A Human Security Population-Based Approach to Achieve Equity, Solidarity and Gender Sensitivity for the Population Living in Southwestern Bateyes of the Dominican Republic

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A HUMAN SECURITY POPULATION-BASED APPROACH TO ACHIEVE EQUITY, SOLIDARITY AND GENDER SENSITIVITY FOR THE POPULATION LIVING IN SOUTHWESTERN BATEYES OF THE DOMINICAN REPUBLIC

By

Eddy Nelson Perez

A DISSERTATION

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The present study was designed to contribute to the application of human security principles in vulnerable populations, using “The Bateyes” (sugar mill camps) from the Dominican Republic (DR) as a case study. Following the “Robin Hood” principle of using resources allocated for the identification and treatment of human immunodeficiency virus (HIV) as a base from which to build infrastructure for other health and human security needs, this project sought to reduce inequalities and promote equal rights in a vulnerable population living in isolated rural areas of the DR. The impact of a human security model versus non-intervention (standard of care) was examined longitudinally in relationship to the outcomes (prevention of morbid events such as HIV, tuberculosis, diarrhea, dengue, malaria, and model impact on breastfeeding and vaccines rates). The project was implemented in three phases: baseline assessments, implementation of a “human security” model over a six month period, and evaluation of the interventions at six and twelve months after the initiation of the intervention.
Qualitative evaluation methods were used to complement quantitative assessments. An economic analysis was also conducted to evaluate the costs of the intervention and potential sources of economic benefits. Overall, at baseline, the owners of the houses from Batey A (Case) were more likely to respond incorrectly than the residents of Batey B (Control) questions about knowledge, attitudes and practices, for the most prevalent infectious diseases of the southwestern area of the Dominican Republic. To control for baseline differences between the study groups, a Knowledge, Attitudes and Practices (KAP) score system was created. The KAP score system showed that the people living in Batey A had a higher percentage of right answers than residents of Batey B, six months after the intervention. These findings, however, were not observed at the 12 month follow-up visit, suggesting that future studies using the human security intervention model may need to be maintained for more than 6 months, to promote sustainability. Economic analysis revealed that the total cost-savings of the Program to the Ministry of Health and society overall to be US$252,399. In addition, at the follow-up visits, morbidity and mortality rates of the study population were lower than the rates reported in a recent Demographic Health Survey conducted in the Southwestern Bateyes of the DR. The qualitative interviews allowed for the identification of community perceptions of the model, as well as the necessity for an interdisciplinary approach, including structural interventions (i.e. water pump, construction of latrines, etc) and monitoring community security-related issues through household monthly visits. The use of HIV resources demonstrated that the money allocated for HIV prevention could be utilized, not only to reduce the burden of disease, but also to invest in health systems and services. Applied to other settings, the design and outcomes of this study could have a
beneficial impact on refugee and undocumented populations in other countries under the impact of the structural violence observed in the Bateyes of the DR.
Dedication:

To God: my reason for living.

To Belkys: my heart, my soul, my life.

To my parents, my brother, my sister, my nephews, my nieces, my brothers- and sisters- in- law and my Mother- in- law: the greatest learners along this journey.

To Michel: our lovely Dove.

To Lily: You are always on my mind.

To Gail Shor-Posner: for all these years of legacy and altruism.

To Arthur Amman: a role model, a father, a human right watcher.

To Miguel (Pastor): an essential factor for my reconciliation with God.

To Andres: God knows why.
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Introduction

Health is inextricably linked to broad social transformations of our times. Beyond its intrinsic interest, the health field offers an observation point from which to examine the economic, political, cultural, demographic, scientific, and technological processes that mark each era (Frenk 1997). Both the health conditions of populations and the institutional arrangements for health care reveal profound aspects of the social structure in which they are immersed. The health field itself, determined by the social system, reflects essential aspects of each particular society (Smith 1997).

People are extremely sensitive to specific changes in their surroundings and many of these changes are related to vulnerability factors in human populations. These factors range from biological (eg, individual immunity) to institutional (eg, inadequate health services) (Oppong 1998).

In an attempt to identify the target groups more precisely, health programs have focused on biologically vulnerable groups such as infants, children under 5 years old, pregnant women, young mothers, and people of reproductive age. This approach, however, ignores other important non-biological features of vulnerability, such as poverty, education, and health-service provision (Oppong 1998).
Much of the discussion on vulnerability in the field of infectious diseases has occurred in the context of the human immunodeficiency virus (HIV) epidemic. Approaches to dealing with the HIV/acquired immunodeficiency syndrome (AIDS) epidemic have focused on “high risks groups”, including sex workers, long distance truck drivers and soldiers, whose behavior was construed as “risky”. These approaches, however, place responsibility for change on individuals, and has been criticized because it ignores the social and economic factors that constrain the ability of an individual to change (Farmer, 2003).

In recent times, attention has shifted towards improved understanding of the many and complex processes that interact to make individuals and communities susceptible to infection. For instance, new health governance, based on the principles of human security, has been proposed to closely monitor social interactions of human populations (Paris 2001).

Human security has been described as a new conceptualization of security, and a new paradigm for understanding human interactions in a specific political context. Moreover, human security may serve as a label for a broad category of research in the field of security studies that is primarily concerned with nonmilitary threats to the safety of society, groups, and individuals, in contrast to more traditional approaches to security studies that focus on protecting states from external threats (Paris 2001).
This dissertation focuses on the application of human security principles in vulnerable populations, using the Bateyes (sugar mills camps) from the Dominican Republic as a case study. To achieve this goal, a pilot study was developed, incorporating the “Robin Hood vision” (Perez-Then 2005) of using HIV resources as a base from which to develop an enhanced comprehensive human security model. This population-based approach integrated chronic, ethical, social, and political factors to increase HIV awareness, reduce health disparities and achieve equity, solidarity and gender sensitivity, was developed.

The final goal of this pilot study is to create a common cause for Dominicans and Haitians, including prevention of health problems, to identify mechanisms of solidarity that can lead to the end of the persistent pattern of structural violence that has prevailed over the past twenty years in the Bateyes of the Dominican Republic.

Overall, the implementation of the model could also have a beneficial impact for refugee population who share the social and structural violence observed in the Bateyes of the Dominican Republic.
CHAPTER I

A HUMAN SECURITY MODEL POPULATION-BASED APPROACH TO ACHIEVE EQUITY, SOLIDARITY AND GENDER SENSITIVITY FOR THE POPULATION LIVING IN SOUTHWESTERN BATEYES OF THE DOMINICAN REPUBLIC: THE CONCEPTUAL FRAMEWORK.

1. The Dominican Republic

A. General situation and trends

The Dominican Republic occupies the eastern side and roughly three-quarters of the island of Hispaniola or Kiskeya, by its Native name. Haiti occupies the other quarter of the island of Hispaniola which is located between the Caribbean Sea and the Atlantic Ocean. The country comprises 48,442 km², and it is divided onto thirty one provinces plus the National District. The population of the Dominican Republic in 2007 was estimated at 9,492,876, with a population density of 195.0 inhabitants per km² (CESDEM/USAID 2007).

Throughout much of the early history of the Dominican Republic, the economy was based on agriculture. Mining began to gain importance (ferronickel, gold and silver) in the 1970s. After that time, there was also a rapid development of free export industry zones and tourism. In 1996, more than 75% of the poor households were located at the southwestern part of the country. In 1998, the literacy rate was 84.4% in adults over 15 years of age. Illiteracy in the Dominican Republic is almost three times higher in rural than in urban areas (PAHO 2009).
The maternal mortality rate in 2007 was 72.8 per 100,000 live births; however, underreporting is believed to be as high as 46.1%. In 2007, 91.2% of all maternal deaths were physician-certified. In the same year, registered mortality by age was: 1-4 years, 2.4%; 5-14 years, 2.1%; 15-49 years, 23.8%; 50-64 years, 16.3%; and 65 and over, 43.9% (CESDEM/USAID 2007, PAHO 2007).

B. Description of health problems

In this section, the Dominican health problems which will be described are the ones related to the case study. It is important to point out that other health problems can occur in isolated rural areas of the Dominican Republic but will be overlooked to put more emphasis on the ones related to the model that will be developed as case study.

B.1 Vector-borne diseases: In 2007, there were 3,525 cases of malaria (Plasmodium falciparum), with an annual parasite index of 4.7 per 1,000. There is endemic transmission of malaria in 36 municipalities of 6 provinces (linked to the cycles of crop production) and epidemic outbreaks linked to the construction industry. Dengue is endemic in the country (serotypes 1-4); 9,628 probable cases were reported in 2007, which represents 1% of the total cases reported in Las Americas. The frequency of Bancroftian filariasis (Wuchereria bancrofti) is low, and there is a control program including massive treatment of the population once a year (CESDEM/USAID 2007, PAHO 2009).
B.2 Vaccine-preventable diseases: In October 2000, an outbreak of poliomyelitis, caused by a poliovirus derived from the vaccine virus Sabin type 1, was detected. Between July 2000 and June 2001, 104 cases of acute flaccid paralysis (3.4 per 100,000 children under 15) were detected, with fourteen cases confirmed as polio. Vaccination coverage against measles in children under 1 year in 1997 and 2007 varied from 80 to 96.1%. In 2007, four cases of diphtheria and three cases of neonatal tetanus were reported; 152 cases of non-neonatal tetanus were reported between 1997 and 2007. Vaccination against rubella has recently been introduced into the Dominican Republic. Early in the year 2000, 346 cases of rubella were confirmed. There has been an annual incidence of *Haemophilus influenzae* type b (Hib) of 14 per 100,000 in children under 5 in the National District; vaccination against Hib was started in 2001. The vaccination coverage with all three doses for hepatitis B in children under 1 year was 85% in 2007 (CESDEM/USAID 2007, PAHO 2007).

B.3 Communicable chronic diseases: Much progress in tuberculosis (TB) control has been achieved in the Dominican Republic since the implementation of directly observed therapy supervision (DOTS) was initiated in 1999. By 2005, DOTS services had been made available to 80% of the population. Case detection of infectious cases was 83% for the whole country and 76% under DOTS areas. The 2003 cohort analysis suggests 80% treatment success for TB, still shy of the 85% target (Perez-Then et al 2007). The incidence of TB in 2006 was 47.4 cases per 100,000, with wide variation among the incidence in individual provinces. The case
rate with positive microscopic examination was 27.6 per 100,000 (PAHO 2007). Funding for TB control has been secured for the next 3-5 years due to an increased government commitment, the Global Fund to Fight AIDS, TB, and Malaria (GFATM) grant to PROFAMILIA, and the United States Agency for International Development (USAID). WHO/PAHO leads the provision of technical support along with the Netherlands Tuberculosis Foundation (KNCV) and Management for Science Health (MSH) (Perez-Then et al 2007).

The achievements in TB control in the Dominican Republic in such a short period of time are impressive. To ensure sustainability of the gains, however, planning in line with the Global Plan to Stop TB 2006-2015 and implementation of the new Stop TB Strategy are critical to reach the impact of Millennium Development Goals (MDG)/Stop TB Partnership targets by (or before) 2015. The latest epidemiologic data suggest slow progress to address TB/HIV and Multiple Extreme Drug Resistant (MXDR)-TB. Laboratory strengthening, public-public and public-private mix approaches, training of human resources, and engagement of civil society are areas also in-need of critical attention (Perez-Then et al 2007).

B.4 HIV/AIDS: From 1995 to 1998, the annual incidence of reported cases of HIV/AIDS declined from 6.4 to 3.9 per 100,000 (high underreporting is assumed) (SESPAS 2000). In 2007, AIDS represented 5% of the total causes of hospitalization at the national level. The transmission was through heterosexual sexual contact in 80% of cases (CESDEM/USAID 2007, PAHO 2007). According to DHS-2007 data, 0.8%
of the population between 15-49 years of age in the Dominican Republic is infected with HIV (CESDEM/USAID 2007). HIV vertical transmission rates have declined from 30% to 8% (Perez-Then et al 2003).

Data on TB/HIV co-infection is limited to certain areas of the country suggesting that between 6 and 11% of TB patients are infected with HIV. A recent survey suggests that young Dominican adults, provinces with high rate of tourism, and sugar mill camps should be targeted for interventions (Perez-Then et al 2007). While the country has introduced antiretroviral drugs through a successful collaboration with the Clinton Foundation and GFATM, there are no data on the number of HIV-infected TB patients receiving antiretroviral drugs (Perez-Then et al 2007). Surveillance of HIV among TB patients has not been implemented and information is not available on TB/HIV co-infected patients receiving co-trimoxazole prophylaxis. Without any delay, collaboration between the National Tuberculosis Program (NTP) and AIDS program needs to move forward concretely in line with the new WHO Stop TB Strategy. This will include: 1) establishing the mechanisms for collaboration between the two programs which at the moment is very informal, 2) implementing activities to reduce the burden of TB among people living with HIV/AIDS and 3) implementing activities to reduce the burden of HIV among TB patients (Perez-Then et al 2007).

B.5 Sexually transmitted infections: A sentinel survey conducted in the South Region of the Dominican Republic revealed the prevalence of syphilis in female sex workers,
men who have sex with men and drug Users to be 8.4%, 5.6% and 5.1%, respectively (Caballero 2008). Hepatitis B and C prevalence among these groups ranges from 0.3% to 0.5% (Caballero 2008).

B.6 Nutritional and metabolic diseases: From 1999 to 2006 the percentage of low births weight infants was recorded as 11% (Soriano et al 2003, UNICEF 2009). According to 1999-2006 surveys, 4% of children were exclusively breast-feeding at birth, and approximately 5% of children under five were suffering from moderate and severe underweight. Micronutrient surveys of children fewer than 15 years of age showed deficiencies of iron (30%), iodine (74%) and vitamin A (19%) (UNICEF 2009).

It is important to point out that there are other diseases which are categorized as Neglected Tropical Diseases (NTD) such as leptospirosis and leprosy of which few cases are reported in the southwestern rural areas of the Dominican Republic. Parasitic Diseases are more common in rural areas, specially giardias and amebiasis due to consumption of unsafe water (UNICEF 2009).

C. The health system

The health system of the Dominican Republic is comprised of two subsectors, the public subsector (insurance and provider institutions of nonprofit and for-profit services, governed by the General Health Law), and the private subsector (nonprofit and for-profit). The Ministry of Health provides leadership for the system and
provides services to 75% of the population, most of whom are uninsured (care is free but with no guarantee of access or quality). The private sector provides services mostly to the upper-economic strata. Types of insurance include worker-employer prepayment schemes (such as the Social Security Dominican Institute), prepaid private health insurance, self-managed insurance and private providers (Glassman 1999).

The public subsector (administered by the Secretary of Health) is organized at four levels of management, central, regional, provincial and local. Decentralization of resources, however, is not in place at these four levels of administration. Health services are organized in three levels of care: primary care (1,099 ambulatory establishments of which 474 are rural), secondary care (126 establishments with five basic specialties), and tertiary care (42 specialized hospitals) (Glassman 1999).

In 1996, the total expenditure per capita on health was US$ 111 (6.5 % of GDP). As there were no significant structural changes between 1996 and 2000, it was assumed that the level remained stable over the period. The private sector finances the majority of health costs - 55% come directly from households, 75% of which have no insurance or pre-payment mechanisms (Glassman 1999).

As part of State modernization, from 1996 to 2000, decentralization was a main orientation, as well as availability of services and drugs. Actions were taken to face problems of coverage, organization, management and quality of services. A set of
strategies based on primary care and democratization was addressed to improve equity with respect to access to services (Glassman 1999).

In 1997, a framework was established for the management of health sector reform under six principles: universality, equity, comprehensiveness, solidarity, participation, and sustainability. In 1996-2000, a process of decentralization of the Ministry of Health and hospital management began. A new model of care was established, with emphasis on the first level (primary healthcare); standards of care were re-formulated; and health promotion strengthened. The Social Security Reform Law established the separation of financing, healthcare delivery, and insurance, essentially creating a compulsory basic universal health insurance plan (Glassman 1999).

D. The Bateyes*

One area of the country where needs have yet to be addressed is the approximately 300 Bateyes. The Bateyes are isolated rural areas attached to the old sugar cane plantations of the Dominican Republic. They are populated almost exclusively by Haitian migrant workers and/or descendents of Haitian migrant workers. At this time, the majority of the population of the Bateyes lack access to hospitals/clinics, basic healthcare, basic hygiene, clean water and sanitation (Canario et al 2005).

* The word “Batey” was first utilized by the Native Inhabitants of Hispaniola (Tainos), to name areas designated to play baseball and other social activities (Lopez-Severino & De Moya 1999). Nowadays, Bateyes are defined as barracks in the Dominican cane fields where cane cutters are housed (Wucker 1999).
As industry in the Dominican Republic has shifted away from sugar cane to a tourism driven economy, the situation in the Bateyes has become increasingly desperate. The government, along with several non-profit and faith-based groups, is now beginning to turn its attention to addressing the needs of the Bateyes’ populations (Canario et al 2005).

Currently, infant mortality rates are much higher in the Bateyes than in the rest of the country, due mainly to lack of prenatal care. Infants and children often suffer from respiratory and parasitic diseases, as well as malnutrition. Diarrhea remains one of the main causes of infant deaths, most frequently in children under 2, and with only slightly less frequency in children under 5. Less than 30% of the children in the Bateyes receive any type of immunizations. This, in part, explains outbreaks of polio and other preventable diseases occurring in the region (Canario et al 2005, CESDEM/USAID 2002).

Women in particular face extreme hardships in the Bateyes. Untrained mid-wives in less than sterile environments deliver babies. Reports of domestic and sexual abuse are high, but the women of the Bateyes have no legal course of action (they are not under the same justice system as the rest of the Dominican Republic system) (Canario et al 2005, CESDEM/USAID 2002).

Regarding HIV and AIDS, it is estimated that the Bateyes has almost triple the prevalence of HIV infection of the rest of the country (2.5% vs 1%) (Canario et al 2005, CESDEM/USAID 2002, CESDEM/USAID 2007).
These scenarios create a vulnerable situation in this population of the Dominican Republic, not only regarding HIV/AIDS, but also for other health-related conditions. Structural violence (which will be described in the next chapter), which influences the nature and distribution of extreme suffering, and susceptibility to infectious diseases is another factor to potentially increase human insecurity in these locations. Therefore, the implementation of an ecological approach which integrates chronic, ethical, social, and political factors, with the goal of reducing vulnerability in this group, should build on a human security framework. The historical context and basic elements of the human security model are described in the following section.


“Human security” is the latest in a long line of neologisms, including common security, global security, cooperative security, and comprehensive security, that encourage policymakers and healthcare providers to think about international security as something more than military defense of state interests and territory. Theoretically, the human security approach harkens back at least as far as Barry Buzan’s (1983) distinction between individual and national security and his view of the state as a threat to individual security (Peterson 2005), and human rights advocacy with HIV positive patients by Jonathan Mann in the mid-1980’s (Fidler 2003). The concept of human security, however, should be formally dated from 1994, when the United Nations Development Program (UNDP) issued its annual
Human Development Report and first made the connection between human security and the dual freedoms from fear and want, which were originally outlined in the US Secretary of State’s report on the 1945 San Francisco Conference. The UNDP report is also said to be the first document to provide a comprehensive definition of human security, covering economic, food, health, environmental, personal, community and political security (UN 2009).

In practice, the need for an expanded conceptualization of security was triggered by a series of tragedies around the world. The genocides in Rwanda (1994) and Bosnia and Herzegovina (1995) starkly illustrated to the world that the traditional concept of security as the protection of national borders was not sufficient to save lives in the face of civil conflict. In both cases, national security failed to protect individuals and communities within their own national boundaries, which thus provided justification for expanding the objective of security (Commission of Human Security 2003).

To urge the international community in the new millennium to take action on the needs of individuals and communities around the world, in order to ensure human security for all, an influential report was published in 2003 by the Commission on Human Security, co-Chaired by Sadako Ogata, a former UN commissioner for refugees, and Amartya Sen, a Nobel laureate in economics, linking security, not to military definitions, but to human development, human rights, and democracy. The
Commission’s report proposes nine immediate areas requiring concerted action by the international community: protecting people in violent conflict; protecting people from the proliferation of arms; supporting migrants, refugees, and internally displaced persons; establishing funds for post-conflict situations; encouraging fair trade to benefit the poor; providing minimum living standards everywhere; giving high priority to universal access to basic health care; developing an equitable global system for patent rights; and providing universal basic education (Commission of Human Security 2003, LANCET 2003).

In other words, human security means protecting people from critical (severe) and pervasive (widespread) threats and situations, using processes that build on people’s strengths and aspirations, creating political, social, environmental, economic, military and cultural systems that together give people the building blocks for survival, livelihood and dignity.

Because the concept of human security encompasses both physical security and more general notions of social, economic, cultural, and psychological well-being, it is impractical to continue this section without illustrating how this new holistic human security vision of the health-illness process, appears to differ from two government health approaches that have dominated health policy for more than 100 years. It is also the intention of the following paragraphs to prepare the conceptual background for understanding why health security must be addressed with great
urgency in people living in isolated rural areas (Bateyes) of the Dominican Republic.

2.1 Westphalian and post-Westphalian health governance approaches.

Two distinct health governance approaches prevailed from the mid-nineteenth century until HIV/AIDS emerged in the 1980s: the Westphalian approach and post-Westphalian approach.

The term Westphalia refers to the two peace treaties of Osnabrück and Münster, signed on May 15 and October 24, 1648, respectively, that ended both the Thirty Years' War in Holy Roman Empire (today mostly Germany) and the Eighty Years' War between Spain and the Republic of the Seven United Netherlands. The treaties were between the Holy Roman Emperor, Ferdinand III (Habsburg), the Kingdoms of Spain, France, Sweden, the Netherlands and their respective allies among the princes and the republican Imperial States of the Holy Roman Empire (Fidler 2003). The *Peace of Westphalia* resulted from the first modern diplomatic congress and initiated a new order in central Europe based on the concept of state sovereignty.

The Westphalian governmental structure and principles for international politics had been in place for two centuries before the cross-border spread of infectious diseases became a subject for international governance in the mid-nineteenth century. Pathogens had been crossing borders since the beginning of human
civilization, and they crossed borders established by the Westphalian system from the beginnings of this system in the mid-seventeenth century. The Westphalian system, however, created a particular governance structure and process through which states would address the international spread of infectious diseases (Fidler 2003).

Prior to the mid-nineteenth century, states in the international system handled infectious disease threats predominantly as a national issue and without systemic cooperation with other states. For example, European states adopted and implemented national quarantine measures in an effort to keep diseases from entering their territories from foreign lands. The practice of quarantines began in Italian city-states in the fifteenth century; and, by the nineteenth century, ‘nearly all civilized countries of the world adopted some form of quarantine control’ (Fidler 2003).

Quarantine practices demonstrated that infectious diseases caused problems for the international system through state interactions fostered by trade and travel. In addition, the practice of requiring ships to acquire bills of health in order to avoid the application of quarantine measures illustrates the systemic impact of infectious diseases. A state would require that a ship, leaving a foreign port bound for one of its ports, would need to obtain a bill of health stating that the ship’s last port of call was free of epidemic diseases (e.g., plague, cholera and yellow fever). The requiring state’s diplomatic representative resident in the foreign country often had
to certify bills of health to ensure their accuracy and legitimacy. Use of bills of health by states became widespread by the latter half of the seventeenth century (Fidler 2003).

Thus, diplomats were engaging infectious disease control efforts long before the mid-nineteenth century. Yet, until the mid-nineteenth century, states attempted to handle the systemic effects of infectious disease transmission through the uncoordinated and unregulated exercise of national sovereignty. Quarantine measures and bills of health focused exclusively on preventing diseases from entering a state from foreign locations and relied exclusively on a nation’s own governmental capabilities-diplomats abroad and quarantine officials at home. Westphalian governance on public health was, therefore, strictly a matter of sovereign discretion because of the absence of any international legal rules or diplomatic processes to manage the problem differently (Fidler 2003).

The growing threat of infectious diseases in the nineteenth century caused Westphalian governance on public health to change dramatically. In response to a series of damaging cholera outbreaks in the first half of the nineteenth century, states, led by the European great powers, began in 1851 to develop systemic diplomatic processes and international legal rules in order to facilitate cooperation on infectious diseases. Over the course of the next century, states constructed a specific governance regime to address the growing problem of cross-border microbial traffic (Fidler 2003).
The period from 1851 to 1951 proved fertile for the process of making international law on infectious diseases as states concluded many treaties on infectious disease control. These agreements represented Westphalian governance attempts to balance national public health actions on infectious diseases (such as quarantine) with the desire for an efficient flow in international trade. In this sense, the problem of cross-border transmission of infectious diseases was slotted directly into the structure and principles of Westphalian governance (Fidler 2003).

The development of international governance on infectious diseases also reflected the non-intervention principle of the Westphalian system. The regime’s focus was on the management of state interactions (i.e. trade and travel) not on the public health conditions and problems that existed within the sovereign territories of states. The rules did not penetrate the state to require improvements with respect to national infectious disease control. How a state organized and implemented public health in its own territory was not the subject of infectious disease diplomacy or international law on infectious disease control. This non-intervention approach held even when governments knew that the trade frictions created by germs could be mitigated by reducing the infectious disease burden before the pathogens spread to other countries (Fidler 2003).

Finally, Westphalian public health bore the imprint of the great powers of the international system. The great powers of Europe began to construct a governance regime for infectious diseases in the latter half of the nineteenth century for two
basic reasons. First, the European great powers felt vulnerable to the importation of infectious diseases from non-European regions, what were called the ‘Asiatic diseases’. As played out in the development of international health diplomacy, fear of disease importation was ‘not a wish for the general betterment of the health of the world, but the desire to protect certain favored (especially European) nations from contamination by their less-favored (especially Eastern) fellows’ (Fidler 2003).

The imprint of the great powers can also be seen in the infectious diseases selected for inclusion in the governance regime. Throughout its history, the international legal rules on infectious diseases for which trade and travel were considered vectors, such as plague, cholera and yellow fever. Westphalian public health targeted germ threats considered external to Europe, hence the emphasis on ‘Asiatic diseases’ seen in the development of international governance on infectious diseases. Infectious diseases endemic to Europe, such as smallpox and tuberculosis, generally did not fall within Westphalian governance for public health despite their cross-border transmissibility. Governance of such endemic diseases remained a matter of the unfettered exercise of sovereignty (Fidler 2003).

Although the Westphalian approach survived into the latter half of the twentieth century, international public health policy turned its back on this approach in favor of something radically different after World War II. Between 1948 and 1978, a post-Westphalian governance framework developed that focused on individual
rights, human solidarity, and universal justice. This framework eventually eclipsed the state-centric, horizontal, and great power dominated strategy that had evolved during the previous 100 years (CESDEM/USAID/COPRESIDA/Macro International 2002, Fidler 2003, Committee on Emergin Microbial Threaths in the 21st Century 2003, Garret 1994).

The World Health Organization (WHO) Constitution, which was drafted in 1946 and started to be enforced in 1948, first expressed this new conceptualization as an approach to global health. The WHO constitution’s preamble asserts that: (1) health is the state of complete physical, mental, and social well-being and not merely the absence of disease; (2) the enjoyment of the highest attainable standard of health is a fundamental human right; (3) the health of all peoples is fundamental to attaining peace and security; (4) unequal development in different countries pose common dangers, particularly concerning infectious diseases; and (5) extending to all peoples the benefits of health-related technology and knowledge is essential to the attainment of health (WHO 1994).

Developments at the WHO in the post-World War II period demonstrated the policy moved away from the Westphalian approach. Three shifts signaled the construction of post-Westphalian governance. First, policy began to focus on health inside states rather than just on cross-border disease transmission. This shift revealed interest in attacking infectious diseases at their sources within countries

Second, the WHO’s efforts on eradicating infectious diseases and providing technical assistance to developing countries illustrated the transition toward vertical strategies (WHO 1994). Such strategies are also apparent in the increasing attention the WHO paid to health in developing countries, which was consistent with the WHO Constitution’s emphasis on the health needs of the most vulnerable and the importance of equity in the enjoyment of health and access to health-related services.

The third major policy shift involved the formulation of a holistic strategy called “Health for All” to advance the right to health, health solidarity among nations, and global redistributive justice for health. The “Health for All” strategy was articulated in the Declaration of Alma-Ata by the WHO/UNICEF International Conference on Primary Health Care in 1978 (Declaration of Alma Ata 2005). The Declaration of Alma Ata connected the rights to health, health solidarity, and universal justice, in the WHO constitution with the vertical strategy of providing primary health care to all people by the year 2000. Equity, solidarity, sustainability, and gender sensitivity are central values in the renewed proposal of “Health for All” (Puentes-Markides 1998).
By the end of the 1970s, the post-Westphalian governance approach dominated international public health policy. With the eradication of smallpox and the adoption of “Health for All” occurring almost simultaneously, post-Westphalian governance looked toward a bright future. Nevertheless, the failure of the post-Westphalian, international legal regime on infectious diseases in the late 1970s, as embodied in the WHO’s International Health Regulations, also highlighted the ascendance of a new more comprehensive, human security, approach.

To date, health strategies, as a result of the transition from westphalian to post-Westphalian frameworks, have not been applied to the people living in bateyes of the Dominican Republic. Moreover, Westphalian health-related strategies are being implemented in most of the Bateyes of the Dominican Republic, essentially ignoring the post-Westphalian issues of health concerning human rights and community perceptions of priorities of health. Nowadays, a people-centered health model, such as the human security model, with prevention considered as important as cure, looks like the best way to reduce the gap and social inequities in this population group.

A human security approach will use primary health care as the cornerstone to tackle the root causes of ill health and offer an upstream attack on threats to health. A recent WHO report called for a return to primary health care to steer health
systems toward better performance (Frenk J 1997). The report also pointed out that when countries at the same level of economic development are compared, those where health care is organized around the tenets of primary health care produce better health for the same investment.

The human security approach brings together the human elements of security, rights, developments, and promotes people’s ability to act on their own behalf and on the behalf of others. The human security model moves toward an integration of health, structural, political and environmental factors to overcome inequalities in human populations, and provides the essential elements to develop a normative primary health care framework to reduce vulnerability in this population living in southwestern Bateyes of the Dominican Republic.
CHAPTER II

THE CONCEPT OF RISK, VULNERABILITY, STRUCTURAL VIOLENCE AND HUMAN SECURITY: THE BATEYES AS A CASE STUDY.

1. The implication of being “at risk”

By the 1840s, disease distribution was classified into categories such as sex, age and geographic location. In the early 1900s causality was considered to follow deterministic laws. Hence, regularities in numerical data were read like Newtonian’s laws of nature; people were predestined to develop particular diseases. With the advent of quantum mechanics and the erosion of determinism in the 20th century, data were interpreted in terms of probability leading to the use of the term “risk” (Hacking 1990).

Risk has become the dominant way to attempt to predict who gets sick and why. The term itself is most widely used in the general health literature, in relation to clinical research, to describe units of measurement (relative risk, attributable risk, risk ratio, etc); (Susser 1987 and Sackett 1976). Nowadays, however, a distinction has been drawn to create two general categories of disease risk: those arising from the environment and those resulting from an individual’s lifestyle.

Environmental risks to health include pollution, toxic chemicals and nuclear waste. Contemporary sociology has concentrated on environmental risks produced by “industrial progress”. While in the 19th century “wealth production” justified the increasing risks, in late modernity, citizens are now recognizing the

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* Determinism is defined as the philosophical proposition that every event, including human cognition and behavior, decision and action, is causally determined by an unbroken chain of prior occurrences.
global health dangers of industrial development. These consequences are now threatening to “endanger and expropriate property and profits” so that “industrial society destabilizes itself through its establishment”. In such a scenario, everyone is, to some extent, “at risk” (Beck 1992).

Lifestyle-related risks have been the focus of health promoters and health educators, and include activities such as smoking, exercise and diet. Individuals determined to be at “high risk” of acquiring a particular disease are encouraged to change aspects of their lives, monitoring their behavior and engaging in a regime of better self-care. People are now expected to manage their own risks, “to enter into a process of self-governance through processes of endless self examination, self-care, and self improvement.” This “project of self” is directed towards maximizing one’s health and minimizing one’s burden on society (Petersen 1996).

Lifestyle risks may threaten the moral integrity of an individual because these risks are a consequence of something a person does (Meltcalfe 1993). The moral self is not threatened by environmental risks which are externally imposed and pose hazard only to the physical self. Individuals might blame corporations or governments for environmental risks. No individual, however, can be held responsible for their own, or other people’s, exposure to environmental hazards.

A third class of risk has been neglected by social scientists: embodied or corporeal risks. They are distinguished by being located within the bodies of individual people.
In a population, or sample of a population, people with particular corporeal characteristics (e.g. hypertension) might be more likely to develop specific diseases in the future. Although environmental, lifestyle and corporeal risks can be distinguished, they also overlap. Hypertension, for example, is located within the body of the person (corporeal), but is also construed as at least partly a function of the person’s way of living (lifestyle) and aspects of their social and physical surroundings (environment). Ultimately, one’s environment or lifestyle cannot pose a threat without a vulnerable body, nor does the body exist independent of the environment in which one lives and the way one acts (Kavanagh 1998). Such interactions will be analyzed in the following section.

2. **Vulnerability and structural violence.**

2.1 Vulnerability

While there are many definitions of vulnerability, there is one that is of particular relevance to the concept of risk. It describes vulnerability as those features of a social or economic entity that determine the severity of impact likely to be caused by excess morbidity or mortality, and encompasses the factors that lead to variation in the impact of disease between different communities and individuals (Oppong 1998).

These factors range from biological (e.g., individual immunity) to institutional (e.g., inadequate health services). The interactions between these factors, many of which lie outside of the health sector are not easily understandable, making appropriate targeting of interventions difficult.
Most discussion on vulnerability in infectious disease has been in the context of the HIV epidemic. Initial approaches to dealing with the HIV/AIDS epidemic focused on “high risks groups”, such as sex workers, injection drug users, long distance truck drivers, and soldiers, whose behavior was construed as “risky”. This approach places responsibility for change on individuals, and it has been criticized because it overlooks the social and economic factors that constrain the ability of an individual to change, and ignores other important non-biological features of vulnerability such as poverty, education, and health-service provision.

There is a lack of “systemic” and “critical” analysis regarding modern inequalities and infections, and even though it is stated that health policies are incorporating social issues, the responses tend to be medically focused, and fail to embrace the non-biological factors that perpetuate ill-health processes (Farmer 2003).

More recently, attention has shifted towards improved understanding of the many and complex processes that interact to make different individuals and communities vulnerable to infection.

In order to outline the essential elements related to vulnerability in a population groups, the effect of individual, household, community, environmental and institutional factors that could impact on the process of ill-health will be examined.
A. Individual level: biological and disease-related factors

A.1. Age and Sex

To explain the importance of these factors, the experience in three of the most prevalent infectious diseases in the world (malaria, tuberculosis and HIV) will be used. The degree of malaria immunity acquired by individuals living in endemic areas depends on the amount of exposure to infections and genetically determined immunological responses (Trape and Rogier 1996). In areas of high stable transmission of malaria, the incidence of clinical malaria peaks between 1 and 5 years of age, then declines rapidly as effective immune responses develop. In high transmission areas, 25% of all-cause mortality in children aged 0-4 years has been attributed to malaria (Sachs 2002 and Sharp 1980).

Unlike malaria, the greatest mortality and morbidity related to tuberculosis in poorer countries is concentrated in the economically productive 15-59 years age group. Active disease occurs when the host immune response is unable to control replication of the organism, a state most commonly occurring in immunosuppressed adults and young children.

In term of gender, women live longer than men. At all ages, after infancy, females have lower mortality rates than males. Women, especially young women, are more vulnerable to acquiring infections, such as HIV infection, than men, partly for physiological reasons such as the immature genital tract and high rates of asymptomatic untreated sexually transmitted diseases occurring in young women, as
well as the lack of women’s rights in many countries decrease the likelihood that a woman can refuse sexual encounters and/or demand condom use (Buve et al 2001).

A.2. Genetics

Epidemiological and molecular evidence shows that genetic background influences the degree of protection an individual develops against any specific infectious disease, and is a factor that could play a key role in the vulnerability of the population to develop any specific disease.

For example, certain ethnic groups, such as the Fulani, have less parasitaemia and malaria illness and higher malaria antibody titers than other similarly exposed groups living in the same regions (Modiano 1999).

In malaria-endemic regions, there is a high frequency of genes that cause red-blood cell abnormalities, such as sickle cell disease and glucose-6-phosphate dehydrogenase deficiency, which confer a selective advantage against malaria mortality (Aidoo et al, 2002). Specific genetic associations such as HLA-B53 and MHC antigens have been linked to protection against severe disease and reduced vulnerability to malaria fever, respectively (Hill et al 1991).

Studies on twins and different ethnic groups have shown that host genetic factors are also important in influencing susceptibility to tuberculosis infection and disease (Comstock 1978 and Stead 1992). Genetic variants of the natural resistance-
associated macrophage protein 1 and vitamin-D-receptor genes are associated with smear positive tuberculosis (Bellamy et al 1998 and Bellamy et al 1999) and there is some evidence that the observed difference in male and female tuberculosis incidence after infection is also due to genetic differences (Bellamy 2000).

Genetic factors have been identified that confer resistance against infection by HIV-1 strains or delay progression of disease (Hogan 2001). Mutations in the chemokine receptor CCR5 affect susceptibility to HIV infection, and polymorphisms in several other chemokine receptors seem to reduce the rate of progression to AIDS or death in non-African populations (Ramaley et al 2002).

B. Household and Community Level.

B.1 Poverty

Poverty and disease are commonly linked in a downward spiral. Although poverty is a complex experience involving a lack of key capital assets (natural, financial, physical, human, and social), it is commonly viewed simplistically in economic terms with low income as a proxy indicator (Birley 2002 and Narayan et al 2000).

Ideally, information on poverty should be disaggregated into several indicators of deprivation, such as income, food, housing, knowledge, power and access. This approach would help to unravel confounding relations, but the complex interactions among these factors make disaggregation impractical; whether discussing the effects of lifestyle, environment, biology, or the organization of services, low income people
are consistently at a disadvantage. They have more of virtually every health problem, with higher rates of morbidity, mortality, and dependency (Pocket and Hanlon 1990). Poverty and lack of education affect the biologic dimension through malnutrition and leave a residue of diseases and injuries that accumulate over a lifetime.

Poverty has a powerful impact on the environmental dimension, degrading the quality of housing, increasing the risk of injuries, exposing people to excessive environmental hazards such as pollutants and vectors of disease, and subjecting them to excessive crowding and noise pollution.

Poverty also alters the behavioral dimension: the poor drink alcohol more than the non-poor and are less likely to value prevention highly, since day-to-day survival is more of a problem than prevention of some future catastrophe. Organizationally, although the poor have a number of official support systems intended to constitute a “safety net”, they generally have poorer transportation systems, poorer schools, and less effective access to necessary health and social services (Bates et al 2004).

B.2 Nutritional Status

Poor nutritional status is associated with vulnerability to infectious diseases. Infectious diseases and malnutrition influence each other and frequently occur together in developing countries.
Poor nutritional status is also associated with vulnerability to progression from tuberculosis infection to active disease (Kochi 2001) and with adverse outcomes in HIV/AIDS (Macallan 1999) and malaria (Sharp and Harvey 1980). Low body mass and food shortages have both been associated with increases in tuberculosis infection and mortality (Nair 1997).

B.3 Gender

The term “gender” refers to the different behaviors, roles, expectation and responsibilities women and men learn in the context of their own society. Women and men of different ages, marital status, and socioeconomic status have different vulnerabilities influenced by a complex interaction of social, economic, and institutional factors.

Gender can therefore affect disease exposure as well as treatment-seeking behavior and adherence to treatment. Stereotyped gender roles can also influence how women and men are treated by the health-care system during diagnosis and treatment processes, therefore affecting their vulnerability to progression to severe disease.

For example, gender differences in social customs (*e.g.* men in India sitting outside in the evenings) or occupations (*e.g.* male loggers in Thailand) can lead to increased exposure to malaria. Women may be more willing than men to invest in malaria-prevention measures (*e.g.* insecticide-treated bednets), but many lack the financial and decision-making power to act on this desire (Rashed et al 1999).
Although it is generally women who care for children who become sick with malaria, many women have a subordinate role to men in the household and have little control over resources. Their ability to seek malaria prevention or care for themselves and their children is therefore hindered (Tanner and Vlassoff 1993).

In addition, the time women have to spend looking after sick relatives can also negatively affect their livelihoods. These combinations of factors tend to make women more vulnerable than men to the consequences of malaria and other infectious diseases (Asenso-Okyere and Dzator 1997).

Gender also influences adherence to treatment. In India, married men and single women seem to find it easier to receive and complete treatment than married women, who try to keep their illness secret owing to fear or blame of rejection (Filteau SM and Tomkins AM, 1994). Many families are more willing to support and pay for treatment for men than women because men are major wage earners (Khan et al 2000).

Gender differences in the social and economic effects of being diagnosed as having any particular infectious disease vary with age, employment opportunities and timing of accessing health care services.
B.4 Influence of Education and Religion

Preventive and treatment-seeking behavior is influenced by perceptions, personal and religious beliefs, and knowledge about the illness. The precise mechanisms through which education affects health-related behavior are much debated because education does not necessarily translate into effective behavior change. The constraints that individuals face in moving from knowledge to behavior change are complex and involve power relations that are affected by many factors including gender, age and poverty.

Religious beliefs may also influence disease prevention and treatment-seeking behavior. For example, Muslim Africa generally has lower rates of HIV/AIDS than other parts of the continent. In mixed communities, Muslims have HIV rates 25-50% of those in non-Muslims (Oppong 1998). This difference could be due to the practice of circumcision among Muslims although there may also be other factors such as sanctions against promiscuity and the effect of abstinence from alcohol on high-risk behavior (Bellamy et al 1998).

Religious beliefs, such as forbidding blood transfusion and alcohol intake in Jehovah’s witnesses, have also been related with behavioral changes and low HIV rates (Muturi 2008).
B.5 Physical and geographic factors

The macro-environment determines the type of malaria transmission that occurs and thus affects a community’s vulnerability to malaria infection. Countries on the border of endemic zones, such as dessert fringes and upper highland limits, are prone to malaria epidemics; these have been increasing in frequency in Africa in recent years (WHO 2002). Tools for predictions of the epidemics are becoming available, but most epidemic-prone countries cannot yet mount an effective response that will decrease the population’s vulnerability to malaria.

In contrast to tuberculosis and HIV infection, malaria transmission is very sensitive to climate changes. Climatic patterns are closely linked to the life-cycle of the malaria parasite (Sachs and Malaney 2002). For example, the recent long-standing drought in West Africa has resulted in an extension of the epidemic zone and a reduction in parasite rates in some areas from 50% to less than 10%. Mosquito vectors can adapt to environmental changes such as increasing urbanization, which has resulted in increases in urban and peri-urban malaria in South Africa and other areas (Filteau 1994).

Segregation of groups of people creates geographic pockets where factors such as poverty, overcrowding, and poor housing are concentrated and result in greater spread of tuberculosis (Acevedo-Garcia 2002). Such aggregation occurs, for example, in refugee camps or in more developed countries in neighborhoods dominated by ethnic minorities (Sachs and Malaney 2002). Despite the association of
tuberculosis with overcrowding, the incidence of the disease is higher in rural than in urban areas because of the difficulties in rural areas in accessing prompt diagnosis and treatment (Nhlema et al 2003, Ministry of Health of Beijing 1990 and Liendhart et al 2001).

The prevalence of HIV/AIDS is higher around country borders than in internal areas, probably as a result of social disruption brought about by cross-border movement. In Asia, this effect is so pronounced that initiatives to reduce the frequency of HIV/AIDS have focused on border regions and mobile populations (Lyttleton and Amarpibal 2002).

Particular physical conditions lead to greater vulnerability to HIV infection. One example is imprisonment. Prison inmates can be exposed to homosexual sex, sexual violence, and transactional sex, from both other inmates and warders. Other factors such as overcrowding, sharing of non-sterile equipment by intravenous-drug users, and non-sterile tattooing, all contribute to transmission (UNAIDS 1997).

B.6 Migration, conflict and complex emergencies

Ecological or social disturbances that initiate the movement of large groups of unprotected, non-immune, and physically weakened people between different infectious disease transmission zones, can increase their vulnerability to diseases. Refugee camps such as those along the Tai/Cambodian border and in Pakistan are typical examples. In addition, many of these camps affect the local population by
increasing malaria transmission and introducing permanent changes in the local environment such as removal of vegetation (Inhorn 2001 and Carovana 1991).

Migrants who have spent long periods not exposed to malaria are more vulnerable to death or disease when they return to their original homes in endemic areas owing to loss of immunity (Commission on Macroeconomics and Health 2001).

High immigration rates with associated economic stressors are significantly related to tuberculosis mortality, which suggests that immigrant populations have greater vulnerability to disease (Patten 1993 and De Koning 2009). High tuberculosis prevalence is a well-recognized late sequel of complex emergencies because the disruption of health service delivery that is inevitable in such situations leaves refugees vulnerable to tuberculosis infection and disease (UNIFEM 2002) and without access to health care.

Migrants such as refugees and internally displaced people and their host communities all have increased vulnerability to HIV infection. Greater risk occurs, for example, with sexual violence perpetrated by combatants, camp workers and residents, and border officials, and through increased transactional and commercial sex (Twigg 1998, Bankoff 2002, Sachs 2002, UNAIDS/WHO 2002, Frieden 2003 and Trape 1996).
C. Institutional Factors

C.1 Health services and policy

In most countries the health sector has less than 5% of the national budget. Per person annual expenditure on health in African nations is US$4-11 (Msamanga and Fawzi 1997). Even in developed countries such as the United States, expenditure on health is only 16.2 percent of the nation's Gross Domestic Product - ranking 12th, among 300 nations - in the human health expenditure per capita index (Centers for Medicare & Medicaid Services 2009). There is very little evidence about the influence of political will on disease control and prevention; anecdotally it appears to be a major factor in the success or failure of disease-control programs.

Lack of political support, for example, for malaria-control measures and subsequent deterioration of services has led to re-emergence of malaria in some areas from which it had previously been eradicated, such as the North Korea, Tajikistan, northern Iraq, and Turkey (WHO 2002).

Political efforts to change rates of malaria, HIV, tuberculosis, and other infectious diseases will be sustainable only if governments maintain their commitment to control programs.

C.2 Access to Health Care

Access to health care is affected by both demand-side and supply-side factors. Demand-side factors include lack of resources to pay for healthcare and fear of social
consequences associated with seeking healthcare. Supply-side factors include the geographic distribution of facilities and staff, rates of formal and informal fees, and perceptions of the quality of care offered. Responsibility for addressing problems with access, such as poor transport systems and physical access, lies under the purview of non-health sectors, including public works, transportation, and social services (Narayan 2000).

Most individuals in the poorest communities may never approach the formal health sector for care of disease (Bates et al 2004). Inability or unwillingness to access health care is a major obstacle to initiation of early treatment of a particular disease and to prevention of severe disease and death.

Unhelpful staff attitudes and poor-quality of services are cited by users as the main factors that contribute to delays in accessing treatment (Frieden et al 2003). Other reasons include inconvenient opening hours, long waiting times, transport costs, and hidden costs such as the cost of missed opportunities and informal payments to health workers (Frieden et al 2003).

C.3 Quality of Health Care

Quality of health care covers all areas of service provision, including staff attitudes and communication skills, the physical state of facilities, nursing care, availability of good-quality drugs, equipment and reagents, and accuracy and timeliness of diagnostic tests (Birley 2002).
The confidentiality of services and the attitudes of health-service providers are of great importance on encouraging use of the service, particularly for individuals with potentially stigmatizing diseases, such as tuberculosis and HIV/AIDS (Ramaley et al 2002). Poor-quality healthcare services ultimately discourage people from coming forward for advice, diagnosis, or treatment, thus affecting the vulnerability of individuals and communities to infection and disease progression (Ramaley et al 2002).

In addition to discouraging use of health facilities, poor quality is also associated with: repeat visits to individual or many health facilities with the associated economic and opportunity costs further decreasing the already limited resources, decisions to seek treatment outside the formal health sector, when traditional medicine is perceived to have failed perception that the service does not provide value for money, misdiagnosis with extended or worsening illness, and misconceptions about curability of disease. Within the health sector, poor quality of care is associated with misinformation about clinical resistance patterns and poor-quality of information for public-health planning and budgeting (Sachs et al 2002).

Many of the vulnerability factors described above relate to different kinds of powerlessness and to underlying interactions under the umbrella of “structural violence”. The concept of structural violence and its relationship with vulnerability and the probability of being at risk will be described in the following section.
2.2 Structural violence

In 1969, Johan Galtung originally framed the term “structural violence” to mean any constraint on human potential caused by economic and political structures (Christie et al 2001). In other words, structural violence denotes a form of violence which corresponds with the systematic ways in which a given social structure or social institution “harms” people by preventing them from meeting their basic needs. Unequal access to resources, to political power, to education, to health care, or to legal standing, is forms of structural violence.

Structural violence exits, for example, when inner-city children have inadequate educational resources while others do not; when gays and lesbians are fired for their sexual orientation; when laborers toil in inhumane conditions; when people of color, the homeless, and otherwise disadvantaged are subjected to environmental toxins in their neighborhoods. Unfortunately, even those who are victims of structural violence often do not see the systematic ways in which their plight is choreographed by unequal and unfair distribution of society’s resources. Such is the insidiousness of structural violence.

How significant is structural violence? How does one measure the impact of injustice? While this may sound like an impossibly difficult question, Gernot Kohler and Norman Alcock (Kohler and Alcock 1976) have constructed a surprisingly simple method for estimating the major forms of structural violence, at least at an
international level. The specific question they ask is how many extra deaths occur each year due to the unequal distribution of wealth between countries?

To understand their approach, a few global statistics will be examined. It will help to start with the relationship between Life Expectancy (LE) and Gross National Product Per Person (GNP/p) that is shown in the following figure (Sirvard 1982).

Figure 2.1

Each dot in this figure stands for one country with its LE and GNP/p for the year 1979. All together, 135 countries are represented. Except for a few oil-exporting countries (like Libya) that have unusual combinations of high GNPs and low Life Expectancies, the data follow a consistent pattern shown by the curve. Among the "poor" countries (with GNP/p below about $2400 per person per year), life expectancy is relatively low and increases rapidly with increasing GNP/p. Among the "rich" countries, life expectancy is consistently high and is relatively unaffected by GNP.
The dividing line between these two groups turns out to also be the world average GNP per person. The value of the life expectancy curve at that point (for 1979) was 70 years. Thus, other things being equal, if the world's wealth was distributed equally among the nations, every country would have had a life expectancy of 70 years. This value is surprisingly close to the average life expectancy for the industrial countries at that time (72 years), and is not far below the maximum national life expectancy of 76 years (Iceland, Japan, and Sweden) in 1979.

The actual number of deaths in any country can be estimated by dividing the population (P) by the life expectancy (LE). The difference between the actual number of deaths and the number of deaths that would occur under egalitarian conditions is thus P/LE - P/70. For example, in 1979 India had a population of 677 million and a life expectancy of 52 years. Thus India's death rate was 13 million while if the life expectancy had been 70, the rate would have been 9.7 million. The difference of 3.3 million thus provides an estimate of the number of extra deaths in India contributable to not having a longer LE. Calculating this difference for each country and then adding them up gives the number of extra deaths worldwide due to the unequal distribution of resources.

An extra death worldwide is a major example of how structural violence sinuously establishes its own rule in vulnerable environments. Moreover, structural violence is not only problematic in and of itself, but it is also dangerous because it frequently leads to direct violence. The chronically oppressed are often, for logical reasons, those who resort to direct violence. Organized armed conflict in various parts of the
world is easily traced to structural inequalities. Northern Ireland, for example, has been marked by economic disparities between Northern Irish Catholics, who have higher unemployment rates and less formal education, and Protestants. In Sri Lanka, youth unemployment and underemployment exacerbates ethnic conflict. In Rwanda, huge disparities in both income and social status between the Hutu and Tutsis eventually led to ethnic massacres (Msamanga and Fawzi 1997).

The sugar mill camps (Bateyes) of the Dominican Republic, an extremely poor and vulnerable region, is a place where recognition of structural violence—specifically unequal distribution of resources and violation of human rights—can lead to concern regarding the potential existence of social injustice there. The following section describes how structural violence appears to be invisible when human rights are conceived simply in civic and political realms. The examination of the essential factors to develop a potential human security approach to reduce health inequalities in people living in the southwestern bateyes of the Dominican Republic is also described.

3. Risk, vulnerability, structural violence and human security in the Dominican Republic: the Bateyes as a case study.

The Dominican Republic has played a major role in Haitian politics and economic issues. Relations between Haiti and the Dominican Republic have always been characterized by racial and political tensions which have risen into deep anti-Haitian sentiment in the Dominican Republic. These “anti-Haitians” have both historical and political roots, and provide the context for the widespread abuse and profound
insecurity endured by the Haitian and Dominican-Haitian populations in the Dominican Republic.

A series of conflicts that originated in the independence wars of the nineteenth century, culminating with the massacre of thousands of Haitians in the Dominican Republic in the twentieth century, generated tensions that still characterize relations between the two nations. Since the 1980’s, these tensions have principally focused on the use of Haitian labor in the Dominican sugar cane industry. The seasonal migration of low-wage Haitian cane cutters, which began in the early 1900s, gradually left a large permanent population of Haitians and Dominicans of Haitian origin in Dominican agricultural zones and major cities. That vulnerable population has grown to an estimated 750,000 residents today; Haitians and Dominican-Haitians comprise at least 7% of the population of the Dominican Republic (Americas Watch 1989, Americas Watch 1990, Human Rights Watch 1991, Americas Watch and National Coalition for Haitian Refugees 1992).

Investigations of state-owned sugar cane plantations in the Dominican Republic have revealed how Haitians were deceptively recruited in Haiti, “turned over” to the Dominican military at the border, then transported to sugar plantations throughout the Dominican Republic, where they were forced to work and live under appalling conditions for the duration of the cane harvest (Americas Watch 1990, Human Rights Watch 1991, Americas Watch and National Coalition for Haitian Refugees 1992). These investigations pointed out that Haitians are vulnerable to exploitation and
arbitrary deportation from the Dominican Republic because the Dominican government refuses to undertake any serious program to formalize their immigration status. Temporary work visas and labor contracts in the cane industry still remain the exception and the terms and conditions of the contracts are rarely honored when available. Few long-time residents of the Bateyes have residence permits or have received labor contracts and, without Haitian or Dominican papers, have no way to apply for permanent residency status in either country (Americas Watch 1989).

The situation of the Bateyes in the Dominican Republic has often brought into question the conduct of the Dominican Government on this migratory problem. Hiring policies in conjunction with the loss of opportunities for disease prevention have resulted in a refugee camp-like situation for inhabitants of the Bateyes. They must face uncertainties of day to day survival, must often move from one place to another to improve their life conditions, within the Dominican territory.

Wages remain a serious problem in the Bateyes. Individuals are paid by the amount of sugar cane they cut; the current rate is 75 pesos per ton (US$2.22). A veteran cutter can cut a maximum of 1.5 tons per day, working 12 hours to earn 125 pesos (US$3.33). Working six-days a week, the experienced cane cutter can earn 3,000 pesos (US$80.00) per month, but most do not usually earn this amount (Americas Watch 1990, Human Rights Watch 1991, Americas Watch and National Coalition for Haitian Refugees 1992). The cane cutter often must pay the (Dominican) driver of the assigned truck to pick up the cane to transport it to the weighing station; if the
cane sits overnight, it dries out and loses weight. A similar payment is made at the weighing station to get the cane weighed soon after it is cut. The cane cutter ends up with little control over the timing of the processing of the cut cane, and the mill owners routinely allow cane to sit to reduce payments. In the end, then, even a skilled cutter earns significantly less than 3000 pesos per month. This amount is far less than the food costs for a family of four in the Dominican Republic, estimated to be approximately 18,000 pesos per month (Americas Watch and National Coalition for Haitian Refugees 1995).

The environmental conditions, and lifestyles, as well as poor remuneration and education of the inhabitants of the Bateyes, unfortunately provide an ideal situation for the development and spread of disease. Gastrointestinal, respiratory and sexually transmitted infections are prevalent, reflecting the vulnerability of this population which has been exposed to structural violence for more than thirty years.

Although this situation in the Dominican territory has been well-described, little attention has been given to providing structural advances. Improvement in “basic services” and addressing human rights has been the response from the Dominican Government to the demands of international human rights organizations. Nevertheless, most of the specific structural interventions, such as the construction of latrines and installations of water pumps for access to clean and safe water, have been performed by international faith-based nongovernmental organizations (Canario et al 2006).
Previous data have been obtained from different sources, most of them community and national surveys carried out in different areas of the Dominican Republic. Evidence on how the Bateyes population could be empowered, by the development and implementation of potentially sustainable community interventions with a systematic methodology, and measuring cost and benefit of the implementation is scarce.

It is perceived that the Dominican Republic is in its best moment to delineate and conduct community interventions in the Bateyes to improve living conditions and reduce health inequalities. The Dominican Republic has been awarded 80 million dollars by the United Nations to prevent and to control HIV infection and AIDS, tuberculosis and malaria, becoming the most important public-private relationship relating to the public health history of the country. This type of public-private relationship is framed under the canons of the model of human security that prevails on a world-wide level, in which solidarity and the post-wephyalian vision comes together for the improvement of the health of the nations in most need.

It is indeed under this paradigm that a community-based intervention, under the lineaments of the model of human security, was proposed. This community intervention, which links the solidarity of international institutions with the combined participation of Dominican and Haitians of Dominican origin in the implementation of an educational strategy, intervention intended to be a pilot model to provide
scientific evidence and increased understanding to the Dominican Republic health authorities regarding the feasibility and cost-savings of a community intervention at the sugar mill camps.

The model applies the Robin Hood Theory (Pérez-Then 2005) by using resources originally intended for HIV prevention as a hook to improve, not only the knowledge, attitudes and practices of Bateyes’ residents in HIV-related activities, but also to improve understanding of other diseases which are prevalent, in two sugar mills located at the southwestern border of the Dominican Republic.

The community-based intervention also includes a combination of quantitative and qualitative approaches to identify factors related to community investment in health and reduction of social inequalities (Perez-Then 2007 and Musgrove 1999). These include economic efficiency criteria (public goods, externalities), ethical reasons (poverty, horizontal and vertical equity), conditional factors (vulnerability and susceptibility), and political considerations (especially community/public demands).

Clean and safe water, environmental protection, and fighting poverty, are examples of “public goods”*. If an intervention does not qualify as a pure public good, because private purchasers are willing to pay for it, there may still be significant effects on non-purchasers, that is, externalities. Measures to treat communicable diseases can fall into this category, because while a person with the disease may be willing to pay

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* A “public good” has two key properties: non-excludability, meaning that it is not possible to prevent the use or consumption of the good by some category of people, such as those who have not paid for it; and non-rivalry, meaning that, for any level of production, the marginal cost of providing the good to an additional consumer is zero. Examples of Global Public Goods are clean air and access to potable water. The control of malaria, tuberculosis and HIV/AIDS, as well as the control of resistance to antibiotics, are considered global public goods.
to be cured, treating him or her also reduces the risk of transmission and thereby protect others (e.g. chemotherapy for tuberculosis).

The suggested model includes questions on ethical issues such as poverty, horizontal and vertical equity. The burden of disease differs somewhat between poor and non-poor populations, with the poor suffering more from communicable diseases and from premature mortality, compared to non-communicable causes and disabilities as seen in non-poor populations. Horizontal equity implies giving equal treatment to people with equal health problems, which is not discriminating among them as to how much or what kind of care to provide. Vertical equity, however, concerns preferential treatment for people with more serious problems. Severity, in this situation, cannot be ignored the way it can be when dealing with horizontal equity.

The impact of previous factors on the reduction of vulnerability of the sugar mills population to morbid events (diarrhea, malaria, respiratory infectious diseases, HIV, etc) would be the final outcome. Vulnerability, as previous defined, describes those features of a social or economic entity that determine the severity of impact on the community likely to be caused by excess morbidity and mortality at the community level. The model also takes into consideration that not all persons have the same susceptibility to a particular exposure or disease, and health benefits could be different if two people differ in age and therefore in life expectancy, with the younger beneficiary having more to gain from treatment.
The ultimate goal of the model is to achieve the best possible harmonization of public health and respect for human rights and dignity (Mann 1999). A qualitative approach (in depth interviews, discussions groups) will be used to evaluate harmonization of public health practices and human rights of the southwestern Bateyes’ population.

Finally, the model considers the cost-savings of the program and community perceptions of priorities (public demands). Otherwise, community “ownership” of the program is unlikely, and it is doubtful that objectives will be achieved, even though services are, in principle, available.
APPLYING A HUMAN SECURITY MODEL USING HIV/AIDS RESOURCES TO REDUCE VULNERABILITY IN THE SOUTHWESTERN BATEYES OF THE DOMINICAN REPUBLIC: DEVELOPING THE “ROBIN HOOD THEORY”.

1. Overview

In order to obtain base line data for future health interventions, a Rapid Assessment Process (RAP) was developed for implementation in the Bateyes located in the southwest region of the Dominican Republic (Canario et al 2006).

An intensive review of existing data, using a multi-method approach (observation, interviews, and literature review) was conducted to obtain information about essential elements of human security in the southwestern Bateyes. This included a review of conditions of economic security (freedom from poverty), food security (access to food), health security (access to health care and protection from diseases), environmental security (protection from environmental depletion), personal security (physical safety from domestic violence), community security (survival of traditional cultures) and political security (enjoyment of civil and political rights), conditions in the Bateyes (Canario et al 2006). The southwest Bateyes region was selected, as it is an area of extreme poverty, coupled with prominent health inequalities.

In-depth interviews with four key informants from the Bateyes were also performed to extend understanding of current issues. The RAP investigative team worked
closely together, and met weekly over an eight week period with experts in the field, to
discuss and interpret the information.

Technical and economic support for the development of the RAP was provided by the
Dominican State, through Consejo Presidencial de SIDA (COPRESIDA) -Presidential
Council of AIDS- and of the Divisiones Provinciales en Salud (DPS) -Provincial
Divisions in Health-, as well as by North American faith-based organizations, including,
the Foundation for Peace and Global Strategies for HIV Prevention. International
organizations with research experience in the southwestern Bateyes of the Dominican
Republic such as Vision Mundial (World Vision) and the Instituto de Desarrollo Integral
(IDDI) -Institute of Integral Development- were invited to participate as technical
advisors of the RAP.

The RAP identified important demographic characteristics of the region. An informal
economy (crafts, “motorcycle conchos”, etc.) is now the predominant source of income,
replacing work in the sugar cane fields that had been the major economic resource since
1980’s. The Bateyes has evolved from a seasonal emigrant community to a permanent
community where many Dominican–Haitians live.

Most houses are rustic and in need of repair. Basic services, including electricity, gas for
cooking, and access to consumer goods (radios and televisions) are limited. The drinking
water is considered dirty by many residents, and intestinal parasites are common
problems. Diarrhea is common among the children, with rates of episodes ranging from
40-50% (CESDEM/USAID 2007). The latrines that are available for some are used less often than “open fields” to excrete wastes. The open field is the most common place to deposit trash.

Residents of the Bateyes communities are bilingual, but the rate of Spanish literacy is low. Traditional religion brought from Haiti (voodoo) is practiced by the majority of the population. Access to birth control and health services are generally limited, leading to barriers for family planning. Moreover, travel to the nearest clinic is costly, and although the majority of women reported having given birth in a hospital or in a clinic, access to health care is limited due to the distance to the nearest health center.

Infection by HIV, especially, is a challenge, because neither laboratory tests, nor treatment for HIV are available. HIV prevalence is more than twice that observed in the general population of the Dominican Republic (2.5% vs 1%), (CESDEM/USAID 2007). Similarly, the low vaccination coverage, malnutrition, respiratory diseases, dengue, malaria and tuberculosis, have had a deleterious impact on the health of children younger than two years.

Women in particular face extreme hardships in the Bateyes. Reports of domestic and sexual abuse are high, but the women of the Bateyes have no legal course of action. Moreover, few long-time residents of the region have either residence permits or labor contracts. Without these Haitian or Dominican papers, they have no way to apply for permanent residency status.
Previous data (Canario et al 2006) have indicated the need to improve human security in the southwestern Bateyes of the Dominican Republic. The RAP further demonstrates the necessity for the development of specific strategies and approaches that can reduce the most prevalent diseases of this region of the Dominican Republic and the existing disparities in health. Results of the RAP were presented to the Ministry of Health authorities and to faith based organizations. These groups have endorsed the present study and committed themselves to giving closer attention to the situation of the country’s southwestern Bateyes and to developing community mobilization models that will guarantee sustainability.

The integration of the Dominican State with other international and local agencies concerned with the critical situation in the Bateyes has allowed, for the first time in the country, a solidarity mechanism to be developed to reduce inequalities in health in this group. In fact, the degree of commitment of the involved players has encouraged the development of the current proposal for the creation of a human security model based on the “Robin Hood Theory” (Perez-Then E 2005). This theory considers that the huge amount of economic resources allocated for HIV prevention in the Dominican Republic (80 million dollars from the Global Fund-Geneva), could not only be used to reduce the burden of AIDS in the country, but that the resources could also be used to improve overall living conditions of vulnerable populations. Improvement in living conditions requires a better understanding of the population and emphasis on prevention of morbid
events related to the most prevalent infectious diseases reported in the southwestern part of the Dominican Republic.

The present proposal is the end product of the work of the RAP investigative team for implementing a pilot study based on the principles of a human security model previously analyzed in the RAP. The pilot study incorporated the “Robin Hood vision” using HIV resources as a hook to develop an enhanced comprehensive human security model population-based approach, which integrated chronic, ethical, social, and political factors, to increase HIV awareness, reduce health disparities and achieve equity, solidarity and gender sensitivity.

The final long term goal of this pilot study is to create a common cause for Dominicans and Haitians, including prevention of health problems, to identify mechanisms of solidarity that can lead to the end of the persistent pattern of structural violence that has prevailed over the past thirty years in the Bateyes of the Dominican Republic.

2. Specific Aims and Hypotheses

Specific Aim 1 – To determine the impact of a Human Security Model (monthly interactions through household visits by a trained Community Visitor) on HIV awareness, knowledge of preventable diseases, and gender sensitivity in families living in Bateyes.

Hypothesis 1.1.: Families receiving the intervention will demonstrate increased HIV awareness and knowledge about preventable diseases, as measured by a Knowledge,
Attitude and Practice (KAP) assessment, compared to families not receiving the intervention.

Hypothesis 1.2: Families receiving the intervention will show increased gender sensitivity, as measured by the number of men participating in the evaluation sessions, compared to families who did not receive the intervention.

Specific Aim 2 – To determine the impact of a Human Security Model (monthly interactions through household visits by a trained Community Visitor) on immunization and breastfeeding rates, as well as on the prevention of morbid events (i.e. diarrhea, respiratory infections, tuberculosis, malaria and dengue) in families living in Bateyes.

Hypothesis 2.1: Families receiving the intervention will have a lower risk of morbid events than families not receiving monthly visits.

Hypothesis 2.2: Families of pregnant women receiving the intervention will have a higher childhood immunization and breastfeeding rates following the intervention as compared to families not receiving household visits.

3. Methods

3.1 Study Design

This study employs a quasi-experimental, pre-test, post-test control group, design in which HIV resources were used as hook to promote human security in the study groups following the “Robin Hood Theory” principles. The Robin Hood Theory states that the funds allocated to reduce the burden of disease (AIDS) in the Dominican Republic, can
also be used to positively impact diseases of greater prevalence, as well as to improve the health system of the country (Perez-Then 2005).

A. Study Phases

A quasi-experimental, pre-test, post-test control group, was designed following a KAP evaluation method approach to identify human security factors in vulnerable populations. All households living in Batey Algodon (Experimental Condition-Batey A), who consented to participate in the study, through the head of the house, received monthly household visits by a trained Community Visitor within the first six months of the project. The control group was the population living in Batey #1 (Batey B) who, following consent, was evaluated at baseline, but did not receive the household visits. The project was implemented in three phases consisting of: training and baseline measurements; implementation of the “human security” model, and evaluation at 6 and 12 months after the initiation of the intervention (household visits). The evaluation also included an economic analysis and qualitative assessments.

B. Study Phases – Ethical Approval- Timeline

The proposed work was planned for 22 months. The first eight months of Year One, focused on getting support for field activities, IRB approval, hiring and training of personnel. An award notification from the Global Strategies for HIV Prevention, an international organization based in California, USA, was received in January 2007. Following the award notification, a research protocol manual was developed (in English and Spanish), over a 4 month period, incorporating WHO guidelines (WHO 2002) and
containing training materials as well as KAP assessments. Consent forms were
developed in Spanish, English and Creole. The proposal received ethical approval from
CENISMI’s IRB in the Dominican Republic in June 2007 and from the University of

Training of study personnel started in July 2007 and was concluded in early September
2007. Following the training period, procedures for recruitment and enrollment were
implemented by the in-country Principal Investigator (Dr. Perez).

Implementation of assessments began on September 24, 2007. The trained Community
Workers (interventionists) administered the baseline survey assessments and performed
monthly household visits. Data entry began at month four, and continued through year
two to permit management of the data collection. Quality control procedures were
conducted throughout the course of the study at CENISMI, the Dominican Republic.
Interim data analyses were conducted at 6th and 12th month after the implementation of
the intervention at baseline.

Final assessments were concluded by November, 2008. Data merging and final data
analyses were performed in the last five months of the study (November, 2008 – March,
2009).

CENISMI was the institution responsible in the Dominican Republic for Data
Management and IRB Report Submissions. CENISMI is located in Santo Domingo, the
Capital of the Dominican Republic, and occupies 1,000 square feet of the Robert Reid
Children Hospital, the largest pediatric hospital of the country. This institution was founded in 1986 by Dr. Hugo Mendoza for the design and implementation of pediatric and maternal research in the Dominican Republic.

C. Selection of the interventionists

The interventionists/Community Visitors were selected from the Bateyes with the help of community leaders. Eligible Community Visitors were able to read and write in Spanish and were fluent in both Spanish and Creole.

Six interventionists/Community Visitors, 2 males and 4 females (three for each Batey), were selected from within the Bateyes in order to increase community involvement and ownership during the survey assessment. Selection of individuals within the community also helped build local capacity, and strengthen study staff relationships with community members.

D. Selection of a Coordinator of Field Activities and Two Research Supervisors

A Coordinator of Field Activities with previous community research experience was hired by the project to organize logistics and to monitor field activities. The Coordinator, who provided study oversight, also interacted with the Research Supervisors, who were chosen from the Ministry of Health, in order to promote collaboration between personnel from the Dominican Government and Community Visitors from the Bateyes, who implemented the intervention. The Coordinator, Research Supervisors, and Community
Visitors met on a monthly basis to discuss the process of intervention and morbid event occurrence in the study population.

3.2 Study Population

The Southwestern Bateyes located in Barahona, are areas of the Dominican Republic, most in need of health promotion services. Two Bateyes of this region, Batey Algodon and Batey #1, which have similar characteristics and particularly poor living conditions, were selected by random sampling. Case and control were designated by random determination. Batey Algodon (Batey A) was designated as the case and Batey #1 (Batey B) was assigned as the control. Batey Algodon is approximately 30-45 minutes away from Batey #1 by car. There are 60 families living in Batey Algodon, and 210 families in Batey #1. All household members of both communities, through the head or the owner of the house, were invited to participate in the study.

3.3 Eligibility

A. Inclusion Criteria:

1) All household members, consenting adults, living in Batey Algodon and Batey #1, located in Barahona, the Dominican Republic, were invited to participate in the study.

2) An adult household member was eligible if he/she spent the previous four nights in the house and has no other residence.

3) Signature on consent forms.
B. Exclusion Criteria:

1) All adult household members of Batey Algodon and Batey #1 who declined to participate in the study.

2) Inability to understand or sign a consent form.

3.4 Recruitment of the study subjects

A. Initial Contact

The heads of the households within the two selected Bateyes were contacted by the Community Workers to identify their willingness to participate in the survey. A household member was eligible if he/she spent the previous four nights in the house and had no other residence.

B. Baseline

At the baseline visit, following consent, a 45-minute face-to-face structured interview in Spanish or Creole based on the subject’s preference, was conducted at the participant’s home. In both Bateyes (case and control) a structured interview was administered by Community Visitors to assess vulnerability to HIV, as well as other prevalent diseases in the rural area. Interviewers (The trained Community Visitors) assessed demographic (age, number of household members, income, gender and pregnancy status) and environmental characteristics (trash collection, source of water, type of toilet, etc), presence of morbid events (diarrhea, fever, respiratory diseases), past history of infectious diseases (Tuberculosis, dengue, malaria, HIV, etc) morbidity and mortality data, geographic mobility, access to medical care and HIV testing. Following the
structured interview, the Community Workers administered a one-hour face-to-face session with the families of Batey Algodon (case) and Batey #1 (control). These one hour- session were conducted by a trained interventionist (Community Visitor) who approached the family to talk about HIV-related issues (prevention, treatment, stigma, solidarity) All consenting participants, including pregnant women, with signs and symptoms of HIV infection were referred to the community health center for HIV screening and transportation was provided.

3.5 Assessment visits

A. Intervention Assessments

A.1 Experimental Condition: Following the baseline visit, the Community Workers administered monthly face-to-face sessions with the families in Batey Algodon. These one hour- sessions were conducted within the first five months of the project and the trained interventionist approached the family to talk about HIV-related issues prevention, treatment, stigma, solidarity). After the HIV information session, the interventionist trained the family in food preparation, water sanitation, infectious diseases prevention, namely, diarrhea (water sanitation, use of latrines), respiratory infections (environmental education), HIV (condom use/ accessibility), malaria (bed nets), dengue (covering water tanks with lid, use of Clorox), tuberculosis (persistent cough for 2 weeks), breastfeeding and vaccine administration.

A.2 Control condition (Standard Care): Consented individuals living in Batey #1 were administered a structured interview at baseline and an HIV explanatory session, but did not receive face-to-face sessions at the monthly visits.
B. Evaluation Assessments

Both study groups, received an initial assessment visit and were followed longitudinally. The control and experimental groups were evaluated at 6 and 12 months after the initiation of the intervention.

At the baseline and follow-up assessment visits, information was recorded regarding: presence of HIV, diarrhea, respiratory disease, tuberculosis, malaria, dengue, visits to the clinics, as well as vaccine administration and mortality. Diagnosis of HIV, malaria, dengue, tuberculosis, as well as diarrhea and respiratory infections, was based on signs and symptoms of each disease by the In-country Principal Investigator (Dr. Perez).

Knowledge on HIV infection, importance of vaccine administration, and prevention of morbid events was evaluated using a Knowledge, Attitudes and Practices (KAP) assessment in both the experimental and the control groups at 6th and 12th months.

3.6 Outcomes

Number of immunization rates and prevention of morbid events (i.e. diarrhea, respiratory infections, tuberculosis, malaria and dengue), as well as knowledge gained about prevention of HIV and other infectious diseases (condom use, water sanitation, breastfeeding, bed nets, etc), and the perceived importance of vaccine administration, were recorded. Presence of morbid events was recorded at the follow-up visits. Gender sensitivity (as measured by the number of male partners participating at monthly
intervention sessions) was evaluated at the final visit through group discussion with study staff. Mechanisms of solidarity were measured through group discussion with study staff at the final visit.

3.7 Pilot Study

To test how well the questions or the instructions were understood, and how the process of collecting information flowed, a pilot study was conducted. The Coordinator of Field Activities selected the first fifteen houses within the two selected Bateyes to evaluate the questionnaire, information flow, and determine if the costs were accurately projected. No changes were made as a result of the pilot study. The information collected in this pilot study was included in the final data analysis.

3.8 Quality Control

Quality control includes: assurance or the prevention of possible errors; assessment of the detection of errors after they have occurred, and feedback, or the correction necessary to avoid error in the future. Monthly and quarterly data reports were reviewed for outliers, quality control matches, adherence to protocol accuracy, and consistency with previous reports at CENISMI. Preliminary data power point presentations were produced by the In-Country Principal Investigator and presented to Miami-CoPIs of the project (Committee Members) at the University of Miami on a yearly basis.
3.9 Data Management

The In-Country Principal Investigator provided data management and record maintenance for all data collected in the Dominican Republic. The confidentiality and security of the data files in the computer was maintained by ensuring password protection on all computer accounts. The data were double entered to secure confidence of the data when the analyses were performed. Final data analyses were performed at CENISMI, the Dominican Republic, in collaboration with Co-PIs of the University of Miami and the Dominican Republic.

3.10 Sample Size

This is a population-based study, thus all adult consenting members of the Bateyes, through the head or the owner of the house, were included. There were 60 and 210 families living in Batey Algodon and Batey #1, respectively, at the time of the study was performed. All household members, through the head or the owner of the house, of both communities were invited to participate in the study.

3.11 Data Analysis

The project was conducted in three phases and involved: a baseline assessment measurement, implementation of the “human security” model for five months, and longitudinal follow-up evaluations of the intervention at 6th and 12th months. The evaluation included an economic analysis and qualitative assessments.
The data were analyzed using NCSS/PASS 2000 and SPSS version 12.5 for windows. Standard statistical methods were used to calculate the rates and to describe the demographic characteristics, clinical manifestations and basic summary statistics as proportions, means and medians. Relative risks and 95% confidence intervals (95%CI) were also computed. Chi-square and Fisher exact tests were used as needed.

The survey included categorical (nominal), ordinal and continuous (numerical) variables. Gender (male or female) and HIV status (positive or negative) were evaluated as categorical values. Age was measured as numerical variable. As ordinal variables, the survey addressed specific drinking water behaviors: boiled, bottled, tap, river, and filtered water. This variable was coded as ‘never’, ‘rarely’, ‘sometimes’, ‘often’, or ‘always’, and was modeled as a dummy variable with ‘never’ as the baseline. Since some of the intermediate categories (‘often’, ‘sometimes’ and ‘rarely’) were used infrequently, they were collapsed into one category (‘sometimes’).

The associations between the structural factors included in the survey and vulnerability of the study unit (Batey) to infectious diseases, as measured by awareness, attitudes and practices toward infectious diseases, were assessed using bivariate tabulations and calculations of relative risks. Secondary data (census data, Demographic Health Surveys) were used to compare and evaluate the information collected on structural intermediate-level and macro-level factors. Alpha level was set at 0.05.
A. KAP score system.
To explore a potential increment of correct responses within cases and controls at each assessment visit, a knowledge, attitudes and practices composite score (KAP score) was created. The KAP score system was determined by calculating the differences in correct answers from one visit to the other. For example, in order to determine the percentage of persons who demonstrated increased knowledge, attitudes and practices at six months as compared to the baseline measurements, the percentage of correct answers, for each category, at the baseline visit was subtracted from the percentage of correct answers at the six month visit. Similarly, measurements at twelve months were compared to the six month measurements, and the percentage of right answers, for each category, at the six month follow-up visit was subtracted from the percentage of right answers obtained at the twelve month visit. If there was no change from one visit to the other, a zero value was assigned. If the increment was the same from one visit to the other (i.e. 100% at six and 12 month visits), 1 point was assigned.

Once the differences were obtained, a “proportion mean” for each category of the baseline, sixth and twelve month visits was calculated and multiplied by 100 to obtain a percentage value. Finally, the “proportion means” calculated for each Batey were divided in order to obtain a Risk Ratio that measured increases in the percentage of correct responses from baseline to the sixth month visit, and from the sixth to twelve month visit for each category of assessment (knowledge, attitude and practice).
B. Qualitative Component

Individuals who were selected (as described below), for the qualitative component were contacted by an interviewer and invited to participate in an in-depth interview about their use of health care facilities and prevention of morbid events. This component of the study was briefly discussed during the consent process of the study, but the interviewer reviewed the purpose of the interview and how it would be conducted, the risks and benefits to participating, and the rights of a research participant. If the head of the household decided to participate in the qualitative component, the interviewer scheduled an appointment for completing the informed consent process (participants signed a separate consent form for participation in the qualitative interview).

The qualitative interviews were scheduled 2-3 weeks after the quantitative assessments. The interviews were conducted by an expert in qualitative assessment, who was an external person from study staff, in a location that was both convenient and comfortable for the men/women (e.g., in his/her own home). A private location was selected to permit the informant (head of the house or a community leader) and the interviewer to meet without interruption for up to one hour. The entire qualitative interview lasted 45 minutes and was audiotape and transcribed for subsequent coding and analysis.

An unstructured, phenomenologically driven interview was used to maximize the unguided articulation of the informant perception of the study. The interviewer followed the content and issues that emerged from the informant. Thus, the interview consisted of an initial stimulus question to initiate the respondent’s narrative on her/his beliefs about
the use of Health Services and prevention of morbid events. The interviewer encouraged
the study participant to talk without interruption until the respondent required a prompt
to continue. This technique, allowed the respondent to structure her/his narrative
according to her/his own perceptions of the specific issues not mentioned spontaneously.

Study participants were asked to reconstruct the interactions that occurred within access
to health care facilities and the processes of implementing the human security model.
After the respondent had told each story in her/his own words, the interviewer used a
series of questions and probes in order to elicit details regarding key elements of the
event. Participants were also asked to recall any thoughts, feelings, events, or
interactions that may have influenced their decision to follow, or not, the guidance of the
monthly household sessions.

Community Visitors, Research Supervisors and Coordinator of Field activities were also
asked to participate in a 45-minute group discuss session moderated by the In-Country
Principal Investigator to describe implementation process. A semi-structured set of
questions was used to ensure that specific issues were examined while allowing a certain
level of spontaneity for participants to expand the discussion topics.

B.1 Coding and Analysis of Qualitative Material

The qualitative interview data complemented the quantitative data in three main ways: 1) it allowed the staff to capture detailed descriptions of the contexts and processes of model implementation in the Bateyes that influence head of the house to accept or not be part of the intervention; 2) it allowed the staff to capture how decision to participate was interpreted and responded to by the participants themselves; and 3) because of the detail
they provided, the qualitative interview data helped the staff to understand the specific processes by which human security decisions were made.

Each of the qualitative interviews was transcribed verbatim. The transcriber was trained in procedures to standardize designations on the transcripts. Interview material was coded. The coding of the interview information followed a series of steps:

1.1 First, a preliminary set of analytic coding categories (closed codes) was assembled based on the conceptual framework of the study. This list of analytic categories was updated through a process of contrast and comparison, which was carried on throughout the coding period. In addition, before coding an individual interview, the analysts read the summary of the interview provided by the in-depth interviewer. This summary provided the data analyst a sense of the primary themes and topics, which emerged as observed by the interviewer.

1.2 The data analysts read through the interview. Chunks of text were marked off and tagged. The aim of this open coding was to label the actions and experiences that were described in the data; the data analyst looked for leads and ideas as well as issues in the data itself. In identifying material to tag, the data analysts focused on identifying concepts, ideas, themes-descriptions of how people do or should behave; and patterns-regularities and structures of behaviors and ideas which were identified from the analyst’s frame of reference.

1.3 The initial or open coded data was then organized under the analytic category (closed codes) list. To the extent that the open coded data could not be
organized under the existing list, the analysts developed new suggested analytic categories to accommodate the new findings.

In order to analyze the interview material, the analyst locally integrated the information by summarizing the content of each individual categorical file highlighting the main line of sentiments expressed, as well as the material that did not fit the main line content.

During this process, the analyst knew how the material in each category was linked to other analytical categories. Following local integration, the analyst executed a more inclusive integration of the information. This analysis was undertaken to guarantee that a discernible sequence of events, each flowing into the other, was analyzed and reported.

3.12 Economic Analysis

Preliminary data on resource utilization and costs were collected to establish a foundation for examining the economic impact of the program. Costs included: training of study staff (US$12,726), supervision of field activities (US$4,201), and study personnel monthly incentives (US$8,073). In addition, specific outcome measures were identified that could be used to estimate the economic benefits of the program. These measures include: prevention of morbid events for infectious diseases and HIV-related mortality. Program costs and economic benefits were compared across each alternative (Program vs No program) to estimate net economic benefits (i.e., economic benefits minus costs). Net benefits express the “cost-savings” to the Ministry of Health and society overall associated with the Program.
3.13 Human Subjects

A. Description: All households, through the head of the house, within the two selected Bateyes were assigned into one of two arms of the trial: Experimental and Control Conditions. Consented participants were enrolled and administered research questionnaires to collect clinical and socio-demographic data at baseline, and at 6th and 12th months after the initiation of the intervention.

B. Sources of Materials: Data for this study were derived from questionnaires. Knowledge, Attitudes and Behavior assessments, as well as training materials, obtained from previous studies conducted in the Dominican Republic in rural population and from WHO pamphlets (CESDEM/USAID/CERSS/COPRESIDA/Macro International, Inc. 2002). The information participants provided have been used exclusively for research purposes.

C. Risks: No substantial medical or social risks exist to the participants, other than minor discomfort associated with the survey. All participants had the right to refuse to answer any question that caused discomfort. HIV positive persons had the right to refuse to disclose their HIV status to their partners and to the interviewers. The participants did not complain about suffered psychological distress associated with disclosing personal information regarding partner’s knowledge of HIV status.
D. Recruitment and Informed Consent

D.1 Recruitment: Participants were recruited from two selected southwestern Bateyes of the Dominican Republic: Batey Algodon and Batey #1. Eligible participants who lived in these Bateyes and who consented to participate in the study were assigned into one of two arms of the trial, according to random designation: Experimental (Batey Algodon) and Control Condition (Batey #1).

D.2 Consent Form: A consent form was available in English, Spanish and Creole, and the information was presented in a language, which was understandable to the subject population. The consent form contained a statement covering the purpose, procedures, risks/discomforts, benefits, and alternatives associated with the study. Procedures to protect confidentiality were explained, and participants informed that only numbers would be used to identify the family’s data collection forms. A statement in the consent form clearly explained that since this research involved only minimal risk, no compensation was available. A statement was included to explain that participation was voluntary, refusal to participate would involve no penalty or loss of benefits to which the subject or the family was otherwise entitled, and that the subject could discontinue participation at any time without penalty or loss of benefits to which the subject was otherwise entitled.

Participants were given information that there may be no other potential benefits than a sense of helping the public at large. Finally, the consent form had in bold an explanation
of whom to contact for answers to pertinent questions about the research and research subjects' rights, and whom to contact in the event of a research-related injury to the subject. The statement also had the office number of the Principal Investigator in case of additional questions or if they wanted to place any complaints. The PI, Dr. Perez, in the Dominican Republic, offered to answer any questions the participant had concerning the research. All participants agreed to participate in the informed consent procedure.

D.3 Informed Consent Procedure: The informed consent procedure took place in the participant’s house. An explanation of the research procedures that would be involved, the purposes of the research and the expected duration of the subject's participation were provided. Every effort was made to ensure that the participant’s age, language, social status, risk status, or health or mental disorder did not compromise adequate comprehension of the research and participant rights. If consenting adults were interested in participating in the study, adequate opportunity to read the written consent form before it was signed was given to the participants. If the participant was unable to read or had any limitations (i.e. visual problems) the consent form was read to the subject. Assurances were provided to permit potential participants sufficient time to consider enrollment in the study and to avoid the possibility of coercion. Once the participant signed a consent form a copy was provided to the individual.

D.4 Protection Against Risks

The security and confidentiality of the data were of utmost concern and appropriate data management procedures and security clearances were established to insure
confidentiality. The confidential nature of the data was maintained by using unique subject codes and study identification numbers. The confidentiality and security of files were preserved in the computers with password protection and records were kept in cabinets with locks.

E. Economic and Technical Support

The proposal was economically and technically supported by the Fogarty International Research and Training Program of the University of Miami, Global Strategies for HIV Prevention and the Presidential Council on AIDS of the Dominican Republic.

4. RESULTS

4.1 General Information and Demographic Characteristics

A total of 270 families were visited between September 24 and October 22, 2007 (baseline visit). Table 1 presents results from the demographic portion of the questionnaire. The majority of the respondents (owner or head of the house) were female (67%), born and raised in the Dominican Republic (79%), and perceived themselves as Dominicans (66%). Characteristics of the families by marital status, level of education, number of children per home, number of residents in the house and age of the owner or head of the house are also shown in Table 1, and indicate similar distribution among Batey A (Case) and Batey B (Control). Statistical differences for the place where the owner of the house was born and raised were observed between the groups (p < 0.05).

Table 2 presents adherence rates for household monthly visits, sixth and twelve month follow-up visits. Adherence rates ranged from 78% to 100%.
### Table 1. Characteristics of the Study Population*

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Batey A (Case)</th>
<th>Batey B (Control)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>16/59</td>
<td>27</td>
<td>70/201</td>
</tr>
<tr>
<td>Female</td>
<td>43</td>
<td>73</td>
<td>131</td>
</tr>
<tr>
<td><strong>Country where you born?</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dominican Republic**</td>
<td>40/60</td>
<td>67</td>
<td>172/209</td>
</tr>
<tr>
<td>Haiti</td>
<td>20</td>
<td>23</td>
<td>37</td>
</tr>
<tr>
<td><strong>Are you Considered yourself as?</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dominican</td>
<td>39/60</td>
<td>65</td>
<td>149/208</td>
</tr>
<tr>
<td>Haitian</td>
<td>18</td>
<td>30</td>
<td>36</td>
</tr>
<tr>
<td>Arrayano (Dominican-Haitian)</td>
<td>3</td>
<td>5</td>
<td>23</td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married, no papers</td>
<td>29/60</td>
<td>49</td>
<td>110/205</td>
</tr>
<tr>
<td>Single</td>
<td>17</td>
<td>28</td>
<td>56</td>
</tr>
<tr>
<td>Widow/Widower</td>
<td>5</td>
<td>8</td>
<td>17</td>
</tr>
<tr>
<td>Separated</td>
<td>5</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Married, with papers</td>
<td>4</td>
<td>7</td>
<td>15</td>
</tr>
<tr>
<td><strong>Highest Education Level Completed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than high school education ( &lt; standard 7)</td>
<td>31/59</td>
<td>53</td>
<td>78/186</td>
</tr>
<tr>
<td>Completed some or all of high school (Standard 7 – 10)</td>
<td>27</td>
<td>46</td>
<td>96</td>
</tr>
<tr>
<td>Received High School diploma</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Some post-high school education or further degree.</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>None</td>
<td>1</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td><strong>Number of children per home (Means ± SD)</strong></td>
<td>5 ± 3</td>
<td>4 ± 2</td>
<td>5 ± 3</td>
</tr>
<tr>
<td><strong>Number of residents in the house (Means ± SD)</strong></td>
<td>5 ± 3</td>
<td>4 ± 2</td>
<td>4 ± 3</td>
</tr>
<tr>
<td><strong>Age (Means ± SD)</strong></td>
<td>40 ± 17</td>
<td>46 ± 19</td>
<td>44 ± 19</td>
</tr>
</tbody>
</table>

*Information was given by the Owner/Head of the house.

** P < 0.05
Table 2. Number of families per visit included in the study.

<table>
<thead>
<tr>
<th>Visit</th>
<th>Batey A (Case)</th>
<th>Batey B (Control)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>N = 60 %</td>
<td>n = 210 %</td>
</tr>
<tr>
<td>Follow-up visits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>60 100</td>
<td>208 99</td>
</tr>
<tr>
<td>2</td>
<td>58 97</td>
<td>206 98</td>
</tr>
<tr>
<td>3</td>
<td>57 95</td>
<td>207 99</td>
</tr>
<tr>
<td>4</td>
<td>56 93</td>
<td>207 99</td>
</tr>
<tr>
<td>5</td>
<td>55 92</td>
<td>206 98</td>
</tr>
<tr>
<td>Six Month</td>
<td>58 97</td>
<td>200 95</td>
</tr>
<tr>
<td>Twelve Month</td>
<td>47 78</td>
<td>192 91</td>
</tr>
</tbody>
</table>

4.2 Assessment of Knowledge of HIV/AIDS, malaria, dengue, tuberculosis, diarrhea and respiratory diseases.

As shown in Table 3, at baseline, participants in Batey A were two times more likely to have given wrong answers for all HIV modes of transmission-related variables, compared to participants in the control Batey B. At the six-month evaluation, univariate analysis revealed associations between two of the four modes of HIV transmission-related variables. No statistical differences were observed for any of the modes of HIV transmission-related variables at 12 months after the intervention (Table 3).
Table 3. Assessment of HIV knowledge at baseline, six and twelve months.

<table>
<thead>
<tr>
<th>Question</th>
<th>Baseline Visit</th>
<th>Sixth Month Visit</th>
<th>Twelfth Month Visit</th>
</tr>
</thead>
<tbody>
<tr>
<td>How do you think you can get AIDS:</td>
<td>Batey A (Case) Vs Batey B (Control)</td>
<td>Batey A Vs Batey B</td>
<td>Batey A Vs Batey B</td>
</tr>
<tr>
<td></td>
<td>n=60</td>
<td>n=57</td>
<td>n=46</td>
</tr>
<tr>
<td></td>
<td>n=208</td>
<td>n=208</td>
<td>n=176</td>
</tr>
<tr>
<td></td>
<td>RR  95% CI  P</td>
<td>RR  95% CI  P</td>
<td>RR  95% CI  p</td>
</tr>
<tr>
<td>By eating or drinking something given to you?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2.3  1.5, 4  0.0001</td>
<td>2.3  1.5, 3.5  0.001</td>
<td>1.4  1.5  0.6*</td>
</tr>
<tr>
<td>From a mosquito bite?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2.3  1.3, 3  0.003</td>
<td>2.3  1.4, 4  0.004</td>
<td>1.4  0.4, 5  0.6</td>
</tr>
<tr>
<td>Touching someone who has AIDS?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2.2  1.4, 3.5  0.001</td>
<td>1.9  0.9, 4  0.14*</td>
<td>1.9  0.4, 5  0.4*</td>
</tr>
<tr>
<td>By being “azarao” or having “bad luck”?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1.7  1.03, 3  0.07</td>
<td>1.9  0.9, 7  0.11*</td>
<td>0.7  0.1, 4  1.0*</td>
</tr>
</tbody>
</table>

* Fisher exact 2-tailed p-value.
A higher proportion of people living in Batey A (Case) demonstrated better knowledge of malaria and its mode of transmission than the residents of Batey B (Control) at baseline, six and twelve months after the intervention (Table 4).

Greater knowledge related to dengue was also observed in Batey A than Batey B at baseline and at the six-month visit but no statistical difference was observed between the groups at the 12-month visit (Table 4.1)
Table 4. Assessment of knowledge of Malaria at baseline. Six and twelve months.

<table>
<thead>
<tr>
<th>Question</th>
<th>Baseline Visit</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Batey A Vs</td>
<td>Batey B</td>
<td>Batey A Vs</td>
<td>Batey B</td>
<td>Batey A Vs</td>
<td>Batey B</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Case) n=60</td>
<td>(Control) n=206</td>
<td>n=57</td>
<td>n=198</td>
<td>n=46</td>
<td>n=175</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have you ever heard of an illness called Malaria or Jungle Fever (Paludismo)?</td>
<td>No</td>
<td>RR 2.3 CI 1.2,4.5 p 0.049</td>
<td>RR 3.5 CI 0.9,6.4 p 0.08*</td>
<td>RR 3.8 CI 2,7 p 0.03</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Being bitten by a mosquito</td>
<td>RR 1.1 CI 0.6, 2.1 p 0.97</td>
<td>RR 4.9 CI 3.2, 7.5 p 0.001</td>
<td>RR 2.6 CI 2,4 p 0.01</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Fisher exact 2-tailed p-value.
Table 4.1. Assessment of knowledge for Dengue at baseline, six and twelve months.

<table>
<thead>
<tr>
<th>Question</th>
<th>Baseline Visit</th>
<th>Sixth Month Visit</th>
<th>Twelfth Month Visit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Batey A Vs Batey B</td>
<td>Batey A Vs Batey B</td>
<td>Batey A Vs Batey B</td>
</tr>
<tr>
<td></td>
<td>(Case) n=60</td>
<td>(Control) n=209</td>
<td>n=56</td>
</tr>
<tr>
<td>Have you ever heard of a disease called Dengue?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>0.6</td>
<td>0.3,0.9</td>
<td>0.07</td>
</tr>
<tr>
<td>Main cause for getting Dengue?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mosquito bite</td>
<td>1.9</td>
<td>1.2,3</td>
<td>0.008</td>
</tr>
<tr>
<td>A person can die from Dengue?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>3.0</td>
<td>2.1,4</td>
<td>0.007*</td>
</tr>
<tr>
<td>What is the best way to prevent Dengue?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Don’t Know</td>
<td>1.0</td>
<td>0.6, 1.7</td>
<td>0.87</td>
</tr>
</tbody>
</table>

* Fisher exact 2-tailed p-value.
Different patterns related to knowledge about TB were observed as indicated in Table 4.2. At baseline, residents of Batey A (Case) were more likely to demonstrate poor knowledge about the cause of TB than control residents of Batey B (93% vs 60%; RR = 6.9; CI95%:2.6,18, p < 0.05) or whether a person can die from tuberculosis (14% vs 3%; RR = 2.7; CI95%:1.6,5, p < 0.05). No differences, however, in response to these questions were observed between people living in Batey A and B at six and twelve months after the intervention (Table 4.2). Table 4.2 also shows that people living in Batey A were less likely to demonstrate poor knowledge of tuberculosis at the sixth (60% vs 98%; RR = 0.2; CI95%:0.1, 0.3, p < 0.05) and at the 12 month visit (43% vs 94%; RR = 0.14; CI95%:0.1,0.2, p < 0.05), (Table 4.2).
Table 4.2. Assessment of knowledge for tuberculosis (TB) at baseline, six and twelve months.

<table>
<thead>
<tr>
<th>Have you ever heard of an illness called TB?</th>
<th>Baseline Visit</th>
<th>Sixth Month Visit</th>
<th>Twelfth Month Visit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Batey A (Case) Vs Batey B (Control)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n=58</td>
<td>n=208</td>
<td>n=57</td>
<td>n=196</td>
</tr>
<tr>
<td>RR CI 95% p</td>
<td>RR CI 95% p</td>
<td>RR CI 95% p</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.4 0.8, 3 0.4</td>
<td>1.1 0.2, 7 1.00*</td>
<td>--</td>
</tr>
<tr>
<td>What is the main cause for getting TB?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Don’t Know</td>
<td>6.9 2.6,18 0.0001</td>
<td>0.7 0.4,1 0.17</td>
<td>0.9 1.2</td>
</tr>
<tr>
<td>Do you think a person can die from TB?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>2.7 1.6,5 0.005*</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>What is the best way to prevent TB?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Don’t Know</td>
<td>0.7 0.4,1.2 0.33</td>
<td>0.2 0.1,0.3 0.001</td>
<td>0.1 0.1,0.2 0.001</td>
</tr>
</tbody>
</table>

* Fisher exact 2-tailed p-value.
Table 5 indicates that participants from Batey A were more likely to respond correctly about the main cause of diarrhea than people living in Batey B at baseline (54% vs 20%; RR = 3.2; CI95%:1.9,5, p < 0.05), and at six (43% vs 28%; RR = 1.7; CI95%:1.1,3, p < 0.05) and 12 months (47% vs 25%; RR = 2.2; CI95%:1.3,4, p < 0.05) after the intervention.

Table 5 also shows that there was no difference in the number of correct responses between residents of Batey A and Batey B, on the question that a person can die from a respiratory disease, at baseline, six and twelve month visits.
Table 5. Assessment of knowledge of diarrhea and respiratory diseases at baseline, six and twelve months.

<table>
<thead>
<tr>
<th>Question</th>
<th>Baseline Visit</th>
<th>Sixth Month Visit</th>
<th>Twelfth Month Visit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Batey A (Case) n=43 vs Batey (Control) n=200</td>
<td>Batey A n=58 vs Batey n=200</td>
<td>Batey A n=47 vs Batey n=192</td>
</tr>
<tr>
<td>What is the main cause of getting diarrhea?</td>
<td>RR 95% CI p</td>
<td>RR 95% CI p</td>
<td>RR 95% CI p</td>
</tr>
<tr>
<td>Drinking contaminated water</td>
<td>3.2 1.9,5 0.0001</td>
<td>1.7 1.1,3 0.04</td>
<td>2.2 1.3,4 0.004</td>
</tr>
<tr>
<td>Do you think a person can die from diarrhea?</td>
<td>No 2.9 1.3,6 0.07*</td>
<td>No 2.9 1.3,6 0.07*</td>
<td>No 6 4.7 0.001</td>
</tr>
<tr>
<td>Do you believe that a person can die from a respiratory disease?</td>
<td>No 0.8 0.3,2 0.79*</td>
<td>No 2.4 1.03,6 0.12*</td>
<td>No 2 1.10 0.4*</td>
</tr>
</tbody>
</table>

* Fisher exact 2-tailed p-value.
4.3 Attitudes about HIV/AIDS, malaria, dengue, tuberculosis, diarrhea and respiratory diseases.

As shown in Table 6, people living in Batey A were more likely to respond incorrectly to the HIV/AIDS attitude question regarding “washing your private parts after sex prevents AIDS”, than residents of Batey B, at baseline (27% vs 7%; RR = 2.8; CI95%:1.8,4, p < 0.05). Similarly, residents of Batey A were more likely to respond incorrectly to the question whether “the use of Lua (spirits) can protect you from AIDS” than people living in Batey B, at baseline (15% vs 25%; RR = 2.2; CI95%:1.3,4, p < 0.05). At the 6 and 12 month follow-up evaluations, however, the number of correct answers to these two questions was not statistically different between residents of Batey A and people living in Batey B.
Table 6. Attitudes about HIV at baseline, six and twelve months

<table>
<thead>
<tr>
<th>Question</th>
<th>Baseline Visit</th>
<th>Sixth Month Visit</th>
<th>Twelfth Month Visit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Batey A (Case) n=59</td>
<td>Batey A vs Batey B n=45</td>
<td>Batey A vs Batey B n=46</td>
</tr>
<tr>
<td></td>
<td>vs Batey B (Control) n=207</td>
<td>vs Batey B n=195</td>
<td>vs Batey B n=171</td>
</tr>
<tr>
<td>Washing your private parts after sex prevents AIDS?</td>
<td>RR 95% CI p</td>
<td>RR 95% CI p</td>
<td>RR 95% CI p</td>
</tr>
<tr>
<td>Yes</td>
<td>2.8 1.8,4.3 0.0001</td>
<td>1.8 0.7,4.4 0.37</td>
<td>0.4 1.3 0.5*</td>
</tr>
<tr>
<td>Some Luá (spirits) can protect you from AIDS?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2.5 1.3,3.2 0.002</td>
<td>1.5 0.3,8 0.53*</td>
<td>1.9 1.5 0.3*</td>
</tr>
<tr>
<td>If you have AIDS, you should be prohibited from seeing your family?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1.2 0.6,3 0.81</td>
<td>3.7 2.4,6 0.01*</td>
<td>3.5 2.6 0.01*</td>
</tr>
</tbody>
</table>

* Fisher exact 2-tailed p-value.
Table 6 reveals that residents of Batey and Batey B responded similarly to “limiting visits to relatives if they became infected with HIV” at baseline (11% vs 9%; RR = 1.2; CI95%:0.6,3, p > 0.05). People residing in Batey A, however, were more likely to limit visits to a family member who became infected with HIV than people living in Batey B, at the sixth (18% vs 2%; RR = 3.7; CI95%:2.4,6, p < 0.05) and twelve – month (23% vs 4%; RR = 3.5; CI95%:2.6, p < 0.05) visits.

Statistical differences were revealed in response to questions related to malaria treatment (Table 6.1). People living in Batey A were less likely to report that they would get treatment for malaria if they became sick, than residents of Batey B, at baseline (47% vs 25%; RR = 2.2; CI95%:1.3,4, p < 0.05) and at six months (47% vs 25%; RR = 2.2; CI95%:1.3,4, p < 0.05) after the intervention. No statistical difference was observed, however, at the 12 month visit (Batey A 2% vs Batey B 12%; RR = 4.9; CI95%:1.6, p > 0.05). Similarly, there were no statistical differences between people living in Batey A and residents of Batey B regarding the likelihood to seek treatment for dengue and tuberculosis (Table 6.1), as well as for diarrhea and respiratory diseases (Table 6.2), at the baseline, six and twelve months.
Table 6.1. Attitudes about malaria, dengue and tuberculosis at baseline, six and twelve months.

<table>
<thead>
<tr>
<th>Question</th>
<th>Baseline Visit</th>
<th></th>
<th>Sixth Month Visit</th>
<th></th>
<th>Twelfth Month Visit</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Batey A (Case)</td>
<td>n=58</td>
<td>Batey B (Control)</td>
<td>n=208</td>
<td>Batey A Vs Batey B</td>
<td>n=54</td>
</tr>
<tr>
<td></td>
<td>Vs Batey B</td>
<td>n=54</td>
<td>Vs Batey B</td>
<td>n=195</td>
<td>Batey A Vs Batey B</td>
<td>n=45</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If you got sick with malaria or paludismo, would you get treatment?</td>
<td>RR 95% p RR 95%</td>
<td>p</td>
<td>RR 95% p</td>
<td></td>
<td>RR 95% p</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>2.4, 1.2, 5</td>
<td>0.04*</td>
<td>3.1, 1.7, 6</td>
<td>0.01*</td>
<td>4.9, 1.6</td>
<td>0.2*</td>
</tr>
<tr>
<td>If you got sick with dengue, would you seek treatment?</td>
<td>-- -- --</td>
<td>1.00*</td>
<td>0.4, 0.1, 2</td>
<td>0.39*</td>
<td>-- -- --</td>
<td>1.00*</td>
</tr>
<tr>
<td>Yes</td>
<td>-- -- --</td>
<td>1.00*</td>
<td>-- -- --</td>
<td>1.00*</td>
<td>-- -- --</td>
<td>1.00*</td>
</tr>
<tr>
<td>If you got sick with tuberculosis, would you seek treatment?</td>
<td>-- -- --</td>
<td>1.00*</td>
<td>-- -- --</td>
<td>1.00*</td>
<td>-- -- --</td>
<td>1.00*</td>
</tr>
<tr>
<td>Es</td>
<td>-- -- --</td>
<td>1.00*</td>
<td>-- -- --</td>
<td>1.00*</td>
<td>-- -- --</td>
<td>1.00*</td>
</tr>
</tbody>
</table>

* Fisher exact 2-tailed p-value.
Table 6.2. Attitudes about diarrhea and respiratory diseases at baseline, six and twelve months.

<table>
<thead>
<tr>
<th>Question</th>
<th>Baseline Visit</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Baseline Visit</td>
<td>Sixth Month Visit</td>
<td>Twelfth Month Visit</td>
<td></td>
</tr>
<tr>
<td>If you got sick with diarrhea, would you seek treatment?</td>
<td>Batey A Vs Batey B (Case) n=57</td>
<td>Batey A Vs Batey B (Control) n=208</td>
<td>Batey A Vs Batey B n=56</td>
<td>Batey A Vs Batey B n=43</td>
<td></td>
</tr>
<tr>
<td>RR</td>
<td>CI 95%</td>
<td>p</td>
<td>RR</td>
<td>CI 95%</td>
<td>p</td>
</tr>
<tr>
<td>Yes</td>
<td>--</td>
<td>-- , --</td>
<td>1.00*</td>
<td>--</td>
<td>-- , --</td>
</tr>
<tr>
<td>If you got sick with a respiratory disease, would you seek treatment?</td>
<td>Yes</td>
<td>--</td>
<td>-- , --</td>
<td>1.00*</td>
<td>--</td>
</tr>
</tbody>
</table>

*Fisher exact 2-tailed p-value.
4.4 Practices regarding prevention of HIV, malaria, dengue, tuberculosis, diarrhea and respiratory diseases.

Results from questions regarding practices for HIV prevention revealed an irregular pattern of response towards sexual behavior and HIV infection are shown in table 7. Specifically, at baseline, people living in Batey A (Case) were more likely to respond incorrectly to “the probability of getting HIV infection if people have sexual relations only with people they trust” (90% vs 64%; RR = 3.8; CI95%:1.7,8, p < 0.05) or if “people have to pull out before ejaculating to avoid getting infected with HIV virus” (43% vs 19%; RR = 2.5; CI95%:1.6,4, p < 0.05) than residents of Batey B (Control). Statistical differences between the study groups, however, were not observed for any of the HIV practices-related questions, either at the six or twelve month visits (Table 7). Responses to questions related to malaria and dengue (Table 7.1) and diarrhea and respiratory diseases (Table 7.2) revealed statistical differences between the study groups at baseline, six and twelve months visits, suggesting that cases were more likely to respond incorrectly to practice-related questions than controls of Batey B.
Table 7. Practices regarding prevention of HIV acquisition at baseline, six and twelve months.

<table>
<thead>
<tr>
<th>Question</th>
<th>Baseline Visit</th>
<th>Sixth Month Visit</th>
<th>Twelfth Month Visit</th>
</tr>
</thead>
<tbody>
<tr>
<td>In order NOT to get AIDS would you have:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>relations with only one person</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>RR 1.4 95% CI 0.7, 3 p 0.49</td>
<td>RR 1.0 95% CI 0.5, 2 p 0.85</td>
<td>RR 0.3 95% CI 0.1, 1 p 0.1*</td>
</tr>
<tr>
<td>relations only with people you trust</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>RR 3.8 95% CI 1.7, 8 p 0.001</td>
<td>RR 1.5 95% CI 0.8, 3 p 0.21</td>
<td>RR 2.0 95% CI 0.5, 8 p 0.4*</td>
</tr>
<tr>
<td>pull out before ejaculating</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>RR 2.5 95% CI 1.6, 4 p 0.001</td>
<td>RR 1.6 95% CI 0.8, 3 p 0.27</td>
<td>RR 0.2 95% CI 0.1, 0.6 p 0.001</td>
</tr>
<tr>
<td>use condoms in all of your sexual relations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>RR 1.3 95% CI 0.8, 2 p 0.30</td>
<td>RR 0.9 95% CI 0.5, 1.4 p 0.59</td>
<td>RR 0.5 95% CI 0.3, 0.8 p 0.01</td>
</tr>
</tbody>
</table>

* Fisher exact 2-tailed p-value.
Table 7.1. Practices regarding prevention of malaria and dengue acquisition at baseline, six and twelve months.

<table>
<thead>
<tr>
<th>Question</th>
<th>Baseline Visit</th>
<th>Sixth Month Visit</th>
<th>Twelfth Month Visit</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What is the most important thing that you and the people residing in the house do to prevent:</strong></td>
<td>Batey A (Case) n %</td>
<td>Batey B (Control) n %</td>
<td>Batey A (Case) n %</td>
<td>Batey B (Control) n %</td>
</tr>
<tr>
<td>Getting sick with malaria</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use mosquito nets</td>
<td>19/28 68</td>
<td>146/186 78</td>
<td>0.31</td>
<td>28/39 72</td>
</tr>
<tr>
<td>Take chloroquine</td>
<td>15 54</td>
<td>88 47</td>
<td>0.68</td>
<td>8 21</td>
</tr>
<tr>
<td>Avoid being bitten by mosquitoes</td>
<td>14 50</td>
<td>42 23</td>
<td>0.004</td>
<td>19 49</td>
</tr>
<tr>
<td>Keep the house and its surroundings clean</td>
<td>13 46</td>
<td>116 62</td>
<td>0.16</td>
<td>17 44</td>
</tr>
<tr>
<td>Close the doors and windows at night</td>
<td>10 36</td>
<td>69 37</td>
<td>0.94</td>
<td>14 36</td>
</tr>
<tr>
<td>Use insecticides</td>
<td>2 7</td>
<td>10 5</td>
<td>0.65*</td>
<td>3 8</td>
</tr>
<tr>
<td>Use repellents</td>
<td>2 7</td>
<td>8 4</td>
<td>0.62*</td>
<td>4 10</td>
</tr>
<tr>
<td>Avoid going out in the cold</td>
<td>0 0</td>
<td>3 2</td>
<td>-</td>
<td>0 0</td>
</tr>
<tr>
<td>Avoid being exposed to the sun for a long time</td>
<td>0 0</td>
<td>52 28</td>
<td>-</td>
<td>8 21</td>
</tr>
<tr>
<td>Getting sick with dengue?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use mosquito nets</td>
<td>29/41 71</td>
<td>125/194 64</td>
<td>0.55</td>
<td>30/39 77</td>
</tr>
<tr>
<td>Take chloroquine</td>
<td>18 44</td>
<td>54 28</td>
<td>0.06</td>
<td>2 5</td>
</tr>
<tr>
<td>Avoid being bitten by mosquitoes</td>
<td>20 49</td>
<td>68 35</td>
<td>0.14</td>
<td>18 46</td>
</tr>
<tr>
<td>Keep the house and its surroundings clean</td>
<td>25 61</td>
<td>156 80</td>
<td>0.01</td>
<td>22 56</td>
</tr>
<tr>
<td>Close the doors and windows at night</td>
<td>10 24</td>
<td>73 38</td>
<td>0.15</td>
<td>12 31</td>
</tr>
<tr>
<td>Use insecticides</td>
<td>3 7</td>
<td>11 6</td>
<td>0.71*</td>
<td>3 8</td>
</tr>
<tr>
<td>Use repellents</td>
<td>5 12</td>
<td>18 9</td>
<td>0.56*</td>
<td>5 13</td>
</tr>
<tr>
<td>Avoid being exposed to the sun for a long time</td>
<td>1 2</td>
<td>22 11</td>
<td>0.09*</td>
<td>0 0</td>
</tr>
</tbody>
</table>

*Fisher Exact Test, two-tailed p-value.
Table 7.2. Practices towards diarrhea and respiratory diseases (RD) at baseline, six and twelve months.

<table>
<thead>
<tr>
<th>Question</th>
<th>Baseline Visit</th>
<th></th>
<th>Sixth Month Visit</th>
<th></th>
<th>Twelfth Month Visit</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Batey A (Case)</td>
<td>Batey B (Control)</td>
<td>P</td>
<td>Batey A (Case)</td>
<td>Batey B (Control)</td>
<td>P</td>
</tr>
<tr>
<td>What is the most important thing that you and the people residing in the house do to prevent diarrhea:</td>
<td></td>
<td></td>
<td>P</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boil the water</td>
<td>24/40 60</td>
<td>167/199 84</td>
<td>0.001</td>
<td>35/41 85</td>
<td>176/191 92</td>
<td>0.22*</td>
</tr>
<tr>
<td>Wash our hands before handling food</td>
<td>30 75</td>
<td>179 90</td>
<td>0.01</td>
<td>39 95</td>
<td>170 89</td>
<td>0.38*</td>
</tr>
<tr>
<td>Take antibiotics</td>
<td>11 28</td>
<td>65 33</td>
<td>0.64</td>
<td>5 12</td>
<td>58 30</td>
<td>0.03</td>
</tr>
<tr>
<td>Avoid going out in the cold</td>
<td>2 5</td>
<td>4 2</td>
<td>0.26*</td>
<td>1 2</td>
<td>3 2</td>
<td>0.54*</td>
</tr>
<tr>
<td>Close the doors and windows at night</td>
<td>8 20</td>
<td>69 37</td>
<td>0.10</td>
<td>0 0</td>
<td>32 17</td>
<td>-</td>
</tr>
<tr>
<td>Keep the house and its surroundings clean</td>
<td>20 50</td>
<td>104 52</td>
<td>0.9</td>
<td>1 2</td>
<td>95 50</td>
<td>0.0001</td>
</tr>
<tr>
<td>If your child has diarrhea, what do you do to find out if you can treat at home or take him to the nearest health center?</td>
<td></td>
<td></td>
<td>P</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Count the days he has had diarrhea</td>
<td>18/28 64</td>
<td>91/144 63</td>
<td>0.75</td>
<td>18/28 64</td>
<td>91/144 63</td>
<td>0.75</td>
</tr>
<tr>
<td>See if there is blood in his stool</td>
<td>11 39</td>
<td>80 56</td>
<td>0.17</td>
<td>11 39</td>
<td>80 56</td>
<td>0.17</td>
</tr>
<tr>
<td>Determine the overall condition of the child</td>
<td>16 57</td>
<td>79 55</td>
<td>0.98</td>
<td>16 57</td>
<td>79 55</td>
<td>0.98</td>
</tr>
<tr>
<td>Watch the child to see if he cannot drink or drinks poorly</td>
<td>15 54</td>
<td>64 44</td>
<td>0.49</td>
<td>15 54</td>
<td>64 44</td>
<td>0.49</td>
</tr>
<tr>
<td>Watch to see if the skin returns to its prior condition</td>
<td>6 21</td>
<td>52 36</td>
<td>0.19</td>
<td>6 21</td>
<td>52 36</td>
<td>0.19</td>
</tr>
<tr>
<td>If your child has RD, what do you do to find out if you can treat him at home or take him to the nearest health center?</td>
<td></td>
<td></td>
<td>P</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I count how many days he has had the RD</td>
<td>2/39 5</td>
<td>91/169 54</td>
<td>0.001</td>
<td>17/31 55</td>
<td>88/145 61</td>
<td>1.00</td>
</tr>
<tr>
<td>I count his respirations per minute</td>
<td>11 28</td>
<td>115 68</td>
<td>0.001</td>
<td>15 48</td>
<td>89 61</td>
<td>0.46</td>
</tr>
<tr>
<td>I watch him to see if he has difficulty breathing</td>
<td>29 74</td>
<td>151 89</td>
<td>0.03</td>
<td>21 68</td>
<td>103 71</td>
<td>0.88</td>
</tr>
<tr>
<td>I watch to see if he cannot drink or drink poorly</td>
<td>3 8</td>
<td>96 57</td>
<td>0.001</td>
<td>15 48</td>
<td>61 42</td>
<td>0.46</td>
</tr>
</tbody>
</table>
4.5 KAP score system.

In order to explore a potential increment of correct responses within cases and controls at each assessment visit, a knowledge, attitudes and practices composite score (KAP score) was created. The KAP score system evaluated the impact of household visit on knowledge, attitudes and practices at six and twelve months after the intervention (Table 8).

After six months, people who received the intervention (Cases) were more likely to show increased knowledge (RR = 3.3) have better attitudes (RR = 1.8) and better practices related to the infectious diseases included in the study (RR=2.6), than the Control group. At twelve months, cases were more likely than controls, to have better attitudes related to the infectious diseases included in the study (RR= 3.5), but, no differences between cases and controls for the KAP score were observed for knowledge (0.8) and practice (1.02) at this visit (Table 8).
Table 8. KAP score to explore a potential increment of right responses within cases and controls at each assessment visit.  

<table>
<thead>
<tr>
<th>Type of Question</th>
<th>Visit 1 (Baseline)</th>
<th>Visit 2 (Six Months)</th>
<th>Visit 3 (Twelve Months)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Batey A (Case)</td>
<td>Batey B (Control)</td>
<td>Batey A (Case)</td>
</tr>
<tr>
<td></td>
<td>Correct Answers (%)</td>
<td>Correct Answers (%)</td>
<td>Correct Answers (%)</td>
</tr>
<tr>
<td>Knowledge</td>
<td>34</td>
<td>23</td>
<td>18</td>
</tr>
<tr>
<td>Attitudes</td>
<td>58</td>
<td>53</td>
<td>5</td>
</tr>
<tr>
<td>Practices</td>
<td>51</td>
<td>51</td>
<td>10</td>
</tr>
</tbody>
</table>

1 To explore a potential increment of correct responses within cases and controls at each assessment visit, a knowledge, attitudes and practices composite score (KAP score) was created. The KAP score system was determined by calculating the differences in correct answers from one visit to the other. For example, in order to determine the percentage of persons who demonstrated increased knowledge, attitudes and practices at six months as compared to the baseline visit, the percentage of correct answers for each category, at the baseline visit, was subtracted from the percentage of correct answers at the six month visit. Similarly, measurements at twelve months were compared to the six month measurements, and the percentage of right answers, for each category, at the six month follow-up visit was subtracted from the percentage of right answers obtained at the twelve month visit. If there was no change from one visit to the other, a zero value was assigned. If the increment was the same from one visit to the other (i.e. 100% at six and 12 month visits), 1 point was assigned.

2 Percentage of families, among the cases and controls, in which the number of correct answers increased from baseline to six months after the intervention.

3 Percentage of families, among the cases and controls, in which the number of correct answers increased from six to twelve months after the intervention.

4 Risk ratio: Percentage of correct answers in Batey A/percentage of correct answers in Batey B at six months.

5 Risk ratio: Percentage of correct answers in Batey A/percentage of correct answers in Batey B at twelve months.
4.6 Follow-up visits.

Low morbidity and mortality rates were observed during the follow-up visits (Table 9). The presence of morbid events such as diarrhea and respiratory infections was higher in Batey B (Control) than in Batey A (Case). Mortality for tuberculosis (n = 2) and occurrence of malaria (n = 2) and dengue (n = 2) cases, however, were higher in Batey A (Case) than Batey B (Control). Signs and symptoms of HIV disease as well as AIDS-related deaths were not reported in the study population.
Table 9. Follow-up monthly visits to monitor the occurrence of acute diarrhea, respiratory infections (RI), dengue, malaria, HIV/AIDS and tuberculosis after baseline intervention.

<table>
<thead>
<tr>
<th>Question</th>
<th>Visit 1</th>
<th>Visit 2</th>
<th>Visit 3</th>
<th>Visit 4</th>
<th>Visit 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has a member of the family suffered from: Acute diarrhea illness?</td>
<td>5/59 (9)</td>
<td>27/208(13)</td>
<td>23/206(11)</td>
<td>26/207(13)</td>
<td>5/56(9)</td>
</tr>
<tr>
<td>Died from acute diarrhea illness?</td>
<td>0/59 (0)</td>
<td>0/208(0)</td>
<td>0/206(0.5)</td>
<td>0/207(0)</td>
<td>0/56(0)</td>
</tr>
<tr>
<td>Acute RI?</td>
<td>7/59 (12)</td>
<td>40/208(19)</td>
<td>45/206(22)</td>
<td>51/207(25)</td>
<td>5/56(9)</td>
</tr>
<tr>
<td>Died from an acute RI?</td>
<td>0/59 (0)</td>
<td>0/208(0)</td>
<td>0/206(0)</td>
<td>0/207(0)</td>
<td>0/55(0)</td>
</tr>
<tr>
<td>Dengue?</td>
<td>0/59 (0)</td>
<td>0/208(0)</td>
<td>0/206(0)</td>
<td>0/207(0)</td>
<td>1/56(2)</td>
</tr>
<tr>
<td>Died from dengue?</td>
<td>0/58 (0)</td>
<td>0/208(0)</td>
<td>0/206(0)</td>
<td>0/207(0)</td>
<td>0/207(0)</td>
</tr>
<tr>
<td>Malaria?</td>
<td>0/59 (7)</td>
<td>0/208(0)</td>
<td>0/206(0)</td>
<td>0/207(0)</td>
<td>1/56(2)</td>
</tr>
<tr>
<td>Died from malaria?</td>
<td>0/58 (0)</td>
<td>0/208(0)</td>
<td>0/206(0)</td>
<td>0/207(0)</td>
<td>1/54 (2)</td>
</tr>
<tr>
<td>HIV/AIDS?</td>
<td>0/59 (0)</td>
<td>0/208(0)</td>
<td>0/206(0)</td>
<td>0/207(0)</td>
<td>0/55(0)</td>
</tr>
<tr>
<td>Died from HIV/AIDS?</td>
<td>0/58 (0)</td>
<td>0/208(0)</td>
<td>0/206(0)</td>
<td>0/207(0)</td>
<td>0/55(0)</td>
</tr>
<tr>
<td>Tuberculosis?</td>
<td>1/59 (2)</td>
<td>0/207(0)</td>
<td>0/206(0)</td>
<td>2/57(5)</td>
<td>2/56(2)</td>
</tr>
<tr>
<td>Died for Tuberculosis?</td>
<td>0/59 (0)</td>
<td>0/208(0)</td>
<td>0/206(0)</td>
<td>0/207(0)</td>
<td>2/55(4)</td>
</tr>
</tbody>
</table>

* P < 0.05
Exclusive breastfeeding rates in Batey A (Case) increased from 0% at the first visit to 100% after five months of intervention. High vaccine coverage rates were also reported in both study groups (Table 10).
Table 10. Follow-up monthly visits to monitor feeding patterns and vaccine coverage after the baseline intervention.

<table>
<thead>
<tr>
<th>Question</th>
<th>Visit 1</th>
<th>Visit 2</th>
<th>Visit 3</th>
<th>Visit 4</th>
<th>Visit 5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Batey A (Case) n (%)</td>
<td>Batey B (Control) n (%)</td>
<td>Batey A (Case) n (%)</td>
<td>Batey B (Control) n (%)</td>
<td>Batey A (Case) n (%)</td>
</tr>
<tr>
<td>Children under the age of 6 months in this house are fed with:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Only breast milk</td>
<td>0/10 (0)</td>
<td>1/1 (100)</td>
<td>2/7 (29)</td>
<td>0/0 (0)</td>
<td>1/2 (50)</td>
</tr>
<tr>
<td>Milk substitute</td>
<td>1/10 (10)</td>
<td>0/1 (0)</td>
<td>1/7 (14)</td>
<td>0/0 (0)</td>
<td>0/2 (0)</td>
</tr>
<tr>
<td>combination of both</td>
<td>8/10 (80)</td>
<td>0/1 (0)</td>
<td>3/7 (57)</td>
<td>0/0 (0)</td>
<td>1/2 (50)</td>
</tr>
<tr>
<td>Has your child been vaccinated in the past month?</td>
<td>10/10 (100)</td>
<td>1/1 (100)</td>
<td>11/11 (100)</td>
<td>0/0 (0)</td>
<td>8/8 (100)</td>
</tr>
</tbody>
</table>
4.7 Qualitative Component

Four in-depth interviews were conducted with two Community leaders and two owners/heads of the house for each Batey. All participants favored the implementation of prevention activities inside the Bateyes and were hoping that structural interventions could be made at these locations. In this context, a Community Leader from Batey A (case) reported his perception about the human security model as follows:

“The community was very excited with the idea of receiving people in their homes and the model was accepted enthusiastically. People collaborated with these young fellows (Interventionists) in disease prevention. We perceived an improvement in community health and we hope in the near future that you help us in repairing the roads and having faucets inside the houses”.

In the same way, the Community Leader from Batey B (control) was looking forward to continuing the prevention activities and to the initiation of structural interventions in his Batey:

“I hope the health activities that you already performed could be part of a continue process of implementation for the benefit of our people. Moreover, we hope that the next phase of the project includes the purchase of a water pump and the construction of latrines”.


The interviews included narratives of the participant’s beliefs about the use of Health Services and prevention of morbid events. One of the heads of a household expressed that “people here (Batey B) have transportation problems...” “Even though they are (health services) available, money to pay for transportation services is not always on hand”. In contrast, an owner of a house in Batey A said:

“Transportation was an issue one year ago before the water pump was donated by an international faith-based organization. Now, not only we have “clean” water for the community, but also we can use the money we saved, from selling bottles of water to other surrounding Bateyes, for transportation and to solve any other health problem in the community (i.e. buying oral hydration salts for diarrhea).

A group discussion was also conducted with study staff, including Community Visitors (interventionists), Research Supervisors and the Coordinator of Field Activities. Different topics such as informal payments, contributions of model implementation in their personal and professional lives, and gender sensitivity (male involvement) were discussed. Common consensus about these topics is presented as follows:

“The fact of getting a small incentive (monthly payment) was helpful in training the community on how to prevent many of the most frequent diseases taking place in the Bateyes. We believe good health is worth any price”. Probably the thing that motivated us more was to observe the amount of men who participated in the monthly sessions when we approached the family to explain prevention methods...”
“We believed our participation was good, not only for our people, but also for our relationship with Research Supervisors and people from Capital (Principal Investigator and Coordinator of Field Activities).

4.8 Economic Analysis

Table 11 presents the results of the cost analysis and potential economic benefits from reducing morbidity (i.e. diarrhea). Intervention resources for the program included staff training, monthly incentive payments to run the intervention and supervision of field activities. Costs of the intervention were 50% lower than total cost currently spending by the Dominican Government in infectious disease prevention programs in urban areas of the country. The total yearly cost of the intervention was estimated to be $25,000. This translates to roughly US$23.00 dollars per Batey resident.

Table 11. Economic analysis to evaluate costs and potential net benefits of human security model implementation in southwestern Bateyes of the Dominican Republic.

<table>
<thead>
<tr>
<th>Intervention Resources</th>
<th>Yearly Costs (US$)</th>
<th>Economic Benefit ($)</th>
<th>Net Benefits ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No Program (Standard of Care)</td>
<td>Program (Human Security Model)</td>
<td>(EB) No Program - Program</td>
</tr>
<tr>
<td>Training of staff</td>
<td>0</td>
<td>12,726</td>
<td>—</td>
</tr>
<tr>
<td>Monthly Incentives</td>
<td>0</td>
<td>8,073</td>
<td>—</td>
</tr>
<tr>
<td>Supervision of field activities</td>
<td>0</td>
<td>4,201</td>
<td>—</td>
</tr>
<tr>
<td>Total Cost</td>
<td>0</td>
<td>25,000.00</td>
<td>—</td>
</tr>
<tr>
<td>Economic benefits</td>
<td></td>
<td></td>
<td>277,399</td>
</tr>
</tbody>
</table>

*Cost of treating episodes of acute diarrhea in a yearly basis.
**The benefits associated with reduced diarrhea episodes in a yearly basis.
In terms of potential sources of economic benefits, effective treatment for severe acute diarrhea was chosen given its high prevalence in the Bateyes. It is estimated that 50% (n = 675) of the current population of the two selected Bateyes will have at least one episode of diarrhea per year (CESDEM/USAID/Macro Int 2007). Treatment cost for acute diarrhea disease is estimated at US$457* – a burden that falls on the Dominican government. Thus, for each case avoided, the Dominican government would save US$457. Given the potential for disease reduction shown by the intervention (10% of the individuals reported to have diarrhea at the follow-up visits), the benefits associated with reduced diarrhea on an annual basis, would translate to approximately US$277,399 [(675- 68) x 457] dollars for preventing morbid events (i.e. diarrhea). This suggests that by investing $25,000 a year to run the intervention, the net economic benefits would be US$252,399 dollars (Table 11).

If other outcomes are factored in, such a reduced HIV transmission, the potential economic benefits are considerably higher. For example, the World Health Organization (WHO) estimates that the average cost per case of AIDS is about 2.7 times the per capita GDP (Barnett and Whiteside, 2000). For the Dominican Republic, this value would be approximately US$23,760 (US$8,800 times 2.7). Thus, if the intervention prevented just 2 cases of HIV/AIDS per year, the monetary savings would be US$47,520. In addition to the economic savings, there is also a potential economic gain because of the

* Treatment cost for acute diarrhea disease included: admission throughout Emergency Room, three to four days of hospitalization and health personnel cost.
contribution that those prevented cases could make to society. The total net benefits ($47,520 - $25,000) would be $22,520 (from HIV/AIDS prevention alone).

The economic analysis revealed that cost-savings to the Ministry of Health and society overall associated with reducing diarrhea under the Program was US$252,399 dollars per year (Table 11). The costs might be different if this intervention were run directly by the Ministry of Health, since the current cost for disease prevention in urban areas of the Dominican Republic is two times higher than the cost of implementing the human security model proposed for this study. Thus, this intervention has also shown that by working with local community members directly, the Ministry of Health could save resources and efficiently address disease prevention and other causes.

5. Discussion

Human security has been described as a new conceptualization of security, and a new paradigm for health governance (Buzan et al 1998, Axworthy 2001, Griffin 1995, Heinbecker 1999, Walker 2007). Moreover, human security may serve as a label for a broad category of research in the field of security studies that is primarily concerned with nonmilitary threats to the safety of society, groups, and individuals, in contrast to more traditional approaches to security studies that focus on protecting states from external threats (Paris 2001, Ullman 1983).

The concept of human security, however, has been criticized for the lack of a precise definition. Even the most widely quoted definition of human security, the UNDP’s 1994
Human Development Report, has a vast connotation, identifying seven specific elements that comprise human security: economic security, food security, health security, environmental security, personal security, community security and political security (UN Development Programme 1994). Virtually any kind of unexpected or irregular discomfort could conceivably constitute a threat to one’s human security. Therefore, it remains unclear whether the concept of human security can serve as practical guide for academic research or for governmental policymaking.

One possible remedy for the expansiveness of a human security definition is to design and implement case studies - based on human security principles - that might offer a better guide for research and policymaking. Studies should focus on root causes of conflicts, paying attention to the differences in local conditions from one operation to the next, seeking sustainable and durable results, and mobilizing local actors and resources in support of equal rights.

The present study was designed to contribute to the application of human security principles in vulnerable populations, using the Bateyes (sugar mill camps) from the Dominican Republic as a case study.

The impact of a human security model vs non-intervention (standard care) on health-related outcomes was examined longitudinally. For this purpose, HIV resources were used as a “hook” emulating the Robin Hood theory. The Robin Hood theory states that the funds allocated to reduce the burden of HIV/AIDS disease in the Dominican
Republic, can also be used to impact on disease prevalence of other diseases of greater occurrence, as well as to improve the health system of the country (Perez-Then 2005). The project was implemented in three phases consisting of: baseline measurements, implementation of a “human security” model over a 6 month period, and evaluation of the intervention at 6 and 12 months after initiation.

Important differences were noted at the baseline assessment. Overall, owners of the houses from Batey A (Case) were more likely to respond incorrectly to questions about knowledge, attitudes and practices, for the most prevalent infectious diseases of the southwestern area of the Dominican Republic, than the residents of Batey B (Control). These differences observed at the baseline may have impacted health-related study outcomes, as well as knowledge, attitudes and practice responses at the follow-up sixth and 12 month visits. In fact, patterns of significance were irregular at the sixth month visit when cases were compared with controls for each category of assessments (knowledge, attitudes and practices), but these findings were not sustained at the 12 month evaluation.

These fluctuating patterns led us to create a KAP score system to compare cases and controls within each group, in order to decrease the possibility of confounding findings observed at baseline when case and control groups were compared. The KAP score system showed that the people living in Batey A (Cases) had a higher percentage of correct answers than residents of Batey B (Control), six months after the intervention.
The model, however, was unsustainable at the 12th month visit suggesting that the human security model should be maintained at least on a monthly basis.

Implementation of the model also demonstrated that the intervention is effective, not only in preventing morbid events, but also in increasing vaccine and breastfeeding rates in the study populations.

Moreover, the economic analysis revealed that the potential annual net savings to the Ministry of Health and society overall associated with the Program (from reduced diarrhea alone) was US$252,399 dollars. In this context if cost-savings are extrapolated to the 300 Bateyes of the Dominican Republic, the Dominican Government could save approximately 75 million dollars in infectious disease prevention by implementing the model in these isolated rural areas of the country. Furthermore, as the analysis was performed for one disease, the projected cost-savings would be more because the intervention has the potential to impact on the course of many diseases.

Although a formal sensitivity analysis was not conducted to examine changes in cost and outcome parameters, even if we assume the Program is only half as effective in other Bateyes, the savings would still be more than $30 million dollars per year. This preliminary economic analysis provides strong motivation for formally examining costs and benefits of the human security model in future studies.
An important finding revealed that even though outcomes were similar in both groups over time, overall morbidity and mortality rates in the present study were lower than the ones reported in a recent Demographic Health Survey conducted in Bateyes of the Dominican Republic (CESDEM/USAID/CERSS/COPRESIDA/Macro International, Inc. 2002). It is difficult to explain, however, why the occurrence of morbid events was similar in both the targeted intervention and the control Bateyes. The fact that people from the community (Community Visitors) were trained in prevention methods, could have been a confounding factor given the probability of informal exchange with the population. It is also possible that interaction with people from NGOs working in the area might have influenced assessment outcomes. To attempt to control for this, the study staff was trained to report any activities that occurred in the study groups that could impact the study results and none were reported. Therefore, the probability that an outside influence could have impacted the residents of the two Bateyes without being noticed by the study staff is low.

Considering previously reported community strategies (Darmstadt et al 2009, Farmer et al 2001), it is also important to ask the following questions regarding the implementation of a human security model: 1) why was a community intervention population based approach, using a KAP evaluation strategy, considered to be a “human security model”?; 2) what is the difference between this “human security model” and the traditional public health post-westphalian community intervention approach?; 3) how can a health security issue, such as HIV infection, integrate other principles of human security in the implementation of the model?
The first question can be answered in the following way. The proposed model involved an intervention in a vulnerable community, considered to be affected by structural violence and human rights violations. The majority of the study population considered themselves to be Dominican without having the rights of Dominican residency, underlying the importance of implementing human security principles. In fact, the proposed model promotes the interactions between the families who live in the Bateyes included in the study and the Community Visitors as part of the construction of a solidarity mechanism among the members of these communities. Furthermore, the interaction between the Community Visitors and the Research Supervisors selected from the Ministry of Health of the Dominican Republic extends beyond a basic community intervention.

The intervention model used in this study, was based on the principles of human security, and designed to generate a collaborative atmosphere between Dominicans, Haitians and Dominican-Haitians. The objective was to identify a common cause (such as the prevention of the most prevalent infectious diseases in the region) to enable these groups to not only improve their health conditions, but also to promote empathy among them, as well as promote the mobilization of human resources that facilitate empowerment in these localities. A major goal of this human security model was to create a platform that would promote interaction between Dominicans and Haitians, and thereby help reduce the possibility of future conflicts, resulting from social inequality and the violation of human rights that currently exists in these isolated rural areas of the Dominican Republic.
The response to the second question involves the specific design and implementation of the human security model “what is the difference between this ‘human security model’ and the traditional public health post-westphalian community intervention approach?”.

The model of intervention used in this study followed the methodology of a KAP survey, comparing the answers between the study Bateyes and using Community Visitors in the implementation of the survey. The use of Community Visitors in previous studies has been considered as a successful and promising strategy for improving survival in low-resource settings (Darmstadt et al 2009). Current evidence indicates that community interventions are cost-effective and reinforce primary health care (Chang 2009, Farmer et al 2001). Sustainability of actions for health and security model interventions in vulnerable populations (refugees, internal displaced persons), however, is still an issue of investigation.

The use of community intervention strategies to determine the effectiveness of activities performed by the interventionists, in the present study, has been previously reported as effective by others (Darmstadt et al 2009, Farmer et al 2001). The training of community interventionists in methods of preventing infectious disease, nevertheless, differed from previous studies (Darmstadt et al 2009, Farmer et al 2001), in that the interventionists did not have prior disease prevention experience.
The community interventionists were also trained in communication skills to educate the families about knowledge, attitudes and prevention practices for the most prevalent diseases of the southwestern region of the Dominican Republic. The intervention was designed and implemented in this manner to assure that, the Community Interventionists, selected from the Bateyes, would remain as potential human security promoters in their communities, once the study ended.

The study model incorporated quantitative evaluation methods, such as the calculation of relative risks to obtain differences between the study groups, to measure differences between the study groups and to demonstrate the effectiveness of the model. The model also included qualitative evaluations of the interventions, to understand the degree of interaction between the interventionists and the families, as well as the interaction of the Community Visitors and the Research Supervisors selected from the Ministry of Health. The qualitative interviews allowed us to identify community perceptions of the model, as well as the need for an interdisciplinary approach, including structural interventions (water pump, road reparation, construction of latrines, vector control, etc) and monitoring community security-related issues through household monthly visits, to reduce the inequalities in health in the Bateyes included in the study.

As mentioned by one of the community leaders interviewed, the construction of a water pump allowed one community to sell bottles of water to the surrounding Bateyes and to save money for other purposes, including transportation payment for pregnant women (i.e. prenatal care visits) and purchase of bed nets for malaria and dengue prevention. In
consequence, structural interventions are needed, not only to improve health outcomes, but also to generate sources of income that could maintain implementation of human security-related activities in these localities.

Of importance, this type of intervention goes beyond obtaining risks for comparing human populations. The model provides a way to integrate community mechanisms and governmental solidarity, through the interaction of the interventionists with the owners of the houses and with the supervisors from the Ministry of Health, to ultimately reduce social and health inequalities in the Bateyes of the Dominican Republic.

Moreover, the implementation of the human security model demonstrated the feasibility that Community Visitors, who live in the communities, were able to train families of their communities in prevention methods. Of equal significance, the Community Visitors were able to work hand-to-hand with people from the Dominican Government, thereby being available to provide potential solutions to human security issues that could develop in the southwestern Bateyes of the Dominican Republic.

The third question is related to the essential elements of a human security approach. How can a health security issue, such as HIV infection, be related to other principles of human security in the implementation of the model? To date, case studies focused on the integration of human security principles in human populations are scarce. In the present study, given the similar conditions of the residents of the Bateyes with refugee camps, this pilot community intervention in two Bateyes of the Dominican Republic strived to
integrate the essential elements of the human security concept through a health security issue (HIV prevention).

A health security issue was considered an opportunity to integrate other elements of human security since interventions to resolve medical problems are more likely to be performed by Dominican Government and international agencies than other environmental or social problems existing in the southwestern Bateyes region of the Dominican Republic. Thus, HIV prevention was considered a potential human security strategy and a base from which to develop a mechanism in the community that might contribute to the identification of other essential human security factors that could impact the vulnerable residents in the southwestern Bateyes of the Dominican Republic.

In fact, the Dominican Republic has been awarded 80 million dollars (Global Fund, Geneva) to reduce the burden of HIV disease. Less than 1% of the population of the Dominican Republic, however, is infected with HIV virus. Mortality for HIV-related conditions is lower than other diseases reported all over the country, including respiratory infections, diarrhea, dengue, malaria and tuberculosis (PAHO 2007).

Since 2005 (Perez-Then 2005), the “Robin Hood Theory” has been proposed as a possible solution to the existing gap between the funds that the Dominican Republic is receiving for HIV prevention and care, and the economic resources available to control other diseases of greater prevalence. Under the auspices of the “Robin Hood Theory”, funds allocated to reduce the burden of HIV/AIDS in the Dominican Republic, could also
be used to impact prevalence from other diseases of greater occurrence, as well as to improve the health system of the country.

In accordance with this idea, the present study results show that economic and human resources to prevent HIV infection in two isolated areas of the Dominican Republic were also potentially helpful in preventing other infectious diseases of higher prevalence in this region. Morbidity and mortality rates for diarrhea, respiratory infections, malaria, dengue and tuberculosis were lower after the sixth month of intervention than Demographic Health Surveys assessment rates reported over the past 10 years (CESDEM/USAID/CERSS/COPRESIDA/Macro International, Inc. 2002, 2007).

At the same time, the current study demonstrated, through interaction between Community Visitors, families and personnel from the Dominican Government, that a health security issue (HIV prevention) could be used as a common cause to identify roots of conflicts and to increase knowledge, attitudes and practices towards essential human security elements, including economic security (sources of income), food security (access to food), health security (access to health care and protection from diseases), environmental security (protection from environmental depletion), personal security (physical safety from domestic violence), community security (survival of traditional cultures) and political security (enjoyment of civil and political rights).

As a pilot human security intervention model, attempting to use a health security issue to integrate other essential elements of the human security concept, some limitations need to
be acknowledged. Since structural, cultural and political interventions were not performed, specific outcomes regarding those factors were obtained indirectly from qualitative assessments.

Another potential study limitation was the statistical difference in knowledge, attitudes and practices observed at baseline between cases and controls. The fact that most of the statistical differences observed at baseline were absent at six months post intervention may have overemphasized the benefits of the model in the case group. Nevertheless, the creation of a KAP score system allowed us to control for potential confounders at baseline, and to infer that the model was effective since a higher percentage of correct answers was observed among the cases than in the controls at the six-month post evaluation.

In summary, this is the first study on human security implemented in the Dominican Republic. Implementation of the model, following a KAP evaluation method approach, was performed to identify human security factors in vulnerable populations. The feasibility of the model, implemented by Community Visitors living in the Bateyes, and their interaction with families and Research Supervisors of the Dominican Government, demonstrates an important strategy that could be used to obtain international and local resources to support human security approaches in Bateyes of the Dominican Republic.

The final goal was to create a common cause for Dominicans and Haitians to establish a harmonic model of cooperation from the heart of the Bateyes that addresses, not only the
elimination of structural violence, but also the vulnerability still in place in this southwestern region of the Dominican Republic. The reduction of structural violence and threat to human security can only be addressed with local (Dominican Government) and international commitment for improving the conditions and life styles of this population group, allowing the transition from the current paradigm of collaboration, based on the hermeneutics of generosity (Farmer 1996), to a human security paradigm, based on the hermeneutics of solidarity (Lopez-Severino and de Moya 1999).
CONCLUSIONS

This study is the first human security model implemented in the Dominican Republic. It was designed to contribute to the application of human security principles in vulnerable populations, using the Bateyes of the Dominican Republic as a case study. HIV resources were used as a hook, emulating the Robin Hood theory, to reduce inequalities and to promote equal rights in this population group living in isolated rural areas of the Dominican Republic. The impact of a human security model versus non-intervention (standard care) was examined longitudinally. The project was implemented in three phases consisting of: baseline measurements, implementation of a “human security” model over a 6 month period, and evaluation of the interventions at the 6th and 12th month after the initiation of the intervention. Qualitative evaluation methods were used to complement quantitative assessments. An economic analysis was also conducted to evaluate the costs of the intervention and potential economic benefits.

Findings from this study reveal specific differences between the case and control groups, at baseline, and changes in the two groups over time. Initially, the owners of the houses from Batey A (Case) were more likely to respond incorrectly than the residents of Batey B (Control) to questions about knowledge, attitudes and practices, for the most prevalent infectious diseases of the southwestern area of the Dominican Republic. At the sixth month post intervention visit, however, Batey A (Case) exhibited a higher percentage of correct responses. These findings, however, were not observed at the 12 month follow-up visit, suggesting that future studies using the
human security intervention model may need to be maintained for more than 6 months, to promote sustainability.

An important finding revealed that even though outcomes were similar in both groups over time, overall morbidity and mortality rates in the present study were lower than the ones reported in a recent Demographic Health Survey conducted in Southwestern Bateyes of the Dominican Republic.

Qualitative assessments showed that interdisciplinary approaches are urgently needed in the Bateyes, including structural interventions such as installation of water pumps, roads reparation, construction of latrines, purchase of bed nets and vector control, not only to fulfill expectation of the community members, but also to increase model impact on morbid events. Of importance, economic analysis showed that monthly interventions at the household level would be less expensive for the Dominican Government to reduce morbidity and mortality in the southwestern Bateyes of the Dominican Republic than not intervening in these localities.

Differences between the traditional public health post-Westphalian approach and the human security model were made to clarify the intent of the intervention. For example, in contrast to the traditional public health model, interventionists or Community Visitors were selected from within the study locale, with the help of Bateyes community leaders, to increase community involvement and ownership during the survey assessment. This
interaction also was used to build local capacity, and to strengthen relationships between community members and officials of the Dominican Government.

A continuous interaction with the Ministry of Health staff, responsible for supervising and taking care of the population living in the two selected Bateyes, was maintained throughout the study. The ultimate goal of the project was to create a common cause for Dominican and Haitians to work together to reduce health disparities in the southwestern Bateyes of the Dominican Republic. By demonstrating the cost-savings of this model, evidence has been provided to encourage the Ministry of Health to promote specific community-based strategies according to the priorities identified in the study.

The use of a health security issue (HIV) to integrate other essential elements of the human security framework, including economic security, food security, environmental security, personal security, community security and political security, was based on the Robin Hood Theory. HIV resources were used as hook to reduce health disparities (morbidity events and mortality) from other diseases and to identify human security factors in the study groups.

The use of HIV resources demonstrated that the money allocated for HIV prevention could be utilized, not only to reduce the burden of disease in developing countries, but also to invest in health systems and services which is an investment in human capital. Healthy human capital is the foundation for productivity and prosperity.
Finally, data from this study could also have a beneficial impact on the living conditions of refugee and internally displaced populations in developing countries who share the social and structural violence observed in the Bateyes of the Dominican Republic. Decisions to implement the model applied in this study should be based on our theoretical understanding of risk relations and the multiple pathways to various outcomes that follow from the influence of poverty on well-being.
RECOMMENDATIONS

Based on the study results, the following steps should be taken in order to fulfill expectation of the community members and to obtain international and local resources to further support and expand the operational scale for implementing human security approaches in Bateyes of the Dominican Republic:

1. Study findings should be presented to the Dominican Government, including cost-savings of monthly interventions at the household level. The Dominican Government, as well as the Dominican society should be informed that if cost-savings are extrapolated to the 300 Bateyes of the Dominican Republic, the Dominican Government could save an estimated 75 million dollars by implementing the model in these isolated rural areas of the country. In this sense, a national meeting should be organized with people from the Ministry of Health, Bateyes’s Community Leaders, as well as international and local NGOs working with these population groups.

A human security promotion strategy should be developed by the Dominican and Haitian Governments to reduce structural violence and vulnerability in the Bateyes of the Dominican Republic. Haiti and the Dominican Republic should take advantage of the current funding initiatives running in both countries under the Global Fund and PEPFAR auspices, to establish a common agenda for preventing and controlling health security issues (i.e. tuberculosis, HIV), and to
2. Identify persons and institutions that could be interested in developing human security models in the Bateyes of the Dominican Republic.

3. If a health security issue such as HIV is used as a hook to establish a human security model in the Bateyes, all levels of society should benefit from increased investment in HIV/AIDS.

4. Assemble different elements of the Dominican and Haitian Government that could impact on human security issues in the Bateyes for the purpose of creating an interdisciplinary collaboration strategy, which is urgently needed. The establishment of a Task Force including clinicians, epidemiologists, policymakers, entomologists, sociologists, community leaders, and human security experts from each country could be the first step in the elaboration of an interdisciplinary and sustainable plan of action to reduce structural violence in these localities.

5. A mechanism of distribution of funds should be developed in order to fulfill community expectations on structural improvement. To guarantee sustainability of actions, international donations should be received by decentralized government organizations with secondary distribution to secular and faith-based NGOs, private organizations, and industries.

6. Study results should be published within the next four months to show effectiveness to the international community and policymakers working with refugee population.
REFERENCES


CESDEM/USAID/CERSS/COPRESIDA/Macro Internacional, Inc. 2007. Encuesta Sociodemográfica y sobre VIH/SIDA en los Bateyes estatales de la Republica Dominicana.


Puentes-Markides C. 1998. Health for all in the Americas: Preferred scenario, in Clment Bezold, Julio Frenk and Shaun McCarthy (eds), 21st Century Health Care in Latin America and the Caribbean: Prospect for achieving health for all (Mexico City:
Institute for Alternative Futures and Fundacion Mexicana para la Salud). Used with permission.


