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# Averting HIV and AIDS epidemic in Nicaragua

*Studies of prevalence, knowledge, attitudes, and  
behavior*

WILLIAM J. UGARTE GUEVARA



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#### **Abstract**

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The overall aim of this thesis was to obtain an understanding of the dynamics of the HIV epidemic by estimating prevalence and exploring the relationship between HIV-related knowledge, attitudes, behavior, and HIV status in Nicaragua. Structured questionnaires were administered to adults from a health and demographic surveillance system in León, Nicaragua (Papers I–III). In-depth interviews and a survey were conducted among men who have sex with men (MSM, Paper IV). Blood sampling for HIV was carried out among 2,204 men and women (Paper I). Bivariate and multivariate analyses, including adjusted prevalence ratio (Papers I, II, IV), factor analysis, Cronbach's alpha, and hierarchical regression analysis (Paper III) were performed. Thematic analysis was used with qualitative data (Paper IV).

The prevalence of HIV in the general population was 0.35% (95% CI, 0.17–0.73). Those who have taken a HIV test were more likely to be females, younger, living in an urban setting, have a higher level of education, be married or cohabiting, and have no religious affiliation. HIV-related knowledge was lower among members of the general population than among MSM. Unprotected sex was reported more times with regular partners than with casual partners. Findings suggested that consistency of condom use and emotional attachment (steady relations) were inversely related. Stigma and discrimination were reported high in the general population; they appeared to be negatively associated with HIV-related knowledge, self-perception of HIV risk, HIV testing, and willingness to disclose HIV status in the event of being HIV-positive. Findings demonstrated an increasing tolerance towards same-sex attractions. MSM have a better understanding of HIV transmission than men and women of the general population. Although seven out of ten MSM and six out of ten women were concerned about becoming infected with HIV, inconsistent condom use was common.

This study confirmed that Nicaragua has a low prevalence but high risk for HIV infection and transmission. Results underscore that social, behavioral, and cultural factors contribute to retard progress in achieving the Millennium Development Goals on reducing gender inequality and combating HIV/AIDS. Addressing these challenges depends not only on successful behavior change interventions, but requires a culturally gender-appropriate strategy.

*Keywords:* HIV-related knowledge, vulnerability, risk behaviors, stigma, discrimination, men who have sex with men, gender, sexuality, Nicaragua

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*To my Father Jehovah and my family –  
For giving me hope and strength*



# List of Papers

This thesis is based on the following papers, which are referred to in the text by their Roman numerals.

- I Valladares, E., Ugarte, W.J., Essén, B., Högberg, U., Morgan, D. HIV community prevalence and testing practices in León, Nicaragua. [Manuscript]
- II Ugarte, W.J., Högberg, U., Valladares, E., Essén, B. Assessing knowledge, attitudes, and behaviors related to HIV and AIDS in Nicaragua: a community-level perspective. *Sexual and Reproductive Healthcare*. Doi: 10.1016/j.srhc.2012.11.001.
- III Ugarte, W.J., Högberg, U., Valladares, E., Essén, B. Measuring HIV and AIDS-related stigma and discrimination in Nicaragua: results from a community-based study. *AIDS Education and Prevention*. [Accepted]
- IV Ugarte, W.J., Valladares, E., Essén, B. Sexuality and risk behavior among MSM in León, Nicaragua: a mixed methods approach. *Journal of Sexual Medicine*, 9(6):1634–1648.

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# Abbreviations

ABC	Abstain, Be Faithful, use Condoms
AIDS	Acquired Immunodeficiency Syndrome
ANC	Antenatal Care
aPR	Adjusted Prevalence Ratio
ART	Anti-retroviral Therapy
BCC	Behavior Change Communication
CDC	Centers for Disease Control and Prevention, Atlanta, United States of America
CSW	Commercial Sex Worker
ENDESA	Nicaraguan Census on Demography and Health
GDP	Gross Domestic Product
HDI	Human Development Index
HDSS	Health and Demographic Surveillance System
HIV	Human Immunodeficiency Virus
IDU	Injectable Drug User
LGBTI	Lesbian, Gay, Bisexual, Transsexual, Transgender, Transvestite, and Intersex people
MDGs	Millennium Development Goals
MSM	Men who have Sex with Men
MTCT	Mother-To-Child Transmission for HIV
NGO	Nongovernmental Organization
PAHO	Pan American Health Organization
PEPFAR	The United States President's Emergency Plan for AIDS Relief
PLHIV	People Living with HIV
PMTCT	Prevention of Mother-To-Child Transmission for HIV
STIs	Sexually Transmitted Infections
TB	Tuberculosis
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNDP	United Nation Development Programme
UNGASS	United Nations General Assembly Special Session
USAID	United States Agency for International Development
VCT	Voluntary Counseling and Testing for HIV
WHO	World Health Organization

# Definitions

*Agency* indicates the capacity to act, to make choices, and to make a difference.<sup>1</sup>

*Self-efficacy* is commonly defined as the belief in one's capabilities to achieve a goal or to complete a task.<sup>1</sup> Self-efficacy in terms of condom use refers to how individuals are able to overcome the barriers to condom utilization.

*Discrimination* refers to any form of arbitrary distinction, exclusion, or restriction affecting a person, usually but not only by virtue of an inherent personal characteristic or perceived belonging to a particular group, in the case of AIDS, a person's confirmed or presumed HIV-positive status, irrespective of whether or not there is any justification for these measures.<sup>2</sup>

*Marianism* is the stereotyped gender role of females that portrays the ideal women as being modest, pure, dependent, weak, acquiescent, vulnerable, and abstinent until marriage, at which point the woman becomes subordinate and obedient to her spouse.<sup>1</sup>

*Machismo* is a word of Spanish and Portuguese origin that describes prominently exhibited or excessive masculinity. It is the stereotyped gender role of males that organizes gender relations hierarchically, with men socially and physically dominating and imposing their will upon women.<sup>1</sup>

*Men who have sex with men* is a term that describes males who have sex with males, regardless of whether or not they have sex with women or have personal or social gay or bisexual identities. The concept is useful because it also includes men who self-identify as heterosexual but have sex with other men.<sup>2</sup>

*Stigma* is derived from the Greek word "stigmat" meaning "a mark" or "a stain". Stigma can be described as a dynamic process of devaluation that significantly discredits an individual in the eyes of others. When stigma is acted upon, the result is discrimination.<sup>2</sup>

*Vulnerability* refers to unequal opportunities, social exclusion, unemployment, or precarious employment and other social, cultural, political, and economic factors that alone or in combination make a person more susceptible to HIV infection and to developing AIDS. These factors may be outside the control of individuals. Among these factors are the lack of knowledge and skills required to protect oneself and others; accessibility, quality, and coverage of services; and societal factors such as human rights violations or social and cultural norms.<sup>2</sup>



# Preface

The conceptual and methodological framework of this thesis has arisen from the completion of my Master's degree in Social Science and Epidemiology in the Center for Demography and Health Research (CIDS) at the National Autonomous University of Nicaragua (UNAN) in León in 2007. However, the process leading me to research the question about HIV and health behavior in León dates back much further and can be attributed to my role as a volunteer peer educator in sexual and reproductive health during my high school years at the beginning of the 1990s.

In 1994, I became involved in a peer education program on sexual and reproductive health. The program reflected the conservative educational policy of the Violeta de Chamorro administration (1990–1996), emphasizing a traditional moralistic approach based on abstinence, monogamy, and natural family planning. I learned about sexually transmitted diseases, HIV, AIDS, and I developed public speaking and program planning skills. As a peer educator I ran workshops in private and public schools for almost two years.

I began my studies in the School of Medicine in 1996. Here I improved my knowledge about health-related issues. I met some HIV-positive people in the hospital who completely changed my perception of the disease. They were common people dealing with the consequences of physical disabilities and social stigma—the later even from my colleagues. By 1999, I joined CARAS, a non-governmental organization (NGO) focused on reduction of high risk behaviors among adolescents and young people. I was a volunteer for two years. After graduation I was employed as a medical doctor and coordinator of a local school-based peer education program focusing on health and safety issues affecting adolescents. In 2003, I represented CARAS before the León Municipal Commission to Fight AIDS. The commission organizes NGOs to address community-based interventions for vulnerable and underserved populations such as commercial sex workers (CSW), drug users, homosexuals, and street children. Here I learned about policy making, advocacy, and human rights. Since then I have been an HIV and AIDS activist.

All of these experiences and with the support of CARAS director, Dr. Jairo García, motivated me to pursue further studies. In 2005 I was fortunate enough to receive a scholarship for a Master's degree in Social Science and Epidemiology at the Center for Demography and Health Research (CIDS). During my Master's training I had the privilege of being an exchange stu-

dent in the United States of America at the Center for Interdisciplinary Research on AIDS (CIRA) at Yale University. There I found myself more involved in HIV and AIDS research. My memories of watching the film *And the Band Played On* encouraged me to enter more deeply into understanding HIV and AIDS, particularly with regard to the epidemic in Nicaragua.

In 2008, a year after completion of my Master studies, I was contacted by Dr. Eliette Valladares and later on Associate Professor Birgitta Essén and Professor Ulf Högberg about the possibility of doing a Ph.D. in the International Health program within the National Autonomous University of León Nicaragua (UNAN) and Uppsala University collaboration. I considered it an ideal opportunity for personal development and professional advancement in the field of HIV research, but most importantly it would allow me to contribute to the further understanding of the epidemic and build on research evidence for policies and programs in Nicaragua.

It is now four years since I began that journey and the end product is this thesis. It consists of six parts. Part 1 seeks to provide an introduction to the issue of HIV and AIDS in a global and a local context. Part 2 describes the aims and theoretical framework on which the thesis is formulated. Part 3 explains how the research project was designed and implemented. Part 4 contains the research results and discussion. Part 5 presents the overall conclusions and suggestions for future work. Part 6 reprints the four published papers and manuscripts that comprise the thesis.

Causes of the HIV epidemic have to be understood, addressed, and reversed through a collective response. It is hoped that this research project can be a part of that response and provide a source of information for those wanting to understand more about the HIV epidemic in Nicaragua.

# Introduction

It has been thirty-one years after the first clinical evidence of what later came to be known as AIDS was reported in the United States. Since then more than 33 million people around the world have died of the disease. Although the response has been remarkable in terms of prevention, surveillance, treatment, research, and human rights, the end of the epidemic is not yet in sight. Many challenges remain, such as late interventions, the global financial downturn, and slow social and behavioral changes, especially in countries with the most limited resources.

The delivery of prevention interventions aimed to reduce HIV transmission has moved beyond traditional approaches to a new, integrative concept. This includes not only strategies to change behaviors, but also medical approaches such as male circumcision and antiretroviral therapy. HIV testing and counseling has helped people for over 20 years to learn their HIV status and to receive opportune health care. Antiretroviral therapy (ART) is considered one of the most incredible advances in modern medicine. ART transformed AIDS from a uniformly fatal disease to a chronic condition.

Despite these advances and benefits, a number of countries still have a limited capacity to determine the magnitude of the HIV and AIDS epidemics. Nicaragua is among those. Global coverage still remains low and many people are reluctant to undertake HIV testing. In addition, many others with HIV are not able to afford treatment, and some eventually discontinue medical care.

## Status of the global HIV and AIDS epidemic

Globally, by the end of 2010 there were over 34 million (31.6 to 35.2 million) people living with human immunodeficiency virus (PLHIV). Women living with HIV comprised half (49%) of the adults ages 15 to 49 years with the infection. Fortunately, HIV incidence (the rate of new infections) is slowing in many regions, largely due to the effect of behavior-change interventions. Additionally, the number of people dying of AIDS-related causes has decreased because of a significant expansion of access to ART.<sup>3</sup>

Since the early 2000s the level of the epidemic in Latin America has remained steady. As a result, the number of PLHIV in this region continues to grow due to the effect of ART. At the end of 2010, there were an estimated

1.5 million [1.2 to 1.7 million] new infections in the Latin American region. More than one-third of all adults living with HIV were women.<sup>3</sup> The overwhelming cause of HIV transmission in the region is sexual behavior.<sup>4</sup> However, structural factors such as poverty, malnutrition, antiretroviral supply interruption, and shortage of staff may affect program effectiveness in reducing HIV infection and AIDS-related mortality.<sup>5,6</sup>

## HIV epidemic scenarios

The Joint United Nations Programme on HIV/AIDS (UNAIDS) and the World Health Organization (WHO) developed the “numerical proxy method” to categorize epidemics on the basis of cross-sectional HIV prevalence thresholds using surveillance data.<sup>7</sup> The method was established to guide HIV prevention strategies. Prevalence estimates are obtained from periodic surveys among women attending sentinel antenatal clinics as a proxy for the general population and among pre-determined key populations at higher risk, such as men who have sex with men (MSM), sex workers, and injectable drug users. Epidemics are classified as “generalized” if HIV prevalence in the general population persistently exceeds 1% in pregnant women; “concentrated” if HIV prevalence is above 5% in populations at greater risk but below 1% in pregnant women; and “low level” if HIV prevalence does not consistently exceed 5% in any most-at-risk sub-populations and 1% in pregnant women. “Hyperendemic” countries are those with adult HIV prevalence over 10%.<sup>7</sup>

The African continent is the most affected by HIV and AIDS. However, it presents different epidemiological scenarios. Whereas most countries in southern Africa are hyperendemic, west-central Africa’s (Cameroon, Togo, Republic of Congo) epidemic is classified as generalized, parts of northern Africa (Egypt, Algeria, and Tunisia) is considered low.<sup>3</sup> North, Central and South America, Europe, the Middle East, Asia, and Australasia HIV epidemics are defined as concentrated.<sup>3,4,8</sup> Nevertheless, in Latin America the etiological pattern and mode of transmission are not homogeneous. While heterosexual transmission of HIV is predominant in most countries in the region, the transmission in Venezuela and Costa Rica predominantly is among bisexual and homosexual males. In countries such as Mexico and Panama primarily heterosexual and homosexual transmission takes place.<sup>4</sup> In addition, the distribution of HIV-1 subtypes and intersubtype recombinants are heterogeneous.<sup>9</sup>

## Factors contributing to the spread of HIV and AIDS

Contributing factors to the spread of HIV and AIDS differ across populations and cultures. Nonetheless, they can be categorized into three groups: structural, behavioral, and external factors. Structural factors increase the vulnerability of people to HIV infection and present obstacles to HIV prevention and detection. They may be related to social, economic, cultural, policy, and organizational aspects of a country. Structural factors include poverty, migration, lack of information, poor education, stigma, discrimination, denial, prostitution, trafficking in and consumption of drugs, corruption, political conflict, gender inequalities, lack of political and legal commitment, and inadequate health care.<sup>10–12</sup> Such factors can have a huge impact on individual health behaviors.<sup>13</sup>

Behavioral risk factors present opportunities for individuals to become infected. These can be divided into three subgroups: (a) behaviors resulting in exposure to infected people (such as early sexual debut, having multiple sexual partners, having an at-risk sex partner, or having untreated STDs); (b) behaviors influencing the efficiency of transmission from infected to uninfected persons (including inconsistent use of condoms, transfusion of contaminated blood products, and drug abuse—especially the use of injectable drugs); and (c) factors affecting the length of the time that newly-infected people remain infectious and continue transmitting the virus (such as inadequate health seeking behavior, primarily with regard to HIV testing, treatment, and care).<sup>14–16</sup>

Finally, there are external factors that affect the opportune implementation of HIV programs and the resources needed to scale up HIV prevention, treatment, care, and support services in many communities with limited resources around the world. Such factors include poor understanding of the epidemic, failure to mount an effective response in a timely manner, funding deficits, and mismanagement of funds.<sup>17,18</sup>

## Global strategy for the prevention and control of HIV and AIDS

Since the epidemic began in the early 1980s, many initiatives have been developed and implemented through comprehensive HIV programs, especially in developing countries, which have the heaviest burden of HIV infections.<sup>12,19,20</sup> These initiatives cover interventions in the areas of behavior change, voluntary counseling and testing, prevention of mother-to-child transmission, infection control, prevention and treatment of STIs, provision of care and support to those already infected, and monitoring and surveillance of the epidemic. Other initiatives include supporting civil society organizations and PLHIV (Table 1).

Table 1. Summary of HIV-related interventions

<i>Level of delivery</i>	<i>Focus</i>	<i>Approach</i>	<i>Outcomes</i>
Health care	Prevention	Behavioral / Psychosocial	Increase knowledge, awareness, condom use, decrease unprotected sex, multiple partners, injectable drug use, needle sharing, newly-acquired STI
Community	Diagnosis	Structural / Societal	Reduce stigma, improve health service utilization, improve quality of life
Group-at risk	Treatment and care	Therapeutic	Supporting organizations from civil society
Individual	Monitoring and evaluation		

Since the early 1990s the ABC approach (Abstain, Be faithful, use Condoms) has been implemented to prevent the sexual transmission of HIV. It was developed in response to the epidemic in Africa and later adopted by a variety of governmental organizations and NGOs, mostly in developing countries.<sup>21</sup> Despite demonstrating its positive impact the ABC concept is highly controversial. The President’s Emergency Plan for AIDS Relief (PEPFAR), the United States’ initiative to combat HIV and AIDs globally, has been criticized for following an ABC strategy through “population-specific interventions” and for prioritizing abstinence and faithfulness over condom use.<sup>22,23</sup> Research findings have consistently favored abstinence, but in combination with programs that encourage condom use and other safer-sex practices.<sup>24</sup>

The eight millennium development goals (MDGs) adopted by the United Nations in 2000 aim to encourage development by improving social and economic conditions in the world’s poorest countries. MDG 6 seeks to prevent people from becoming infected with HIV while expanding the availability of treatment and care. Evidence shows that HIV and AIDS represent significant factors in slowing progress on MDGs.<sup>25</sup>

In 2001, the member states of the United Nations unanimously adopted a Declaration of Commitment on HIV and AIDS. They recognized HIV and AIDS as a complex global emergency demanding a comprehensive response with multisectoral and multilevel approaches. It comprised the framework for achieving MDG 6.<sup>26</sup> Five years later, in a follow-up meeting, governments reviewed and reaffirmed the promises of the 2001 declaration. Furthermore, limitations and progress were recognized, including evidence-based HIV interventions addressing behavioral and social risk factors. Gender inequalities, poverty, and low quality education among young population were targeted.<sup>27</sup> By 2011, countries were aware of the complex nature of the HIV epidemic. Each country had different risk factors, vulnerabilities, and affected populations.<sup>28</sup> Successful prevention strategies required collective

responses generated by community groups and PLHIV. The primary goal was to confront the stigma, discrimination, and denial associated with the disease.<sup>8,10</sup>

The development of appropriate responses depends on understanding the differences in the HIV epidemic from one country to another in order to allocate resources effectively and to implement strategies according to local characteristics. The frequency and nature of liaisons between infected sub-populations and the general population determine the course of the epidemic.<sup>29,30</sup> In a concentrated epidemic the main challenge consists of approaching those whose behaviors are stigmatized and sometimes prohibited. Stigma causes such populations to remain hidden and underserved.<sup>31</sup> An effective approach focus on prevention among subgroups, while engaging in stigma and risky behavior reduction campaigns for the general population.<sup>8,29</sup>

In 1995, ART first became available and made HIV into a chronic condition for people living in developed countries. However, in developing countries HIV and AIDS remained a fatal illness because ART was extremely expensive. In 2003, the WHO and UNAIDS developed a global strategy to make ART more affordable in about 50 low- and middle-income countries. The goal of the “3 x 5 initiative” was to treat 3 million people with antiretroviral drugs by the end of 2005. The initiative ran parallel with other global strategies such as PEPFAR, the Global Fund to fight AIDS, Tuberculosis, and Malaria and the World Bank’s multi-country HIV/AIDS programs.<sup>32</sup>

Since the introduction of ART an estimated 2.5 million deaths have been averted in low- and middle-income countries, one-third of them in 2010 alone.<sup>3</sup> More than 8 million PLHIV from low- and middle-income countries were receiving ART in 2011.<sup>33</sup>

However, long-term investments are needed for an effective response to the HIV/AIDS epidemic.<sup>30</sup> In 2011, despite the global financial crisis, low- and middle-income countries reported the largest domestic investment ever in HIV.<sup>33</sup> UNAIDS has recently established a “Getting to Zero” strategy within the MDG initiative. The strategy comprises three main goals: zero new HIV infections, zero discrimination, and zero AIDS-related deaths. Three strategic directions constitute this approach: a) transform HIV prevention; b) advance human rights and gender equality within the HIV response, and c) catalyze the next phase of treatment, care, and support.<sup>34</sup>

Due to the lack of an effective vaccine, disease control and prevention still represent the best approach for the HIV epidemic worldwide.<sup>35</sup>

## Nicaragua

Nicaragua is the largest country in the Central America isthmus, covering an area the size of Greece. It is bordered by Honduras to the north and Costa Rica to the south. The Pacific Ocean lies to the west and the Caribbean Sea

to the east. The country is divided topographically into three regions: Pacific, Atlantic, and Central. These areas are further subdivided into 15 departments and two self-governing regions. The departments are then subdivided into 153 municipalities. The primary language is Spanish, spoken by 90% of the population.

Years of political instability, economical crisis, and natural disasters have left Nicaragua the second poorest nation in the region after Haiti. However, current estimates foresee recuperation in gross domestic product (GDP). The Human Development Index (HDI) is a comparative measure of life expectancy, education, literacy, standard of living, and quality of life for 187 out of 193 member states of the United Nations. According to the 2011 Human Development Report, Nicaragua was ranked 129 and classified as a country with “medium human development”.<sup>36</sup>

In 2012, Nicaragua had an estimated population of 6 million inhabitants, with over half residing in the Pacific region, and six out of ten people living in urban areas. About 52% of Nicaraguan’s population is in the reproductive age group (15 to 49).<sup>37</sup> Forty-four percent of the population was living below the poverty line in 2010 (equivalent to US \$2.00 per person per day) while 8.2% lived in extreme poverty (equivalent to US \$1.00 per person per day).<sup>38</sup> Life expectancy at birth in 2010 was estimated to be 74 years on average, with women expected to live to age 77 years, and men to age 71.<sup>39</sup>

## Health status and health care

The health care system is comprised of a public and a private sector. The public health care system encompasses the Ministry of Health, the Nicaraguan Social Security Institute, the Ministry of Government, and the Ministry of Defense. The Ministry of Health is the main provider of public health services and covers 61% of the population.<sup>40</sup> In each department health care is organized as a Local Comprehensive Health Care System (SILAIS). The Ministry of Health operates a total 1059 health units. These consist of 32 hospitals, 172 health centers, and 855 health posts. On average there are 4.5 doctors, 3.4 registered nurses, 7.1 auxiliary nurses, and 9.2 available beds per 10,000 inhabitants.<sup>41</sup> Insurance management companies, NGOs, and individual providers offer private health care.<sup>40</sup>

By 2009, Nicaragua was spending 9.5% of its GDP on health care. Approximately 51.5% of all health spending comes from private sources, of which 47% derives from household income.<sup>39</sup>

## Epidemiology of HIV infection and AIDS

HIV has emerged relatively recently in Nicaragua. The first case of HIV was reported in 1987, later than in most Latin American countries. Nicaragua’s recent history has been characterized by several socio-political events that

appear to have delayed the epidemic. Ten years of civil war, low infection rates among injectable drug users and sex workers, and a denial of the epidemic by the government were closely linked to the slow spread of HIV. In 1999, the epidemic took off, largely due to greater access to voluntary counseling and HIV testing.<sup>40</sup> As of December 2011, official reports document 6,863 people living with HIV and AIDS in Nicaragua, while 941 people died of AIDS-related illnesses.

The national HIV prevalence today is the lowest in Central America at 0.1%.<sup>4</sup> However, among all reported cases since the epidemic began approximately 17% of newly diagnosed with HIV occurred in 2011. Adults ages 15 to 49 represent about 89% of the total HIV cases. Overall male-to-female ratio among newly identified HIV cases has been dramatically reduced from 12.5:1 in 1997 to 1.62:1 in 2011.<sup>44</sup> Among young adults ages 15 to 24 ratio is one to one.<sup>4</sup> Approximately 3.4% of those newly diagnosed with HIV infection were co-infected with tuberculosis (TB). Furthermore, TB surveillance data also estimates that two-thirds of the cases of HIV and TB co-infection go unreported.<sup>44</sup>

Nicaragua is currently defined as a country with a “concentrated” epidemic among MSM, whose infection levels were 38 times higher than the general population.<sup>45</sup> By the end of 2011, 7% of reported HIV cases were acquired through homosexual contact. HIV prevalence among MSM and commercial sex workers was 7.5% and 3.2%, respectively, while among pregnant women it was 0.05%.<sup>44</sup>

## National response to HIV and AIDS

From the beginning of the epidemic, civil society organizations dedicated to confronting HIV and AIDS have played a crucial role in advocacy and increasing public awareness in Nicaragua. Nevertheless, it took nine years after the first case was detected in Nicaragua for the government to enact Law for the Promotion, Protection, and Defense of Human Rights of People Living with HIV/AIDS (Law 238). The law was in effect until 1999. In that year surveillance via the national HIV and AIDS case notification system was established. The surveillance system is based on case reporting and routine screening programs at blood banks, prisons, and antenatal clinics. Nevertheless, HIV and AIDS cases remain underreported due to an inadequate capacity with regard to HIV diagnosis, disease surveillance, and therapy-related monitoring.<sup>43,46</sup> In Nicaragua, there is still a considerable lack of knowledge about Law 238. Moreover, the law has not been properly implemented, especially when it came to providing sex education and reducing marginalization.<sup>47,48</sup> Activists demanded changes in the law and in 2010 reforms were introduced in the National Parliament for approval. To date, the law is still under revision.

Since 2000, the National AIDS Commission (CONISIDA) has led the response to HIV. CONISIDA is the highest-level state and civil society decision-making body on dealing with the disease. Coordinating the actions of NGOs and public services as been recognized as a crucial challenge.<sup>47</sup> Prior to 2003, treatment for HIV was not available in Nicaragua.<sup>43</sup> In 2003, with support from the Global Fund and other donors, the Ministry of Health began to strengthen its infrastructure and purchase antiretroviral drugs. By 2010, Nicaragua had more than 80% ART coverage. However, factors such as utilization of many different ARV regimes, very low retention of patients after the first year of ARV initiation, low government spending on health care, and a reduction in international support were the major obstacles to long-term sustainability and cost-effectiveness of ARV treatment.<sup>43</sup>

The United Nations Human Rights Council states that criminalization of same-sex relations violates Article 17 of the International Covenant on Civil and Political Rights.<sup>50</sup> Prior to 2008, homosexuality was criminalized in Nicaragua and carried a maximum penalty of three years imprisonment. In 2009, the government appointed a Special Procurator for sexual diversity to respond to the stigma and discrimination towards LGBTI groups and PLHIV. Although progress has been made, the Office of the Human Rights Procurator recognized that discrimination persists in access to education and justice and in matters of gender identity. In addition, acts of violence against individuals based on their sexual orientation have increased.<sup>51</sup> The most relevant events of the HIV epidemic in Nicaragua are shown in Figure 1.

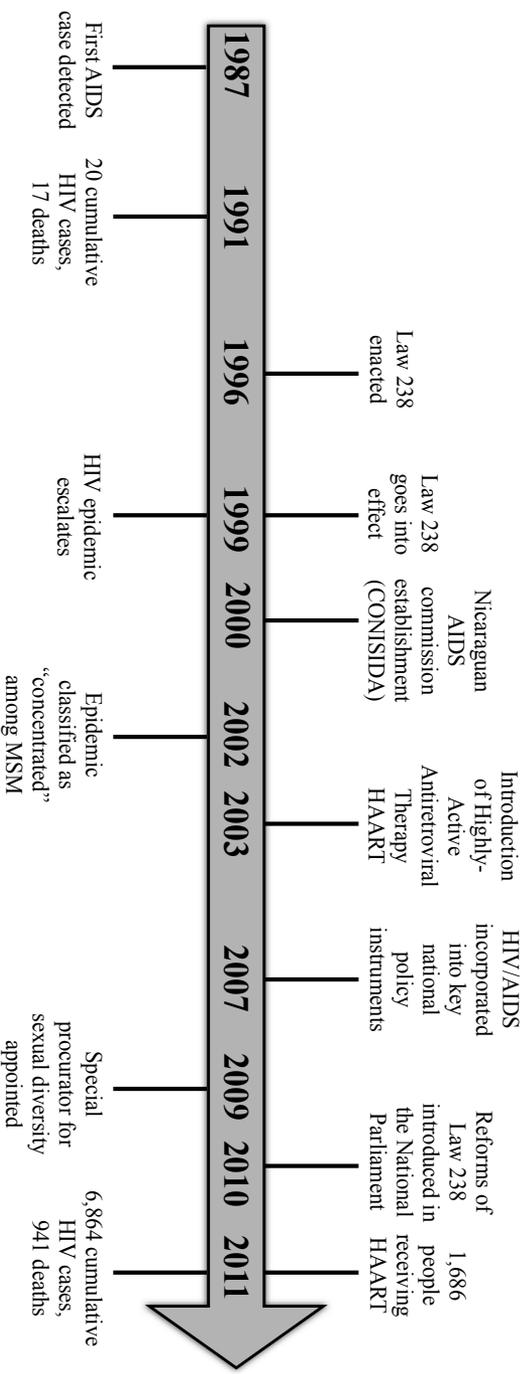


Figure 1. Significant events in HIV epidemic in Nicaragua

# Rationale for the project

The studies in this thesis address two central questions: What is the context and What are the determinants of the HIV and AIDS epidemics in Nicaragua?

Since the beginning of the epidemic the role of HIV and AIDS-related knowledge have repeatedly been emphasized as essential for effective prevention efforts. In addition, surveillance is crucial to assess behaviors that place individuals at risk for HIV infection and transmission, and to monitor trends over time.<sup>52,53</sup> Assessing and confronting stigma and discrimination are widely recognized as two of the major challenges to a successful AIDS response.<sup>54,55</sup> They manifest themselves in different ways and are difficult to define.<sup>56,57</sup>

The concentrated pattern of the HIV epidemic presents several difficulties in the accurate estimation of current cases. Subpopulations with high-risk behavior are often hard to define and approach.<sup>30</sup> The links between these sub-populations and the general population must be identified in planning interventions.<sup>6,27,29</sup>

Limitations in determining the status and extent of the HIV epidemic in Nicaragua, and the magnitude of social and individual obstacles to implementing an effective national response have been previously reported. However, the issues of knowledge, attitudes, and behaviors related to HIV have barely been covered, and the existent information is outdated.<sup>45,46</sup> The magnitude of HIV stigma and discrimination is hardly known, especially since there are no studies of their relationship to socio-economic and HIV-related characteristics at the community level. Moreover, appropriate instruments with which to measure the phenomena of HIV stigma and discrimination in Nicaragua are lacking.<sup>45,46,48</sup> Thus, investigations into the extent and determinants of these factors are needed to establish evidence-based criteria for interventions on HIV, AIDS, and sexually transmitted infections (STIs).

# Aims

## Overall aim

The overall aim of this thesis was to obtain an understanding of the dynamics of the HIV epidemic by estimating prevalence and exploring the relationship between HIV-related knowledge, attitudes, behavior, and HIV status in Nicaragua.

## Specific objectives

Papers I, II, and III studied samples of the general population in order to:

- Determine the prevalence of HIV, the extent of HIV testing practices, and identify HIV-related risk behaviors (Paper I)
- Determine the prevalence of HIV-related knowledge, attitudes, and sexual risk-taking behaviors, and to identify variables associated with knowledge, awareness, and condom use (Paper II)
- Investigate psychometric properties of HIV and AIDS-related stigma and discrimination scales, and examine the effect on those scales of socio-demographic characteristics, HIV-related knowledge, self-perception of HIV risk, testing history, and willingness to disclose HIV status (Paper III)

Paper IV focuses on men who have sex with men by using a mixed method approach. Through in-depth interviews, the paper examines the nature of sexual relationships between men, why MSM engage in risky behaviors, and the social and cultural context of being an MSM in Nicaragua. Through a structured survey, socio-demographic characteristics, and HIV-related knowledge, attitudes, and risk behaviors are assessed.

# Theoretical framework

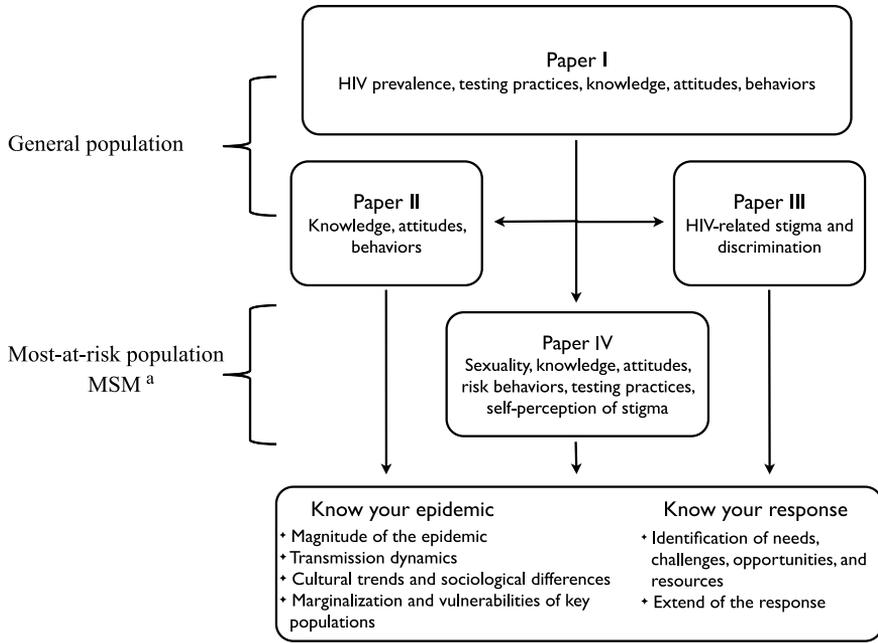
The present thesis is based on the two-“Know your epidemic, know your response” framework promoted by UNAIDS. The first component seeks to understand the epidemic and prioritize what needs to be addressed within each particular context. The second identifies resources and designs prevention and treatment strategies for confronting HIV and AIDS.<sup>6</sup>

The premise of this framework is to recognize that HIV is not a single epidemic, but rather a multitude of diverse HIV epidemics around the world. The greatest challenge is that interventions must be targeted according to the characteristics and priorities of the epidemic in a given place.<sup>6,20,27,28</sup>

The UNAIDS framework begins by determining pre-existing conditions and what can be done about them, based on current research. Epidemiological and sociological data is incorporated to design a qualitative and quantitative approach.<sup>6</sup>

Study A examines the HIV prevalence and the determinants of testing from a broad perspective and provides the basics for the other studies. Study B examines the public’s knowledge, attitudes, and behavior (including stigma and discrimination) toward HIV to illustrate transmission dynamics and gender differences, and the popular discourse. It presents evidence of the main obstacles for tailoring an effective response.

Study C provides information about MSM and their interaction with the general population. It also outlines social and cultural aspects of Nicaraguan society related to sexuality. The focus of this thesis in the context of the “Know your epidemic, know your response” theoretical framework is shown in Figure 2.



<sup>a</sup> Men who have Sex with Men

Figure 2. Overview of the thesis in relation to the “Know your epidemic, know your response framework”

# Material and Methods

## Overview of the study design

This thesis consists of three studies (A–C), which correspond to four papers (I–IV) (see Table 2) Papers I, II, and III are quantitative; Paper IV uses a mixed-method approach.

Table 2. Overview of the study design

Study	A	B		C
Paper	I	II	III	IV
Study setting	Urban and rural areas in the municipality of León, Nicaragua			
Design	Population-based cross-sectional survey			Mixed-methods approach using a sequential triangulation design
Study population	2,204 men and women aged 18 to 69 years	520 men and women aged 15 to 49 years		119 self-identified men who have sex with men (MSM) aged 18 to 52 years
Data collection	November 2009 to October 2010  Structured face-to-face interviews	May to August 2009  Structured face-to-face interviews		September 2008 to May 2009  In-depth interviews  Structured face-to-face interviews
Analysis	Univariate and bivariate analysis; multivariate logistic regression	Univariate and bivariate analysis; generalized linear models to calculate prevalence ratios	Univariate and bivariate analysis; factor analysis; Cronbach's alpha; hierarchical regression analysis.	Thematic analysis (qualitative)  Univariate analysis; generalized linear models to calculate prevalence ratios (quantitative)

## Study setting

The studies in this thesis were carried out in the León department of western Nicaragua, about 90 km northwest of Managua, the capital of the country. The area is 35 km southwest of Chinandega, on the main route to the Honduran border (Figure 3). León is known for its agriculture (peanut, sorghum, sugar cane, plantain) animal husbandry (livestock), and industry (textiles, construction, tourism, mining, automotive parts). Due to Nicaragua's first university was founded in León in 1812, followed by many others in the last 50 years, making the city the intellectual center of the nation. It contains fine examples of Spanish colonial architecture along with natural attractions (eight volcanoes, several beaches, and lagoons.). Many young persons migrate to León to study or travel there for recreational purposes.<sup>58</sup>

The León region consists of ten municipalities. The municipality of León is itself the second largest in Nicaragua after Managua, with 174,051 inhabitants and almost half under 18 years of age. A wide range of public and private health care services is available in León. Public services are organized on two levels: primary healthcare is provided by three health centers and 32 health posts; secondary-level care is available at a 400 bed capacity teaching hospital, which also serves as a specialized HIV treatment facility. All facilities provide rapid HIV testing, but the Nicaraguan National Laboratory can only perform confirmatory testing.<sup>58</sup>

León has the third largest HIV-infected population in the country, with 7.7% of the detected cases.<sup>44</sup> ART first became available in León in 2005. As of August 31, 2012, 136 patients were receiving ARV treatment.<sup>59</sup>

## Study participants, data collection, and data analysis

Studies A and B included in this thesis were carried out within the framework of the Health and Demographic Surveillance System (HDSS) in León (Figure 3), which has been operating since 2002.<sup>60</sup> The León HDSS has been used as a sampling frame for numerous studies in the fields of health system research, epidemiology, clinical research, and health economics. It was set up by means of cluster sampling and represents approximately 30% of the León municipality population (10,994 households with a total of 54,647 inhabitants, 31,084 of whom are between the ages of 15 and 49). The database sex ratio is 0.93. It includes 70% urban inhabitants.<sup>60</sup>

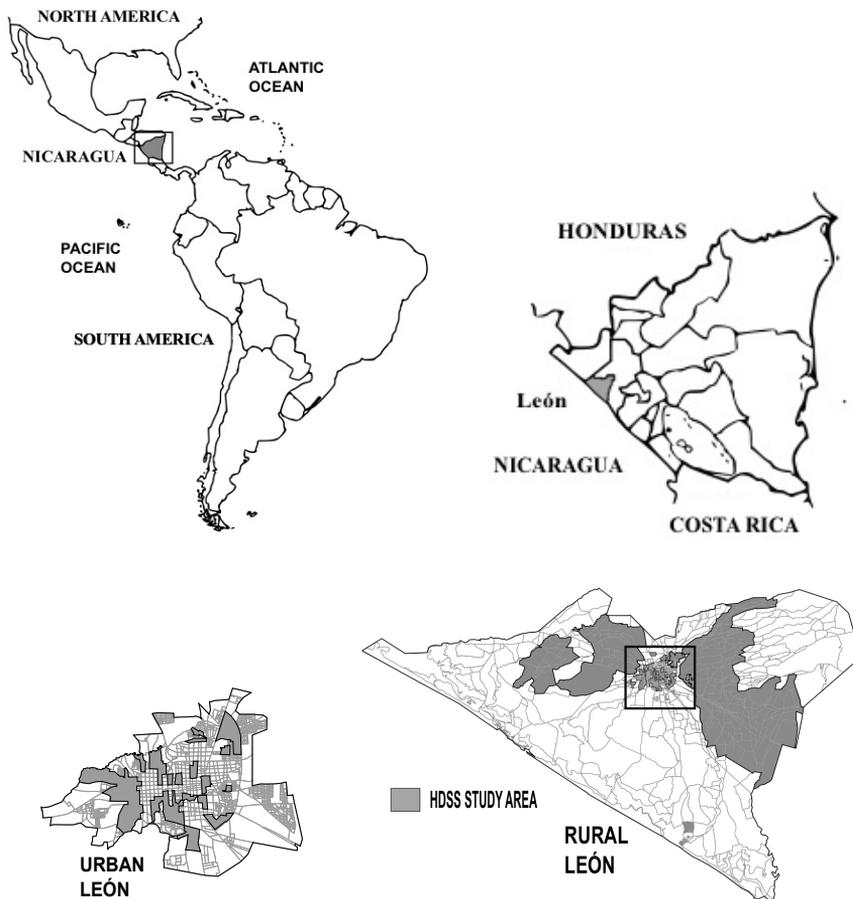


Figure 3. Maps of Nicaragua, León, and HDSS rural and urban study areas

Study C was conducted in collaboration with Ixchen, a non-profit member organization of the Nicaraguan Commission on AIDS. Ixchen has twelve centers located throughout Nicaragua. It promotes quality of life and dignity to all persons living with or at risk for HIV/AIDS, including MSM, by providing assistance with reproductive health, human rights, self-esteem, and behavior change.

### Study A (Paper I)

A cross-sectional community-based study was carried out as part of a multi-screening for chronic disease project using the HDSS in León. Approximately 2,000 participants completed a survey and provided blood samples for HIV testing (Figure 4). This study was conducted from November 2009 to

October 2010 in collaboration with the Ministry of Health, following the guidelines for measuring HIV prevalence through a population-based survey.<sup>61</sup> The Center for Infectious Diseases at the University of León performed the analysis by means of a rapid HIV test. The Ministry of Health performed a Western blot confirmatory test in the Nicaraguan National Laboratory.

The prevalence of HIV and its 95% confidence intervals (95% CI) were calculated. Socio-demographic characteristics were compared by HIV sero-status (positive and negative) after stratification by sex. Chi-squared analysis was performed to determine the association of the prevalence of HIV testing history (tested, not tested) between socio-demographic and sexual behavior characteristics. Because of the low number of outcomes for HIV infection ( $n = 7$ ), multiple analyses were not performed to identify associated risk factors. Nevertheless, logistic regression analysis was calculated to adjust HIV prevalence estimates for non-response, that is, for those who were tested against their background characteristics to estimate the prevalence among those not tested.

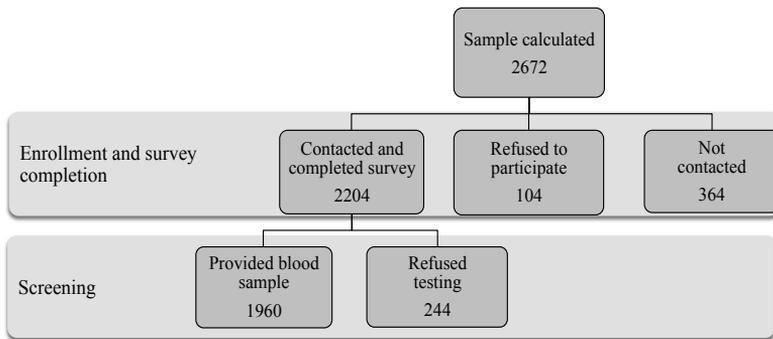


Figure 4. Flowchart of participants through each stage of fieldwork

## Study B (Papers II and III)

The study sample consisted of 520 men and women between 15 and 49 years of age, a range selected because it included people in their sexually active years, and represented 92% of the HIV positive cases in 2009 in Nicaragua.<sup>44</sup> The sample did not differ from the HDSS population in terms of sex and residence distribution.

The survey instrument was divided in three sections: section A requested general information, including migratory and socioeconomic status (SES); section B assessed knowledge of HIV, attitudes and awareness, and behaviors related to HIV (Paper II); and section C measured HIV-related stigma and discrimination (Paper III). The poverty index for each participant was

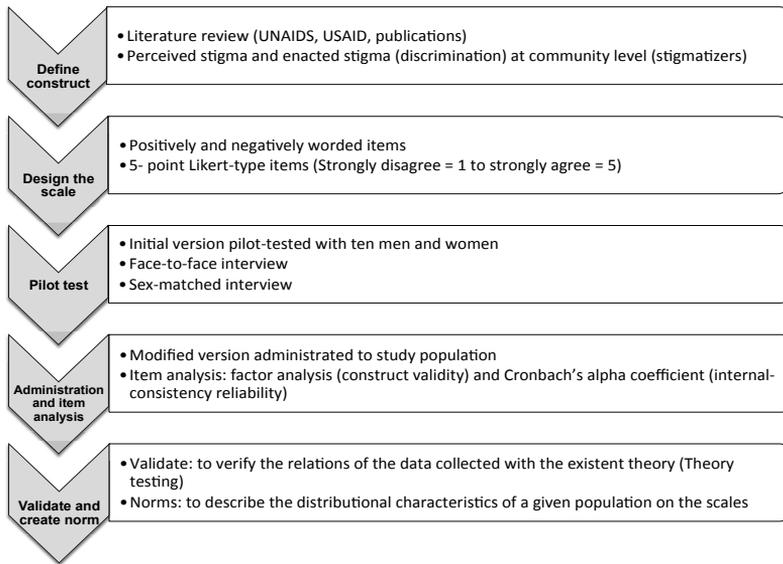
estimated using the household poverty index from the HDSS database. It was defined by means of an “unsatisfied basic needs” assessment, as developed and adapted to Nicaraguan conditions.<sup>60</sup> Data were collected through personal household interviews from May to August 2009, using maps created by the geographical information system (GIS) unit at CIDS. The interviewers were sex matched.

In Paper II, knowledge about HIV/AIDS was assessed using a 17-item score (10 questions about HIV transmission modes and 7 questions about HIV misconceptions), developed and tested in Nicaragua among adolescents<sup>63</sup> and among MSM in Paper IV. A knowledge score was calculated by totaling the number of correct answers. Attitudes were assessed by asking about perceptions of HIV risk and disclosure of HIV status. HIV-related behaviors examined sexual intercourse over the last 12 months and with the most recent partner. Questions included age at sexual debut, number of sex partners, frequency of sex, condom use, use of drugs before and during sex (including injectable drug use), and history of STIs.

Findings were analyzed using Chi-square to determine differences in the proportion of bivariate categorical data relationship. The log binomial model was used to estimate adjusted prevalence ratios (aPR) among the main outcomes (HIV-related knowledge, awareness of HIV infection, and use of condom on latest occasion of sexual intercourse) within the generalized linear models feature of SPSS version 18 (IBM Corporation, Armonk NY, USA) and STATA version 10 (StataCorp, College Station TX, USA). The log binomial model allows direct estimation of prevalence ratios in a study with common outcomes (prevalence above 10%), when the odds ratio (OR) is not a good estimate.<sup>62</sup>

In Paper III, 18 and 19 item assessments measured HIV-related stigma and discrimination, respectively. Scales were developed from UNAIDS and USAID guidelines.<sup>64,65</sup> Each participant’s level of agreement was measured using the Likert method of summated ratings (1 = strongly disagree to 5 = strongly agree).<sup>66</sup> Items were constructed alternating between negative and positive worded statements for PLHIV. Then, positively worded statements were reverse-coded for consistency in meaning. Finally, all items were used to compute a total score (Figure 5).

Factor analysis of the stigma and discrimination constructs was conducted using the principal components method and then evaluated with a varimax rotation. All items with factor loadings less than 0.50 were removed. Coefficient alpha calculated for the total scales provided evidence of internal consistency-reliability. A two-step hierarchical regression analysis was performed to evaluate the association between socio-demographic characteristics and HIV-related variables in the stigma and the discrimination scales.



*Figure 5.* Major steps in developing stigma and discrimination summated rating scales

## Study C (Paper IV)

A mixed-methods (qualitative and quantitative) investigation was conducted using a sequential triangulation design.<sup>67</sup> Participants in the qualitative approach were recruited by purposive sampling. Fifteen completed an in-depth interview, analyzed by means of thematic analysis. The interview was modified from the Focus Group Questions for Young Gay/Bisexual Men.<sup>68</sup> It covered a variety of topics, such as childhood, social and sexual relationships, knowledge and attitudes towards HIV and AIDS, identity, and network.

In the quantitative approach, 104 additional participants were interviewed using a questionnaire adapted from different studies and guidelines<sup>63,64,69</sup> measuring knowledge, attitudes, and behaviors related to HIV and AIDS. As Paper II, knowledge about HIV was assessed using the 17-item score. HIV-related attitude was measured by examining self-perception of HIV risk and through the use of the stigma score applied in Paper III. HIV and AIDS-related behaviors were assessed by asking about sexual practices, HIV testing, drug use (including alcohol) before or during sex, and history of sexual abuse.

## Data quality control

All the research instruments were pre-tested before data collection. Research assistants and fieldworkers were trained and supervised in the field by the main researcher. Ten percent of the participants were interviewed a second time. Data were cleaned and checked before entry.

In the in-depth interviews, trustworthiness was sought by different means. The principal researcher carried out the interviews. Each interview was recorded and transcribed immediately afterward in order to determine if it was necessary to question the interviewee further before going on to the next participant. The *credibility* of the results refers to the ability to capture the multiple realities of those we interviewed. The strategies for increasing credibility in this study included taking field notes and memos, peer-debriefing with colleagues, triangulation of investigators (including people from the MSM program staff at Ixchen), and a member check to clarify the information provided and confirm the researcher's interpretation. The *transferability* of the results (applicability), the ability to transfer the study findings to other contexts, was achieved by providing a description of the research context detailed enough for readers to determine if other contexts reflect similar situations, questions, and problems. An inquiry auditor checked *dependability* (consistency) and *confirmability* (neutrality) by assessing the research process and the data obtained.

## Ethical issues

The study design, data collection, analysis, and reporting in this thesis followed those recommendations from WHO, UNAIDS, and USAID for HIV, AIDS and Gender research that we considered relevant for this project.<sup>61,64,65</sup> All participants received verbal or written information or both, about the research project before beginning any of the three studies. Minors were admitted to study B after obtaining written informed consent from their parents or legal guardian.

The Ethics Committee of the National Autonomous University of León approved the research project. Ethics clearance was also obtained from the Institutional Review Boards at the University of North Carolina and the Nicaraguan Ministry of Health (Study A), and from the Human Investigation Committee of the Yale School of Medicine and the NGO Ixchen (Study C).

# Main Findings

## Characteristics of the study population

### Study A (Paper I)

Out of the 2,672 individuals in the original sample, 364 (14%) were not reached, and 104 (4%) refused to participate. Of those eligible, 2,204 (82%) enrolled in the survey, of whom 1,960 (89%) provided a blood sample.

Sixty percent of the 2,204 participants were female and 40% male. The average age of the female was 38.6 years (SD 12.9; range 18 to 69 years). More than one-third were between 25 and 34, and 11% were under 25. Forty-five percent had a primary education or no schooling; six out of ten were married or cohabiting, and 29% were single. Sixty-six percent was employed. Forty-five percent were classified as poor or extremely poor. The mean age of male participants was 38.4 years (SD 12.2; range 18 to 69 years). A few (9.6%) were less than 24 years old. Half reported primary or no education. Eighty percent were married or cohabiting; 14.7% stated they were single. Eighty-three percent was employed. Half was classified as poor or extremely poor. Overall, six of ten were catholic, but 16.5% of males and 12% of females were not affiliated with a specific religion.

### Study B (Papers II and III)

The population sample contained 646 individuals, of whom 126 (19.3%) were not included in the study because they could not be reached (12.4%) or they refused to participate (6.9%), leaving 520 people (51% female and 49% male). Their mean age was 30 years (SD 10.1; range 15 to 49). In total, 28% had less than a primary education, 49% were married or cohabiting, and 64% were unemployed. About 70% of the participants were urban inhabitants. According to the poverty index, 40% of their households were poor. Fifty-seven percent of the respondents were Catholic; however, 14% claimed no religious affiliation. More than 95% of all respondents identified themselves as heterosexual (99% of the females and 97% of the males). Most of the respondents (86%) had already had engaged in sexual intercourse.

## Study C (Paper IV)

One hundred and thirty-eight males were invited to participate in the study but only one hundred nineteen decided to take part (15 in-depth interviewed and 104 surveyed). Ten of the 15 men who were selected to be interviewed in depth described themselves as homosexual or gay, two as bisexual, and two as heterosexual. Their ages ranged from 18 to 49 years. Nine participants stated that they were single, and one male said he was married to a female. Four participants completed secondary school or higher. Ten participants were employed; seven reported being Catholic, four said they had no religion.

Of the 104 men who agreed to participate in the survey, three-quarters self-identified as homosexual or gay, 15% as bisexual, and 3% as heterosexual. The mean age of the sample was 26.3 years (SD 8.3; range 18 to 52 years). Seventy-three percent were single, 5% were married (to women). One-third completed secondary school or higher. Six out of ten participants were employed; one-quarter had no religion.

## Prevalence of HIV (Paper I)

HIV was confirmed in seven of 1,960 participants. The observed HIV prevalence for the study was 0.35% (95% CI, 0.17–0.73). Sex-specific HIV prevalence rates were 0.55% for males (4/722, 95% CI, 0.21–1.41) and 0.24% for females (3/1238, 95% CI, 0.08–0.71). The HIV prevalence ratio comparing adult men and women was 1.3:1. The predicted prevalence of HIV among non-participants was 0.39% or approximately 11% higher than the related observed HIV prevalence. Nevertheless, there was no significant difference.

## Determinants of HIV testing practices among MSM and the general population in Nicaragua (Papers I, III, and IV)

In Paper I, none of the HIV positive participants has been previously tested for HIV, although five of them knew where they could be tested. The reason reported for not being tested in three of seven cases was “fear of being HIV-positive”.

Findings from Paper III revealed that not being tested for HIV was associated with higher levels of external HIV-related stigma and discrimination.

In Paper IV, one-third of the MSM respondents reported not having been tested for HIV, although 91% knew where they could be tested. Moreover,

76% did not know the HIV status of their most recent sexual partners. None of the individuals in our study reported being HIV positive. Among those who said they had not been tested, the majority expressed fears of being HIV-positive as their main reason for avoiding the test. Multivariate analysis demonstrated that not having been tested for HIV was associated with the respondents who were younger, had insufficient HIV-related knowledge, had experienced stigmatization due to their sexual preferences, and had unprotected sex with their most recent sexual partner.

## Knowledge, HIV risk perception, and behavior (Papers II and IV)

### HIV-related knowledge

According to the HIV knowledge score, adults in the general population (Paper II) were significantly less knowledgeable about modes of transmission of HIV than MSM (Paper IV) (32% versus 71%).

The percentage of correct answers was high among MSM and members of the general population for knowing the most common means of HIV transmission, especially on questions of sexual contact, blood transfusion, and injectable drug use. However, anal and oral sex were less frequently identified as a means of HIV transmission by the general population than by MSM. More than three-quarters of all respondents properly identified HIV transmission from mother to child as a possible route. In Paper II, females had a greater knowledge of mother-to-child HIV transmission than males ( $p < 0.01$ ). In the misconceptions subsets, more than 95% of all respondents knew that HIV is not transmitted through hugging or shaking hands with an HIV positive person. However, other forms of casual contacts such as kissing and sharing eating utensils were correctly identified as not viable means of HIV transmission in almost 80% of the responses. The most misinformation was indicated in responses to questions about casual contact and the use of public toilets. Similar results were found among MSM (see Figure 6). Approximately 90% of all participants considered always using a condom as a way of reducing the risk of sexually transmitting HIV. On the other hand, less than one-third of the respondents considered mutual fidelity and one-fifth mentioned sexual abstinence as prevention methods.

Mass media represent the main and most reliable source of information about HIV for 70% of the general population and 89% of MSM. NGOs represent the second most important source for MSM, although only 12% of the general population reported this. Only 13% of all respondents among the general population and 50% of MSM mentioned health care facilities as sources of information.

Males and females. Those of rural origin who had minimal education and females living in poverty were more likely to have insufficient knowledge of HIV transmission modes ( $p < 0.05$ ). No gender differences were found for such knowledge by age, religious beliefs, being tested for HIV, or most recent partner.

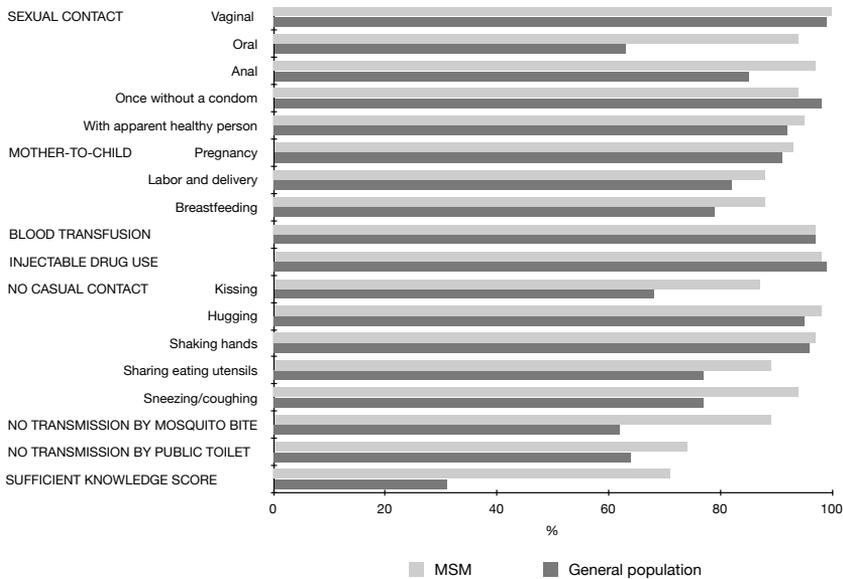


Figure 6. Percentage of correct responses regarding knowledge of HIV transmission modes among MSM (Paper IV, n = 104) and adults in the general population (Paper II, n = 520) in León, Nicaragua, 2008-2009

### HIV attitudes and awareness

Findings from Paper II reveal that males were significantly less concerned about HIV than females ( $p < 0.001$ ). Besides HIV-positive people, participants considered migrants (38%) and sex workers (25%) the groups most responsible for spreading HIV around the world. Only 8% of all respondents believed homosexuals were the primary cause of HIV dissemination. However, in Paper IV most MSM respondents held negative attitudes toward themselves. Eighty percent considered that MSM are more promiscuous than other people. One-third of the participants believed that “MSM are not reliable,” and one-fourth believed that “MSM are immoral.” One participant explained having so many sexual partners.

Being happy for most of us (MSM) is not easy. So, we love experiencing life as much as possible and sexual relationships are a big part of that. It is really about what makes you happy. Everyone I know, including me, wants to find his “soul mate”. Unfortunately, it does not happen like that. So, having many

partners gives you the opportunity to meet people, to enjoy life, and perhaps to find love. (In-depth interview, bisexual, age 28, single)

Concerning the self-perception of risk for HIV, two-thirds of MSM as well as two-thirds of the general population perceived themselves at high risk for becoming infected with HIV in the future. The likelihood of being unaware of becoming infected for females living in rural areas was 1.67 times greater (95% CI: 1.13–2.49), 1.65 times greater for females with a low level of education (95% CI: 1.10–2.45), and 1.93 times greater for females with insufficient HIV-related knowledge (95% CI: 1.16–3.28) than for females living in an urban setting, with greater education, and with sufficient knowledge of HIV (Paper II). Despite having a high perception of HIV risk, most MSM and women reported being emotionally attached to their partners. A MSM participant expressed it this way:

If I know that may become infected with HIV, yes I do as anyone else is... I just try to demonstrate no fear, but confidence to my partner. I love him. Love requires trust no matter what. No using a condom, no being jealous, nor fighting, are kinds of love. (In-depth interview, homosexual, age 21, cohabiting)

A low percentage (12%) of respondents from the general population and two-thirds (68%) of MSM mentioned that they would disclose their HIV status if they became HIV positive.

## HIV-related behaviors

Table 3 shows the frequency distribution of HIV-related behaviors among MSM participants and members of the general population. In Paper I, only one HIV positive male reported having had sex with men. None reported the use of intravenous drugs, a history of STI, or blood transfusions. Low rates of condom use and gender differences in behavior were characteristic among participants. Inconsistent condom use was associated with low SES, discomfort, emotional attachment, and insufficient HIV-related knowledge. Safer sex practices were more frequently reported in casual sexual encounters, including commercial sex, than in steady relationships. Furthermore, the majority of participants indicated using the least effective protective measures to avoid HIV transmission and other STIs. Those practices included checking genitals, having sex with a sexually inexperienced person, and reducing the number of one's sexual partners. A substantial percentage (81%) of MSM participants and a lesser percentage (40%) of males from the general population reported having multiple sexual partners in the last six months and the last year, respectively. Few females indicated similar behavior.

Table 3. Distribution of behaviors related to HIV among sexually experienced adults of the general population (Paper II) and MSM (Paper IV) in León, Nicaragua, 2008-2009.

Behavior	Females (n = 221)	Males (n = 226)	MSM (n = 1 04)
Age at first sexual intercourse <sup>a</sup> (mean ± standard deviation)	18 (SD 3.6)	16 (SD 2.9)	14 (SD 2.7)
Currently in a steady relationship [n (%)] <sup>a</sup>	173 (78)	148 (65.5)	39 (37.5)
Had sexual intercourse in last year [n (%)] <sup>b</sup>	179 (81)	210 (93)	104 (100)
Vaginal sex	178 (99.4)	207 (98)	16 (15.4)
Oral sex	27 (15)	59 (28)	95 (91)
Anal sex	12 (6.7)	31 (14.7)	81 (78) <sup>c</sup>
No. of sexual partners in last year [n (%)] <sup>b</sup>			
One	158 (88.3)	126 (60)	20 (19.2)
Two or more	21 (11.7)	84 (40)	84 (80.8)
Used condoms at latest sexual intercourse [n (%)]			
Yes	17 (10)	51 (24.3)	50 (48)
No	162 (90)	159 (75.7)	54 (52)
Use of drugs before or during sex [n (%)] <sup>b</sup>			
Yes	9 (5)	62 (29.5)	73 (70.2)
No	170 (95)	148 (70.5)	31 (29.8)
Sexual intercourse with a sex worker [n (%)] <sup>b</sup>			
Yes	—	16 (7.6)	54 (52)
No	—	194 (92.4)	50 (48)
Tested for HIV [n (%)] <sup>a</sup>			
Yes	77 (34.8)	28 (12.4)	65 (62.5)
No	144 (65.2)	198 (87.6)	39 (37.5)
Diagnosed with STI [n (%)] <sup>a</sup>			
Yes	40 (18)	22 (9.7)	32 (30.8)
No	181 (82)	204 (90.3)	72 (69.2)

<sup>a</sup> Among all participants

<sup>b</sup> In the last 6 months among MSM participants

<sup>c</sup> Receptive anal sex

One of the most frequently cited risk behaviors was the use of alcohol or drugs before or during sexual intercourse, especially among MSM. Reasons given for turning to them were escaping from problems, socializing, enhancing sexual pleasure, and reducing inhibitions during same-sex intercourse. Other risky behaviors and conditions such as suicidal ideation and attempts, engaging in commercial sex, and a history of STIs were present. In-depth interviews elucidated the stresses related to suicidality. Adopting a sexual identity, having unsatisfactory intimate relationships, fear of becoming infected with HIV, and living with stigmatization were among the most common stressors. MSM (30%) and women (18%) were more likely than heterosexual men (10%) to report previous STI diagnoses. Some MSM and fe-

males participants experienced intimate-partner sexual violence that was attributed to abuse of power and to use of alcohol and drugs.

## The role of family and society in the lives of participants

Our findings revealed that family and society played a dual role in the lives of individuals. The protective role of family relationships and social support strongly influenced a participants' life. An MSM participant with suicidal ideation commented in the in-depth interview on the support he received from his mother:

It has not been easy for me to be happy, the way I have all this suffering for my feelings. There have been times when I wanted to die. It is very difficult to be what I am and not be able to live well with this. . . . But, after all, I thank God and my mom for not having done something to my self (homosexual, 22 years, single).

Participants from both the general population and MSM group mostly exhibited a greater inclination to disclose their positive HIV status to relatives and health care providers, whereas they would disclose this to partners less often. Furthermore, the patterns of disclosure differed within families. Female family members such as grandmothers, mothers, sisters, and aunts were considered in making a decision about disclosing sexual orientation more often than male members.

On the level of society our results confirm the role of NGOs as an important source of information and crucial provider of psychosocial, medical, and legal support, especially for the MSM population.

We also found that family and society can play a negative role in individual development. Most MSM participants were raised in a dysfunctional family characterized by alcoholism and lack of support predominantly from male parents. More MSM (10%) than adults from the general population (3.7%) experienced sexual abuse within their families. Twenty percent of MSM reported being ejected from home. We found a lack of appropriate public services and programs on sexual and reproductive health, especially for MSM. Many of them expressed their dislikes about the short-term of the programs. In Figure 2 of Paper IV, the factors involved in the different levels of MSM sexual development are portrayed.

# Factors associated with HIV-related stigma and discrimination

## People Living with HIV (Paper III)

This study revealed gender differences in the expression of stigmatization and discriminatory attitudes towards PLHIV on the community level. Female participants reported a higher level of agreement with statements that reflect stigma and discrimination than males ( $p < 0.05$ ). There was greater agreement with forms of stigma related to fear of HIV transmission through day-to-day contact with a PLHIV. However, most participants (86%) considered that PLHIV should feel ashamed, and slightly more than half (54.2%) believed that professionals working with PLHIV should also be ashamed. Approximately three-fourths of all respondents thought that foreigners (77.6%) and commercial sex workers (72.7%) are primarily responsible for the spread of the HIV infection. Most respondents expressed agreement with negative judgments towards HIV-positive people, including “HIV is a punishment from God” and PLHIV “are immoral”; these beliefs were more prevalent in females than in males ( $p < 0.001$ ). Similarly, a large proportion (86%) of participants said that they favored public disclosure by PLHIV and identification of PLHIV by authorities.

In relation to discrimination, nine out of ten participants voiced agreement with behaviors that shun and isolate HIV-positive people. Believing that access to services or resources should be limited appeared to be a common discriminatory action favored by the majority of participants. The level of agreement that enabled us to confirm verbal stigma as a component of HIV and AIDS-related discrimination varied for different statements. A high level of agreement was obtained for practices related to disclosure of a diagnosis of HIV. There was modest agreement reported with regard to items reflecting humiliation, such as giving verbal offense and spreading rumors.

## Men Who Have Sex with Men (Papers III and IV)

About two-thirds (66%) of the participants interviewed in Paper III blamed homosexuals for the increasing number of HIV cases. Respondents in Paper IV repeatedly reported being stigmatized by having their sexual preference associated with AIDS. Public institutions such as health care facilities, the police, and schools were the most common stigmatizers. Negative attitudes and beliefs about homosexuality were experienced by 95% of MSM in the form of rumors or gossip, and 52% felt they were discriminated against when they sought employment. A self-identified 38 years old bisexual MSM commented about the challenges of getting a job:

It has been difficult to get a job. . . . They ask for a lot of recommendations, and they also investigate. . . . For many MSM keeping their sexual preference hidden is the easiest way to find a dignified and less stigmatized job.

# Discussion

## Prevalence of HIV and testing practices

Using the “Know your epidemic, know your response” framework has allowed countries such as India<sup>70</sup> and Thailand<sup>71</sup> to conduct a critical analysis of their epidemic from a national to a local level and to allocate resources more effectively. The evidence generated resulted in the management and the reduction of HIV cases. Following this framework, in Paper I we identified a low HIV prevalence in the general population of León, Nicaragua, including almost the same sex ratio. We consider that all data has to be interpreted with caution. Although Nicaragua political conflict and economic crisis delayed the introduction and dissemination of HIV in the 1980s, there is concern that the epidemic is worsening and Nicaragua is unable to handle it.<sup>46,47</sup> According to Baral et al., Nicaragua is among the countries with most elevated risk for HIV transmission among MSM.<sup>72</sup> Findings from Paper IV identified a hidden bisexual behavior that may increase the risk of HIV transmission to the general population. Much progress has been made in HIV diagnosis, infrastructure, and the human resources devoted to combating it, yet many challenges remain. In addition, there is a great deal of pressure from donors to meet targets at the risk of decreasing quality services.<sup>73</sup> The global financial crisis has led to substantial reduction of funding and reorienting interventions directed at MSM and sex workers. Young people and women in general were not included in the response.<sup>74</sup>

Participants in Paper I reported low HIV testing rates; none of the HIV positive cases were tested previously. We identified the fear of being HIV-positive as one of the main reasons for not taking the HIV test. Paper III demonstrated that low HIV testing motivation was related to high levels of stigma. Women were better at presenting themselves for HIV testing than men, perhaps as result of their high-perceived vulnerability and the current prevention of mother-to-child HIV testing policy. Vietnam, a country with a concentrated epidemic, has a high level of social stigma towards PLHIV and low testing uptake. Pharris et al. recommended removing financial barriers to client-initiated testing, encouraging testing for those who believe that are at risk of HIV, and reducing stigma through community-based interventions.<sup>75,76</sup> Similar interventions have been documented in the Americas, especially in the Caribbean region, the second most affected HIV area after sub-Saharan Africa. The intensive testing policy, counseling, and monitoring

of HIV cases in Cuba and Haiti have been considered a useful approach to controlling the epidemic and reducing stigma.<sup>77,78</sup>

## Knowledge, attitudes, and behavior continuum

The continuum of knowledge, attitude, and practice (KAP), also known as knowledge-attitude-behavior (KAB), has been widely studied and described in a variety of theoretical models.<sup>79</sup>

A cognitive-rationale message that presents a combination of perceived great benefits from action and perceived high susceptibility to an illness can motivate behavior adoption.<sup>79</sup> Individuals with accurate information about HIV transmission and prevention and an accurate assessment of their own risk increase the adoption rate of safer sexual practices.<sup>80-82</sup> In Papers II and IV, participants reported using condoms as the main protective measure they took against HIV. Despite a perception of great vulnerability for HIV infection, there were low condom use rates. In agreement with other studies,<sup>83,84</sup> we identified inconsistent condom use more frequent among those in steady relationships. In addition, bisexual MSM reported more consistent use of condoms with male partners than with female ones. Women<sup>15,85,86</sup> and receptive MSM<sup>87</sup> have been shown to be powerless to negotiate condom use, especially with their regular partners. However, Violence, especially intimate partner violence (IPV), is a common risk factor associate with HIV.<sup>85,88,89</sup> We did not inquired IPV among females, but it has been well documented by Valladares et al. in the Nicaraguan context.<sup>90</sup> Nevertheless, in-depth interviews with MSM revealed different expressions of IPV (emotional, physical, and sexual) related to commercial sex, drug use, and inconsistent condom use.

Furthermore, affective attitudes have been shown to negatively influence adoption of safer sexual practices.<sup>91-93</sup> In our study, MSM and women expressed strong feelings that may have conditioned their susceptibility assessment and their rationale for not using condoms with steady partners. Interventions that have included emotional component have been successful in increasing condom use.<sup>94</sup>

We found MSM more knowledgeable on matters of HIV than men and women in the general population. MSM in Nicaragua have been recognized as an important at-risk group and several education interventions on their behalf have been implemented.<sup>95</sup> However, MSM in Paper IV exhibited negative attitudes toward their social network such as lack of trust, feelings of hostility, and rivalries among its members. These conflicts may interfere with the implementation of peer-based interventions.

## Cultural and societal influences

Macrosocial determinants such as religious, cultural, economic, and political factors heavily influence the continuum of HIV-knowledge transmission and acquisition, risk perceptions, and behavior adoption.<sup>82,96,97</sup> Overall, high socioeconomic status (SES) has a great influence on this continuum. Approximately half of the participants in our study had a poor SES that increased their vulnerability, especially in the case of females.

The ideology of Machismo is another cultural factor that is deeply rooted in Nicaragua and other Latin American cultures. In Latin America machismo acts as a barrier for a proper HIV response.<sup>98-99</sup> In all the studies we conducted gender was an important factor that appeared to affect both the perceived vulnerability and adoption of risky behaviors, and the expression of stigma towards PLHIV. We found that females in Paper III endorsed higher levels of stigma and discrimination than males.

We have already discussed how IPV was associated with inconsistent condom use. However, violence goes beyond an expression of unequal interpersonal relationships affecting communities and society-at-large. The Nicaraguan Center for Human Rights reported that 353 women were killed from 2007 to 2011 as a result of violence.<sup>100</sup> Femicide, the murder of women, is the most extreme form of violence against women. It is dramatically increasing in Latin American countries, mainly in Central America and Mexico in areas of poverty, gender inequality, political conflict, and weak legal structure.<sup>101</sup>

Religion has been shown to have multiple, complex roles in its relationship with HIV and AIDS. It may exert a positive influence on individuals coping with stressors such as the loss of a loved one to AIDS, seeking spiritual support, or dealing with the disclosure of their HIV status, etc. Religion may also act as a protective factor against risk-taking behaviors. Some faith-based organizations have been involved in HIV prevention.<sup>102-103</sup> Conversely, negative aspects of spirituality have been associated with high levels of stigma, on the part of health care providers.<sup>104</sup>

Most respondents in paper III believed that HIV is a punishment from God. Reducing stigma in the community should be addressed through a supportive role on the part of religious organizations. We found that MSM participating in Paper IV reported suffering some level of discrimination from all religious groups.

## Mass media and entertainment industry effects

Over the last three decades of the global HIV and AIDS epidemic, an aggressive and committed scientific and activist community has been promoting access to information in developing and developed countries. The use of knowledge has been described as dependent on the source, the content, the

medium, the user, and the context.<sup>101</sup> The mass media have played a vital role in reversing the progression of HIV and reducing inequalities, especially in developing countries. Media is most effective when reinforced by community interventions.<sup>106–109</sup> We found that mass media represented the primary source of information about HIV and AIDS, more than family, friends, and doctors. This finding is in accordance with studies elsewhere.<sup>110,111</sup> MSM in Paper IV had a favorable impression of the fashion and entertainment industries due to their support of gay people, which may have increased the acceptance of MSM by society.

It has been documented that broadcast media such as television and radio might be used for directing health messages to less health-oriented individuals.<sup>111</sup> Media messages designed to guide individual decisions and encourage protective behaviors, rather than simply inform, have shown to be the most efficient strategy for reducing risky taking behaviors with long-term adverse effects on health.<sup>111</sup> In Nicaragua, mass media utilization has been limited to political, cultural, and advertising issues. Information on public health is occasional broadcast, especially in times of crisis. Recently there have been efforts in Nicaragua to increase knowledge and awareness of HIV and AIDS, along with human rights and behavior change strategies all through the media. An intervention approach exploiting the potential of HIV-oriented mass media messages on popular soap operas have been found to contribute positively in the HIV response.<sup>112</sup> The Peace Corps program, the Nicaraguan Red Cross, and the Nicaraguan Ministry of Health are capitalizing on an initiative using mobile communication technologies to improve health education and outcomes.<sup>113</sup>

To best address the HIV epidemic, countries need to select a combination of context-specific HIV prevention interventions.<sup>27</sup> Cost-effectiveness analysis should be done to help direct those efforts.<sup>107–114</sup>

## Methodological considerations

### HDSS and community-based studies

In most developing countries vital registration and health information systems are rudimentary. Demographic surveillance systems are created to improve this situation. They are not a replacement but provide ideal research environments that complement the national systems.<sup>60,115</sup> Participants in studies A and B were randomly selected from a HDSS that generated reliable basic demographic and epidemiological data for health monitoring, planning, and policy making. In study C, participants were recruited by purposive sampling. They did not belong to the MSM program at Ixchen.

## Data control and biases

Face-to-face interviews (FTFI) were carried out to reduce missing information, clarify doubts, and ensure that responses were properly understood. In seeking to obtain sensitive information, such as sexual behavior, FTFI has been shown to have similar reliability as self-administered questionnaires.<sup>116</sup> Since the quantitative studies in this thesis are all cross-sectional, it is difficult to establish causation. Therefore, findings may be bidirectional (e.g., HIV stigma can trigger HIV testing and vice-versa). The effect of acquiescence response set bias, non-response bias, social desirability bias, and poor recall may influence data quality. Several measures were taken in this regard. In Study B, non-response bias was handled during the design stage by adjusting sample weights and drawing a larger sample (compensation technique); and in the data collection stage by ensuring quality control on a daily basis, as well as conducting follow-up surveys to correct and confirm data. In Paper III, acquiescence bias was addressed by alternating negative and positive wording in statements about PLHIV. Social desirability bias was minimized by working with a group of experienced interviewers using a standardized instrument, and by guaranteeing the confidentiality and anonymity of the information collected.

## Mixed methods approach

This study combined quantitative and qualitative methods, which have demonstrated several advantages for dealing with issues of HIV and AIDS.<sup>117</sup> The qualitative research provided a context for understanding the dynamics of MSM life experience, focusing on sexuality and HIV/AIDS risk behaviors and underlying relationships; on the other hand, the quantitative approach helps to corroborate phenomena identified through the qualitative method.<sup>67</sup> A mixed methods approach requires considerable effort to make them cohere. However, it can increase understanding the underlying aspects of the HIV epidemic in Nicaragua, its determinants, barriers, and facilitators. This interaction was also useful for exploring the relationships, meanings, or participants' perspectives on sexuality and risk-taking factors, especially towards unprotected sex.

# Conclusion

A number of issues regarding the status of the HIV and AIDS epidemic have been studied by approaching members of the general population and MSM in León, Nicaragua. To our knowledge, these are the first studies in Nicaragua at the community level that seek to determine HIV prevalence (Paper I), develop a scale to measure stigma and discrimination, and examine their determinants (Paper III), and explore the sexuality and risk-taking behaviors of MSM using an ecological model (Paper IV). In addition, the levels of knowledge about HIV, perceived vulnerability, and risk-taking behavior have been investigated from a community level perspective (Paper II).

Several conclusions emerge from this thesis:

- 1) HIV prevalence in the general population was similar to the National estimate in addition to low rates of HIV testing.
- 2) Misconceptions about HIV transmission were common among people in the general population and among MSM. Nevertheless, the latter were more knowledgeable about true modes of HIV transmission.
- 3) We found that inadequate knowledge, low SES, and affective attitudes negatively influenced safer sexual practices. Inconsistent condom use was significantly more frequent in steady relationships.
- 4) Mass media was the public's main source of information on HIV and AIDS.
- 5) Women, less educated, and poor people are the most vulnerable for HIV infection, which should be recognized in future intervention and prevention strategies.
- 6) MSM as well as also heterosexuals represent important risk groups for the further spread of the HIV epidemic in Nicaragua,
- 7) People in the community, especially females, endorsed high levels of stigma and discrimination. This was associated with low HIV testing rates.

- 8) Family, especially female members, and NGOs were identified as an important source of social support for MSM in their construction of their sexuality and for the potential disclosure of participants' HIV status.
- 9) All the conclusions described above represent opportunities for improving ongoing and future actions for achieving the MDGs by 2015.

# Policy and research implications

The response to the concentrated HIV and AIDS epidemic in Nicaragua must not only recognize its low prevalence, but its potential to increase as well. The implementation of the most effective combinations must be carried out with an efficient use of resources beyond traditional strategies and priorities. We have indicated the following actions that can be taken to develop prevention, care, and research efforts in the Nicaraguan context:

- The HIV epidemic needs a multisectorial response. Improving the coordination among governmental organizations, civil society groups, and donors is necessary.
- It is essential to set up a common agenda for HIV; sexual reproductive and human rights; and other associated conditions and needs such as TB, infrastructure improvement, and an operative monitoring and evaluation system.
- HIV prevention is neither simple nor simplistic. Providing information alone has been proven to be inadequate. The simultaneous use of different strategies properly targeted in accordance with individual risks and vulnerabilities, taking into account local characteristics, should be implemented. Since mass media is the major source of HIV information for the general public in Nicaragua, it should be considered among these initiatives.
- Reducing social, political, and cultural disparities is vital. Improving education could increase people's cognitive, affective, and decision making abilities across a variety of areas beyond basic HIV-related knowledge.
- As vulnerable groups, women, rural residents, poor people, HIV-positive, and less educated people should be prioritized. Promoting acceptance of people with HIV and those of diverse gender and sexual identity at all levels of society is essential.

- Research on HIV prevalence in the community is needed in areas with high and low incidence to determine the local and the national magnitude of the epidemic.
- To assess the extent and impact of HIV-related stigma and discrimination requires an investigation into diverse expressions (self-perceived, externalized), among other levels of the population (PLHIV and their families, health care providers, decision makers), and other outcomes (ART adherence, care seeking, and provision of social support).

# Summary in English

UNAIDS estimates by December 2010 that over 7,000 people infected with HIV live in Nicaragua, although the country has one of the lowest HIV prevalence in Latin America. Nevertheless, the increasing number of HIV cases in Central America, high levels of poverty and migration rates, and risk-taking behaviors may be conditions for the further spread of HIV and for slow progress toward achieving the Millennium Development Goals. In addition, incomplete and outdated epidemiological data are obstacles for a reliable assessment of magnitude of an effective response to the HIV epidemic. The overall aim of this thesis was to obtain an understanding of the dynamics of the HIV epidemic by estimating prevalence and exploring the relationship between HIV-related knowledge, attitudes, behavior, and HIV status in Nicaragua.

Structured questionnaires were administered to men and women ages 15 and above in conjunction with a health and demographic surveillance system in León, Nicaragua (Papers I–III). A behavioral survey and blood sampling for HIV were carried out among 2,204 men and women (Paper I). Bivariate analysis and adjusted prevalence ratios and their confidence intervals were estimated for HIV-related knowledge, awareness of HIV infection, and use of condoms (Paper II). Factor analysis and Cronbach's alpha were computed to investigate psychometric properties of HIV and AIDS-related stigma and discrimination scales. Hierarchical regression analysis was performed to determine their predictors (Paper III). In-depth interviews and a behavioral survey were conducted among men who have sex with men (MSM) ages 18 years and above (Paper IV). Thematic analysis was used to analyze qualitative data. Adjusted prevalence ratios and their confidence intervals were estimated for quantitative data.

In Paper I, the prevalence of HIV in the general population of the municipality of León was 0.35% (95% CI, 0.17–0.73). A large proportion of the population had not been tested despite having a high self-perception of risk and knowing where they could be tested. Those who had taken an HIV test were more likely to be female, young, living in an urban setting, more educated, married or cohabiting, and have no religious affiliation.

In Papers II and IV, HIV-related knowledge was lower among members of the general population than among MSM. Unprotected sex was reported more often with regular partners than with casual partners. Findings suggest-

ed that the consistent use of condoms was inversely related to emotional attachment (steady relations).

In Paper III, stigma and discrimination were reported high in the general population. Socially and economically disadvantaged women were significantly more likely to express stigmatizing attitudes and hold discriminatory beliefs towards PLHIV. Moreover, stigma and discrimination appeared to be negatively associated with HIV-related knowledge, self-perception of HIV risk, HIV testing, and willingness to disclose HIV status in the event of being HIV-positive.

In Paper IV, findings demonstrated an increasing tolerance towards same-sex attractions. MSM have a better understanding of HIV transmission than men and women of the general population (Paper II). Seven out of ten MSM and six out of ten women were concerned about becoming infected with HIV.

This study confirmed that Nicaragua has a low prevalence but high risk for HIV infection and transmission. Results underscore that social, behavioral, and cultural factors contribute to retard progress in achieving the Millennium Development Goals on reducing gender inequality and combating HIV/AIDS. Addressing these challenges depends not only on successful behavior change interventions, but requires a culturally gender-appropriate strategy. More effective systems to monitor and evaluate the HIV epidemic are also needed.

# Summary in Swedish/ Sammanfattning på Svenska

UNAIDS uppskattade i december 2010 att över 7,000 hivinfekterade personer bor i Nicaragua, även om förekomsten av hiv är ett av de lägsta bland länderna i Latinamerika. Det ökande antalet hivsmittade i Centralamerika, stort antal fattiga och migranter samt risk-beteenden är faktorer som riskerar att hiv får en ökad spridning och att milleniemålen kan bli svårare att uppnå. Att göra tillförlitliga bedömningar av omfattningen för ett effektivt bemötande av hiv-epidemin försvåras på grund av ofullständiga och föråldrade epidemiologiska data. Det övergripande syftet med denna avhandling var att få en förståelse för dynamiken av hiv-epidemin genom att uppskatta förekomsten och utforska sambandet mellan hiv-relaterad kunskap, attityder, beteenden samt hiv status i Nicaragua.

Strukturerade enkäter delades ut till män och kvinnor, från åldern 15 år och uppåt, i samband med en hälso- och demografikontroll i León, Nicaragua (artikel I – III). En beteendeundersökning och blodprov för hiv gjordes på 2,004 män och kvinnor (artikel I). Bivariatanalys, justerade prevalenskvoter, och konfidensintervall uppskattades för hiv-relaterad kunskap, medvetenhet av hivinfektion och användning av kondom (artikel II). Faktoranalys och Cronbach's alpha räknades ut för att undersöka psykometriska egenskaper av hiv och AIDS-relaterat stigma och diskrimineringskala. Hierarkisk regressionsanalys utfördes för att uppskatta deras prediktorer (artikel III). Djupintervjuer och en beteendeundersökning gjordes på män som har sex med män (MSM), i åldern 18 år och uppåt (artikel IV). Tematisk analys användes för att analysera kvalitativa data. Justerade prevalenskvoter och deras konfidensintervall uppskattades för kvantitativa data.

I artikel I var förekomsten av hiv bland den generella befolkningen i León 0.35% (95% CI, 0.17–0.73). En stor del av befolkningen hade inte blivit testade även om de kände till risken och visste att de kunde bli testade. De som hade gjort ett hiv test var oftare kvinnor, unga, bosatta i urbana förhållanden, högre utbildade, gifta eller sambon, och utan religiös anknytning.

I artikel II och IV var hiv-relaterad kunskap mycket lägre bland den generella befolkningen än bland MSM. Oskyddat sex var oftare rapporterat bland fasta förhållanden än vid tillfälliga förbindelser. Resultaten visar att det finns ett omvänt samband mellan regelbunden användning av kondom och emotionell förbindelse (stadigt förhållande).

I artikel III rapporterades stigma och diskriminering som vanligt förekommande bland den generella befolkningen. Det var signifikant mer förekommande bland socialt och ekonomiskt missgynnade att uttrycka en stigmatiserande attityd och diskriminerande tro mot människor som lever med hiv. Dessutom verkar stigma och diskriminering ha ett negativt samband med hiv-relaterad kunskap, självuppfattning om risken att smittas med hiv, hiv-testning och villigheten att avslöja sin hiv-status om man blivit smittad med hiv.

I artikel IV demonstrerar resultaten en ökad tolerans mot samkönad attraktion. MSM har en bättre förståelse för hiv smittspridning än män och kvinnor från den generella befolkningen. Sju av tio MSM och sex av tio kvinnor var oroliga över att bli smittade med hiv.

Denna studie har bekräftat att förekomsten av hiv i Nicaragua är låg, men risken för hiv infektioner och spridning är hög. Resultaten betonar att sociala och kulturella faktorer samt beteenden bidrar till långsammare framsteg i att nå millenniemålen, att minska ojämlikheten mellan könen och kampen mot hiv/AIDS. För att ta itu med dessa utmaningar krävs inte enbart framgångsrika interventioner av, utan även en kulturellt genusanpassade strategi. Utöver det behövs mer effektiva system att granska och utvärdera hiv epidemin.

## Summary in Spanish/Resumen en español

Nicaragua posee una de las prevalencias del virus de inmunodeficiencia humana (VIH) más bajas en Latinoamérica. ONUSIDA estima que para Diciembre del 2010 más de 7,000 personas en el país tenían VIH. Sin embargo, el creciente número de casos de VIH en América Central, los altos niveles de pobreza y las altas tasas de migración y comportamientos de riesgos pueden ser condiciones para la propagación del VIH y del lento progreso hacia el logro de los Objetivos de Desarrollo del Milenio. Los datos epidemiológicos incompletos y obsoletos son también obstáculos para una evaluación fiable de la magnitud de la epidemia y su respuesta eficaz. El objetivo general de esta tesis ha sido comprender la dinámica de la epidemia del VIH mediante la estimación de su prevalencia y la exploración de la relación entre el VIH con el conocimiento, las actitudes y los comportamientos.

Se administraron cuestionarios estructurados a los hombres y mujeres mayores de 14 años provenientes del sistema de vigilancia en demografía y salud en León, Nicaragua (Artículos I-III). Una encuesta de comportamiento y la toma de muestra de sangre para el VIH se llevaron a cabo entre 2,204 hombres y mujeres (Artículo I). Se aplicaron análisis bivariados y las razones de prevalencia ajustadas con sus intervalos de confianza para determinar la relación del VIH con el conocimiento, la percepción de vulnerabilidad ante una infección y el uso de preservativos (Artículo II). Se realizó un análisis factorial y el alfa de Cronbach para investigar las propiedades psicométricas de las escalas de estigma y discriminación relacionadas al VIH y el SIDA. Además se empleó un análisis de regresión jerárquica para determinar sus factores predictivos (Artículo III). Se aplicaron entrevistas a profundidad y una encuesta de comportamiento entre hombres que tienen sexo con otros hombres (HSH) mayores de 18 años (Artículo IV). Para la interpretación de los datos cualitativos se realizó un análisis temático. Razones de prevalencia ajustadas y sus intervalos de confianza se calcularon para los datos cuantitativos.

En el Artículo I, la prevalencia del VIH en la población general del municipio de León fue de 0.35% (95% IC, 0.17–0.73). Una gran proporción de la población no se había realizado la prueba del VIH a pesar de tener una alta auto-percepción de riesgo y saber dónde podrían hacerse la prueba. Los que se realizaron la prueba de VIH tenían más probabilidades de ser mujer, joven, vivir en un entorno urbano, más educados, casados o en unión estable, y sin afiliación religiosa.

En los Artículos II y IV, el nivel de conocimiento relacionado con el VIH fue menor entre los miembros de la población general que entre los HSH. El sexo sin protección se informó en mayor frecuencia con parejas estables que con parejas ocasionales. Los resultados sugirieron que el uso consistente del condón está inversamente relacionado con el apego emocional (relaciones estables).

En el Artículo III, se reportaron altos niveles de estigma y discriminación en la población general. Las mujeres social y económicamente desfavorecidas fueron significativamente más propensas a expresar actitudes estigmatizadoras y discriminatorias hacia las personas con VIH. Por otra parte, el estigma y la discriminación parecen estar asociados negativamente con el nivel de conocimiento y la auto-percepción de riesgo del VIH, las pruebas para la detección del VIH, y la disposición de revelar el estado de portador en caso de ser positivo.

En el Artículo IV, se encontró una creciente tolerancia hacia las relaciones entre personas del mismo sexo. Los HSH tienen una mejor comprensión de la transmisión del VIH que los hombres y mujeres de la población general (Artículo II). A siete de cada diez HSH y seis de cada diez mujeres les preocupaba la posibilidad de infectarse con el VIH.

Este estudio confirmó que Nicaragua tiene una prevalencia baja, pero con alto riesgo de infección y transmisión del VIH. Los resultados subrayan que los factores sociales, de comportamiento y culturales contribuyen a retardar la consecución de los Objetivos de Desarrollo del Milenio sobre la reducción de la desigualdad de género y la lucha contra el VIH y SIDA. Hacer frente a estos retos depende no sólo de la intervención con éxito en el cambio de comportamiento, sino también de implementar una estrategia de género culturalmente apropiada. Además, para afrontar la epidemia del VIH se requieren de sistemas más eficaces de monitoreo y evaluación.

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