

HIV MODES OF TRANSMISSION MODEL

*Analysis of the distribution of new HIV infections in the
Dominican Republic and recommendations for prevention*



Final Report: November
2010

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Dominican Republic and recommendations for prevention

This report is the result of the study conducted during the period August 2009-November 2010 by a working team integrated by:

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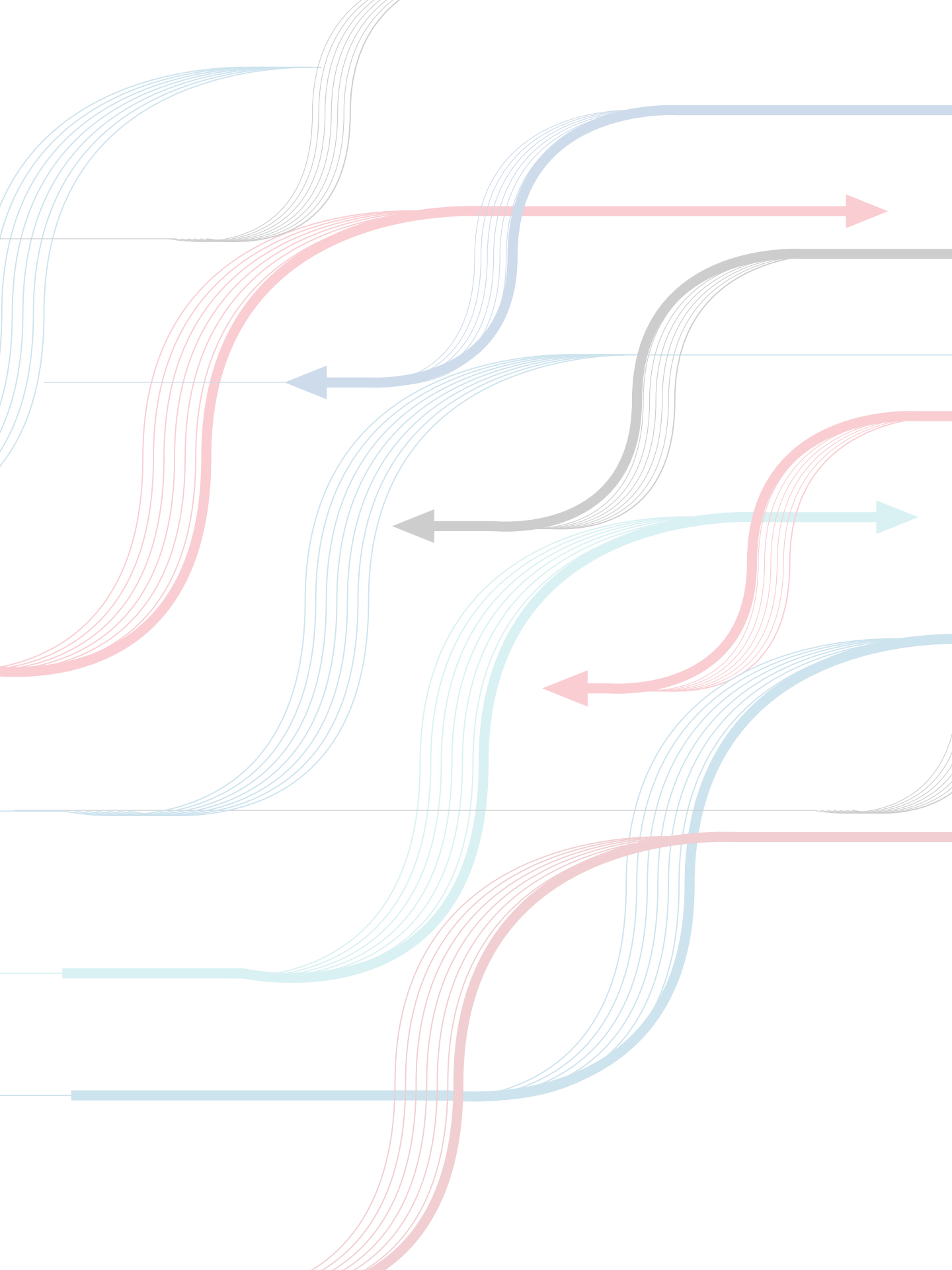
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Prologue

Twenty seven years after the first case of HIV infection was reported in the Dominican Republic, the country has proven its commitment with the Three Ones as a mechanism to coordinate a multisectoral national response to the epidemic.

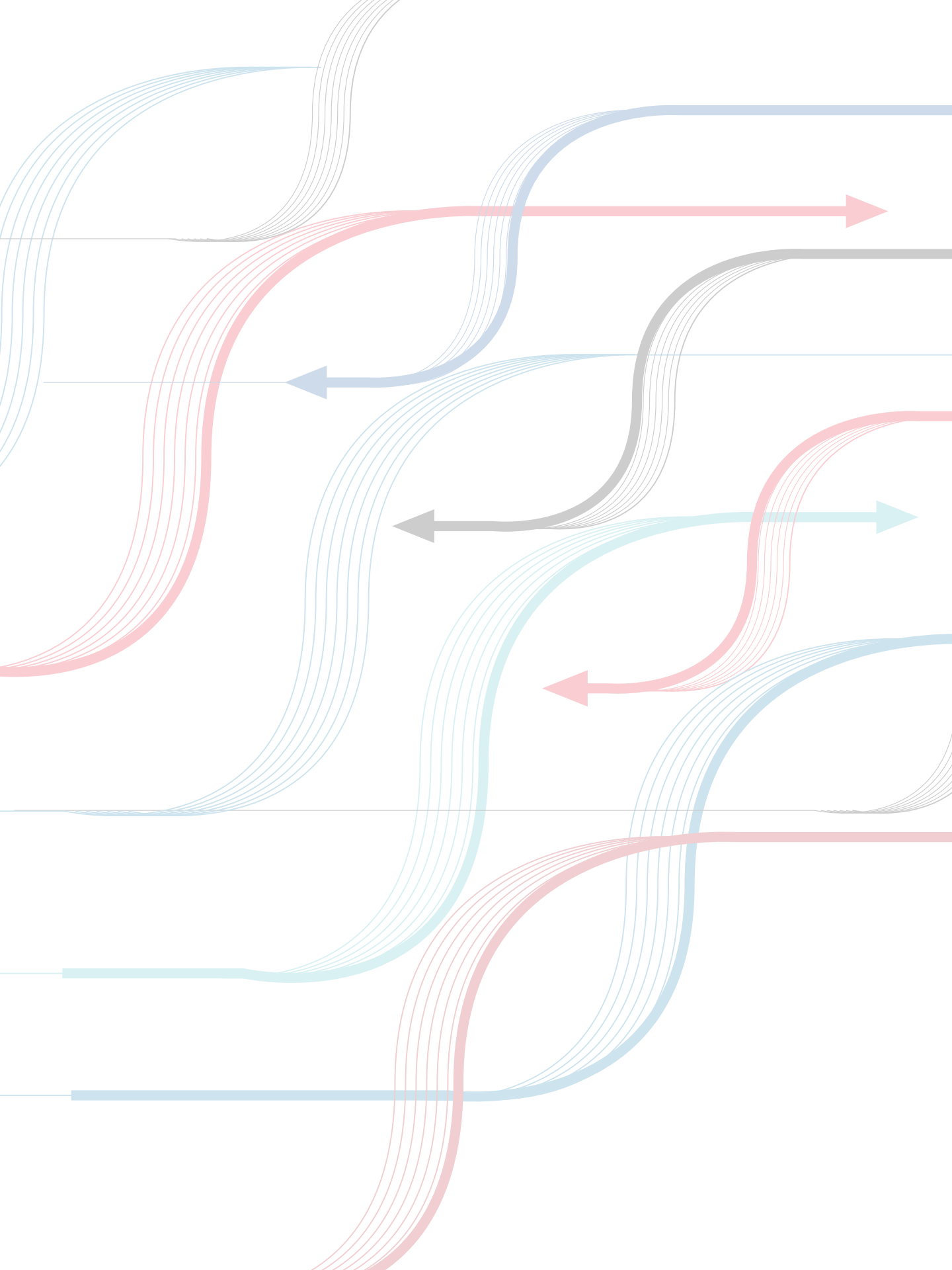
The Dominican Republic has a lengthy tradition of data collection which has been vital to characterize the HIV and AIDS epidemic in the country. Sentinel Surveillance Studies have been conducted since 1991; the Demographic and Health Surveys (ENDESA); the Estimations and Projections of HIV Prevalence and Burden of the Disease; behavior surveillance in vulnerable populations; a Surveillance Study on Behavior Linking to Serological Status, among others, provide qualitative and quantitative information to reflect the behavior of the epidemic and solid evidence to plan a consistent and effective response.

Appropriate prevention strategies that respond to the characteristics of the different epidemics that exist at global and country levels are fundamental for a successful response that contributes to the achievement of Universal Access and the Millennium Development Goals. To that end, identifying behaviors with a high risk of infection as well as the distribution of new infections in most-at-risk populations represents information that is critical in planning timely prevention strategies.

This Modes of Transmission exercise is the result of a joint effort of the Consejo Presidencial de SIDA (COPRESIDA) and the Dirección General de Control de las Infecciones de Transmisión Sexual y SIDA (DIGECITSS) with the support of UNAIDS.

The results of the study provide the country with an opportunity to reorient its prevention efforts and include interventions that generate impact and target those population groups where new infections are fueling the epidemic in country.

Dra. Ana Navarro
UNAIDS Country Office
Dominican Republic and Cuba





Remarks from National Directors

The AIDS epidemic has endangered the development of countries in this new century, presenting one of the greatest challenges of this generation and threatening human development. This epidemic will continue to challenge us for many decades in our endeavor to reduce its impact. To accomplish an efficient response requires the use of information obtained from epidemiological surveillance through different methods to verify the development of the epidemic at the national and global levels.

The Dominican Republic has considerable information on the prevalence of HIV, the status of the epidemic and the activities being carried out to reduce its impact; however, there is a more limited base of knowledge regarding incidence and modes of transmission.

The success of preventing the transmission of the HIV virus relies on changing several risk behaviors. These changes occur as a result of providing education, increased condom use, reducing the number of sexual partners by those who are sexually active, shifting the practice of sharing needles by injected drug users, among others.

Many countries increase their prevention efforts in a proportion similar to the spread of HIV to promote adequate behavior changes within the population at risk. In order to prioritize and design prevention efforts, countries need information to design effective prevention programs, to monitor and to subsequently verify if these programs are successful.

Given this need for information, the Joint United Nations Programme on HIV/AIDS (UNAIDS) has developed the epidemiological model, Modes of HIV Transmission (MOT), which allows countries at the global level to use national prevalence and behavioral data to model the distribution of the incidence in key populations at risk of HIV infection. This epidemiological model is intended to provide a simple message; it uses sources from different studies to generate an estimation indicating which populations will contribute most to the incidence of HIV in the short term; thus helping the country to “Know its HIV Epidemic”.

This report assembles the results of the first analysis conducted in the Dominican Republic, and reflects the distribution of new HIV infections and the recommendations for the prevention of HIV in the Dominican Republic.

The Consejo Presidencial del SIDA (COPRESIDA), institution responsible for coordinating the National Response, which I am honored to direct, is pleased to present to

you, the reader, and to all leaders and decision makers in the area of sexually transmitted diseases and AIDS, the results of the country application of the Modes of HIV Transmission Model, which presents a clear analysis of the distribution of new HIV infections and its recommendations resulting from this analysis for the prevention of this pathological entity in the country, and to serve as input for the development and implementation of short and medium term operational plans that will benefit the populations prioritized following this exercise.

Finally, I wish to convey a special acknowledgement to the central and local offices of the Joint United Nations Programme on HIV/AIDS (UNAIDS) for their technical and financial support to carry out this important exercise in our country.

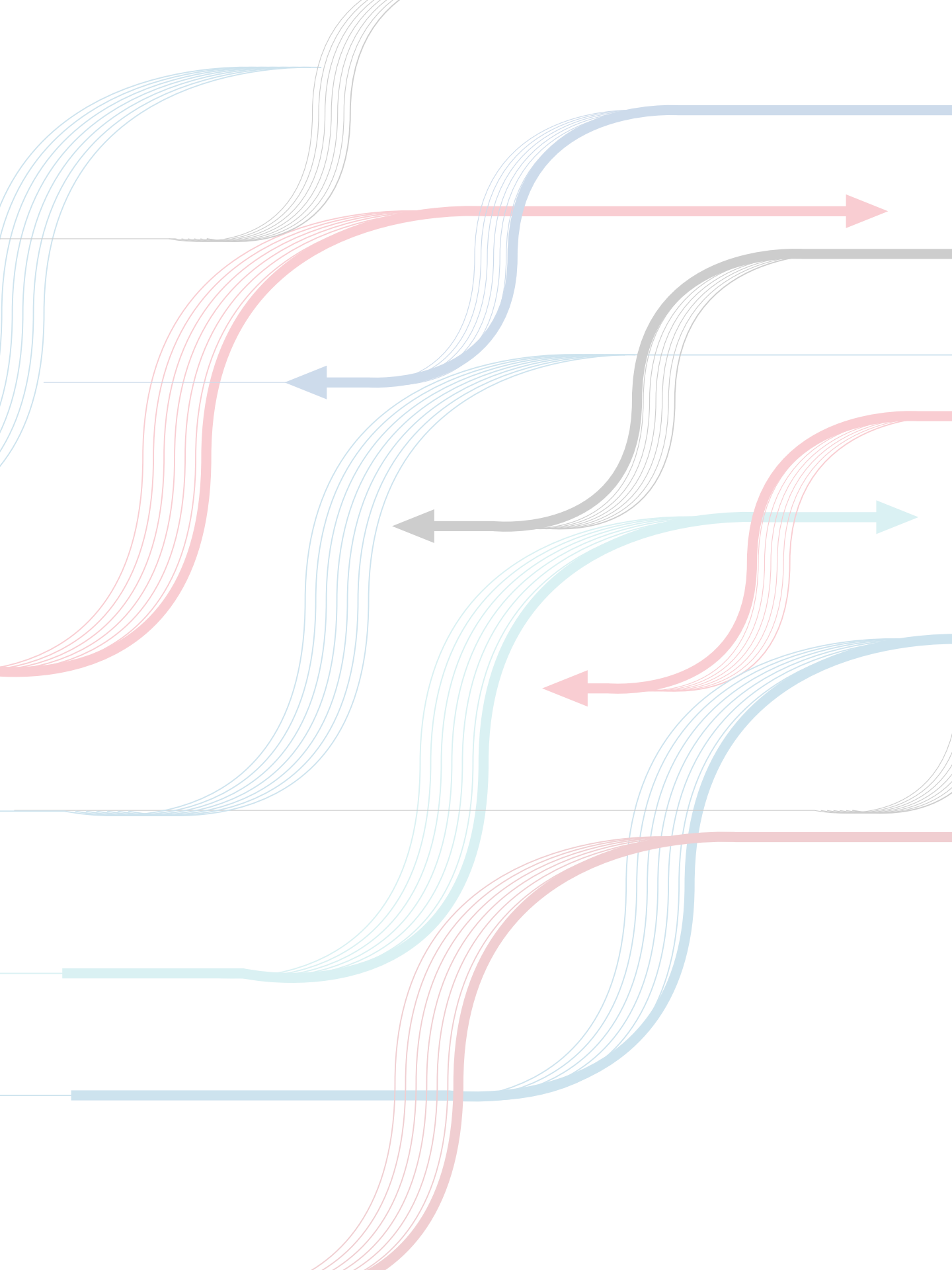
Dr. Gustavo Rojas Lara.
Executive Director - COPRESIDA

With joint efforts of the Ministry of Health and the main stakeholders who participate in the National Response to HIV and AIDS, DIGECITSS and COPRESIDA have developed the study, “Modes of HIV Transmission Model”, contributing to widen the scope of the response and better adapt it to the country’s needs.

The Dominican Republic is among the first countries in Latin America to apply the Modes of Transmission Model, an epidemiological tool intended to provide a simple message to indicate which populations will contribute most to the incidence of HIV, so that prevention efforts and resources may be directed to these populations.

This document is an important tool made available to all the stakeholders and decision makers of the National HIV/AIDS response. The results of the study aim to shed light on the current situation of HIV in vulnerable populations to facilitate timely and efficient decision-making to address the HIV and Aids epidemic at the national level.

Dr. Luis Ernesto Feliz Báez
Director DIGECITSS.





Abbreviations

ARV: Antiretrovirals

COPRESIDA: Consejo Presidencial del SIDA [Presidential AIDS Council]

DIGECITSS: Dirección General de Control de las Infecciones de Transmisión Sexual y SIDA.[General Directorate for the Control of Sexually Transmitted Diseases and AIDS]

ENDESA: Encuesta Nacional Demográfica y de Salud [Demographic and Health Survey]

BSS: Behavior Surveillance Survey

FFAA: Armed Forces

DRG: Dominican Government

GTMSM: Gays, transsexuals and men who have sex with men

MSM: Men who have sex with men

STI: Sexually Transmitted Diseases

CCM: Country Coordinating Mechanism

MOH: Ministry of Public Health

MOT: Modes of Transmission

M&E: Monitoring and Evaluation

NGO: Non Governmental Organization

PAHO: Pan-American Health Office

WHO: World Health Organization

CBO: Community Based Organization

NSP: National Strategic Plan

PNRTV: Programa Nacional para la Reducción de la Transmisión Vertical [National Program for the Reduction of Mother to Child Transmission]

PNCTB: Programa Nacional de Control de la Tuberculosis [National Program for TB Control]

PLWHA: People living with HIV and Aids

PEPFAR: President's Emergency Plan for AIDS Relief

CSW: Commercial sex workers

RCC: Rolling Continuation Channel

USAID: United States Agency for International Development

DU: Drug users

IDU: Injected drug users

UNICEF: United Nations Children's Fund

UNFPA: United Nations Population Fund

UNAIDS: Joint United Nations Programme on HIV/AIDS

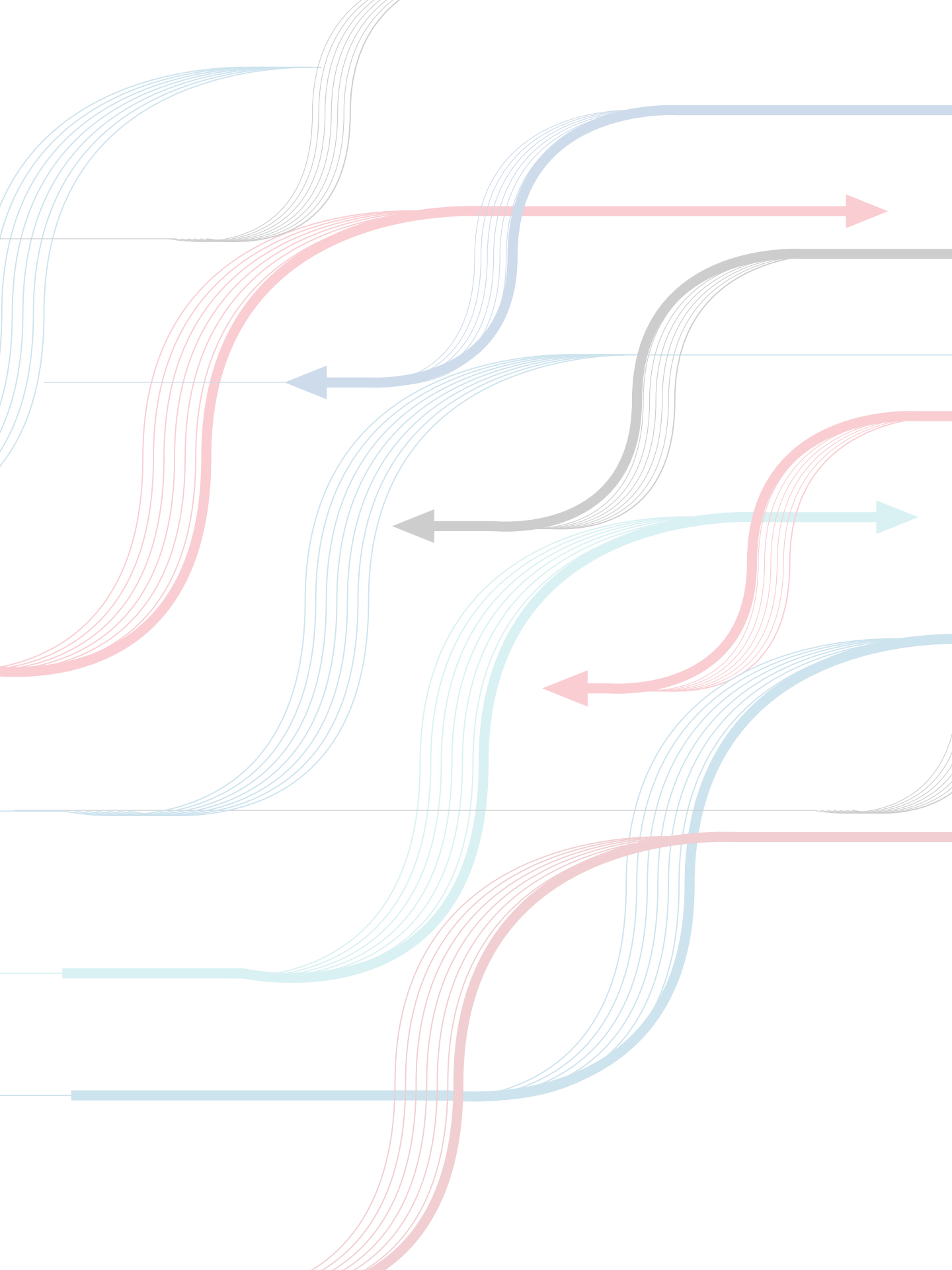
UNGASS: United Nations Global Assembly Special Session on HIV/AIDS

SESPAS: Secretaria de Estado de Salud Pública y Asistencia Social [former Ministry of Public Health]

MEE: Ministry of Education

AIDS: Acquired Immune Deficiency Syndrome

TB: Tuberculosis





Executive Summary

Introduction

According to the HIV prevalence rates reported for the general population in the 2007 Demographic and Health Survey (ENDESA 2007), as well as in the latest Sentinel Surveillance Survey for pregnant women, 0.8% and 1.37%, respectively, HIV in the Dominican Republic is categorized as a generalized epidemic. In other words, while vulnerable subpopulations may continue to contribute disproportionately to the spread of HIV, sexual contact in the general population is sufficient to sustain an epidemic, regardless of other subpopulations at high risk of infection (Estimaciones y Proyecciones, 2009). Based on this classification, the national Aids response has been reinforcing its interventions in the general population and providing fewer resources for those populations that are considered vulnerable to HIV, such as commercial sex workers (CSW) and their clients, gays, transsexuals and other men who have sex with men (GTMSM) and other groups with a much higher prevalence than the general adult population.

The Behavioral Surveillance Study Linked to Serological Status (COPRESIDA, 2008) provides prevalence and behavior data in groups of CSW, drug users (DU) and GTMSM; however, and despite the

significant contribution of this survey, there is still a lack of information: 1) to underline the importance of concentrating efforts on vulnerable populations, and 2) to have an accurate knowledge of which populations are contributing most to the HIV epidemic in the country. A minimal portion of the current RCC Global Fund grant to the country as assigned to prevention, thus the importance of counting on evidence that would enable appropriate decision-making with respect to the allocation of funds.

Objectives

The objective of the Modes of Transmission Model (MOT) is to use sources from different studies to generate an estimation of the specific populations foreseen to contribute most to the incidence of HIV during the coming year, so that prevention efforts and resources are directed to those populations.

Methodology

The epidemiological Modes of Transmission Model (MOT) was developed by the Joint United Nations Programme on HIV/AIDS (UNAIDS). The following steps

were taken for its application at country level: 1) selection of the populations that share the same risk behavior; 2) search for information sources to establish indicators, including population size, HIV and STI prevalence, condom use, number of sexual partners and sexual acts with partners; 3) selection of the best quality sources to be incorporated based on defined criteria, such as study coverage, validity and methodology, and 4) data processing and analysis, which included entering information and developing estimations of HIV incidence for the coming year, by population.

Among the populations that were selected based on a common risk behavior and the availability of data to generate incidence estimations are: commercial sex workers, their clients, men who have sex with men, injected drug users, residents of bateyes and various segments of the general population.

Results

The results of the Model showed that most of the new infections in 2010 are estimated to occur in two population groups: gays, transsexuals and other men who have sex with men, with 33.3%, and a segment of the general population who engage in sex with a steady partner or who have “low risk” sex, with 31.9%.

These are followed by other population groups at higher risk such as residents of bateyes (9.1%), the clients of CSW (5.6%) in addition to the other segment of the general population that reported having casual sex (8.3%).

Discussion

The results provide evidence which suggests the coexistence of a generalized and a concentrated epidemic, since the groups that are contributing most to the HIV epidemic with a large number of new infections are found in segments of the general population such as those having sex with only one partner, which is considered “low risk”, as well as particularly vulnerable populations such as GTMSM. This fact has significant implications for the efforts that are being made in prevention, as they require actions addressed both to specific groups and to the general population.

Although they are not explicitly depicted in the MOT model, the subpopulations within each group must be taken into account so as to design interventions that reach groups considered to be the most vulnerable. Such is the case of drug users in every population group, as studies show this type of behavior places people at an even higher risk if HIV infection. The case is similar with transsexuals, who report a higher STI and HIV prevalence than the rest of the GTMSM population. Finally, women without formal education, who may belong to or be the partners in multiple groups, also require further follow up.

It is important to be able to conduct a supplementary analysis of the funds currently being invested in programs that address these population groups, in order to determine if the investment is consistent with the estimated needs with respect to the new infections foreseen to occur in each population.



Introduction

Epidemiological situation

The epidemiological profile of the HIV epidemic in the Dominican Republic has been constructed based on multiple studies, including the Demographic and Health Surveys (ENDESA) completed in 2002 and 2007 which have provided prevalence rates for the general population and residents of the bateyes, as well as the Sentinel Surveillance Surveys that are being conducted since 1991 with commercial sex workers, pregnant women and patients requiring treatment for a STI. National estimations are based on the results provided by both the ENDESA and the Sentinel Surveillance Survey in pregnant women. According to the National Estimations of HIV Prevalence and Burden of the Disease, in 2009 the HIV prevalence in the adult population (15-49 years) is 0.85%, which in absolute numbers represents 48,560 people living with HIV or Aids in the Dominican Republic.

The Behavior Surveillance Study 2008 (BSS) and the Demographic and Health Survey (ENDESA) in bateyes complement the data on other population groups such as residents of bateyes, communities located in sections and localities throughout the national territory but mainly those near sugar cane plantations, which play a socio-cultural and economic role in the country. The majority of these communities are populated by Haitians and their Dominican descendants. Also included are commercial sex workers (CSW), drug users (DU), gays, trans and other men who have sex with men (GTMSM); these groups, together with subgroups within the general population such as women with no formal education, have an impact on the HIV incidence in the Dominican Republic. In addition to pointing out these subgroups, these studies identify geographic areas with larger numbers of people living with HIV/AIDS in comparison

Table 1: HIV Prevalence in Specific Populations

Population	HIV Prevalence	Source
CSW	4.8% (3.3%-8.4%)	SSS*, 2008
GTMSM	6.1% (5.1%-7.6%)	SSS*, 2008
DU	7.8% (5.1%-13.7%)	SSS, 2008
Residents of bateyes	3.20%	ENDESA bateyes, 2007
Women with no formal education/preschool	3.70%	ENDESA, 2007

with the rest of the country, which include health regions V (1.2%) and VII (1.6%).

National Response to STI/HIV/AIDS

In terms of the structure for service provision, the Ministry of Public Health (MPH) is responsible for all public health programs in the Dominican Republic. The Dirección General de Control de las Infecciones de Transmisión Sexual y SIDA (DIGECITSS) is a branch of the MOH responsible for management, monitoring and evaluation of all the actions in HIV prevention and care in the country. At the same time, the Dirección de Desarrollo y Fortalecimiento de los Servicios Regionales de Salud, (REDES), [Office for Development and Strengthening of Regional Health Services] is responsible for governing the provision of health services at the facility level.

The Consejo Presidencial de SIDA (COPRESIDA) is a governmental institution, created by Presidential Decree 32-01, responsible for organizing and regulating the National Response to HIV and AIDS at country level. COPRESIDA oversees the inclusion and participation of all sectors (multisectoral response) and resource mobilization. Currently, COPRESIDA is co principal recipient of the Global Fund grant for HIV and AIDS jointly with the Instituto Dermatológico y Cirugía de la Piel (IDCP) [Dermatological and Skin Surgery Institute], a non-profit organization responsible for implementation of the grant funds with civil society organizations.

Since 2003, the country was in need of an updated National Strategic Plan (NSP), and

with the support of a World Bank loan was able to complete the development process of the NSP 2007-2015 which was coordinated by COPRESIDA with the participation of governmental organizations for public service (GO), non governmental organizations (NGO), including civil society organizations community based organizations, faith based organizations (FBO) and international technical and financial cooperation agencies.

Based on the current country situation, the National Strategic Plan prioritized the scope of work in HIV prevention with the following vulnerable groups:

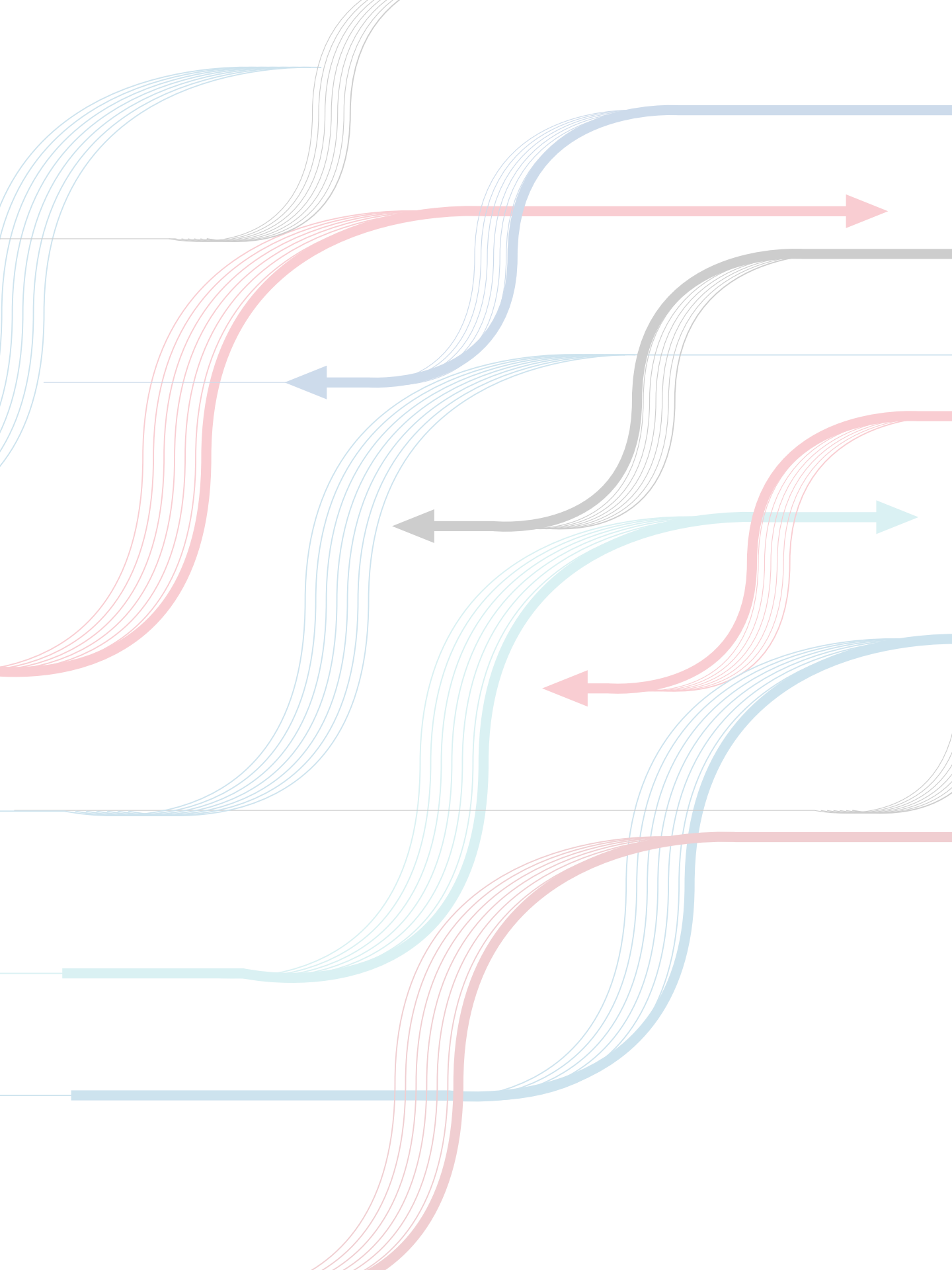
- a) Children and adolescents
- b) Young people of both sexes
- c) Women
- d) Residents of the bateyes
- e) Migrants with emphasis on the Haitian population and their descendants in the Dominican Republic
- f) Male and female commercial sex workers
- g) Gays, transsexuals and other men who have sex with men
- h) People with disabilities
- i) Drug users
- j) Prison inmates
- k) People living with HIV or Aids

In addition to the role played by the governmental institutions, a great diversity of civil society organizations participate in the National Response to STI, HIV and Aids in the Dominican Republic currently leading prevention efforts in the country.

Objectives

The main objectives of the MOT Model are:

- *To understand and estimate the importance of the sources of new HIV infections.*
- *To create a simple message that will allow for the use of that information for planning STI, HIV and Aids prevention programs and efforts.*





Justification of the MOT Model

The UNAIDS Modes of Transmission Model uses the national prevalence and behavior data to model the incidence distribution in key populations at risk of HIV infection. It is therefore an important tool to support the country in “knowing its HIV epidemic”. Before conducting this exercise, it is essential to review the existing epidemiological data at the country level in order to develop a clear account of the dynamics of the HIV infection and assess the degree of alignment between the program and the budgetary allocations and the priority areas identified through this modeling exercise. When an understanding of the epidemic and the national context (gaps, risks, service coverage and resources) is developed, the country can make better decisions in terms of identifying priorities and setting targets for an effective strengthening of the universal access to prevention, care, support and treatment of HIV. It is consequently an important tool to support the country in knowing its HIV epidemic.

In terms of the Dominican Republic, the application of the MOT Model is very relevant for the following reasons:

1. Due to the fact that the country's epidemic is considered to be generalized, less attention is given to vulnerable populations.

According to the HIV prevalence rates reported for the general population in the last Demographic and Health Survey (ENDESA 2007), as well as in the latest Sentinel Surveillance Survey for pregnant women, 0.8% and 1.37%, respectively, HIV in the Dominican Republic is categorized as a generalized epidemic. In other words, while vulnerable subpopulations may continue to contribute disproportionately to the spread of HIV, sexual contact in the general population is sufficient to sustain an epidemic, regardless of other subpopulations at high risk of infection (Estimaciones y Proyecciones, 2009). Based on this classification, the national Aids response has been reinforcing its interventions in the general population and providing fewer resources for those populations considered vulnerable to HIV, such as commercial sex workers (CSW) and their clients, gays, trans and other men who have sex with men (GTM) and other groups with a much higher prevalence than the general adult population.

The Behavioral Surveillance Study Linked to Serological Status (COPRESIDA,

2008) provides prevalence and behavior data in groups of CSW, drug users (DU) and GTMSM; however, and despite the significant contribution of this survey, there is still a lack of information: 1) to underline the importance of concentrating efforts on vulnerable populations, and 2) to have precise information on which populations are contributing most to the HIV epidemic in the country. In addition, the weaknesses in the National Epidemiological Surveillance System do not allow to generate incidence data, which also limits the information available for decisions making.

2. The high investment in treatment for PLWHA translates to fewer resources available for prevention efforts and the need to prioritize populations and cost-effective interventions.

Approximately 30% of the resources required for the National Response were covered by the last Global Fund grant. The greater part of these funds was assigned to the treatment of people living with HIV/Aids because the cost of ARV is still not covered by the Dominican Social Security System. This pattern is also reflected in the NASA 2008 report, where 27% of the resources were committed to prevention, in comparison with 40% for care and treatment. In addition, it is unknown if the vulnerable groups are included in the 27% of the resources invested in prevention.

3. An analysis would enable the development of valuable information for decision-making on national prevention strategies.

Given that the country has fewer resources for prevention, it becomes even more pertinent to rely on sufficient evidence to make adequate decisions regarding the use of funds. In addition, the new financing opportunities, Rounds 10 and 11 of the Global Fund and PEPFAR from the United States Government, require ample justification and evidence to apply for funds that may be used in the various sectors of the National Aids Response.

Technicians at the local level have also recognized the MOT Model as a useful tool the country can continue updating in the coming years to make estimations of the incidence within specific groups. Having a user friendly tool for local technicians is an added strength for the country. Likewise, through time and as more country studies and data analyses are completed, additional data on different populations will become available that will continue to enhance future applications of the MOT model.



Methodology

Modes of Transmission Model and its application at the international level

The purpose of the model is to calculate the expected HIV incidence in the short term within the adult population by mode of transmission. The calculation is based on the current HIV prevalence, the number of individuals in particular at-risk groups and the risk of exposure to HIV infection within each group. The model was initially developed by the UNAIDS Reference Group for Estimations, Models and Projections in 2002 and since then it has been used in several countries. It was also developed as part of the UNAIDS/WHO methodology and has been included in regional training workshops conducted by UNAIDS and WHO. This model has been applied in several African countries and its application has recently started in Latin America and the Caribbean regions, namely in Peru, Mexico and the Dominican Republic.

Application of the Model in the Dominican Republic

The application of the Modes of HIV Transmission Model was led jointly by a national team and an international technical group with expertise in the application of

this tool. In the Dominican Republic, the local team was coordinated by the pertinent government institutions (COPRESIDA and DIGECITSS) with the support of the local UNAIDS office.

The application of the MOT study began in August 2009 and was completed in September 2010. The following steps were taken during the development process:

1. Creation of the local working group and training on the MOT Model

A technical team was created with representatives from COPRESIDA, the National HIV/AIDS Program (DIGECITSS) from the Ministry of Health; a technical staff member from UNAIDS and a local consultant contracted to support the process. This local team joined the UNAIDS Geneva team which guided the review process of the MOT findings. Once the team was established, it participated in an on-line training of the model, to review the methodology and experience of the African countries. Guidelines were defined to plan the implementation process of the MOT model in the Dominican Republic, resulting in a joint work plan.

2. Selection of the populations and creation of operative definitions

The first step was to select the most-at-risk populations to be considered for incorporation in the model. In addition to CSW, their clients, GTMSM, IDU and other segments of the general population, initially it was decided to include residents of bateyes, due to the characteristics that place this population at risk of infection. While aware that the population group living in the bateyes consist also of IDU, CSW and GTMSM

who are contributing to the prevalence within this group, it was deemed important to reflect this population and its current situation in the model. In the absence of other data associated with the migrant population in the country, the bateyes population was selected with the purpose of including other data on migrants as these became available. Similarly, the definitions and indicators of these populations were documented based on recent studies conducted in these populations. A breakdown of these definitions is shown in the table below.

Table 2: Definitions of the populations*

Population	Operative definition
Female sex workers	A woman who had exchanged sex for money in the last 6 months.
Clients of the CSW	Men aged 15-59 years who reported having paid for sex in the last year
Partners of Clients	Number of clients who are married
GTMSM	Men who identified themselves as gay, transsexual or other men who have sex with men
Partners of GTMSM	Number of GTMSM who reported being married or living with a woman.
IDU	Man or woman who had used injected drugs in the last 6 months.
Partners of IDU	Approximately 50% of total population of IDU.
Residents of bateyes	Persons included in the ENDESA in bateyes.
Persons with multiple sexual partners—“Casual heterosexual sex”	Of the women and men who had sex in the last 12 months, those who had high risk sex in the last 12 months. (High risk sex is defined as having sex with a person not living with you)
Partners of CHS	Part of the population reporting having had “casual heterosexual sex” who is married.
Persons with a single partner—“Low risk heterosexual sex”	Of the women and men who had sex in the last 12 months, those who DID NOT have high risk sex in the last 12 months. (Other segment of the population who DID NOT have high risk sex or sex with a person not living with them)
“Without risk”	Persons in the general population who reported not having sex in the last 12 months.

*Note: these definitions were utilized in the studies that were used as data sources.

3. Data collection

After defining the populations, the work team proceeded to make a preliminary identification of potential sources of information. In order to collect the largest amount of information possible, a written communication was sent to the institutions working with the populations of interest. After the communications were sent out, calls were made to coordinate the search for documentation and to verify the data submitted. The internet was also used to find publications from the Latin America and Caribbean regions and other statistical data published by organizations such as WHO, UNAIDS, PAHO and USAID. Appendix A shows the complete data collection sheet which includes identification of values used for each indicator and their respective explanation of the calculations and the data sources.

4. Data verification and selection based on quality criteria

Following the first data collection exercise, the data was evaluated. In many cases, as with the population of CSW, multiple studies have been conducted which provide prevalence and behavioral information. When various sources were available for one group, the team evaluated the quality of the study, including sample size, geographic scope and the date it was completed. Also, a comparison of the operative definitions used in the different studies was made to determine which source better depicted the “risk behavior” of that particular population. This process was initially

conducted by the country technical team and later revised during the regional meeting and in the presentation with local experts.

5. Entering data in the MOT Model

Once the preliminary data was obtained, it was entered in the Excel sheet. After checking the type of analysis generated, the model was adjusted and revised in order to reflect precise data. To see the model, please see Appendix D.

6. Validation with other countries

A review of the data included in the model was reviewed during a meeting held in February, 2010 with the participation of Mexico and Peru. Based on other studies conducted in these two countries and shared methodologies to estimate populations of MSM and CSW, some additional adjustments were made to the model.

7. Consensus with local experts

A validation workshop was conducted to facilitate data revision with the institutions involved in the National Aids Response. The following was achieved during this workshop:

- Review of the populations selected for application of the model.
- Validation of the data sources used for each indicator in the selected populations.
- Adjustment of the results based on calculations of the Dominican population.

As part of this consensus, the group of local experts requested a revision of the populations prioritized in the National Strategic Plan to enable full comprehension of the inclusion and non inclusion of these populations in the model. The main

criterion to determine if a population should be included in the model was if it shared a common behavior, followed by the availability of information on that particular population.

The following table shows the populations and their corresponding evaluations.

Table 3: Populations evaluated for inclusion in the MOT Model

Population	Shared Risk Behavior	Available sources to respond to indicators? Yes/No
GTMSM	Multiple sexual partners/acts without using a condom	Yes
CSW	Multiple sexual partners/acts without using a condom	Yes
Clients of CSW	Multiple sexual partners/acts without using a condom	Yes, limited
IDU	Sharing needles	Yes – needs further analysis
Residents of Bateyes	Multiple sexual partners, closed population	Yes
Migrants	Multiple sexual partners/acts without using a condom	No – requires further analysis of other studies.
Military and uniformed	Multiple partners	Yes – check what is available
Women with no formal education	Unknown – multiple partners? CSW? Spouses are clients of CSW?	Yes – ENDESA
Drug Users (not injected)	Unknown – clients of CSW? Multiple partners?	Yes, but there are difficulties in identifying DU in other subgroups to avoid duplication
Prisoners	Multiple partners, closed population	No
People with disabilities	They do not share same behavior	No
Street children and adolescents	*Not all are sexually active *Model only considers adults	

As a result of the analysis, the following populations were confirmed for inclusion in the model: GTMSM, CSW, their clients, IDU, residents of the bateyes and the rest of the general population comprised of the different subgroups, by behavior.

Disaggregating the subpopulations within the GTMSM and adding the populations of women with little schooling and drug users was also considered. This proposal, as well as the available data and the conclusions are outlined in the table below.

Table 4: Analysis of options to include additional elements in the MOT Model

Issue	Options	Information	Decision
How can we include drug users without overlapping populations?	<p>Include them in different subgroups (users and non-users). GTMSM, clients of CSW, men in the general population.</p> <p>This would provide evidence to support the premise that drug use is a behavior that contributes considerably to HIV transmission.</p> <p>Include new lines; insert data and leave the rest as is (only divide population number).</p>	<p>GTMSM: Drug use once a week (68.7%) Drug use daily (31.3%).</p> <p>Clients: Since we have no information on clients, we have no information on drug use in this population.</p> <p>Men general population: We have no drug use information in the ENDESA.</p>	<p>Include results from subgroups (users and non-users) as an additional study (separate from the MOT model) to document the importance of drug use as a risk behavior.</p> <p>Consider this for the next MoT exercise.</p>
Should we divide GTMSM in Trans and other MSM?	<p>They could be divided using assumptions for indicators of partners of trans population.</p> <p>We would have to work to subtract this segment of the population (trans and their partners) from the group of MSM to avoid overestimation.</p>	55% STI, 47.7% HIV (N=109 trans in a sample of 1,388).	<p>Without disaggregated data on trans and other MSM and their respective partners, we cannot incorporate in the model.</p> <p>Try to collect information for future MOT models.</p>
How can we include women with no formal education?	As there is no data for behavior based on education level, it is not recommended to include in the model.	3.7% prevalence in women with no formal education (ENDESA, 2007).	Calculate approximate incidence rate in subgroup of women with no formal education to have this information to enhance the analysis.

8. Data analysis and report development

Following the debate concerning the possibilities of including different populations in the model, the data analysis was conducted and completed. In addition to observing the populations with higher incidence estimations, it was important to compare the results of the MOT with the Estimations and Projections of HIV Prevalence and other exercises to ensure coherence with other national data.

Once we completed the information, we began to draft the country report and prepared an executive summary to share with the stakeholders of the National Response.

9. Uncertainty Analysis

The estimates of “uncertainty” or confidence intervals are not incorporated directly in the MOT Model; however, it is important to have certain measures to determine the reliability of the results. Uncertainty is produced as a result of the availability and quality of the data in terms of representation, the capacity of generalizing the results and the statistical impact of the studies conducted. In order to consider these factors, collaborators from the Futures Group developed a method to estimate the level of uncertainty of each MOT model applied.

This is done by attributing a variation ratio to each variable ranging from 0%, if we are absolutely sure of a correct value, to 100% if we have a number of doubts concerning a particular estimate. The levels assigned are outlined by source in Appendix B.

Results

Summary of the results

As seen in the graph below, the results of the application of the Model indicate that most of the new infections estimated to occur in 2010 will be concentrated among two population groups: gays, transsexuals and other men who have sex with men (33.3%) and the portion of the general population who engages in sexual relations only with the person they live with or “low risk” sex, (31.9%).

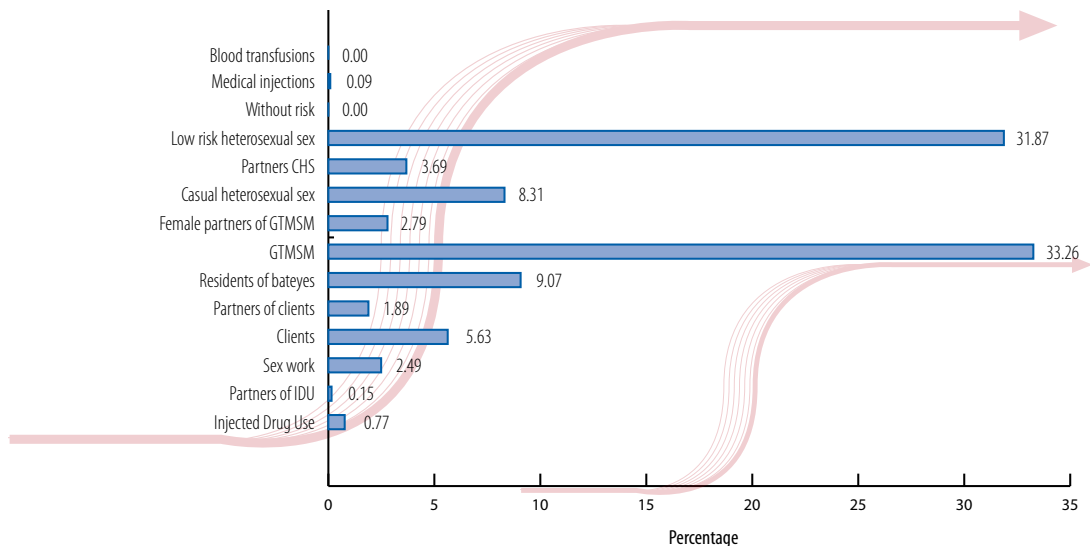
These are followed by other population groups at greater risk such as residents of the bateyes (9.1%), the clients of CSW (5.6%) and

the other segment of the general population reporting casual sex (8.3%).

It is interesting to note that the group in the general population reporting “low risk” sexual relations or having sex only with a steady partner contributes a greater number of new infections than those reporting “casual” sex with various partners. Contrary to what would be expected, that those engaging in casual heterosexual relations and considered a higher risk group would contribute significantly more cases of HIV infection, this is not the case.

This may be the result of multiple behaviors such as the lack of condom use

Graph 1: Results of the MOT Model



among cohabitating partners (or with trusted partners), and unfaithful partners, among others. Since estimations indicate this group will contribute 31.9% of new infections in 2010, it is important to consider strategies that address this population.

Similarly, with an approximation of more than 33% of new infections, GTMSM is a group that merits close attention. This is a result of many factors, including a low level of condom use.

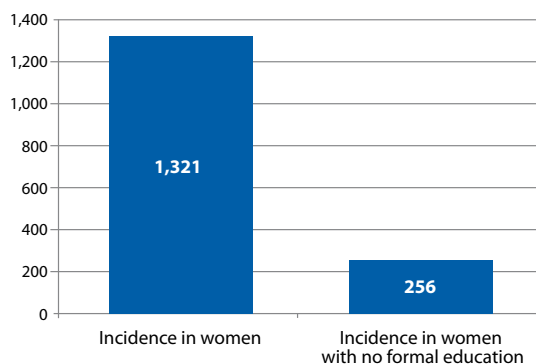
The results also reveal that attention should be given to residents of the bateyes and the clients of CSW. In the case of the bateyes, although the prevalence here is three times higher than in the general population, all the specific reasons which place these individuals at greater risk are unknown. There are many probable factors, mostly associated with their level of mobility; whether they are migrants or permanent residents, and their sexual behavior. Likewise, the clients of CSW have not been considered a country priority in terms of STI/HIV/Aids prevention and, together with the residents of the bateyes, should be subject to further research and analysis to determine their role in the spread of the epidemic.

Analysis of women with no formal education

Although women with no formal education was not included as a separate group in the MOT Model to avoid duplication of women in other groups that were included in the model, an analysis was conducted to obtain an approximate number of new infections contributed by this group within the incidence rate for women. As seen in the

graph below, women with no formal education would represent 19% of the HIV incidence in women.

Graph 2: HIV incidence in women with no formal education



Analysis of uncertainty

The uncertainty levels for the incidence values included in the MoT model in each population are shown in Graph 3 below. As it can be observed, the groups representing the highest numbers of infection, both in GTMSM and in the general population reflect wider confidence intervals.

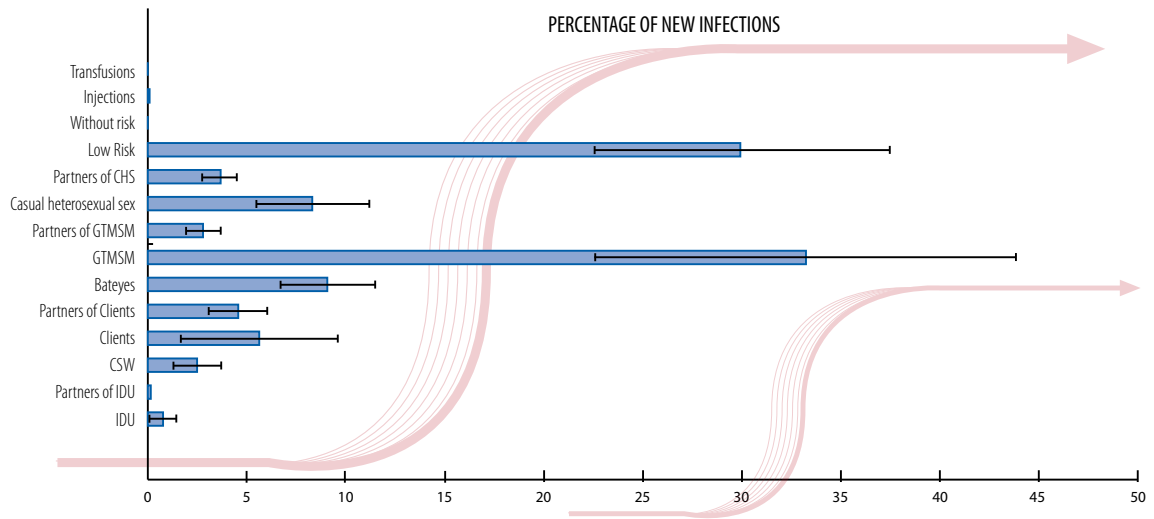
Limitations of the MOT Study

Since the Modes of Transmission Study is a model of incidence estimations, it has certain limitations that must be considered when interpreting the results. These include:

Gaps in the availability of information.

The lack of information to generate the indicators required for the MOT Model led to the use of several assumptions, use of Regional data sources, and in some cases, the omission

Graph 3: Results of uncertainty analysis



of populations considered to be significant. These gaps include the following:

- Lack of information on the size (number of individuals) of specific populations such as CSW, drug users and residents of bateyes.
- Data on the number of partners that was available, particularly in specific behavior studies. These studies were usually limited to certain geographic areas where specific projects have been conducted and the data is not able to be generalized to reflect the National situation.
- In some cases, a complementary analysis of previous surveys such as the ENDESA and the Behavior Surveillance Study was needed to obtain data that was not analyzed in these studies. Given the lack of resources

and time to conduct this exercise, such needs must be identified for a future MOT study.

The quality of the data determines the precision of the incidence estimation. Since the MOT model is based on existing prevalence and behavior data from other studies conducted, the quality of the data in these studies has a significant impact on the results of the model.

Difficulties with the estimation of the number of people by population group because of the inability to group individuals under a single HIV risk behavior. Since the MOT Model requires that 100% of the country population is placed under one of the selected categories it is difficult to consider those individuals with multiple risk behaviors. For example, a woman

with no formal education can be at the same time a commercial sex worker or the partner of a man with multiple sexual partners, placing her in several categories at the same time. Thus, it is impossible to analyze how

the sum of various risk behaviors contributes more to the possibility of becoming infected with HIV, as the model requires dividing the entire population in groups. Similarly, this presents a challenge when attempting to include groups such as women with no formal education, because they could also be partners of GTMSM, commercial sex workers, women with a single partner or women with multiple partners.



Recommendations

The following recommendations are made based on an analysis of the data produced by the MOT Model:

Discuss and determine priorities in STI/HIV/AIDS prevention: The analysis of the MOT produced information that is highly useful. However, if this information is not disseminated and used in decision-making, it loses momentum. Therefore, it is extremely important to promote discussions to evaluate current strategies and future investments in prevention using the study results.

Analysis of investment vs. needs: It is important to be able to carry out a subsequent study on the current financial investment in programs addressing these population groups with HIV prevention activities to determine if the investment corresponds to the estimated needs in terms of new infections expected in each population.

Importance of the subpopulations: Although they are not explicitly depicted in the MOT model, the subpopulations within each group must be taken into account so as to design interventions that reach the most vulnerable portions of these groups. Such is the case of drug users in every population

group, as studies show this type of behavior places people at an even higher risk if HIV infection. The case is similar with transsexuals, who report a higher STI and HIV prevalence than the rest of the GTMSM population. Finally, women without formal education, who may belong to or be the partners in multiple groups, also require further follow up.

Surveillance of population groups: Apart from commercial sex workers, who are part of the populations monitored by the Sentinel Surveillance Studies, the rest of the populations are monitored through specific behavior surveys. Many of these studies are conducted in response to the specific needs of donors and projects rather than to meet the country need to monitor the epidemic as well as changes in behavior and trends among these groups. It is therefore also important to identify needs for strategic information to enable planning and to provide continual monitoring of high-risk groups.

Identify needs for strategic information and research: As an added value to the application of the MOT Model, important information gaps were identified in the different population groups. In some cases, the data is insufficient to determine the status

of the population and in others there is limited information; thus greater efforts are required to enable the inclusion of these populations in future exercises. If a needs assessment is achieved as a source to develop an agenda of

priorities in terms of strategic information, the country will make a better use of the resources available for surveillance, research, monitoring and evaluation of the HIV and Aids epidemic.



Appendices

Appendix A: Data Collection Sheet

Risk Group	Estimation	Year of Estimation	Data Source	Comments
Total number of adults (15–49 years)	M: 2,472,943 W: 2,536,507 Total: 5,204,450	2009	Consejo Nacional de Población y Familia (2009). Estimations and Projections of the Dominican Population by province and municipality. Searched December 15 at http://www.conapofa.gov.do/estimaciones.asp	
Estimated HIV prevalence in adults	M: 0.8% W: 0.8% Total: 0.8%	2007	Centro de Estudios Sociales y Demográficos (May 2007). Demographic and Health Survey, Dominican Republic	
1) Commercial sex workers (CSW)				
1.1-Number / percentage of female sex workers in the population	80,000	2004	1-Kerrigan et al (2004). Combinando Estrategias Comunitarias y Política Gubernamental para Prevenir la Infección del VIH en la República Dominicana	60,000-100,000-AIDSCAP 1993 and COIN 2000 (use median=80,000)
1.2-HIV prevalence in CSW	4.8%	2008	COPRESIDA (May 2009). First Behavior Surveillance Survey in Vulnerable Populations linked to Serological Status: Gays, Trans and other MSM, Commercial Sex Workers and Drug Users.	Definition: (VCC) a woman who had sex in exchange for money during the last 6 months
1.3-STI prevalence in CSW	7%	2008	COPRESIDA (May 2009). First Behavior Surveillance Survey in Vulnerable Populations linked to Serological Status: Gays, Trans and other MSM, Commercial Sex Workers and Drug Users.	Syphilis- 7%, Hep B-.08%, Hep C-.06% We used syphilis assuming it is "for life". No data available on gonorrhea or Chlamydia.
1.4-Average number of sexual partners per year	156	2004	DIGECITSS (2004), STI/HIV/AIDS Behavior Surveillance Survey	Defined as "sexual partners in the last 7 days" =6 6/week X 52 weeks=312 312/2=156 Taking into account concept of trusted partners and clients (1 trusted or spouse and 1 client)
1.5-Average number of sexual acts by partner per year	2	2004, 2008	DIGECITSS (2004), STI/HIV/AIDS Behavior Surveillance Survey COPRESIDA (May 2009). First Behavior Surveillance Survey in Vulnerable Populations linked to Serological Status: Gays, Trans and other MSM, Commercial Sex Workers and Drug Users.	Taking into account concept of trusted partners and clients (1 trusted or spouse and 1 client) =2 acts 312

Risk Group	Estimation	Year of Estimation	Data Source	Comments
1.6-Percentage of CSW who used a condom during sex	80.8%	2008	COPRESIDA (May 2009). First Behavior Surveillance Survey in Vulnerable Populations linked to Serological Status: Gays, Trans and other MSM, Commercial Sex Workers and Drug Users.	Question: In the last sexual relation, did you use a condom with last client? BS Study 2008 condom use with last client by province 75.2,86.4,63.6,93.8 Median=80.8%
2) Clients of commercial sex workers (CSW)				
2.1-Number / percentage of clients for each sex worker in this population	8%	2002	Centro de Estudios Sociales y Demográficos (May 2007). Demographic and Health Survey, Dominican Republic Barrington, C., et al., Talking the talk, walking the walk: Social network norms, communication patterns, and..., Social Science & Medicine (2009), doi:10.1016	ENDESA-Definition; % Men 15-59 years who reported paying for sex during the last year (p. 241)-8% 2002
2.2-HIV prevalence in this population	2.4%	2008	COPRESIDA (May 2009). First Behavior Surveillance Survey in Vulnerable Populations linked to Serological Status: Gays, Trans and other MSM, Commercial Sex Workers and Drug Users.	50% HIV prevalence in CSW
2.3-STI prevalence in this population	3.5%	2008	COPRESIDA (May 2009). First Behavior Surveillance Survey in Vulnerable Populations linked to Serological Status: Gays, Trans and other MSM, Commercial Sex Workers and Drug Users.	3.5% is 50% of 7% for Syphilis in CSW ENDESA shows 2.7% in Men 15-49 years
2.4-Average number of client partners per year	2			
2.5-Average number of sexual acts by partner per year	146			Sexual acts clients=sex acts of CSW CSW=7.5% of the population of women are CSW x 312 acts by CSW=8% population of men are clients* number of acts by client (X) X acts= 312*7.5%/8=292 292 acts by client/2 =146
2.6-Percentage of times a condom is used during sex with a commercial sex workers	80.8%	2008	COPRESIDA (May 2009). First Behavior Surveillance Survey in Vulnerable Populations linked to Serological Status: Gays, Trans and other MSM, Commercial Sex Workers and Drug Users.	Definition: Men 15-59 years who reported paying for sex, those who used a condom in their last sexual relation. ENDESA 83.5% Since 80.8% of CSW reported using a condom, this information is used
3) Partners of clients				
3.1-Number / percentage of partners of CSW clients in this population	5%	2007, 2009	1- Centro de Estudios Sociales y Demográficos (May 2007). Demographic and Health Survey, Dominican Republic 2-Barrington, C., et al., Talking the talk, walking the walk: Social network norms, communication patterns, and..., Social Science & Medicine (2009), doi:10.1016	45.6% population of married men X 11% clients=5% are partners of CSW 2-40% of clients interviewed (Barrington, et al) are married or in free union
3.2-HIV prevalence in this population	1.2%	2007	Centro de Estudios Sociales y Demográficos (May 2007). Demographic and Health Survey, Dominican Republic	Women with low levels of schooling = 2.0% 2.4% is estimated prevalence in clients/2 (assumption of 50% of this prevalence)=1.2%

Risk Group	Estimation	Year of Estimation	Data Source	Comments
3.3-Average number of sexual partners per year	1			1 partner for those married
3.4-Average number of sexual acts by partner by year	85	2000	Stover J, Bertrand, JT y Shelton, JD (2000, February). Empirically Based Conversion Factors for Calculating Couple Years of Protection. EVALUATION Review 24:1:3-46.	
3.5-Percentage of times a condom is used during sex	1.9%	2007	Centro de Estudios Sociales y Demográficos (May 2007). Demographic and Health Survey, Dominican Republic	Current use of condom in women cohabitating p.94
4) Gays, transsexuals and MSM (GTMSM)				
4.1-Number / percentage of GTMSM in this population	4.3%	2006	Cáceres, Konda, Pecheny, Chatterjee, Lyerla, (2006).	Rank of 1-7.6% MSM=4.3% (Cáceres, Konda, Pecheny, Chatterjee, Lyerla, 2006)
4.2-HIV prevalence in this population	6.1%	2008	COPRESIDA (May 2009). First Behavior Surveillance Survey in Vulnerable Populations linked to Serological Status: Gays, Trans and other MSM, Commercial Sex Workers and Drug Users.	
4.3-STI prevalence in this population	5.3%	2008	COPRESIDA (May 2009). First Behavior Surveillance Survey in Vulnerable Populations linked to Serological Status: Gays, Trans and other MSM, Commercial Sex Workers and Drug Users.	5.3%-Syphilis
4.4-Average number of sexual partners per year	2.26	2006	(Cáceres, Konda, Pecheny, Chatterjee, Lyerla, 2006)	
4.5- Average number of sexual acts by partner per year	37	2005	Toro-Alfonso, J & Veras-Díaz. P (2004). Proyecto Delta: Identificación y descripción de conocimientos, actitudes, creencias y comportamientos de riesgo para la transmisión del VIH de homosexuales y HSH en Republica Dominicana.	$0(.136)+1(.173)+2.5(.288)+4.5(.246)+7(.157)=3.08$ acts/month $X12=37$ p.27
4.6-Percentage of condom use during sex	74.55%	2008	COPRESIDA (May 2009). First Behavior Surveillance Survey in Vulnerable Populations linked to Serological Status: Gays, Trans and other MSM, Commercial Sex Workers and Drug Users.	Median of 75.7 who penetrate and 73.4 who are penetrated=74.55%
5) Female partners of GTMSM				
5.1-Number / percentage of female partners of GTMSM in this population	0.44%	2008	COPRESIDA (May 2009). First Behavior Surveillance Survey in Vulnerable Populations linked to Serological Status: Gays, Trans and other MSM, Commercial Sex Workers and Drug Users.	Median of those who are married or living with a woman 7.2%, 13.3%, 13.4%=(10.25%)(4.3%HSH)=
5.2-HIV prevalence in this population	1.8%			Double prevalence of group at risk (ASSUMPTION)
5.3-Average number of sexual partners per year	1	2007	Centro de Estudios Sociales y Demográficos (May 2007). Demographic and Health Survey, Dominican Republic	
5.4-Average number of sex acts by partner per year	85	2000	Stover J, Bertrand, JT y Shelton, JD (2000, February). Empirically Based Conversion Factors for Calculating Couple Years of Protection. EVALUATION Review 24:1:3-46.	

Risk Group	Estimation	Year of Estimation	Data Source	Comments
5.5-Percentage of condom use during sex	1.9%	2007	Centro de Estudios Sociales y Demográficos (May 2007). Demographic and Health Survey, Dominican Republic	Current condom use among women in free union p.94 62.8% of MSM using a condom every time during sex with a woman during the last 6 months (not from the partner's perspective)
6) Residents of bateyes				
6.1-Number / percentage of residents of bateyes	195,000	2007	Centro de Estudios Sociales y Demográficos (May 2007). Demographic and Health Survey, Dominican Republic COPRESIDA Bulletin on Bateyes (2007)	1-The range 70,000 –320,000 is given by ENDESA. Median = 195,000 2-IOM estimates 650,000 (7.5% of the population) live in bateyes. 3-700,000 there are 405 bateyes with approximately 175,000 homes, an average of 4.1 people per home 5-180,000 in 204 bateyes owned by the government (2004).
Men	97,500			As the general population is approximately 50/50, we assume this ratio.
Women	97,500			
6.2- HIV prevalence in residents of bateyes	3.2%	2007	Centro de Estudios Sociales y Demográficos (2007, Mayo). Sociodemographic and HIV/AIDS Survey in the Bateyes of the Dominican Republic.	H-3.3% M-3.1%
6.3-STI prevalence in residents of the bateyes	3.3%	2007	Centro de Estudios Sociales y Demográficos (2007, Mayo). Sociodemographic and HIV/AIDS Survey in the Bateyes of the Dominican Republic.	Data from those interviewed reporting "having had a STI in the last 12 months"
6.4- Average number of sexual partners per year	2.1	2008	Population Services International (2008). Estudio TRAC acerca de Conductas de Riesgo del VIH/SIDA con Trabajadoras Sexuales en la República Dominicana Segunda Ronda.	Population Services International, TRAC study p.13 $1(.871)+2(.871)+3(.129)=2.129$ partners/month
6.5- Average number of sex acts by partner per year	85	2000	Stover J, Bertrand, JT y Shelton, JD (2000, February). Empirically Based Conversion Factors for Calculating Couple Years of Protection. EVALUATION Review 24:1:3–46.	
6.6-Percentage of residents of bateyes who used a condom during sex	53.2%	2007	Centro de Estudios Sociales y Demográficos (2007, Mayo). Sociodemographic and HIV/AIDS Survey in the Bateyes of the Dominican Republic.	Defines as casual and commercial partner ENDESA indicates condom use for: those who have high risk sex (partner other than spouse or cohabitant). M: 39.0% F: 67.4% Total is a median—53.2%

Risk Group	Estimation	Year of Estimation	Data Source	Comments
7) Injected drug users				
7.1-Number / percentage of IDU in adult population	0.044%		<p>ENDESA, 2007</p> <p>Behavior Surveillance Study, 2008</p> <p>http://www.unodc.org/pdf/barbados/caribbean_trends_2000-2001.pdf</p>	<p>In the ENDESA, 5% of men and 1% of women reported having used an illegal drug sometime in life. Of these, 54% of the men and 41% of the women reported not using drugs in the last 3 months. To avoid overestimating the number of drug users, we can focus on those who have used recently. This results in $5\% \times 46\% = 2.3\%$ of the men and $1\% \times 59\% = 0.6\%$ of the women are drug users. Regional studies also indicate that 2.5% of the adult population uses illegal drugs (marihuana was the point of reference).</p> <p>If we assume that the population is comprised of 50% men and 50% women, $2.3\% \times 50\% + 0.6\% \times 50\% = 1.45\%$ of the total population uses illegal drugs.</p> <p>In the behavior survey approximately 2% of drug users reported injected drugs. If we rely on this fact, $1.45\% \times 2\% = 0.044\%$ of the population is IDU.</p> <p>It is better to calculate separating men from women because we know women use less than men.</p> <p>$2.3\% \times 2\% = 0.046\%$ of men and $0.0\% \times 2\% = 0.012\%$ of women are IDU.</p>
Men	0.046%			
Women	0.012%			
7.2- HIV prevalence in this population	12.8%	2008	COPRESIDA (May 2009). First Behavior Surveillance Survey in Vulnerable Populations linked to Serological Status: Gays, Trans and other MSM, Commercial Sex Workers and Drug Users.	Definition—man or woman who reported injecting drugs in the last 6 months
7.3-STI prevalence in this population	8%	2008		We use data on syphilis.

Risk Group	Estimation	Year of Estimation	Data Source	Comments
7.4-Number of partners with whom they share needles	2.6	2008	Steffanie A. Strathdee, Remedios Lozada, Robin A. Pollini, Kimberly C. Brouwer, Andrea Mantsios, Daniela A. Abramovitz, Tim Rhodes, Carl A. Latkin, Oralia Loza, Jorge Alvelais, Carlos Magis-Rodriguez, Thomas L. Patterson, for Proyecto El Cuete. Individual, Social, and Environmental Influences Associated With HIV Infection Among Injection Drug Users in Tijuana, Mexico. <i>J Acquir Immune Defic Syndr</i> 2008;47:369–376.	
7.5-Average number of exposures by partner per year	80	2000	Magis-Rodriguez C;Ruiz-Badillo A;Ortiz-Mondragón R;Lozada R;Ramos M E;Ramos R;Ferreira J; Título: Uso de drogas inyectables y VIH/SIDA en dos cárceles de la frontera norte de México Fuente: II Conferencia de Cooperación Técnica Horizontal en VIH/SIDA y ETS 2000; Sao Paulo, Brasil Año: PD— 2000. Cravioto P, Medina-Mora ME, De la Rosa B, Galván F, Tapia-Conyer R. Patrones de consumo de heroína en una cárcel de la frontera norte de México: barreras de acceso a tratamiento. <i>Salud Publica Mex</i> 2003; 45:181-190.	
7.6 Protected acts	92%	2008	Behavior Surveillance Study (2008)	92% reported not sharing needles
8) Partners of IDU				
8.1-Number / percentage of partners of IDU in this population	0.2%	2008	COPRESIDA (May 2009). First Behavior Surveillance Survey in Vulnerable Populations linked to Serological Status: Gays, Trans and other MSM, Commercial Sex Workers and Drug Users.	
8.2- HIV prevalence in this population	2.0%			Half of the population of IDU
8.3-STI prevalence in this population	N/A			
8.4- Average number of sexual partners per year	1			
8.5- Average number of sex acts by partner per year	85	2000	Stover J, Bertrand, JT y Shelton, JD (2000, February). Empirically Based Conversion Factors for Calculating Couple Years of Protection. <i>EVALUATION Review</i> 24:1:3-46.	
8.6 Percentage of condom use during sex	2%	2007	Centro de Estudios Sociales y Demográficos (May 2007). Demographic and Health Survey, Dominican Republic	
9) Casual heterosexual sex				
9.1-Number / percentage of people in the general population engaging in casual sex (i.e. sex with a person they don't cohabitate, not a regular partner o have multiple sexual partners)		2007	Centro de Estudios Sociales y Demográficos (May 2007). Demographic and Health Survey, Dominican Republic	Definition: Of the women and men who had sex during the last 12 months, those who had high risk sex in the last 2 months. Age:15-49 (with partners you don't live with) -pages 237& 238

Risk Group	Estimation	Year of Estimation	Data Source	Comments
Men	56.5%			
Women	22.1%			
9.2- HIV prevalence in this population	H: .09% M: .09%	2007	Centro de Estudios Sociales y Demográficos (May 2007). Demographic and Health Survey, Dominican Republic	- p. 277
9.3- STI prevalence in this population	3.0%	2007	Centro de Estudios Sociales y Demográficos (May 2007). Demographic and Health Survey, Dominican Republic	Those who reported having a STI in the last year=2.3%
9.4- Average number of sexual partners per year	2			
9.5- Average number of sex acts by partner per year	42.5			85acts/2 partners=42.5
9.6-Percentage of condom use during sex	53.5%	2007	Centro de Estudios Sociales y Demográficos (May 2007). Demographic and Health Survey, Dominican Republic	Definition: condom use during last "high risk" sexual relation p. 238 M: 67.4% H: 39.6% Median: 53.5%
10) Partners of people who engage in casual heterosexual sex				
10.1-Number / percentage of people in general population whose Partners have casual sex:	26,671	2007	Centro de Estudios Sociales y Demográficos (May 2007). Demographic and Health Survey, Dominican Republic	This is the % of the population reporting "casual sex" who is married. -p.238
Men	24.6%- 11,254			
Women	2%-15,417			
10.2- HIV prevalence in this population	0.8%	2007	Centro de Estudios Sociales y Demográficos (May 2007). Demographic and Health Survey, Dominican Republic	Under these conditions the prevalence is considered to be the same as the general population
10.3- Average number of sexual partners per year	1			
10.4- Average number of sex acts by partner per year	85	2000	Stover J, Bertrand, JT y Shelton, JD (2000, February). Empirically Based Conversion Factors for Calculating Couple Years of Protection. EVALUATION Review 24:1:3-46.	
10.5-Percentage of condom use during sex	1.9%	2007	Centro de Estudios Sociales y Demográficos (May 2007). Demographic and Health Survey, Dominican Republic	Current condom use among women in free union p.94
11) Low risk heterosexual sex				
11.1-Number / percentage of people in stable relationships (i.e. married or involved with a steady partner):		2007	Centro de Estudios Sociales y Demográficos (May 2007). Demographic and Health Survey, Dominican Republic	This figure is another part of the population —those who "have had high risk sex" 43.3% M and 16.4% W, other proportion. P. 277

Risk Group	Estimation	Year of Estimation	Data Source	Comments
Men				Number of people with multiple partners and those having no sex -100 results in this population.
Women				
11.2- HIV prevalence in this population	0.8%	2007	Centro de Estudios Sociales y Demográficos (May 2007). Demographic and Health Survey	Prevalence general population
11.3- STI prevalence in this population	2.3%	2007	Centro de Estudios Sociales y Demográficos (May 2007). Demographic and Health Survey	Those who had reported STI in the last year=2.3%
11.4- Average number of sexual partners per year	1	2007	Centro de Estudios Sociales y Demográficos (May 2007). Demographic and Health Survey	Clarify definition — wouldn't it be 1 partner?
11.5- Average number of sex acts by partner per year	85	2000	Stover J, Bertrand, JT y Shelton, JD (2000, February). Empirically Based Conversion Factors for Calculating Couple Years of Protection. EVALUATION Review 24:1:3-46.	
11.6-Percentage of condom use during sex	1.9%	2007	Centro de Estudios Sociales y Demográficos (May 2007). Demographic and Health Survey, Dominican Republic	Current condom use among women in free union p.94
12) Without risk				
12.1-Number / percentage of people who are NOT at risk of HIV infection	M 7.2% W 10.26%	2007	Centro de Estudios Sociales y Demográficos (May 2007). Demographic and Health Survey, Dominican Republic	
12.2- HIV prevalence in this population	.08	2007	Centro de Estudios Sociales y Demográficos (May 2007). Demographic and Health Survey, Dominican Republic	Prevalence general population .08% (Note: 1.2% among those who had not had sex)
13) Medically prescribed injections				
13.1-Number of people receiving medical injections per year	M: 58.2% W: 63.4%	2007	Centro de Estudios Sociales y Demográficos (May 2007). Demographic and Health Survey, Dominican Republic	p.250-people receiving injections from a health professional
13.2- HIV prevalence in this population	0.01	2007		1 to 2% of HIV cases
13.3-Average number of medical injections received by persona and year	2.35	2007		M: 2.2 W: 2.5=2.35 ENDESA
13.4-Percentage of times a sterile needle is used for medical injections	98.55%	2007		M: 97.9% W: 99.2% Total: 98.55%
14) Blood transfusions				
14.1-Number of people receiving a medical transfusion per year	81,478	2008	SESPAS Reporte de Bancos de Sangre	We only have information on the blood units available/year for transfusions
14.2- HIV prevalence in this population	0.8%	2007	Centro de Estudios Sociales y Demográficos (May 2007). Demographic and Health Survey, Dominican Republic	0.8%, according to ENDESA

Risk Group	Estimation	Year of Estimation	Data Source	Comments
14.3-Average number of blood transfusions per year (i.e. for those receiving a blood transfusion)	Not available			
14.4-Percentage of blood units efficiently screened for HIV	100%	Jan-Dec 2008	SESPAS Blood Banks	Reflected in report Jan-Dec 2008 from SESPAS / Blood Banks WHO
15) Percentage of adult men who are circumcised	27,975 (13.7%)	2007	Centro de Estudios Sociales y Demográficos (May 2007). Demographic and Health Survey, Dominican Republic	
16) Women with no formal education				An estimate of the incidence in women with no formal education (taking the incidence in women and multiplying it times the proportion of women without formal education that according to ENDESA is 4.3% and times the infection risk factor compared to women in the general population (prevalence in women with no formal education/ prevalence in women of general population:3.7/0.9=4.5)

Appendix B: Assigned Values for Uncertainty Analysis

Group	Number/ dimension of the population	HIV Prevalence (%)	STI Prevalence (%)	# partner/ year	# acts/ partner/ year	(%) of protected sexual acts
Injected drug users (IDU)	20%	10%	10%	10%	10%	10%
Partners of IDU		20%			20%	20%
Female sex workers	15%	5%	5%	10%	10%	5%
Clients	10%	10%	10%	15%	15%	15%
Partners of clients		15%			15%	15%
MSM	20%	5%	5%	15%	10%	5%
Female partners of MSM		15%			20%	5%
Residents of bateyes	10%	5%	5%	10%	20%	5%
General population- casual heterosexual sex (CHS)	5%	5%	15%	20%	20%	5%
Partners of CHS						
Low risk sex- casual heterosexual sex	5%	5%	15%	20%	20%	5%
Without risk	5%	5%	15%	20%	20%	5%
Medically prescribed injections				5		
Blood transfusions		20%				

Appendix C: Inventory of key documents consulted

Source	Year	Data provided for MOT
Barrington, C., et al., Talking the talk, walking the walk: Social network norms, communication patterns, and... Social Science & Medicine (2009), doi:10.1016.	2009	-Qualitative data on clients of CSW
Cáceres, Konda, Pecheny, Chatterjee, Lyerla, 2006.	2006	Number of partners
Centro de Estudios Sociales y Demográficos (May 2007). Demographic and Health Survey.	2007	-Data on general population -Injections -Circumcision
Centro de Estudios Sociales y Demográficos (May 2007). Sociodemographic and HIV/AIDS Survey in Bateyes of the Dominican Republic.	2007	-Prevalence and behavior for residents of bateyes
COPRESIDA (2008). Behavior Surveillance Survey Linked to Serological Results.	2008	-Prevalence and behavior for CSW, MSM and DU.
Consejo Nacional de Población y Familia (2009). Estimations and Projections of the Dominican Population by province and municipality. Searched December 15 at http://www.conapofa.gov.do/estimaciones.asp	2009	-Projections adult population 15-49 years
National Directorate of Blood Banks (2008). Blood Bank Report.	2008	-Information on transfusions
Dirección General de Control de Infecciones de Transmisión Sexual y SIDA (2004). HIV/AIDS/STI Behavior Surveillance Surveys in CSW and MSM from Region V.	2004	-Behavior CSW, MSM
Dirección General de Control de Infecciones de Transmisión Sexual y SIDA (2004). Geographic Mapping of Community Areas of Risk for HIV Transmission.	2004	-Estimation of population of CSW
Population Services International (2008). TRAC Study on Risk Behaviors in Residents of Bateyes in the Dominican Republic.	2008	-Behavior indicators in resident of the bateyes
Toro-Alfonso, J & Veras-Díaz, P (2004). Proyecto Delta: Identificación y descripción de conocimientos, actitudes, creencias y comportamientos de riesgo para la transmisión del VIH de homosexuales y HSH en Republica Dominicana.	2004	-Prevalence and behavior in MSM
Stover J, Bertrand, JT y Shelton, JD (2000, February). Empirically Based Conversion Factors for Calculating Couple Years of Protection. EVALUATION Review 24:1:3-46.	2000	Acts/partners/year

Appendix D: MOT Analysis Sheet

Total number with Risk Behavior	HIV Prevalence (%)	Number HIV+	STI Prevalence (%)	No. partners p/year	No. exposure acts partner/year	(%) Protec- ted acts	Probability of transmission by risk act				Incidence by 100,000	Validation
							With STI	Without STI	Incidence	% of Incidence		
1,509	12.8%	193	8.0%	2.6	80	92%	NA	0.0100	27	0.77	1,796	
551	2.0%	11	NA	1	85	2%	0.0032	0.0008	5	0.15	979	
80,018	4.8%	3,841	7.0%	156	2	81%	0.0032	0.0008	88	2.49	110	24,965,747
208,178	2.2%	4,580	3.5%	60	2	81%	0.0029	0.0007	199	5.63	95	24,981,360
43,613	1.1%	480	NA	1	85	2%	0.0032	0.0008	67	1.89	153	
195,000	3.2%	6,240	3.3%	2.1	40	25%	0.0031	0.0008	320	9.07	164	
111,896	6.1%	6,826	5.3%	2.26	16	54%	0.0400	0.0100	1,174	33.26	1,049	
22,379	1.8%	403	NA	1	85	2%	0.0032	0.0008	99	2.79	441	
1,019,875	0.9%	9,179	3.0%	2	43	53%	0.0030	0.0008	293	8.31	29	
210,376	0.9%	1,893	NA	1	85	2%	0.0032	0.0008	130	3.68	62	
2,140,054	0.8%	17,120	2.3%	1	85	2%	0.0031	0.0008	1,124	31.87	53	
1,171,001	0.8%	9,368							0	0.00	0	
3,164,306	0.1%	2,531	NA	1	2.35	99%	NA	0.0004	3	0.09	0	
81,478	0.8%	652	NA		1	100%	NA	0.9	0	0.00	0	
5,204,450	1.16%	63,317						Total Incidence	3,529		68	
Residents of Bateyes	1.08%				Total incidence in partners of individuals with at-risk behavior				301	8.52	109	