

Trade-offs in health investments: HIV, Malaria and Malnutrition

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Abstract

While life expectancy has increased worldwide during the last decades, the developing world is still losing millions of lives each year due to three pervasive illnesses: Malaria, HIV and Chronic Malnutrition. This work analyzes the observed trade-offs between health investments on these three conditions and their incidence in Ghana and Nigeria during the period 2005-2015. We use data from the OCDE credit report system database together with data on incidence from the World Health Organization, World Bank, Global Fund and the Bill and Melinda Gates Foundation. Results of the cross-data analysis show that: (i) the largest investments go to HIV in both countries, (ii) both malaria and HIV receive investments much larger than those directed to malnutrition, even when the incidence of chronic malnutrition is larger (Ghana), (iii) investments in malaria are larger in Ghana than in Nigeria despite that malaria incidence is higher in Nigeria, and (iv) the Southern states of both countries receive larger health investments in detriment of the poorest Northern areas. We identify and discuss several factors that may explain the mismatch between health funds and incidence for these conditions as well as the apparently low investments in chronic malnutrition in comparison to HIV and Malaria.

Keywords: HIV/AIDS, Malaria, Malnutrition, health investments, trade-offs

1. Introduction

Since the beginning of the HIV/AIDS epidemic, funds towards combating this disease haven increased systematically, although at a decreasing rate in the last years. The fact that this condition was affecting not only developing countries but also developed countries got the allocation of more resources than ever to the health sector all around the world, thanks to the involvement of multilateral and bilateral organizations as well as foundations such as Bill and Melinda Gates Foundation, the Bill Clinton Foundation, and the creation of the Global Fund, focused on HIV/AIDS, Malaria and TB. The amount of funds devoted to HIV/AIDS reached such levels that in several sub-Saharan African states investments approximate or exceed the entirety of their national budgets (Shiffman, 2008). Such massive investments were beneficial to attract more attention from the donor community to health related issues, but it also produced displacement effects since the growing share of HIV/AIDS as a share of total health aid was accompanied by global stagnation in health population aid, and decreased the attention towards malaria fighting (Shiffman, 2006, Lordan et al , 2011).

But HIV/AIDS is not the only condition that causes millions of deaths in Sub-Saharan Africa, malaria and chronic malnutrition incidence are very high in this part of Africa (and in many other developing regions around the world). The fight against malaria started later than the fight against HIV/AIDS, but has yielded dramatic progress over the last 10–15 years (USAID, 2015)). The World Health Organization (WHO) estimates that the scale-up of malaria control interventions between 2001 and 2013 resulted in an estimated 4.3 million fewer malaria deaths. These impressive results – particularly in sub-Saharan Africa – are due to a massive scale-up of malaria prevention and case management measures resulting from the combined efforts of national malaria control programs (NMCPs), a broad range of partners, and the launch of three major initiatives: the Global Fund to Fight AIDS, Tuberculosis and Malaria in 2002, The World Bank Malaria Booster Program in 2004, and the U.S. President’s Malaria Initiative (PMI) in 2005. More recently, The Bill & Melinda Gates Foundation has adopted malaria eradication as its primary goal. This shift also is reflected in the Roll Back Malaria

Partnership's draft second Global Malaria Action Plan 2, 2016–2030 (GMAP 2) and WHO's draft Global Technical Strategy (GTS). These efforts have led to the eradication of malaria in 17 countries, between 2000 and 2015. Despite these achievements, there are still voices that claim that malaria is still underfunded relative to its share of disease burden (Shiffman 2006, WHO,2016).

Investments in chronic malnutrition have been way below investments in HIV/AIDS or malaria. Nutrition has been a neglected area of global health and development, accounting for less than 1 percent of global foreign aid. This is largely due to its underlying and often hidden role in child illnesses and deaths. Nutrition-related factors contribute to about 45 percent of child deaths under age 5. Among undernourished children who survive, more than one quarter suffer from stunted growth, which can impair neurological development and learning.

The objective of this paper is to analyze funding trends regarding HIV, malaria and malnutrition in two countries of Sub-Saharan Africa. The final objective of this study is to determine whether the allocation of resources has been done effectively in order to prevent and battle these diseases, allocating more resources to the areas of higher incidence.. Nigeria is the most populous country and the largest economy of the African continent; in addition, the country shows growing incidence of HIV and Malaria despite significant investments to fight these diseases. Malnutrition is also very high. Ghana is close to Nigeria not only geographically but also in terms of the incidence of these conditions.

The analysis is based on two main databases: one for the health investments reported by the OECD credit report system and another one for the incidence of Malaria and HIV by WHO and the WB. In addition, another database has been used in order to retrieve the data of refugees by the UNHCR, as a complement to the analysis of Nigeria, where the conflict of Boko Haram is causing significant implications in health and health investments.

The structure followed is the following: first, we begin with a brief description of the selected diseases and countries (Section 2. Background). Section 3 focus on the data and

methodology used. Section 4 presents the results. Finally, section 4 discusses the results and concludes.

2. Background

2.1. Malaria, HIV and Malnutrition

Malaria

Malaria is a preventable and treatable infectious disease caused by parasites of the Plasmodium family and transmitted by female Anopheles mosquitoes. There are four different malaria species: *P. falciparum*, *P. vivax*, *P. malariae* and *P. ovale*. The first two are the most prevalent species of malaria and *P. falciparum* is the most dangerous. *P. knowlesi* is a zoonotic plasmodium that is also known to infect humans (WHO, 2016)

Many medical advancements have been made in order to prevent, diagnose and treat malaria. The main methods used for the prevention of malaria are long-lasting insecticidal nets (LLINs), indoor residual spraying (IRS) in which insecticides are sprayed on the walls of homes, and intermittent preventive treatment for pregnant women (IPTp) (Roll Back Malaria Partnership, 2008). Despite the efforts of the last years in the development of a vaccine against malaria, nowadays there is no licensed malaria vaccine. The RTS,S/AS01 is the most advanced vaccine against the most dangerous specie, the *P. falciparum*. Researches to find a vaccine against malaria are currently taken and more than 20 other vaccines are being evaluated as we can see in (*Annex 5*) (WHO, 2016).

Malaria kills each year more than one million people, the majority in sub-Saharan Africa, where malaria is the leading cause of death for children under five. In fact, more than 90% of malaria deaths occur in Sub-Saharan Africa; where Nigeria and Democratic Republic of the Congo account for about the 40% of estimated mortality due to malaria worldwide. In addition, half of the world's population, 3.2 billion people, is at risk of infection (Roll Back Malaria Partnership, 2017).

The population with the highest biological risk of getting infected by malaria are infants and young children (from six months to five years), pregnant women, non-immune people (as for travelers, laborers and populations moving from low-transmission to high-transmission areas) and people living with HIV/AIDS (Roll Back Malaria Partnership, 2008). Malaria is a global emergency that perpetuates a vicious cycle of poverty in the

developing world. For this reason, malaria has been a main point of the discussion among international institutions working on development. Actually, it was present in the Millennium Development Goals (MDG) in 2000 and it is a target of the Sustainable Development Goals (SDG) in 2015 of the United Nations. Target 6.C of the MDG was to have halted by 2015 and begun to reverse the incidence of malaria and other major diseases. The SDG take a step forward and in Goal 3 (Ensure healthy lives and promote well-being for all at all ages) they include the target of ending by 2030 the epidemics of malaria among other diseases.

In addition, the Global Technical Strategy for Malaria 2016-2030 by the World Health Organization provides guidance to countries and development partners towards the elimination of malaria. The target proposed is to reduce malaria by 90% by 2030 and for arriving there they highlight the need of increasing investments in preventive measures, diagnostic testing, treatment, disease surveillance, innovation and research.

The endeavors made in reducing malaria incidence and mortality since 2000 were possible due to the large increases in the financing of malaria control and elimination programs. In fact, investments in malaria control for developing countries went up from \$²⁰¹⁵33 million in 2002 to \$²⁰¹⁵1.8 billion in 2015. During the first years, most efforts focused on India, that received more than the 60% of the investments.. Nevertheless, nowadays the focus is on Africa where more than the 80% of 2015 investments were incurred (OECD, 2016). The investments made in battling malaria between 2001 and 2015 contributed to reduction of malaria mortality rates almost by half, a 47%. In Africa, the reduction was even higher when referring to one of the most vulnerable populations to malaria, children under 5 years, with a reduction of 58%. Moreover, the incidence of malaria was reduced by 30% during the same period.

Coordination among international institutions and affected countries is crucial for the eradication of this preventable and treatable infectious disease.

HIV/AIDS

HIV corresponds to the acronym Human Immunodeficiency Virus. This virus targets the immune system and weakens people's defense systems by destroying and impairing the function of immune cells. It is measured by the CD4 cell count (WHO, 2016).

AIDS corresponds to the acronym Acquired Immunodeficiency Syndrome, which is the most advanced stage of HIV infection. It is defined by the development of certain cancers, infections, or other severe clinical manifestation, which can arise, depending on the characteristics of the individual, in various times of HIV; usually between the second and the fifteenth year of the disease (WHO, 2016).

The transmission of HIV can be through the exchange of a variety of body fluids from infected individuals as for semen, vaginal secretions, blood and breast milk. HIV is a non-curable disease but treatable with effective antiretroviral drugs (ARV), which helped in control of the virus and prevent its transmission. According to WHO's estimations, only a 60% of HIV infected people currently know their status (WHO, 2016)

HIV has a high incidence worldwide, in fact, approximately 37 million people are currently infected with HIV, from which 2 million people were infected with the disease in 2015. Moreover, more than 35 million people have lost their life due to HIV, from which 1.1 million died in 2015. The world's region with the highest number of infected people is Sub-Saharan Africa, where more than the 70% of HIV infected people live, more than 25 million people, in 2015. In addition, Sub-Saharan Africa is also the region with the highest number of HIV new infections, accounting for the two thirds of new global infected people in 2015, around 1.3 million people.

The prevention of HIV is based in the following actions: male and female condom use; testing and counselling of HIV and STI (Sexually Transmitted Infections); testing and counselling of TB (Tuberculosis, leading cause of death among HIV infected people); voluntary male medical circumcision (reduces de risk of infection in male up to a 60%); prevention with Antiretroviral (ARV) drugs (reducing the risk of transmission by 96%); harm reduction for injecting drug users (i.e. needle and syringe programs, information and education, etc.); and the elimination of mother to child transmission (EMTCT) of HIV (by the prevention with ARVs to the mother and the child during pregnancy, labor and post-natal period).

International bodies have made different efforts in order to reduce the incidence of HIV over the years. In fact, HIV was present in goal 6 of the Millennium Development Goals, 'Combat HIV/AIDS, Malaria and other diseases', where the Target A exposed as a goal

to have halted the between 1990 and 2015, and begun to reverse the spread of HIV/AIDS; and in Target B stated the achievement by 2010 of universal access to treatment. The targets were partially fulfilled, as for the decrease in the number of new infected people, which fell around 40% between 2000 and 2013; and the increase in the number of ARV treated people. Sustainable Development Goals have continued the path of MDG but with a more ambitious goal: Goal 3, 'Ensure healthy lives and promote well-being for all at all ages', where target is to end the epidemic of AIDS by 2030.

Another relevant international commitment for the battle against HIV was the "Global Health Sector Strategy on HIV for 2016-2021" concluded at the sixty-ninth World Health Assembly (WHA) that established the steps to follow in order to accomplish the specific targets of the SDG.

In addition, the United Nations Population Fund (UNFPA) battles against HIV with its co-sponsor UNAIDS. The mission of UNFPA's programs is halting the new infections of HIV, discrimination and AIDS related deaths by the promotion of human rights, the reduction of inequalities UNAIDS offers another strategy to battle HIV, the 90-90-90 by 2020. The ambitious plan settles that by 2020 90% of all people living with HIV will know their status; 90% of all people with diagnosed HIV infection will receive sustained antiretroviral therapy; and 90% of all people receiving antiretroviral therapy will have viral suppression.

In fact, investments in HIV for developing countries went up from \$²⁰¹⁵ 1.1 billion in 2002 to \$²⁰¹⁵ 6.2 billion in 2015. The efforts were focused in Africa since the beginning, with an increasing share of the percentage of investments in developing countries from more than a 35% in 2002 to more than the 55% in 2015.

HIV/AIDS is among the three diseases studied the one with the highest investments in developing countries worldwide since the beginning.

Malnutrition

Malnutrition alludes to deficiencies, excesses or imbalances in a person's intake of energy and/or nutrients. Two groups are distinguished among malnutrition conditions, undernutrition and overweight. Undernutrition is comprised of stunting (low height for age), wasting (low weight for height), underweight (low weight for age) and micronutrient

deficiencies or insufficiencies (a lack of important vitamins and minerals). On the other hand, overweight involves obesity and diet-related noncommunicable diseases (as for heart diseases, stroke, diabetes and cancer). During this study we will put the emphasis on the first group, under-nutrition, and more concretely in stunting (height for age).

Stunting is an under-nutrition disease. It alludes to the insufficient height of a child for his or her age as result of chronic or recurrent malnutrition. Stunting affects not only the physical conditions of a child but also his/her cognitive skills; in addition to a reduced productive capacity, poor health and an increased risk of degenerative diseases such as diabetes. The factors that contribute to stunted growth and development include poor maternal health and nutrition, inadequate infant and young child feeding practices, and infection.

In 2015, two out of ten children under five were considered stunted. In fact, in 2015, 156 million children under five suffered from stunting worldwide from which a 56% lived in Asia and 37% in Africa. Progress has been made since 2000 regarding stunting rates, from 198 to 156 million stunted children, nonetheless this progress has not been the same in all regions. Actually, from 2000 to 2015, Asia and Latin America and Caribbean managed to diminish stunting rates by over one third whereas Africa's reduction during the same period was of one sixth. Even though, stunting rates are diminishing over time in all regions, the number of African stunted children is increasing, in 2015 there were 8 million stunted children more than in 2000, from which 4 million lived in Western Africa.

Researches show that the first 1,000 days, since the pregnancy of the mother until the two years of the child, are crucial for his/her development. As mentioned before, stunted children have weaker immune systems, which makes them more susceptible to death and diseases. They also have a diminished cognitive capacity, which impacts their ability to learn and develop; and therefore, in their ability to earn higher incomes later in life, generating a poverty trap.

International bodies have made different efforts in order to reduce the incidence of stunting over the years. In fact, stunting was present in goal 1 of the Millennium Development Goals, 'Eradicate extreme poverty and hunger', where the Target C exposed to reduce by half, between 1990 and 2015, the proportion of people who suffer

from hunger. Stunting is not mentioned specifically, but it was covered by the MDG of the United Nations. Sustainable Development Goals have continued the path of MDG but with a more ambitious goal: Goal 2, 'End hunger, achieve food security and improved nutrition, and promote sustainable agriculture', where Target 2.1. establishes the end by 2030 of all forms of malnutrition.

In addition, since 2012 the 194 member states of the World Health Assembly have joined their efforts and they have established several targets to improve nutrition towards the horizon 2025 focusing on six areas: stunting, exclusive breastfeeding, wasting, anemia, low birth weight, and overweight. Regarding the area of stunting, the target to achieve is the reduction of a 40% the number of children under five stunted, which accounts for at least 65 million fewer stunted children in 2025, with an estimated investment of \$49.5billion. The actions determined in order to arrive to the target established are the following: an antenatal micronutrient supplementation for 180 days per pregnancy, the promotion of good infant and young child nutrition and hygiene practices, a balanced energy-protein supplementation for pregnant women living under the poverty line, an intermittent preventive treatment for malaria in pregnancy, vitamin A supplementation for children of 6 to 59 months, prophylactic zinc supplementation for children of 6 to 59 months, public provision of complementary foods for children of 6 to 23 months living under the poverty line.

The endeavors made in reducing the incidence of stunted children were possible due to the large increases in the financing of basic nutrition programs as the ones mentioned above. In fact, investments in basic nutrition for developing countries went up from \$²⁰¹⁵142 million in 2002 to \$²⁰¹⁵866 million in 2015. The efforts were focused the very first years in South and Central Asia, where more than the 40% of the investments were made in 2002, centering the attention in India where the figure was 30%; facing the 27% of Africa. Nevertheless, nowadays the contrary situation occurs, the focus is on Africa where more than the 50% of 2015 investments were incurred, facing the 30% of Asia, that currently is more spread among the continent.

Despite the increase of investments in basic nutrition over time, if we compare them to the investments made in malaria, we are far behind, almost a billion US dollars at constant

prices of 2015. Stunting is a problem faced by millions of children and that is restraining development in poor countries and urgent action needs to be taken.

3. Data and methodology

We build up our analysis on two main databases, one for the health investments reported by the OECD credit report system and another one for the incidence of Malaria, HIV and Chronic Malnutrition by the WHO and the WB. In addition, another database has been used in order to retrieve the data of refugees by the UNHCR, as a complement to the analysis of Nigeria, where the conflict of Boko Haram is causing significant implications in health and health investments.

3.1. Donations Data

The data used mainly in the section of Donations Data is extracted from the website of the OECD (Organization for Economic Co-Operation and Development), the OECD.Stat. The database includes a variety of data on different topics as for Economy, Agriculture, Development, Education, Energy, Environment, Finance and Government.

The selected variable for this study project has been Development, based on Development resource flows and Official Development Assistance (ODA). Concretely, this study analysis focuses on the individual project flows and Creditor Reporting System (CRS). As it is described in the OECD's website, *the objective of the CRS Aid Activity database is to provide a set of readily available basic data that enables analysis on where aid goes, what purposes it serves and what policies it aims to implement, on a comparable basis for all DAC members. Data are collected on individual projects and programs.*

In order to extract the data of interest several filters have been selected. Firstly, we have selected Official Development Assistance as main flow, All Channels of aid (Private Public Partnerships (PPP), Public Sector, NGOs, Multilateral Organizations) and all types of aid (Project Type Interventions, Budget Support, etc.).

In addition, the data is expressed in constant prices, more concrete, in US Dollars of 2014. In the dataset, the amount of USD is represented in millions of USD₂₀₁₄, but in this project, we will mention thousands of USD₂₀₁₄. Moreover, the flow type selected is Gross

Disbursements. This means that the amounts of the dataset are resources which have been distributed to a recipient country in a given year. The reasoning behind the selection of Gross Disbursements over Commitments is that the aim of the project is to extract conclusions based on the analysis of the investments really accomplished in the recipient country, not the committed ones.

The Regions of interest selected for the study of first, an overview of the developing world, and then, the country specific investments, are the following:

- Developing Countries Total
- Africa Total
- America Total
- Nigeria
- Ghana

In this project, we will study the main Health Investments in the selected countries and regions. Therefore, the different ‘Sectors’ selected in the dataset reflect this objective. Each sector defines the economic or social mission of the investments. In particular, the studied sectors are the following 4:

- 120. *I.2. Health, Total*: including both, general and basic health. In the section of General Health, we can find a variety of subsectors as for *Health Policy and Administration Management, Medical Education and Training, Medical Research and Medical Services*. Regarding the section of Basic Health, we find subsections as for *Basic Health Care, Basic Health Infrastructure, Basic Nutrition, Infectious Disease Control, Health Education, Malaria Control, Tuberculosis Control and Health Personnel Development*.

An important modification made for this specific study, with the objective of making more complete and accurate to reality this variable, is to sum up to the amount of investments Health Total the investments devoted to battle Sexually Transmitted Diseases (STD). Currently, this line item of investment has been crucial for the Aid of Development in Health Issues, and therefore it would not be accurate to talk about Health Total investments without including STD investments, mainly devoted to fight HIV. The variable used for this study is Health Total (including HIV/AIDS), of own elaboration.

- 12240. *Basic Nutrition*: Part of the Subsection of Basic Health in Health Total. This variable includes all investments made in order to guarantee the basic nutrition and nourishment of the population.

- 12262. *Malaria control*: Part of the Subsection of Basic Health in Health Total. This variable includes investments made in order to ensure the battle against this disease.

- 13040. *STD Control including HIV/AIDS*: Part of the Subsection of Population Policies/Programs & Reproductive Health Total. This variable includes the total amount of investments devoted to battle Sexually Transmitted Diseases (STD), the major part of the resources in this issue are devoted to fight against HIV, therefore we consider this variable as the referent variable for the battle against HIV.

The study uses data of the last 10 consecutive years from 2006 to 2015, both included.

3.2. Health Indicators

With the aim of gathering data for the incidence of the three main health issues studied, malaria, HIV and malnutrition, in Ghana and Nigeria, two databases were consulted: the dataset of the World Bank and the World Health Organization dataset.

This case study formulates the evolution of five health variables over a time-lapse of 10 years (2005-2015) with the intention of describing the incidence of these health issues regionally and in the two countries of interest, Nigeria and Ghana. As result of the use of two different databases, the regions used to explain a global situation of the health issue are slightly different. On the one hand, we find as regions of interests Sub-Saharan Africa, Latin-American & Caribbean and Low & Middle Income Countries Total for some variables. On the other hand, we described as important regions Africa Total, America Total and Developing Countries Total for the remaining variables. The difference among them are minimal in the topic of incidence of these health problems (Malaria, HIV and Stunting) because those are mainly a developing countries' issue, therefore we can consider that they comparable among them, and also similar to the developing regions of the section for investments.

Developing Countries, Africa and Latin-America have been selected as regions of study in order to contextualize the incidence of the illnesses in the World. Even though our focus of study is Ghana and Nigeria in Africa, we obtain data from Africa in general (in addition to the data from Ghana and Nigeria) and we also obtain data Latin America as a region. Nonetheless, the selection of Latin America as a region of study has the objective of seeing from another angle the health issues covered in this study and compare the

region of Africa to other developing regions of the world. Latin Americas is a more developed region than Africa, whose incidence in malaria, malnutrition and HIV is also significant. We use the data of Latin America in order to have it as a reference to other developing regions with the same health issues but with a different level of development.

The five health variables (Prevalence of stunting, malaria incidence, malaria n° of reported deaths, malaria n° of reported cases, HIV incidence) have been extracted primary from the two databases explained before, but in the case of malaria another source has been part of the project in order to complete the dataset, the Malaria Report of 2016, by the WHO.

- *Prevalence of stunting, height for age (% of children under 5)*: which measures the prevalence of child malnutrition as the percentage of children under age 5 whose height for age (stunting) is more than two standard deviations below the median for the international reference population ages 0-59 months. Two different sources of the World Bank DataBank have been used for this variable: the Subnational Malnutrition database for the regional data of Ghana and Nigeria and the Health Nutrition and Population Statistics for the national average data of both countries. In addition, with the dataset of the WHO information about Developing Countries, Africa and America was obtained.

- *Incidence of Malaria*: is the number of new cases of malaria in a year per 1,000 population at risk. The incidence of malaria was obtained from the World Development Indicators, one of the sources of the DataBank of the World Bank.

- *Malaria number of deaths*: Two different variables are showed in these graphs, the number of reported deaths and the number of estimated deaths due to malaria in a given year, with a significant difference among them, mainly due to the lack of reporting deaths. In poor countries as the ones studied the reporting indexes are very low and even lower when it refers to the cause of death.

- *Malaria number of cases*: as in the case of malaria deaths, two different variables are showed in these graphs, the number of reported cases and the number of estimated cases of malaria in a given year, with a significant difference among them, mainly due to the low reporting indexes and the lack of resources.

For the previous variables, numbers of deaths and cases of malaria, two datasets have been used. Firstly, for the number of reported cases and deaths the main source of information was the DataBank of the WorldBank (Health, Nutrition and Population Statistics; Africa Development Indicators) and it was completed with the Malaria Report 2016 edited by the WHO and the WHO dataset. On the other hand, the estimations about the number of malaria cases and deaths were obtained by a unique source the WHO dataset, which included estimations for the margins of error, represented in the graph. The estimations are for three specific years 2005, 2010 and 2013; and only for the two countries of interest Ghana and Nigeria.

- *Incidence of HIV (% of uninfected population ages 15-49)*: Number of new HIV infections among uninfected populations ages 15-49 expressed as percentage. It was obtained from the Health, Nutrition and Population Statistics' source of the WorldBank's DataBank.

3.3 Refugees and IDPs

In addition, I considered the information of refugees and IDPs of Nigeria due to the current violent situation with the Boko-Haram's conflict in the North-East part of the country. I realized during my study that the most violent areas of the country were suffering a striking situation of malnutrition jointly with the adjoining countries of asylum as Niger, Cameroon and Chad. The purpose of including this new variable to the study is to see if the investments made in malnutrition matched with the critical situation that the area is suffering.

Therefore, the information about the refugees and Internally Displaced Persons has been an additional part of interest for this project. Two main sources have been used for this purpose the Statistics Database of the United Nations Refugee Agency (UNHCR) in Spain called ACNUR and the 2015 Revision of World Population Prospects by the Department of Economics & Social Affairs of the United Nations.

The variables of interest for this analysis were two, the number of Nigerian refugees and IDPs and its places of asylum, both retrieved from the UNHCR' Statistics Database, with data of 2015.

- *Nigerian refugees, asylum-seekers, internally displaced persons (IDPs), returnees (refugees and IDPs), stateless persons, and others of concern to UNHCR, end-2015*

In this database, we can find information about asylum-seekers, refugees, IDPs and others in the year ended 2015. The UNHCR provides the following descriptions about the main variables used in this study (refugees and IDPs):

- Refugees “include individuals recognized under the 1951 Convention relating to the Status of Refugees; its 1967 Protocol; the 1969 OAU Convention Governing the Specific Aspects of Refugee Problems in Africa; those recognized in accordance with the UNHCR Statute; individuals granted complementary forms of protection; or those enjoying temporary protection”.
- Internally displaced persons (IDPs) “are people or groups of individuals who have been forced to leave their homes or places of habitual residence, in particular as a result of, or in order to avoid the effects of armed conflict, situations of generalized violence, violations of human rights, or natural or man-made disasters, and who have not crossed an international border”.

Therefore, the Table 6 (*Annex 2*) includes information of 2015 about the number of Nigerian refugees (broken down in refugees, refugees-like situations, assisted by the UNHCR and asylum seekers-pending cases); IDPs and others of concerned.

- *Nigerian refugees and people in a refugee-like situation, excluding asylum-seekers, and changes by country of asylum, 2015*, the countries of asylum for Nigerians in 2015 were the following:

- Cameroon
- Canada
- Chad
- France
- Italy
- Niger
- UK

	Population start-2015		Population end-2015	
	TOTAL	of whom: UNHCR-assisted	TOTAL	of whom: UNHCR-assisted

Cameroon	39.968	24.874	71.840	71.840
Canada	4.683	-	4.502	-
Chad	2.930	2.327	5.689	5.689
France	1.102	-	1.250	-
Italy	6.293	-	9.931	-
Niger	30.000	30.000	68.321	68.321
United Kingdom	1.471	-	1.679	-

Table 7 (Annex 2) gives two different points of information: the number of Nigerian refugees at the beginning of 2015 and at the end of 2015 by country of asylum, and it also includes the number of refugees of those that were assisted by the foundation.

In addition, as a complement for the variables defined above, inside the other UN's database mentioned before, an historic of Nigerian migrants from 1990-2013 by place of asylum was recovered in order to have a broader mind of the situation.

- Total migrant stock at mid-year of Nigeria by major area, region, country or area of destination, 1990 – 2013, which principal areas and regions of study are the following:

- More developed regions
- Less developed regions
- Sub-Saharan Africa
- Africa (North, South, East, West, Middle)

Table 1. Development indicators 2006-2015

Middle & Low Income Countries	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
GDP per capita, PPP (constant 2011 international \$)	6483,10	6957,70	7255,75	7371,15	7828,89	8185,52	8482,10	8798,30	9090,40	9349,44
GDP growth (annual %)	8,09%	8,68%	5,69%	2,37%	7,54%	5,99%	4,88%	4,95%	4,31%	3,72%
Population growth (annual %)	1,34%	1,32%	1,32%	1,32%	1,32%	1,32%	1,32%	1,32%	1,32%	1,30%
Population, total, millions	5474,18	5546,49	5619,63	5693,95	5769,21	5845,58	5922,88	6001,16	6080,18	6159,44
Mortality rate, under-5 (per 1,000 live births)	66,30	63,70	61,50	58,90	56,90	54,30	52,00	49,90	48,00	46,40
Life expectancy at birth, total (years)	67,36	67,69	68,00	68,32	68,61	68,91	69,19	69,44	69,68 ..	
Sub-Saharan Africa	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
GDP per capita, PPP (constant 2011 international \$)	2928,82	3051,32	3132,80	3149,07	3238,42	3292,91	3326,47	3399,69	3470,52	3488,27
GDP growth (annual %)	7,05%	7,07%	5,39%	2,85%	5,39%	4,32%	3,72%	4,76%	4,59%	3,01%
Population growth (annual %)	2,74%	2,76%	2,77%	2,77%	2,77%	2,77%	2,77%	2,76%	2,75%	2,73%
Population, total, millions	783,40	805,00	827,20	850,20	873,80	898,00	922,80	948,30	974,40	1000,90
Mortality rate, under-5 (per 1,000 live births)	121,71	116,32	111,12	106,16	101,40	97,08	93,02	89,36	86,06	83,18
Life expectancy at birth, total (years)	53,43	54,18	54,93	55,65	56,33	56,97	57,55	58,08	58,56 ..	
Latin America & Caribbean	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
GDP per capita, PPP (constant 2011 international \$)	12700,35	13256,38	13602,96	13194,67	13795,65	14239,62	14485,04	14732,91	14716,77	14596,57
GDP growth (annual %)	5,32%	5,71%	3,98%	-1,73%	5,80%	4,38%	2,83%	2,78%	0,74%	-0,29%
Population growth (annual %)	1,29%	1,27%	1,25%	1,22%	1,20%	1,17%	1,15%	1,12%	1,09%	1,07%
Population, total, millions	570,05	577,27	584,50	591,60	598,70	605,70	612,60	619,51	626,29	633,00
Mortality rate, under-5 (per 1,000 live births)	23,66	22,76	21,93	21,18	23,66	19,87	19,30	18,78	18,35	17,96
Life expectancy at birth, total (years)	73,15	73,38	73,60	73,82	74,04	74,26	74,49	74,71	74,94 ..	
Nigeria	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
GDP per capita, PPP (constant 2011 international \$)	4352,80	4528,86	4686,61	4879,48	5122,81	5230,60	5309,52	5447,76	5639,45	5638,89
GDP growth (annual %)	8,21%	6,83%	6,27%	6,93%	7,84%	4,89%	4,28%	5,39%	6,31%	2,65%
Population growth (annual %)	2,62%	2,64%	2,66%	2,67%	2,68%	2,69%	2,69%	2,68%	2,66%	2,63%
Population, total, millions	143,32	147,15	151,12	155,21	159,42	163,77	168,24	172,82	177,48	182,20
Mortality rate, under-5 (per 1,000 live births)	152,20	146,40	140,90	135,50	130,30	125,50	120,90	116,60	112,50	108,80
Life expectancy at birth, total (years)	49,24	49,81	50,36	50,87	51,33	51,74	52,11	52,44	52,75 ..	
Ghana	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
GDP per capita, PPP (constant 2011 international \$)	2651,39	2695,88	2867,72	2930,95	3083,87	3430,86	3659,24	3833,79	3894,00	3954,52
GDP growth (annual %)	6,40%	4,35%	9,15%	4,85%	7,90%	14,05%	9,29%	7,31%	3,99%	3,92%
Population growth (annual %)	2,60%	2,59%	2,58%	2,55%	2,52%	2,48%	2,44%	2,40%	2,35%	2,30%
Population, total, millions	21,95	22,53	23,12	23,71	24,32	24,93	25,54	26,16	26,79	27,41
Mortality rate, under-5 (per 1,000 live births)	84,40	82,20	79,90	77,40	74,70	71,90	69,20	66,50	64,00	61,60
Life expectancy at birth, total (years)	59,18	59,64	60,03	60,36	60,61	60,81	60,98	61,14	61,31 ..	

4. Investments and Incidence: a comparative analysis

This section is devoted to see the evolution of health investments made and the incidence of the researched diseases in the countries of interest and worldwide regions.

4.1 Regions of Study

Nigeria and Ghana are countries where the incidence of diseases as malaria, malnutrition and HIV is significant, and many efforts have been made in order to ameliorate the situation. NGOS, Governmental Institutions, individual volunteers; have invested their time and their economic resources in those countries for making civilians' life better. In fact, international health investments summed up 810 million USD₂₀₁₄ in Nigeria and 156 million USD₂₀₁₄ in Ghana during 2015.¹

Nigerian health investments represented in 2015 the 11% of total health investments in Africa and more than the 6% of total health investments in Developing Countries. The figure is even more significant when talking about malaria investments, in 2015 the 14% of the money invested in Africa and almost the 12% of the investments in developing countries in malaria were for Nigeria. Nevertheless, the figures are less impressive referring to basic nutrition investments, Nigeria represented in 2015 only a 3% of the African investments and less than a 2% of Developing Countries' investments in this issue. As for investments in Sexually Transmitted Diseases (STD), where HIV is the principal component, Nigerian investments represented in 2015 the 10% and the 6% of the investments for this purpose in Africa and Developing Countries respectively (*Annex 1*)

In the case of Ghana, health investments represented in 2015 a 2% and 1% of total health investments in Africa and Developing Countries respectively. The percentages are 6% and 5% when they are referred to malaria investments. In the case of Ghana, the investments made in Basic Nutrition are higher than the ones made in STD Control, but both lower than malaria investments. Ghanaian investments in STD Control did not reach the 1% of Developing Countries' investments in this issue in 2015, and were the 1% of African investments. Regarding basic nutrition investments, in 2015 the 2% of the money

¹ OECD. (2016). OECD Stats. Retrieved from <https://stats.oecd.org/Index.aspx?DataSetCode=CRS1>

invested in Africa and the 1% of the investments in developing countries were for Ghana
(Annex 1:

Table 4)

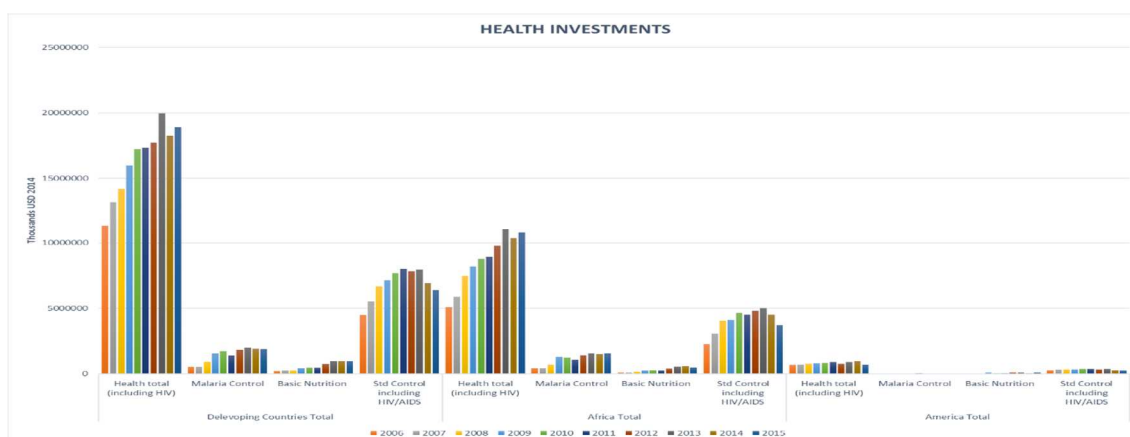
Table 5). During the following sections we will see the evolution of both the health incidence and the health investments made in the regions of study.

4.2. Evolution of Donations

A World Overview

As we can derive from Figure 1, Health investments have increased during the period 2006-2015 in Developing Countries as an average, but also in Africa; whereas the American investments have been more stable along time. We can see a peak in total health investments in 2013 for Developing Countries and Africa; while in America the peak happened two years before in 2011. The trend followed by African health investments is very similar to the one of Developing Countries, in fact, both regions focused first on STD Control (including HIV/AIDS) and afterwards in Malaria, leaving Basic Nutrition in the third place. On the other hand, in America the second and third place are interchanged. In addition, Africa is the developing region where most of the investments go during the whole period. In fact, approximately half of total health investments in the developing world are made in Africa, and the number is even higher when it refers to Malaria investments where the average is almost an 80% and STD control where it comes upon the 60%. The investments made in America are residual in comparison, with the highest number in Basic Nutrition investments, that round the 10% of total developing countries' investments in average for the period selected, nonetheless Africa's figure is higher in nutrition too surpassing the 50% of average.

Figure 1. Health Investments 2006-2015, a World Overview



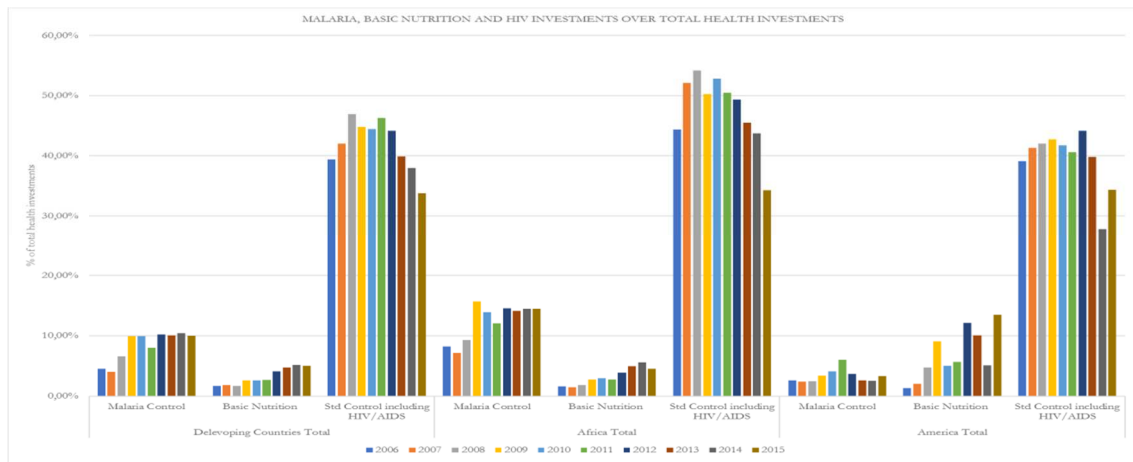
Source: Own elaboration based on data from the OECD's Statistics, CRS (<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>)

As for the portion that the investments made in the different regions in malaria, HIV and basic nutrition represent as part of the total health investments made, we can see in Figure 2 that HIV investments are the ones with the highest proportion in the three regions, but with a decreasing trend among the years of study (2006-2015). In Developing countries and America, HIV investments round in average the 40% of total health investments, whilst in Africa the number is even higher, approximately the 50%.

Regarding malaria control investments, we observe an increasing trend in the three regions, nonetheless the investments have been stagnated or have decrease in the case of America since the middle of the period (2011-2012). The portion that the malaria investments represent as total investments is much lower if we compare it to HIV investments. In fact, malaria investments represent an 8%, 12% and 3% on average to total health investments in developing countries, Africa and America respectively.

In terms of basic nutrition investments, there is an increasing trend over time, with a high fluctuation in America. Basic nutrition investments represent a 3%, 3% and 7% on average to total health investments in developing countries, Africa and America respectively.

Figure 2. Malaria, Basic Nutrition and HIV Investments over Total Health Investments 2006-2015, a World Overview



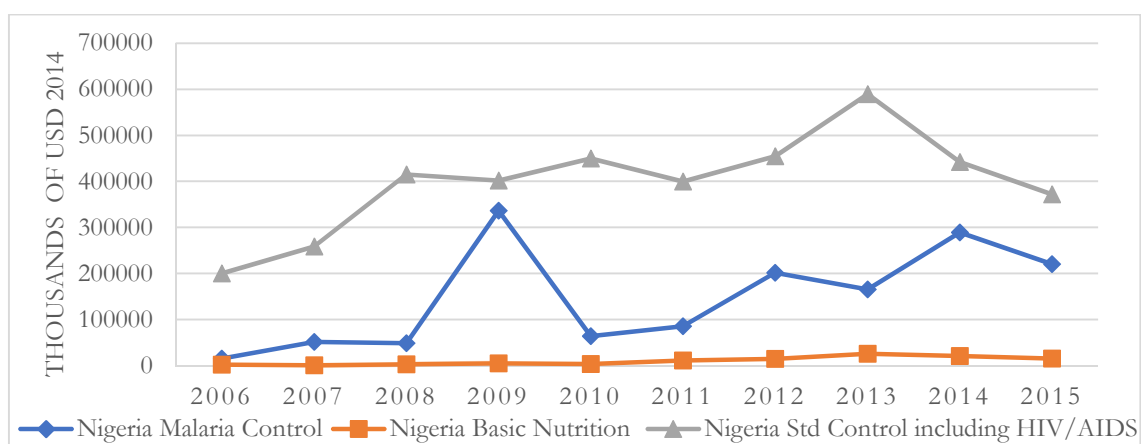
Source: Own elaboration based on data from the OECD's Statistics, CRS (<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>)

For more information see Annex 6, where a more detailed situation of health investments worldwide is provided in different figures and tables.

Nigeria

Nigerian health investments have also followed the pattern of African health investments, see Figure 3, where STD Control (including HIV/AIDS) is the most financed disease, followed by malaria investments, while the investments made in basic nutrition are insignificant in comparison. In addition, we observe a positive pattern in the investments of the three main diseases of study from 2006 to 2015, with some variabilities, as for the peak in malaria investments from \$²⁰¹⁴49 million in 2008 to \$²⁰¹⁴336 million in 2009 and to \$²⁰¹⁴64 million in 2010.

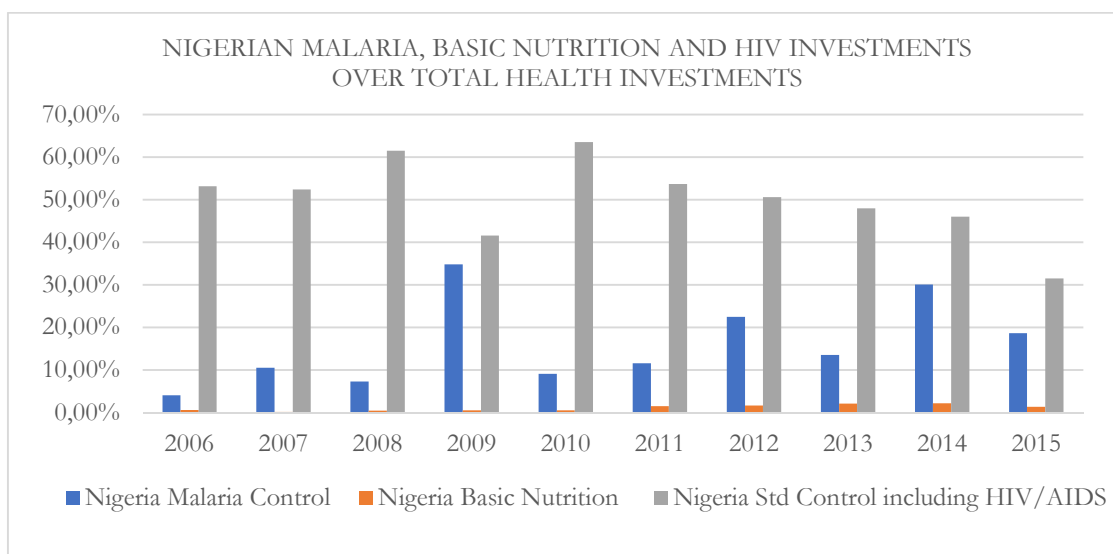
Figure 3. Nigerian Health Investments 2006-2015 (thousands of 2014 USD)



Source: Own elaboration based on data from the OECD's Statistics, CRS (<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>)

Investments in STD Control (including HIV/AIDS), mainly devoted to battle HIV; have increased from \$²⁰¹⁴200 million in 2006 to \$²⁰¹⁴372 million in 2015; which account for the 53% and 32% of the total health investments respectively. The decreasing presence of HIV as part of total health investments as seen in Figure 4, has to do with the fact that donations in other areas of health are being made, as for malaria. As for investments in Malaria Control, they have increased from \$²⁰¹⁴52 million in 2006 to \$²⁰¹⁴220 million in 2015, representing the 4% and 19% of total health investments made in Nigeria respectively. Finally, regarding investments in Basic Nutrition, we can observe that they have increased from \$²⁰¹⁴2 million in 2006 to \$²⁰¹⁴15 million in 2015, doubling its presence as part of total health investments, from 0.6% to 1.3% respectively.

Figure 4. Nigerian Health Investments 2006-2015 (% of Total Health Investments)



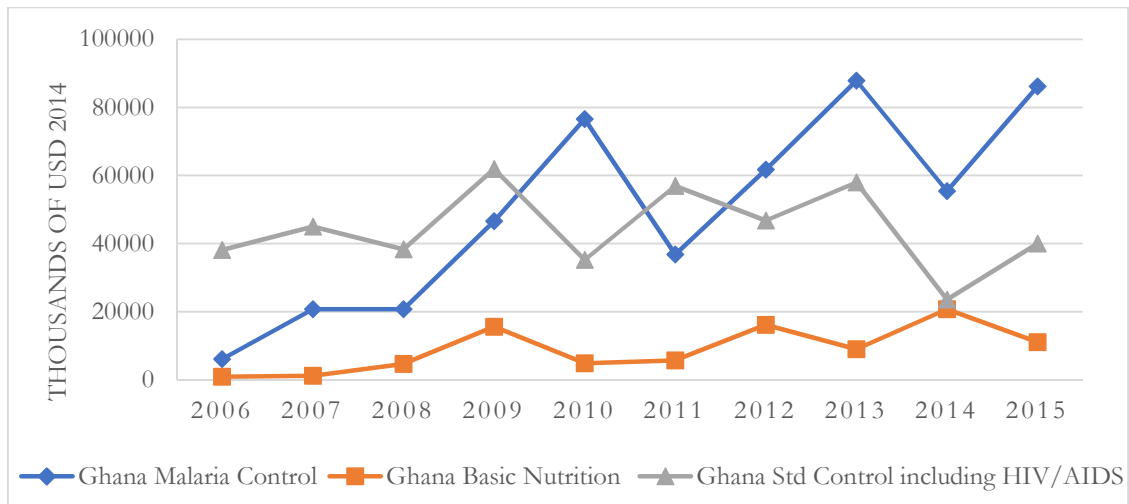
Source: Own elaboration based on data from the OECD's Statistics, CRS (<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>)

To conclude, Nigerian investments in health focused at first in the battle against HIV and AIDS, even though HIV is still the major health investment made in Nigeria, malaria control is increasing its presence too, while basic nutrition investments against stunting were and still are minimal in the country. (Figures 3 and 4)

Ghana

Ghanaian health investments have followed a different pattern, see Figure 5. In Ghana, STD Control (including HIV/AIDS) was at first the most financed disease until 2009 where malaria investments took the lead. In addition, investments made in basic nutrition were and still are in third position, but the disbursement is higher. The variability in Ghanaian health investments is very high, and we can see a periodic pattern of around two years in the ups and downs. From 2006 to 2015, the trend in malaria investments and basic nutrition investments is positive, whereas the trend in STD Control is flat, as seen in figure 5.

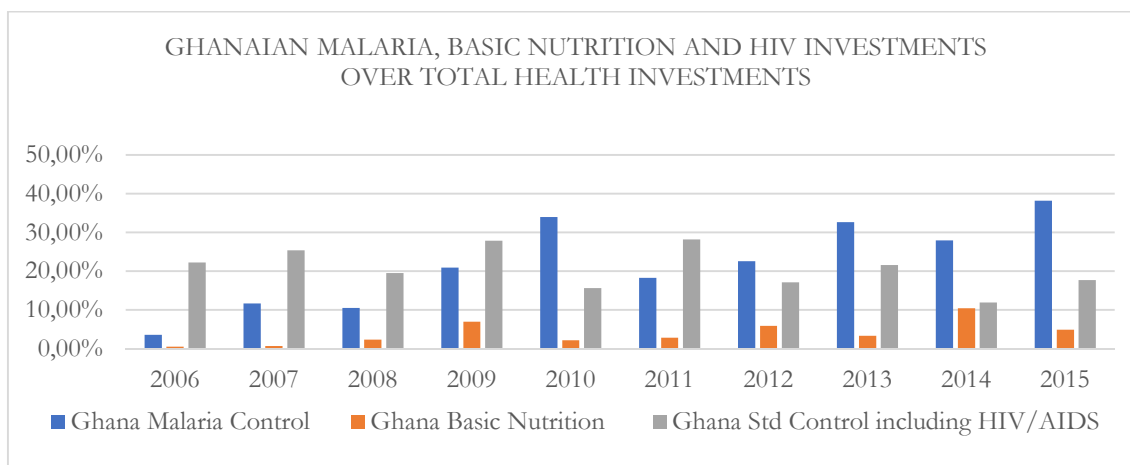
Figure 5. Ghanaian Health Investments 2006-2015 (Thousands of 2014 USD)



Source: Own elaboration based on data from the OECD's Statistics, CRS (<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>)

Investments in STD Control (including HIV/AIDS), mainly devoted to battle HIV; have remained similar from \$²⁰¹⁴38 million in 2006 to \$²⁰¹⁴40 million in 2015; which account for the 22% and 18% of the total health investments respectively. As for investments in Malaria Control, they have increased from \$²⁰¹⁴6 million in 2006 to \$²⁰¹⁴86 million in 2015, representing the 3,5% and 38% of total health investments made in Nigeria respectively. Finally, regarding investments in Basic Nutrition, we can observe that they have increased from \$²⁰¹⁴0,9 million in 2006 to \$²⁰¹⁴11 million in 2015, multiplying its presence as part of total health investments, from 0.5% to 5% respectively.

Figure 6. Ghanaian Health Investments 2006-2015 (% of Total Health Investments)



Source: Own elaboration based on data from the OECD's Statistics, CRS (<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>)

To conclude, Ghanaian health investments in health focused at first in the battle against HIV and AIDS until 2009. Malaria control is the leading cause of health investments in the country, while basic nutrition investments against stunting were minimal and are increasing its presence and budget (Figures 5 and 6).

4. 3. Evolution of Incidence

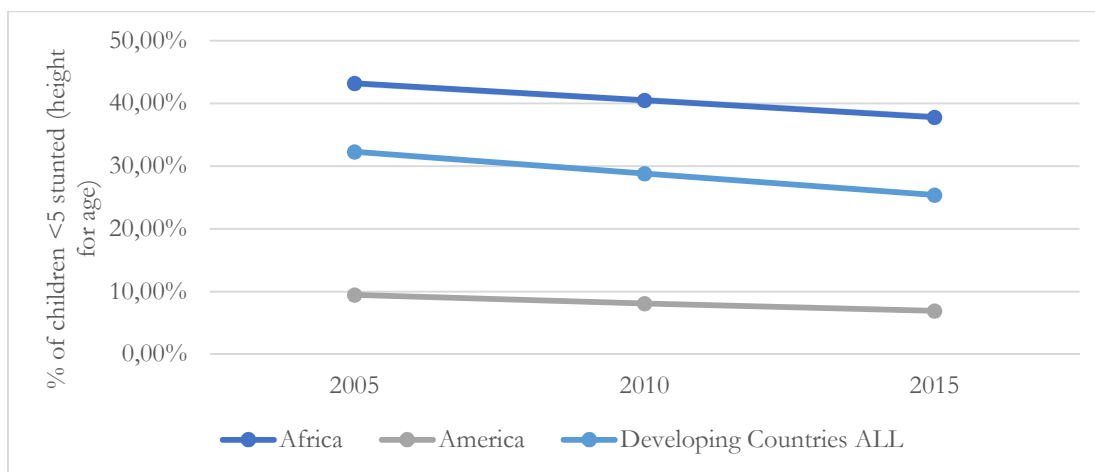
A World Overview

Malnutrition

In developing countries, there is a decreasing trend in the incidence of child malnutrition, more concrete in the proportion of stunted children under five years old, as we can see in Figure 7 (grey line). In fact, there is a decrease of almost a 7% from 2005 to 2015.

Africa and America follow the same decreasing trend as Developing Countries, but the numbers are quite different. Africa is above the incidence of developing countries during the whole period with numbers rounding the 40% of stunted children; whereas America is quite below, with numbers approaching the 10% of stunted children and lower.

Figure 7. Child Malnutrition Incidence 2005-2015, a World Overview (% of stunted children <5)



Source: Own elaboration based on data from the World Health Organization's dataset, the Global Health Observatory (GHO) data (<http://apps.who.int/gbo/data/node.home><http://databank.worldbank.org/>)

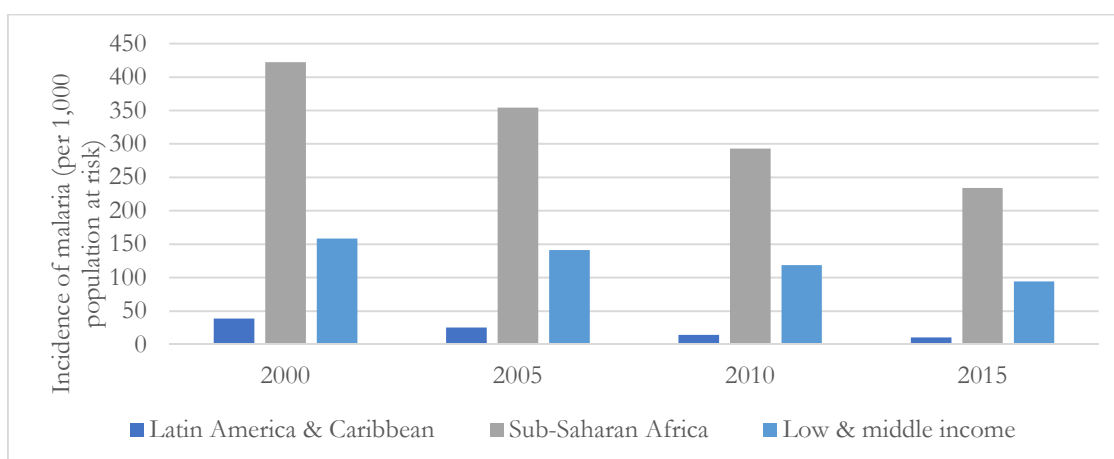
Malaria

As for malaria incidence, the same pattern as basic nutrition incidence is followed, as shown in Figure 8. In this case, we measure the incidence of malaria per 1,000 population at risk. Sub-Saharan Africa is the region with the highest incidence during the whole period, from 2000 to 2015, from more than 400 to less than 250 new people infected per 1,000 population at risk respectively; which represents almost a 45% decrease in fifteen years.

The incidence of malaria in 'Low & middle-income countries' is much smaller, from more than 150 to less than 100 new people infected per 1,000 population at risk in 2000 and 2015 respectively. Africa's incidence in malaria was 2.7 times greater than Low & middle-income countries incidence; this number diminished to 2.5 in 2015.

As for the incidence of malaria in Latin American & Caribbean, is minimal, as seen in Figure 8. In fact, the incidence does not arrive to 40 in 2000, and rounds 10 in 2015.

Figure 8. Malaria Incidence 2000-2015, a World Overview (per 1,000 population at risk)



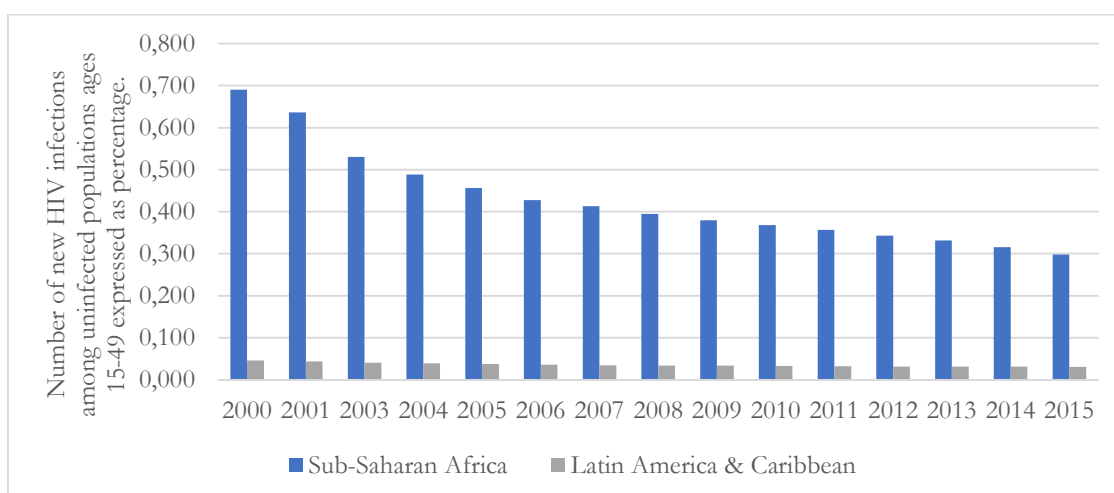
Source: Own elaboration based on data from the World Bank's DataBank (<http://databank.worldbank.org/>)

HIV

HIV incidence is measured by the number of new infections among uninfected population of 15 to 49 years old expressed as percentage. As we can derive from Figure 9, HIV incidence in Sub-Saharan Africa is very high in comparison to Latin American & Caribbean. In Africa in 2000, 0.69 %, which means that there were 0.69 new infections over 100-uninfected population from 15 to 49 years old. This number diminishes along time by more than half, until the 0.30% of 2015.

The trend followed by Latin America and Caribbean in HIV incidence is slightly different; it also has a decreasing slope, but is flatter over time, going from 0.046% to 0.031% in the analyzed period,

Figure 9. HIV Incidence 2000-2015, a World Overview (% of infected population ages 15-49)



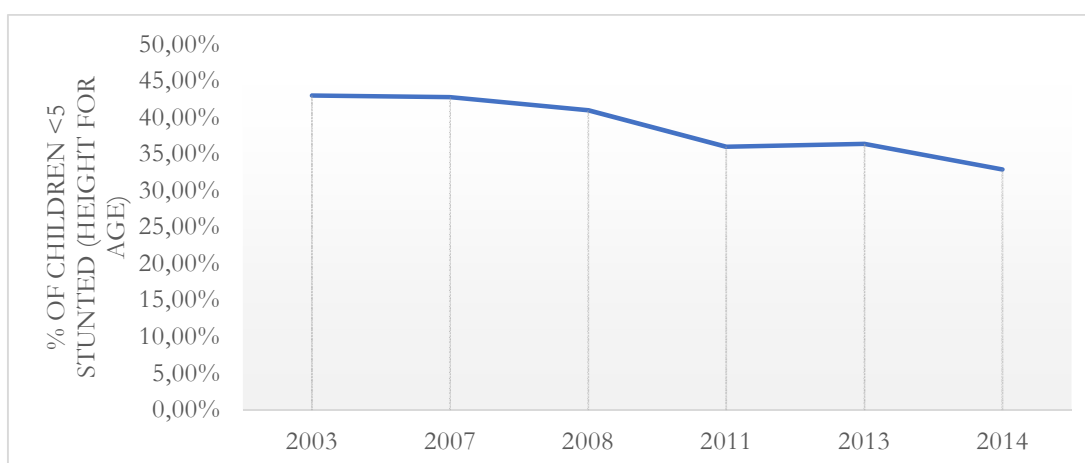
Source: Own elaboration based on data from the World Bank's DataBank (<http://databank.worldbank.org/>)

Nigeria

Malnutrition

The proportion of Nigerian stunted children follows the African example, with a decreasing trend over time, but with a still high rate nowadays. In fact, as we can see in Figure 10, 43% of Nigerian children under 5 years old were stunted in 2003, similar to the 40% of 2005 in Africa as a whole. The number has improved, arriving to a 33% of stunting incidence in 2014, a 10% less in 11 years.

Figure 10. Nigerian Child Malnutrition Incidence 2003-2014 (% of stunted children <5)



Source: Own elaboration based on data from the World Bank's DataBank (<http://databank.worldbank.org/>)

Nonetheless, there are significant differences among the stunting incidence in the different regions of the country. As derived from Table 2, the regions with the lowest

incidence are in the Southern part of the country, with its lowest rate in the South-East Zone that in 2014 was only 11%; extremely low compared to the 33% of national average. On the other hand, the Northern regions are the ones with the highest rates of stunting, specially the North-West Zone where the stunting rate arrived to a 52.7% of children under 5 in 2014 and it was even higher before with almost 60% of under 5 children stunted in 2003.

Table 2. Nigerian Prevalence of Stunting by Regions 2003-2014 (% of children <5)

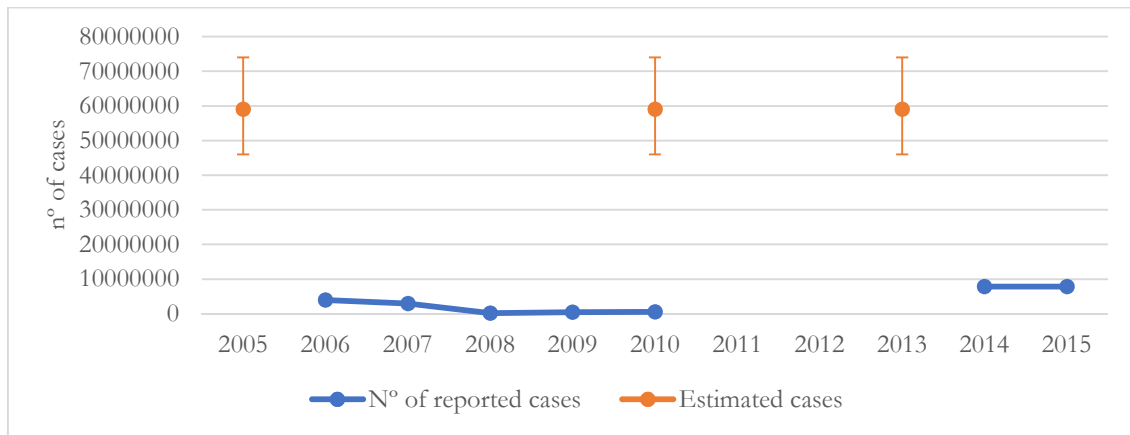
PREVALENCE OF STUNTING, HEIGHT FOR AGE (% OF CHILDREN UNDER 5)				
	2003	2008	2013	2014
Nigeria, South South Zone	28	32,8	18,6	20,8
Nigeria, South West Zone	28,4	32,2	22,4	21,1
Nigeria, South East Zone	20,3	24,2	16,3	11
Nigeria, North Central Zone	34,6	44,5	29,3	29,3
Nigeria, North West Zone	59,7	51,2	53,5	52,7
Nigeria, North East Zone	47,4	46,9	40,3	48,7

Source: Own elaboration based on data from the World Bank's DataBank (<http://databank.worldbank.org/>)

Malaria

Malaria incidence in Nigeria is very high, with around 60 million of estimated cases in 2013, as seen in Figure 11. There is a significant difference with the number of estimated cases versus the reported ones, but it is diminishing over time. In 2014, only the 13% of the estimated cases was reported, this has to do with the fact that the Administration is not recording an exhaustive list of the cases and also that the diagnosis might be inaccurate, for a lack of it or for the lack of resources.

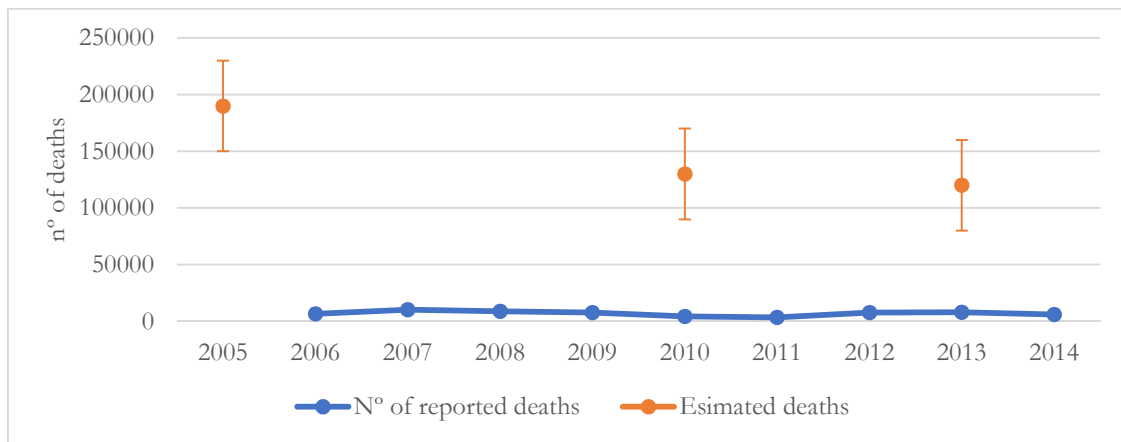
Figure 11. Nigerian Malaria Incidence 2005-2015 (n° cases)



Source: Own elaboration based on data from the World Bank's DataBank (<http://databank.worldbank.org/>), the World Health Organization dataset (GOH) (<http://apps.who.int/gho/data/node.home>) and the 2016 Malaria Report by the WHO

The same situation arises with the number of malaria deaths, as shown in Figure 12. The estimated trend is decreasing over time. The number of estimated malaria deaths in 2013 was of approximately 120 thousand, from which only the 7% were reported.

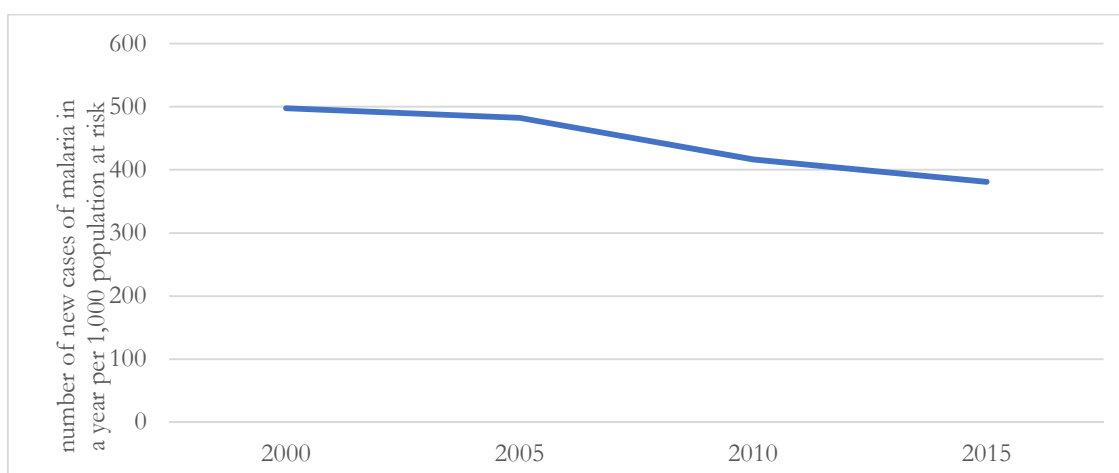
Figure 12. Nigerian Malaria Incidence 2005-2014 (n° of Deaths)



Source: Own elaboration based on data from the World Bank's DataBank (<http://databank.worldbank.org/>), the World Health Organization dataset (GOH) (<http://apps.who.int/gho/data/node.home>) and the 2016 Malaria Report by the WHO

Moreover, the incidence of malaria in Nigeria has slightly decreased from 2000 to 2015. Actually, the number of new malaria cases per 1,000 population at risk decreased from almost 500 new cases to 380 in the period of study, as described in Figure 13.

Figure 13. Nigerian Malaria Incidence 2000-2015 (new cases per 1,000 population at risk)

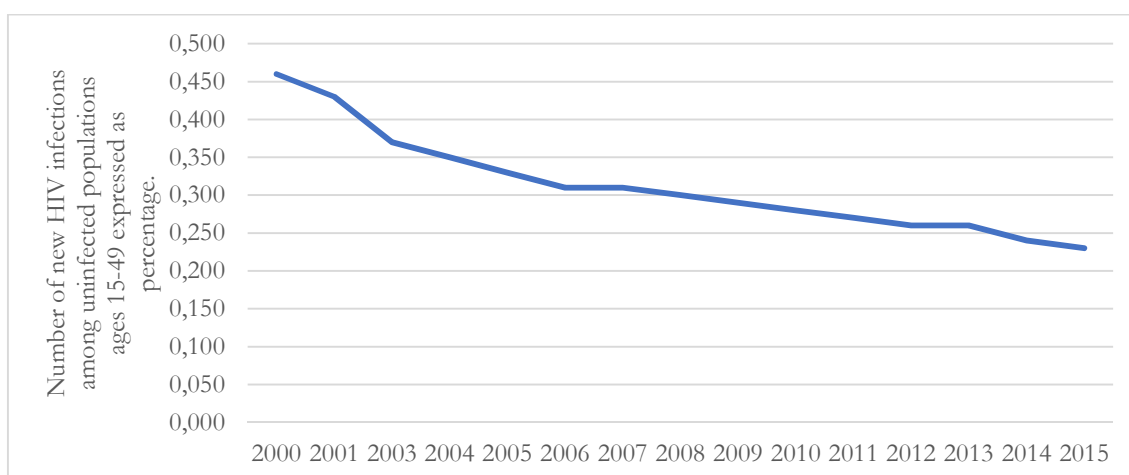


Source: Own elaboration based on data from the World Bank's DataBank (<http://databank.worldbank.org/>)

HIV

Concerning Nigerian HIV incidence, we can see the sharply decrease obtained from 2000 to 2015 in Figure 14. In fact, in 2000, Nigerian incidence was 0.46% versus the 0.69 % of African incidence of HIV. In 2000, there were 0.46 new infections in Nigeria over 100-uninfected population from 15 to 49 years old. The number diminishes by half, arriving to the 0.23% of 2015.

Figure 14. Nigerian HIV Incidence 2000-2015 (% of infected population ages 15-49)



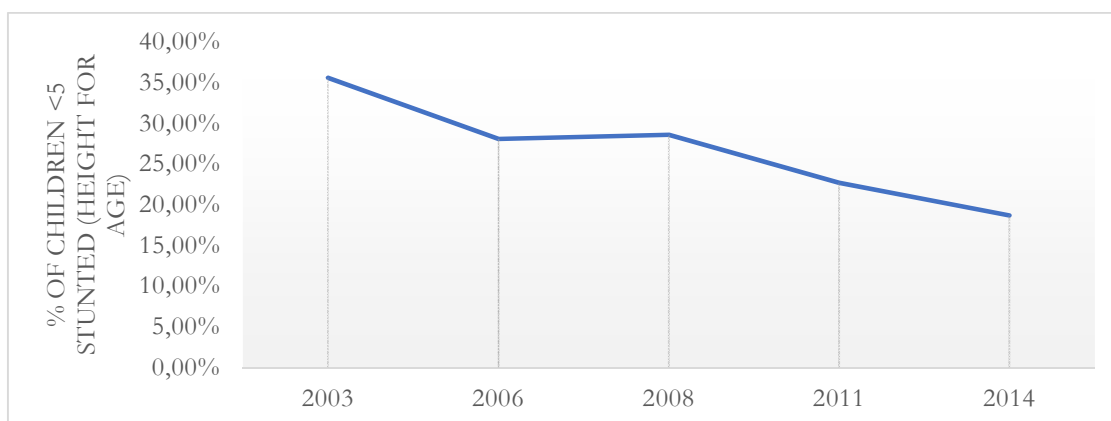
Source: Own elaboration based on data from the World Bank's DataBank (<http://databank.worldbank.org/>)

Ghana

Malnutrition

Ghanaian stunting prevalence is decreasing with time, as seen in Figure 15, where more than 35% of Ghanaian children under five were stunted in 2003, compared to the 18.7% in 2014.

Figure 15. Ghanaian Child Malnutrition Incidence 2003-2014 (% of stunted children <5)



Source: Own elaboration based on data from the World Bank's DataBank (<http://databank.worldbank.org/>)

Even though the prevalence of stunting is decreasing over time in all the regions of the country, there exist differences among them, which are expressed in Table 3. As a matter of fact, the Northern part of the country is the one with the highest prevalence of stunting, a 37.4% in 2011 higher to the national average of 22.7%. The zone with the lowest stunting incidence is Eastern Ghana, with 21.3% of prevalence in 2011.

Table 3. Ghanaian Prevalence of Stunting by Regions 2003-2011(% of children <5)

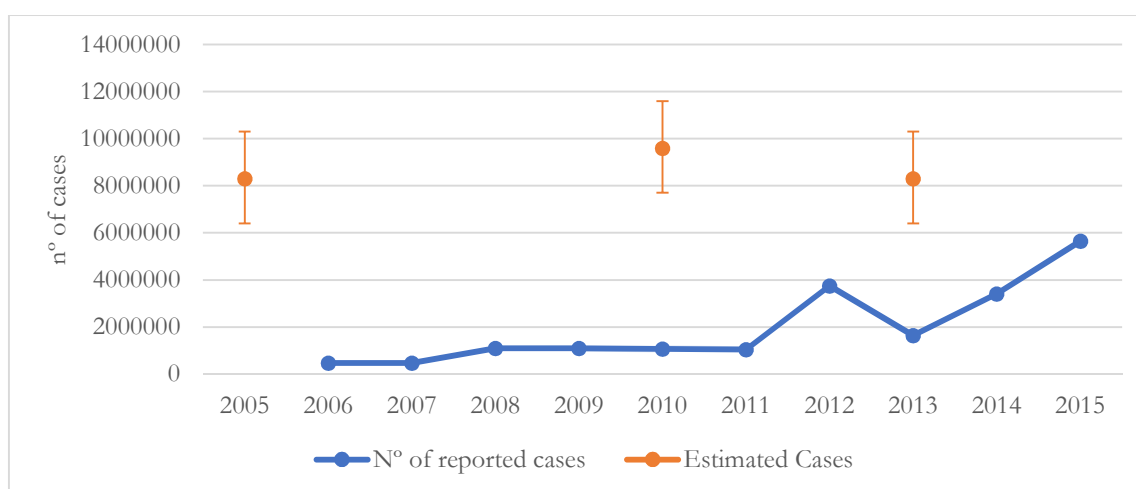
PREVALENCE OF STUNTING, HEIGHT FOR AGE (% OF CHILDREN UNDER 5)				
	2003	2006	2008	2011
Ghana, Central	38,1	33,7	33,9	23,1
Ghana, Eastern	33,2	28,4	39,3	21,3
Ghana, Western	33,4	27,4	26	22,6
Ghana, Northern	54	36,9	32,8	37,4

Source: Own elaboration based on data from the World Bank's DataBank (<http://databank.worldbank.org/>)

Malaria

As in the case of Nigeria, Ghanaian reported cases of malaria are scarce, but the Administration is improving it as we can see in Figure 16, where there is a sharp increase in the number of reported cases from 2006 to 2015. In addition, we can observe that the estimated cases increased from 2005 to 2010, and later decreased in the same proportion from 2010 to 2015, leaving the period estimations unchanged in 8.3 million cases in 2013, from which only a 20% were reported.

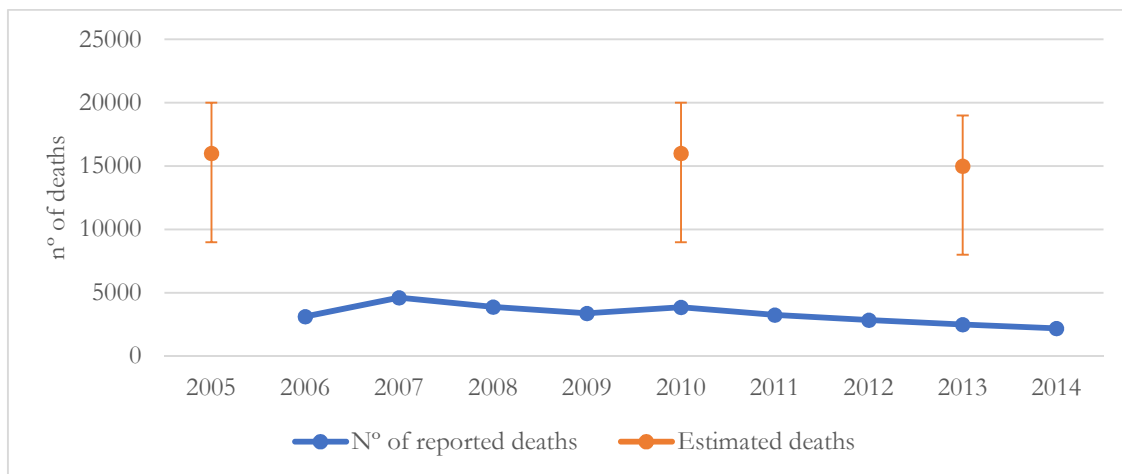
Figure 16. Ghanaian Malaria Incidence 2005-2015 (n° of cases)



Source: Own elaboration based on data from the World Bank's DataBank (<http://databank.worldbank.org/>), the World Health Organization dataset (GOH) (<http://apps.who.int/gbo/data/node.home>), <http://databank.worldbank.org/> and the 2016 Malaria Report by the WHO

An analogous situation arises with the number of malaria deaths, but in this case the number of reported and estimated malaria deaths remains nearly constant over time. In 2013, the number of Ghanaian estimated malaria deaths were 15 thousand, from which a 17% were reported.

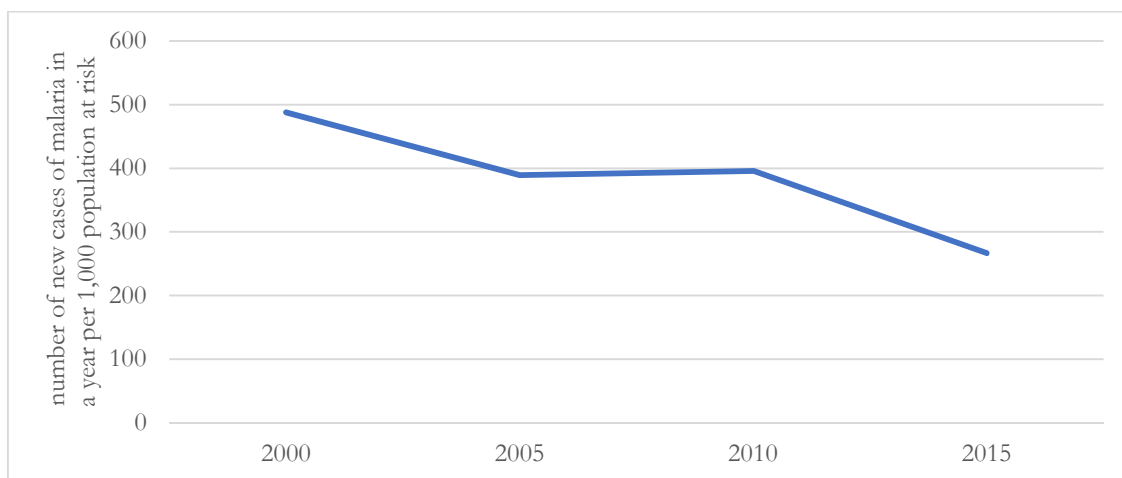
Figure 17. Ghanaian Malaria Incidence 2005-2014 (n° of deaths)



Source: Own elaboration based on data from the World Bank's DataBank (<http://databank.worldbank.org/>), the World Health Organization dataset (GOH) (<http://apps.who.int/gbo/data/node.home>) and the 2016 Malaria Report by the WHO

As regards to the number of new cases of malaria in Ghana, we can state that they suffered a significant decrease from 488 new cases per 1,000 people at risk in 2000; to 266 in 2015; which accounts for a 55% decrease, as seen in Figure 18.

Figure 18. Ghanaian Malaria Incidence 2000-2015 (n° of new cases per 1,000 population at risk)



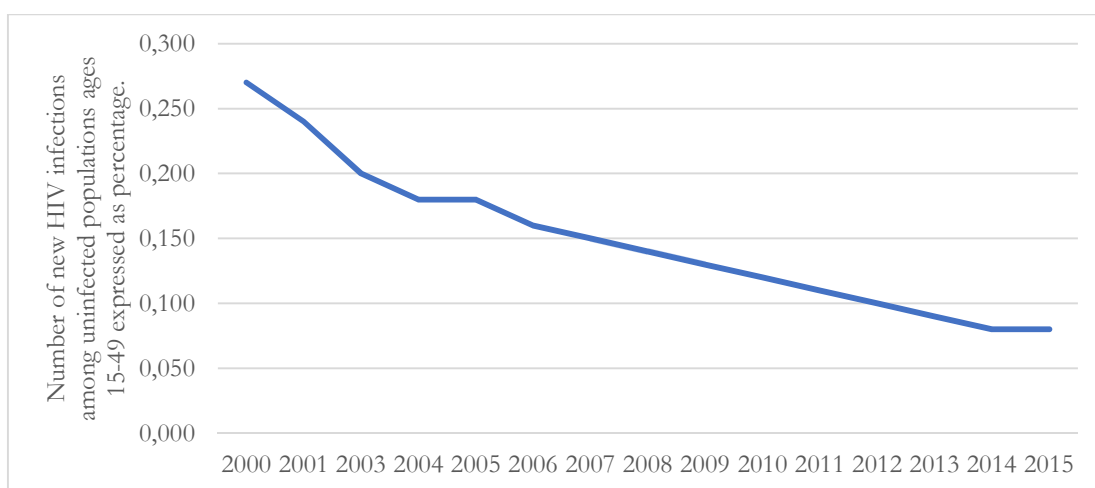
Source: Own elaboration based on data from the World Bank's DataBank (<http://databank.worldbank.org/>)

HIV

Regarding Ghanaian HIV incidence, we can state that the progress made in its reduction has been successful. In fact, the number of new HIV cases in Ghana diminished from

0.27% over uninfected population (ages 15-49) in 2000 to 0.08% in 2015, as shown in Figure 19.

Figure 19. Ghanaian Incidence of HIV 2000-2015(% of infected population ages 15-49)



Source: Own elaboration based on data from the World Bank's DataBank (<http://databank.worldbank.org/>)

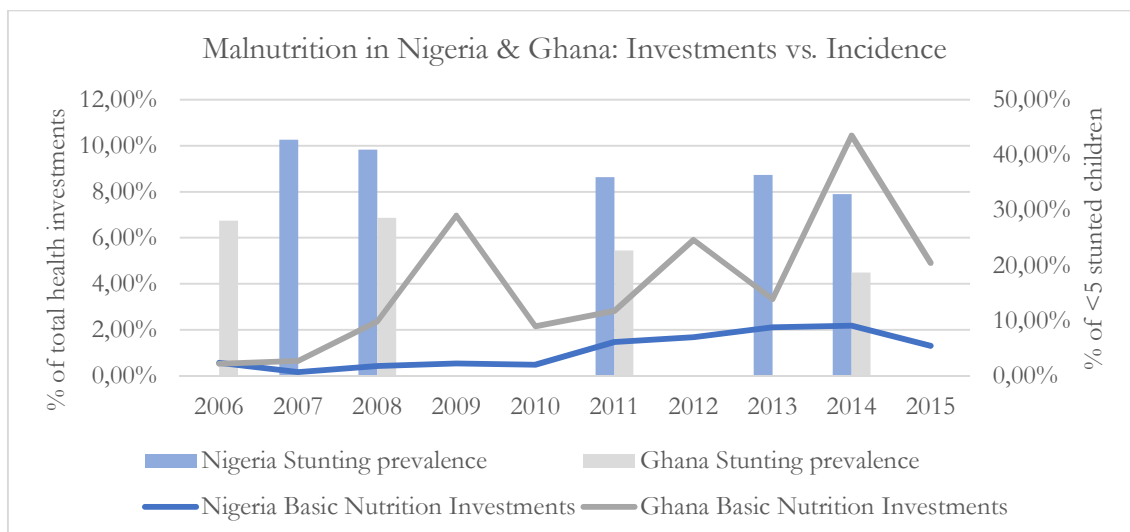
4. 4. Comparison: Donations vs Incidence

In this section, we will compare the incidence of the studied diseases versus the donations made in the countries of interest, Ghana and Nigeria. The investments in basic nutrition, malaria and STD control will be represented in relative terms, as percentage over the total health investments of the country, in order to made an adequate comparison, given the difference of dimension between the countries.

As we can see in Figure 20, the prevalence of stunted children under 5 is higher in Nigeria than in Ghana along the whole period of study (2006-2015). In 2014, the 33% of Nigerian children under five years were considered short for his age (stunted), while in Ghana the

percentage was the 19%. The opposite situation occurs with the investments in Basic Nutrition, which are higher in Ghana, representing the 10.5% of total health investments of the country in 2014, whilst the figure was only the 2% in Nigeria. Even though the incidence of stunted children in Nigeria is higher than in Ghana, 14% higher in 2014; the proportion of basic nutrition investments over total health investments is lower in Nigeria, an 8.5% lower in 2014.

Figure 20. Malnutrition in Nigeria & Ghana: Investments vs. Incidence, 2006 - 2015

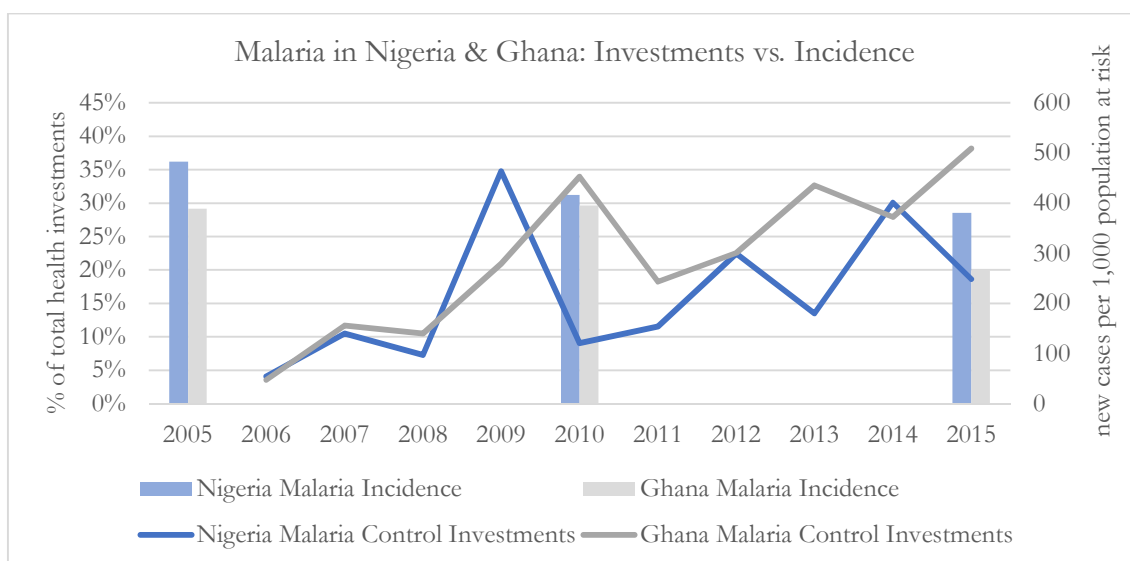


Source: Own elaboration based on data from the World Bank's DataBank (<http://databank.worldbank.org/>) & the OECD's Statistics, CRS (<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>)

In Figure 21, we can observe that the incidence of malaria in Nigeria is slightly higher along the time, in fact, in 2015 there were 381 new cases of malaria per 1,000 population at risk in Nigeria towards the 266 of Ghana. Regarding the investments made in malaria control, we can observe a high volatility in both countries, but with a dominant lead of Ghana since 2009. In 2015, the 38% of investments in health were given over the battle against malaria in Ghana, in contrast to the 19% of Nigeria. Even though the incidence of malaria in Nigeria is higher than in Ghana, 115 new more cases per 1,000 population at risk in 2014; the

proportion of basic nutrition investments over total health investments is lower in Nigeria, an 19% lower in 2014.

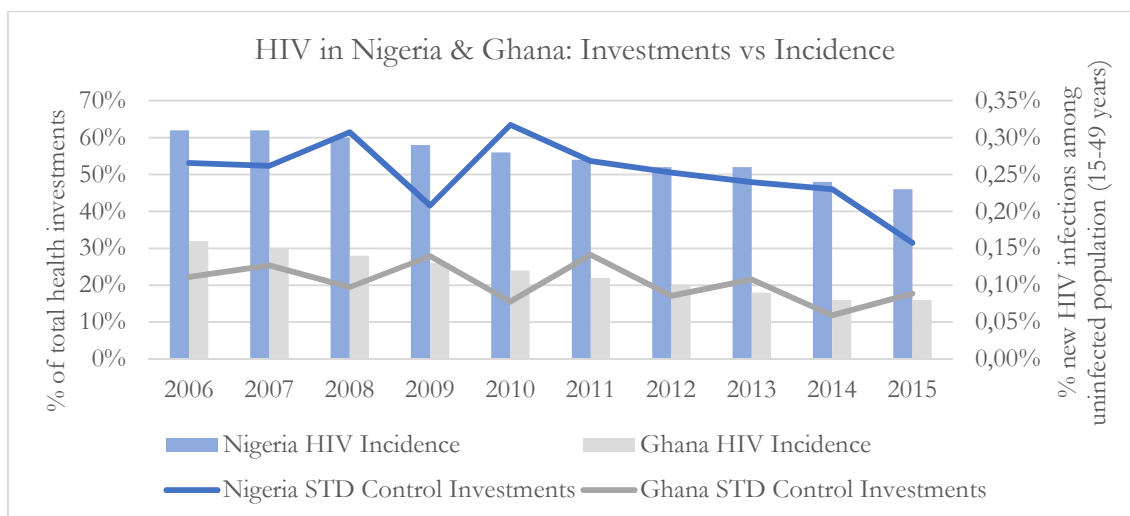
Figure 21. Malaria in Nigeria & Ghana: Investments vs. Incidence, 2006 - 2015



Source: Own elaboration based on data from the World Bank's DataBank (<http://databank.worldbank.org/>) & the OECD's Statistics, CRS (<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>)

In Figure 22, we can observe a more balanced situation among the investments made towards battling HIV and its incidence in both countries, the incidence of HIV in Nigeria is higher than in Ghana, so as the investments made in order to combat it.

Figure 22. HIV in Nigeria & Ghana: Investments vs. Incidence



Source: Own elaboration based on data from the World Bank's DataBank (<http://databank.worldbank.org/>) & the OECD's Statistics, CRS (<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>)

5. Discussion and Conclusions

In the study we found a mismatch between the amount of donations directed to Malaria, HIV and Malnutrition and the incidence of these diseases in both Nigeria and Ghana.

HIV keeps having the largest investments, followed by malaria. This is the trend in Africa as a region, with an average of 35% of total health investments in 2015, and it is found as well in Nigeria, where HIV and malaria investments represented 32% and 19% of total health investments in the same year. In Ghana, malaria and HIV are closer in terms of investments during the period 2005-2015, so we can say that the prevalence of HIV investments is not so clear. In fact, in 2015, malaria investments became larger than HIV ones. Meanwhile, investments in malnutrition are minimal in comparison: just a 1.8% in Nigeria and 5% in Ghana as a percentage of total investments in health.

Large investments in HIV and malaria are justified because their incidence in Africa (and in Nigeria and Ghana, in particular) is above the average of developing countries.

However, the incidence of malnutrition in these countries is also alarming, and yet, in relative and absolute terms, investments do not respond to this need. It seems that malnutrition has been neglected in the period 2005-2015.

While HIV investments in both countries are in accordance to the incidence of the disease, the case of malaria is different. Thus, the incidence of malaria is higher in Nigeria than in Ghana, but it is Ghana who receives a larger proportion of funds to combat this disease.

The lack of accordance between funds invested and incidence of the disease is also notable within countries. Northern regions of both countries are poorer and show higher incidence of HIV; malaria and malnutrition. In the case of Nigeria, this is aggravated by the armed conflict situation of the Boko Haram in the North West, which is displacing millions of people to the neighboring areas, as refugees and IDPs. Despite the disadvantage of these populations, the Southern regions in both countries are favored in terms of health investments. This can be explained by the more favorable trade conditions in the Southern regions due to the closeness to the coast.

Why investments are not being allocated in larger proportion to the countries and regions with the largest incidence? It is not clear. In the case of chronic malnutrition the explanation is easier since it is a hidden disease. People do not die directly from chronic malnutrition (unless there is a famine and there is acute malnutrition), but it is a condition that perpetuates poverty because it affects cognitive and motor development and increase susceptibility to get other conditions. The Bill and Melinda Gates foundation is starting to raise awareness towards this disease and, therefore, it might receive more funds in the near future.

HIV raised massive attention, probably because is a condition that can affect everybody, the rich and the poor. But chronic malnutrition mostly affects the poor, and malaria is more concentrated in poor countries. However, malaria has managed to raise more attention in the last decade as reflected in the increasing trend of funds devoted to it and the eradication of the disease in 17 countries. The shortage of investments on malaria in the case of Nigeria despite its high incidence in the country maybe related to donor tiredness. It also happened with polio before. When polio was about to be eradicated,

donor's funds directed towards that condition decreased. Malaria can be wipe out and it is necessary to keep investing on it.

There are other potential reasons for the mismatch between funds and incidence. Some authors point out the fashions in the market of development (Shiffman, 2009); others mention the politics behind donor investments that guide more money to certain countries than others depending on political interests and intertwined purposes (Seo, 2017). It is possible that despite the availability of data, donors are not following them. Whatever the reasons behind, it is important to pair the investments wit the incidence of the conditions so as to achieve a fair and efficient allocation of resources based on need.

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ANNEX 1

In this section, some tables are shown about Nigerian and Ghanaian health investments as percentage of health investments in Africa and Developing Countries 2006-2015.

Table 4. Nigerian and Ghanaian Health Investments as % of Total Investments in Developing Countries, 2006-2015

% of Developing Countries' Investments		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average 2006- 2015
Nigeria	Health total (including HIV)	3,31%	3,75%	4,75%	6,06%	4,11%	4,30%	5,07%	6,16%	5,26%	6,25%	4,90%
	Malaria Control	3,00%	9,77%	5,25%	21,27%	3,75%	6,20%	11,15%	8,28%	15,21%	11,64%	9,55%
	Basic Nutrition	1,10%	0,33%	1,21%	1,26%	0,76%	2,36%	2,08%	2,74%	2,24%	1,63%	1,57%
	STD Control including HIV/AIDS	4,46%	4,67%	6,22%	5,62%	5,87%	4,99%	5,81%	7,40%	6,38%	5,82%	5,72%
Ghana	Health total (including HIV)	1,50%	1,35%	1,38%	1,39%	1,31%	1,16%	1,54%	1,35%	1,09%	1,19%	1,33%
	Malaria Control	1,18%	3,91%	2,21%	2,94%	4,48%	2,66%	3,41%	4,39%	2,92%	4,55%	3,27%
	Basic Nutrition	0,46%	0,48%	1,95%	3,76%	1,07%	1,22%	2,24%	0,95%	2,21%	1,17%	1,55%
	STD Control including HIV/AIDS	0,85%	0,81%	0,57%	0,87%	0,46%	0,71%	0,60%	0,73%	0,34%	0,63%	0,66%

Source: Own elaboration based on data from the OECD's Statistics, CRS (<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>)

Table 5. Nigerian and Ghanaian Health Investments as % of Total Investments in Africa Total, 2006-2015

% of African Investments		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average 2006-2015
Nigeria	Health total (including HIV)	7,39%	8,41%	9,04%	11,80%	8,04%	8,33%	9,19%	11,14%	9,27%	10,94%	9,35%
	Malaria Control	3,67%	12,32%	7,04%	26,15%	5,24%	7,98%	14,22%	10,64%	19,31%	14,07%	12,07%
	Basic Nutrition	2,59%	0,91%	2,11%	2,32%	1,33%	4,45%	3,95%	4,73%	3,61%	3,14%	2,91%
	STD Control including HIV/AIDS	8,85%	8,46%	10,25%	9,76%	9,66%	8,85%	9,41%	11,74%	9,76%	10,04%	9,68%
Ghana	Health total (including HIV)	3,36%	3,02%	2,63%	2,71%	2,57%	2,25%	2,80%	2,44%	1,92%	2,09%	2,58%
	Malaria Control	1,45%	4,93%	2,97%	3,62%	6,26%	3,42%	4,35%	5,64%	3,70%	5,50%	4,18%
	Basic Nutrition	1,08%	1,35%	3,41%	6,93%	1,87%	2,30%	4,24%	1,64%	3,57%	2,26%	2,87%
	STD Control including HIV/AIDS	1,68%	1,47%	0,95%	1,50%	0,76%	1,26%	0,97%	1,16%	0,52%	1,08%	1,13%

Source: Own elaboration based on data from the OECD's Statistics, CRS (<https://stats.oecd.org/Index.aspx?DataSetCode>)

ANNEX 2

In this section, some tables about the refugee situation in Nigeria are presented.

Table 6. Nigerian Refugees and IDPs in 2015

REFUGEES					IDPs	Others	Total
Refugees	People in refugee-like situations	Total refugees and people in refugee-like situations	of whom: UNHCR-assisted	Asylum-seekers (pending cases)	IDPs protected/assisted by UNHCR, incl. people in IDP-like situations	Others of concern to UNHCR	Total population of concern
152.136	15.852	167.988	146.107	51.863	2.172.532	19	2.392.402

Source: Own elaboration based on data from the UNHCR's Population Statistics (http://popstats.unhcr.org/en/overview#_ga=1.220600017.851890232.1491413062)

Table 7. Nigerian Refugees by Country of Asylum 2015

Country/ Territory of Asylum	Population start-2015		Population end-2015	
	TOTAL	of whom: UNHCR-assisted	TOTAL	of whom: UNHCR-assisted
Cameroon	39.968	24.874	71.840	71.840
Canada	4.683	-	4.502	-
Chad	2.930	2.327	5.689	5.689
France	1.102	-	1.250	-
Italy	6.293	-	9.931	-
Niger	30.000	30.000	68.321	68.321
United Kingdom	1.471	-	1.679	-

Source: Own elaboration based on data from the UNHCR's Population Statistics (http://popstats.unhcr.org/en/overview#_ga=1.220600017.851890232.1491413062)

Table 8. Nigerian refugees by Region of Asylum 1990-2013

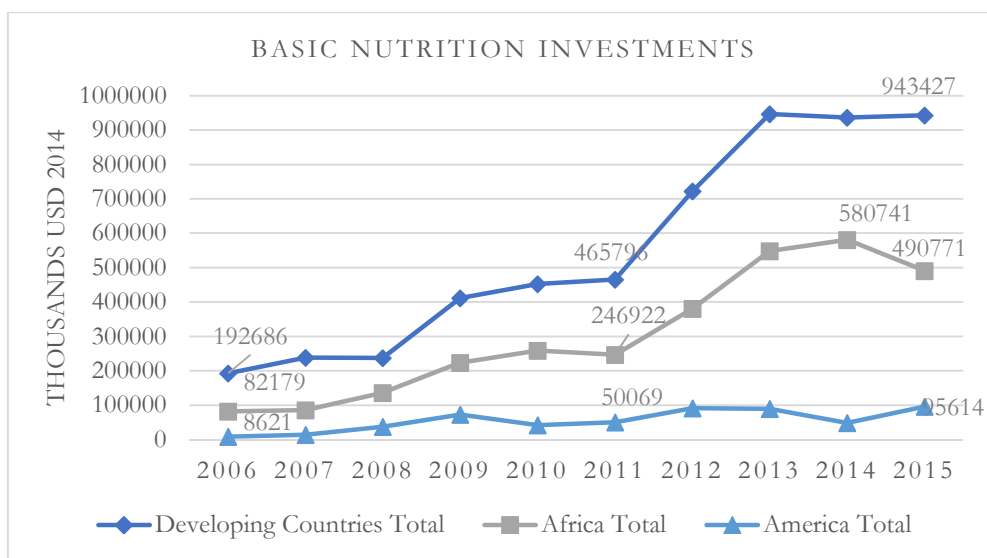
Country/Region/Area of Destination	n° of migrants			% of total migrants, each year		
	1990	2000	2013	% of total 1990	% of total 2000	% of total 2013
1. WORLD	465728	625993	1029466	100,00%	100,00%	100,00%
More developed regions	157326	326323	632782	33,78%	52,13%	61,47%
Less developed regions	308402	299670	396684	66,22%	47,87%	38,53%
SUB-SAHARAN AFRICA	288952	279818	362146	62,04%	44,70%	35,18%
2. AFRICA	291649	282821	366747	62,62%	45,18%	35,62%
Eastern Africa	302	184	3250	0,06%	0,03%	0,32%
Middle Africa	129004	121885	154751	27,70%	19,47%	15,03%
Northern Africa	25768	26888	19876	5,53%	4,30%	1,93%
Southern Africa	9093	7109	19338	1,95%	1,14%	1,88%
Western Africa	127482	126755	169532	27,37%	20,25%	16,47%

Source: Own elaboration based on data from the UN's World Population Prospects the 2015 Revision (<https://esa.un.org/unpd/wpp/>)

ANNEX 3

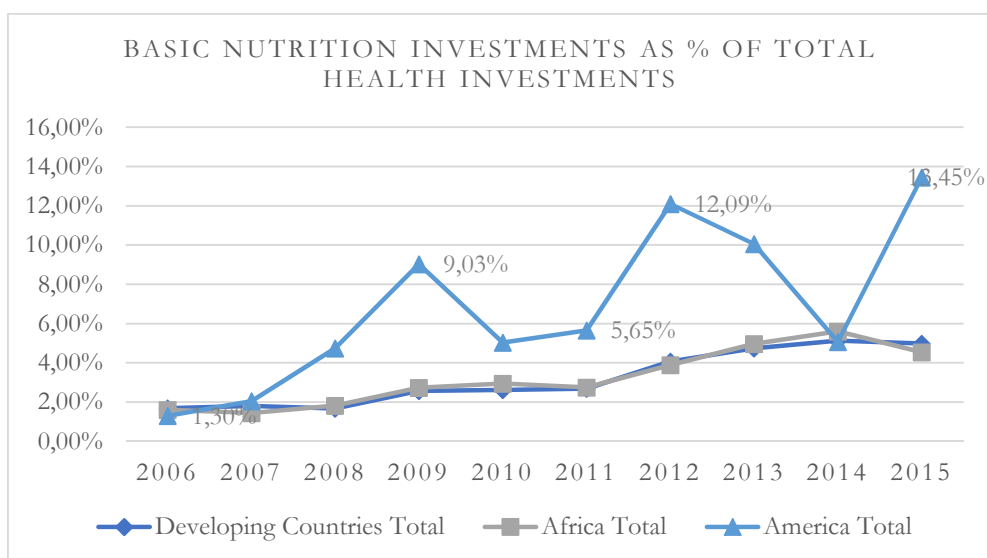
In this section, a more detailed description about worldwide health investments is provided for the following regions, Developing Countries Total, Africa Total and America Total; among the years 2006 and 2015.

Figure 23. Basic Nutrition Investments 2006-2015, a World Overview



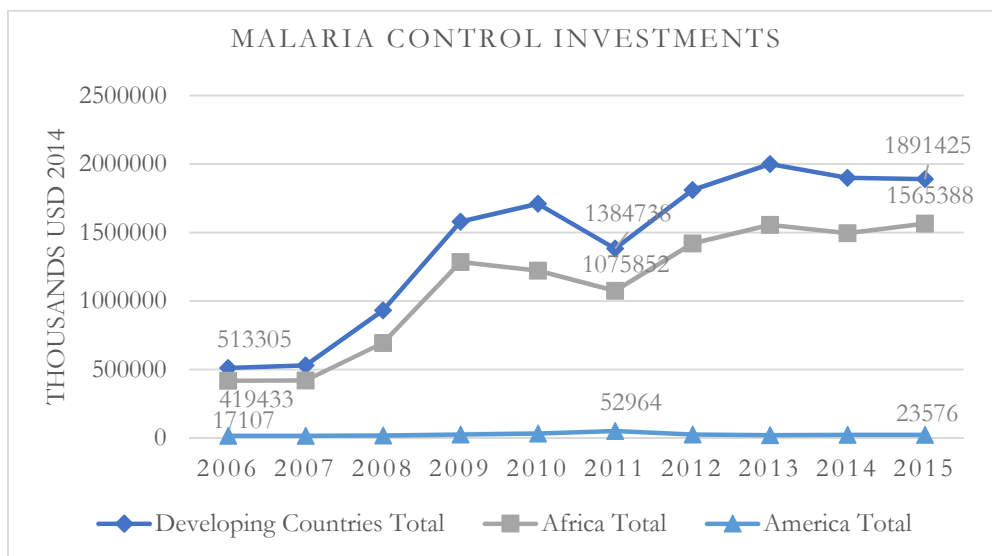
Source: Own elaboration based on data from the OECD's Statistics, CRS (<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>)

Figure 24. Basic Nutrition Investments over Total Health Investments 2006-2015, a World Overview



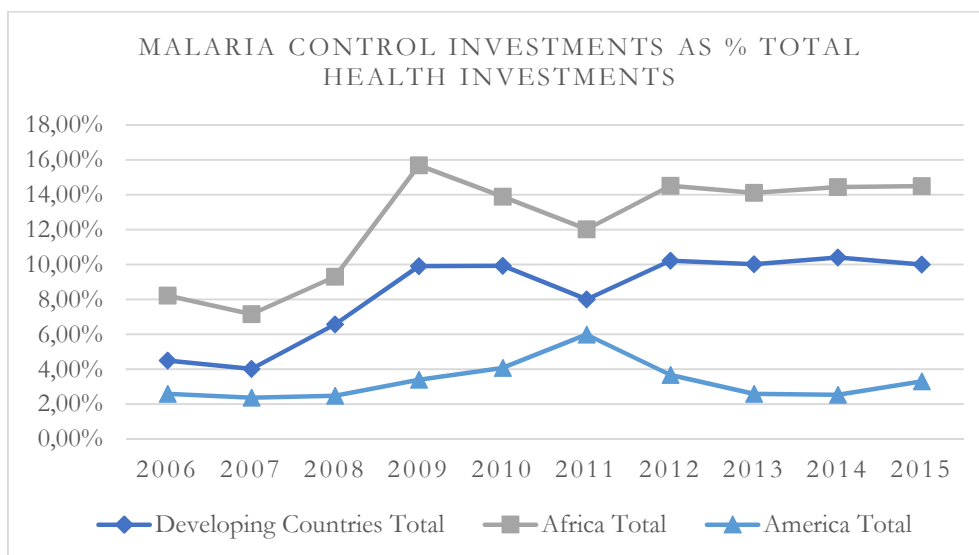
Source: Own elaboration based on data from the OECD's Statistics, CRS (<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>)

Figure 25. Malaria Control Investments 2006-2015, a World Overview



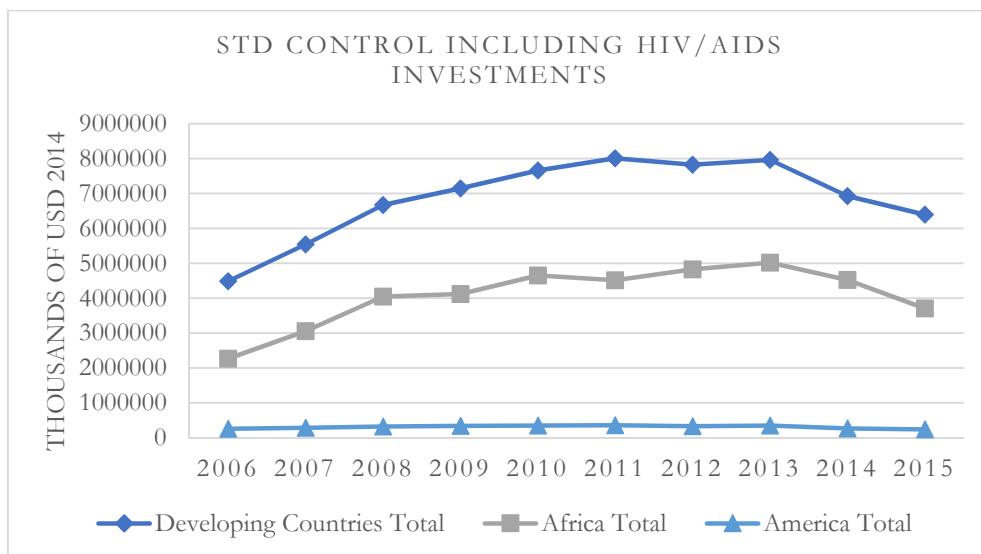
Source: Own elaboration based on data from the OECD's Statistics, CRS (<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>)

Figure 26. Malaria Control Investments over Total Health Investments 2006-2015, a World Overview



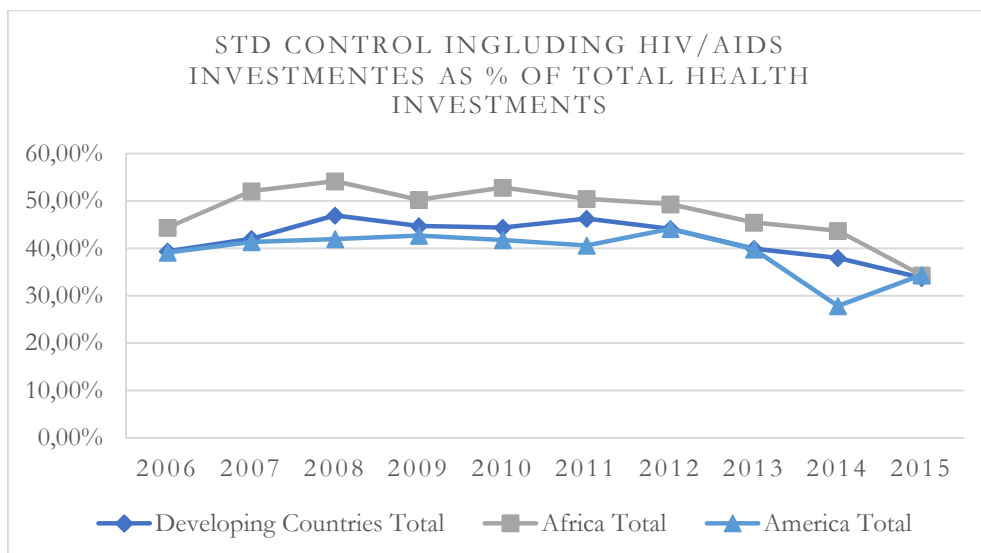
Source: Own elaboration based on data from the OECD's Statistics, CRS (<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>)

Figure 27. STD Control Investments (including HIV/AIDS) 2016-2015, a World Overview



Source: Own elaboration based on data from the OECD's Statistics, CRS (<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>)

Figure 28. STD Control Investments over Total Health Investments 2006-2015, a World Overview



Source: Own elaboration based on data from the OECD's Statistics, CRS (<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>)

Table 9. Africa and America Health Investments as % of Developing Countries' Investments, 2006-2015

% of Developing Countries' Investments		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average 2006-2015
Africa	Health total (including HIV)	44,78%	44,62%	52,58%	51,33%	51,05%	51,66%	55,22%	55,28%	56,76%	57,12%	52,04%
	Malaria Control	81,71%	79,25%	74,52%	81,33%	71,50%	77,69%	78,44%	77,84%	78,75%	82,76%	78,38%
	Basic Nutrition	42,65%	35,76%	57,31%	54,33%	57,13%	53,01%	52,76%	57,99%	62,00%	52,02%	52,50%
	Std Control including HIV/AIDS	50,45%	55,26%	60,68%	57,62%	60,72%	56,38%	61,67%	62,99%	65,35%	57,96%	58,91%
America	Health total (including HIV)	5,80%	5,26%	5,46%	5,02%	4,84%	5,12%	4,24%	4,45%	5,26%	3,76%	4,92%
	Malaria Control	3,33%	3,10%	2,06%	1,73%	1,99%	3,82%	1,53%	1,15%	1,28%	1,25%	2,13%
	Basic Nutrition	4,47%	5,97%	15,52%	17,59%	9,28%	10,75%	12,59%	9,44%	5,19%	10,13%	10,09%
	Std Control including HIV/AIDS	5,76%	5,17%	4,88%	4,79%	4,55%	4,49%	4,24%	4,44%	3,85%	3,82%	4,60%

Source: Own elaboration based on data from the OECD's Statistics, CRS (<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>)

Table 10. Average proportion of Malaria, HIV and Basic Nutrition Investments over Total Health Investments, a World Overview (2006-2015)

% of Total Health Investments Including HIV/AIDS - average (2006-2015)	Developing Countries Total	Africa Total	America Total
Malaria Control	8,36%	12,39%	3,30%
Basic Nutrition	3,20%	3,23%	6,85%
Std Control including HIV/AIDS	41,97%	47,71%	39,36%

Source: Own elaboration based on data from the OECD's Statistics, CRS (<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>)