

¹⁴Source: Drawn from various sources such the websites and publications of the companies.

¹⁵Triomed is a medical device designed for prevention, treatment and rehabilitation of health. The device reproduces low-intensity radiation of the millimeter waves, characteristic of biological structures. These waves are control signals aimed at optimization (harmonization) of work of all systems of the body.

¹⁶<http://indoafrikan.org>.

¹⁷<http://indoafrikan.org/Indias%20Iniated.pdf>

¹⁸<http://www.panafricanenetwork.com>

¹⁹The status is as collected from <http://www.panafricanenetwork.com/Portal/ProjectDetails.jsp?projectidhide=7&projectnamehide=Implementation%20Status> on 15 September, 2015

²⁰<http://www.panafricanenetwork.com/Portal/ProjectDetails>.

²¹Taken from Article ET available at < http://articles.economicstimes.indiatimes.com/2014-09-01/news/53441683_1_preferred-destination-medical-tourists-medical-tourism >

²²KPMG-FICCI Report on Medical Value Travel in India 2014 available at < <https://www.kpmg.com/IN/en/IssuesAndInsights/ArticlesPublications/Documents/KPMG-FICCI-Heal-Sep2014.pdf>>

²³Apollo's customers can save up to 6 per cent on return business class and up to 4 per cent on return economy class bookings across the Emirates network in India. 10 per cent saving on business class and up to 5 per cent on economy class bookings from selected points of origin to India is also provided to travellers.

²⁴<http://addisstandard.com/four-hundred-fifty-ethiopians-treated-at-a-full-day-eye-care-camp/>

²⁵Exim Bank Annual Report 2014-15.

²⁶“Trends in India's Trade in Pharmaceutical Sector: Some Insights” by Dr M.Kallummal & Ms. K. Bugalya, Centre for WTO Studies, August 2012.

²⁷The African Union Commission, Agenda 2063, draft document, May 2014.

²⁸<http://www.tkdل.res.in/tkdل/langdefault/common/Abouttkdل.asp?GL=Eng>

²⁹RIS, The Living Tree, Academic Foundation, 2014. P.256

³⁰Source::clinical trials.gov

³¹<http://www.barefootcollege.org/barefoot-college-announces-commitment-to-launch-six-solar-engineering-training-centers-in-africa/>

“Barefoot College, Ajmer currently has more than 70 trained rural semi-literate and illiterate women working as Barefoot Solar Engineers in Sierra Leone and Liberia. Barefoot College has launched an initiative together with UN Women across both countries to distribute, install and maintain household solar electrification and mini solar plants available for diagnostic clinics & maternal health centres” *ibid*.

³²“Yeshasvini Cooperative Farmers Health Care Scheme” (Yeshasvini Scheme) was introduced by the State Government to the Co-operative farmers of Karnataka in 2002 It is a Self Funded Healthcare Scheme wherein the beneficiaries contribute a small amount of money every year to avail any possible surgery during the period. The beneficiaries are offered cashless treatment subject to conditions of the scheme at the Network Hospitals spread across the State of Karnataka. See, <http://www.yeshasvini.kar.nic.in>.

³³<http://www.icmr.nic.in/>

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