OPERATIONS RESEARCH RESULTS

RWANDA HUMAN RESOURCES ASSESSMENT FOR HIV/AIDS SERVICES SCALE-UP

Phase 3 Report: Staffing Implications and Scenarios for HIV/AIDS Services Scale-up

June 2006

Rebecca Furth, PhD
Robert Gass, MA, MPH
Jean Kagubare, MD, PhD, MPH

DISCLAIMER
The views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.
The Quality Assurance Project (QAP) is funded by the U.S. Agency for International Development (USAID) under Contract Number GPH-C-00-02-00004-00. The project serves developing countries eligible for USAID assistance, USAID Missions and Bureaus, and other agencies and nongovernmental organizations that cooperate with USAID. QAP offers technical assistance in the management of quality assurance and workforce development in healthcare, helping develop feasible, affordable approaches to comprehensive change in health service delivery. The project includes prime contractor University Research Co., LLC (URC), Initiatives Inc., and Joint Commission Resources, Inc. This operations research study was carried out by a team from Initiatives Inc.

Acknowledgements

The Rwanda Human Resources Assessment for HIV/AIDS Services Scale-up was commissioned by the Directorate of Health Care (DSS) of the Rwandan Ministry of Health and the U.S. Agency for International Development (USAID). It was conducted by Initiatives Inc. through the Quality Assurance Project (QAP) with funding from the President’s Emergency Fund for AIDS Relief. Work was conducted in close collaboration with the Rwandan Ministry of Health (MOH), including the office of the Secretary of State for HIV/AIDS, the Treatment and Research AIDS Center (TRAC), DSS, the Directorate of Health Planning, the Directorate of Human Resources and Support Services, and the National AIDS Control Commission.

Numerous individuals and organizations contributed information and insight to the study. Dr. Claude Sekabaraga, Director, and Dr. Bonaventure Nziyamana, Quality Assurance Coordinator, of the DSS requested the study and provided invaluable assistance in its implementation. Dr. Nancy Fitch, USAID HIV/AIDS Technical Advisor, and Dr. Ruben Sahabo, USAID Cognizant Technical Officer, also offered continual support for the study. The study also could not have been carried out without the support of Dr. Eliphaz Ben Karenzi, MOH Secretary General; Dr. Innocent Nyaruhirwa, Secretary of State for HIV/AIDS; and Dr. Kathy Kantengwa, Chief Policy Advisor for HIV/AIDS. Dr. Louis Munyakazi, Director of TRAC, made his staff available for data collection and met with team members on numerous occasions to discuss the study. Dr. Jean-Claude Karasi, Dr. Anita Asii, and Elévanie Nyakensha of TRAC also discussed HIV/AIDS services and made protocols, training materials, and surveillance documents available. The team would also like to thank Dr. Vianney Nizeyimana, Director, and Dr. Emilian Nkusi, Health Management Information Head, of the Directorate of Health Planning, and Dr. Emmanuel Kabanda, Director, Directorate of Human Resources and Support Services.

For providing assistance and sharing information with the study team, thanks are also due to Mary Murebwayire, MOH Chief Nursing Officer; Dr. Thomas Karemgera, Project Coordinator, Multi-country AIDS Program; Dr. Blaise Karibushi, Coordinator of VCT Intégré (VCTI); Barnabé Sebagabo, National Coordinator, Civil Service Health Reform Project; Dr. Apolline Uwayitu, Deputy Medical Director, Central Hospital of Kigali; Valerie Koscelnick, Chief of Party, Centers for Disease Control and Prevention (CDC) Rwanda; Thomas Scialfà, Monitoring and Evaluation (M&E) Officer of CDC-Rwanda; Pierre Rugimbanya, Senior Laboratory Quality Assurance Officer, National Reference Laboratory; Dr. Jessica Price, Country Director, IMPACT Project; Dr. Martin Ngabonziza, Senior Technical Advisor, Project IMPACT; Karen Blyth, Rwanda Country Director, and Gerard Ngendahimana, Technical Advisor, IntraHealth; Laurie Manderino, Rwanda Country Representative, Elizabeth Glaser Pediatric AIDS Foundation; Elizabeth Collins, Rwanda Country Director, Clinton HIV/AIDS Initiative; Chevanne Peercy, TRAC Administrative Coordinator; Dr. Christine Omes, Principal Technical Advisor, Lux Development/Ensemble pour une Solidarité Thérapeutique Hospitaller en Réseau (ESTHER); Cecile Ndoli, UNICEF PMTCT Project Officer; Dr. Bucagu Maurice and Dr. Basinga Paulin, Rwanda School of Public Health; Mr. Kabandana Innocent, Director, Gitwe School of Higher Education; Dr. Justin Wane, Vice-Dean of Post-Graduate Studies, National University of Rwanda, Faculty of Medicine; Pierre Rugimbanya, Senior Laboratory Quality Assurance Officer, National Reference Laboratory; Sister Josephine Mukumunana, Director, Rwamagana School of Nursing; and Dr. Bosco Prince, Caritas Health Department Head.

The QAP country office provided administrative and logistics support for the study. Many thanks are due to Dr. Rachel Jean-Baptiste, then-QAP Country Director for Rwanda, for her support and assistance.

The authors also gratefully acknowledge the data collection team who put in long hours and hard work over four weeks in November and December 2004. Christophe Karuranga served as a team leader for the data collection process: his experience as a TRAC trainer and knowledge of Rwandan HIV/AIDS protocols was invaluable, and his dedication and high standards provided a model for all to follow. Vestine Mukandutiye and Jeanne d’Arc Hajabashi served as data collectors on the study team. César
Kisangani and Doris Mukandori of the TRAC M&E Department were valued partners and provided significant assistance in the data collection process. Olivier Muvuzankwaya also provided assistance in database development, and Rajesh Kasturirangan offered invaluable technical support for data analysis.

Dr. Joyce Lyons and Jennifer Huddart of Initiatives Inc. were the architects of the study methodology, offered technical assistance to the study team, and provided invaluable technical reviews of study reports.

Rebecca Furth, PhD
Robert Gass, MA, MPH
Jean Kagubare, MD, PhD
Kigali, Rwanda
June 2005
TABLE OF CONTENTS

EXECUTIVE SUMMARY .............................................................................................................. v
ABBREVIATIONS ....................................................................................................................... VI
I. INTRODUCTION .......................................................................................................................... 1
II. METHODOLOGY ....................................................................................................................... 1
III. STAFFING REQUIREMENTS FOR VCT AND PMTCT SERVICES ........................................... 2
   A. VCT .................................................................................................................................. 2
   C. VCT/PMTCT Staffing Scenarios ........................................................................................ 5
   D. Implications of Reduced HIV Prevalence for Staffing Requirements and Client Identification .. 6
   E. Salary Cost Scenarios for VCT and PMTCT Counseling and Testing .................................. 7
   F. In-service Training Costs .................................................................................................. 10
IV. STAFFING REQUIREMENTS FOR HIV CARE AND TREATMENT SERVICES ................. 10
   A. HIV Care and ARV Dispensing ....................................................................................... 11
   B. Opportunistic Infection Care ........................................................................................... 12
   C. Laboratory Testing ............................................................................................................ 12
   D. ART Care and Treatment Staffing Costs ......................................................................... 12
   E. In-service Training Costs .................................................................................................. 12
V. SUMMARY OF FTE REQUIREMENTS AND ANNUAL STAFF SALARY COSTS ALL HIV/AIDS SERVICES ........................................................................................................ 13
VI. COMPARISON OF SAMPLE SITE DATA WITH HIV/AIDS SERVICES SCALE-UP REQUIREMENTS ......................................................................................................................... 15
VII. HEALTH CENTER EXAMPLE .............................................................................................. 16
   A. Daily VCT and PMTCT Staffing at Service Sites ............................................................. 18
REFERENCES ............................................................................................................................. 20
APPENDIX 1: HIV/AIDS CARE AND TREATMENT STAFFING AND COST TABLES FOR REACHING TARGETS IN FIVE YEARS AND THREE YEARS ......................................................... 21

LIST OF TABLES

Table 1: Task Time and FTE Counselors Required for Different VCT Uptake Rates, 2005 .................. 3
Table 2: Task Time and FTE Lab Staff Required for Different VCT Uptake Rates, 2005 .................... 4
Table 3: VCT FTE Requirements over the Next Five Years for Different Uptake Rates ....................... 4
Table 4: Task Time and FTE Counselors Required for PMTCT, 2005 ............................................. 5
Table 5: Task Time and FTE Lab Staff Required for PMTCT, 2005 ............................................... 5
Table 6: PMTCT FTE Requirements over the Next Five Years (100% of ANC Clients Tested) .......... 5
Table 7: Effect of Different Scenarios of Actual Service Provision Days on FTE Staff Required for VCT and PMTCT .................................................................6
Table 8: Implications of Different Estimates of HIV Prevalence on Number of HIV-positive Clients Identified per Year through VCT and PMTCT .................................................................................................................................8
Table 10: In-service Training Costs for Integrated VCT and PMTCT Services ........................................10
Table 11: Staff Salary Costs, All HIV/AIDS Services ..............................................................................14
Table 12: Staffing Requirements for VCT and PMTCT Scale-up: “Qualified” Staff Only ....................16
Table 13: Staffing Requirements for VCT and PMTCT Scale-up: “Qualified” Staff, Aides, and Auxiliary Staff.................................................................16
Table 14: FTE VCT/PMCT Counselors Required per Average Health Center ........................................17
Table 15: FTE VCT/PMCT Laboratory Staff Required per Average Health Center ..............................18
Table 16: Continual Service Delivery Staffing: Counselors ......................................................................19
Table 17: Continual Service Delivery Staffing: Laboratory Staff ...........................................................19
Table 18: Concentrated Service Delivery Staffing (Two Days per Week/Service): Counselors ..........19
Table 19: Concentrated Service Delivery Staffing (Two Days per Week/Service): Laboratory Staff ...... 19
Table A1: Task Time and FTE Care Providers Required for Different HIV/AIDS Care and Treatment Services, Assuming Five-year Targets .........................................................................................................................22
Table A2: Task Time and FTE Laboratory Staff Required for Different ART Testing Services, Assuming Five-year Targets .................................................................................................................................23
Table A3: Cost Scenarios for ART Care Providers (Five-year Analysis) .................................................24
Table A4: Annual Staffing and Salary Cost Scenarios for ART Laboratory Staff (Five-year Analysis) ... 24
Table A5: Task Time and FTE Care Providers Required for Different HIV/AIDS Care and Treatment Services, Assuming Three-year Targets .................................................................................................................25
Table A6: Task Time and FTE Laboratory Staff Required for Different ART Testing Services, Assuming Three-year Targets .................................................................................................................................26
Table A7: Annual Salary Cost Scenarios for HIV Care and Treatment Providers (Three-year Analysis) .27
Table A8: Annual Staffing and Salary Cost Scenarios for HIV Care and Treatment Laboratory Staff (Three-year Analysis) .................................................................................................................................27
EXECUTIVE SUMMARY

This report presents findings from Phase 3 of an assessment of the human resources implications of HIV/AIDS services scale-up in Rwanda. The Government of Rwanda is committed to rapidly expanding the delivery of HIV/AIDS care and support services, including antiretroviral treatment. By the end of September 2004, over 6,000 clients had started antiretroviral therapy (ART), 101 health facilities offered voluntary counseling and testing (VCT) services, 101 facilities provided prevention of mother-to-child transmission (PMTCT) services, and 23 sites provided care and treatment to HIV-positive clients. The number of health sites offering VCT, PMTCT, and HIV/AIDS care and treatment is expected to grow to 147 VCT sites and 152 PMTCT sites by the end of 2005. In order to reach a target of 100,000 clients receiving ART, the Ministry of Health also plans to expand HIV/AIDS care and support services delivery to three referral hospitals, 39 district hospitals, and 117 health centers by 2007. Scale-up strategies for national HIV/AIDS services include the rapid training of health staff and decentralization of HIV/AIDS services.

This report focuses on the staffing implications and associated costs of HIV/AIDS services scale-up. By documenting current staffing levels and the level of effort necessary to provide HIV/AIDS services, Phase 3 of the study analyzes how many full-time equivalent (FTE) staff will be needed, and at what costs, if the Government of Rwanda is to meet its HIV/AIDS service delivery objectives. The human resources projections are based on data gathered during Phases 1 and 2 of the study.

The Phase 3 report first addresses staffing requirements for VCT and PMTCT services, detailing the time taken for different services, the number of FTE staff required to fulfill service needs, and the salary and training costs of supporting these FTE staff. The implications of different VCT uptake rates and of time periods of three versus five years to reach targets are explored, as are the implications of recent evidence suggesting that HIV prevalence in Rwanda may be lower than previously estimated. The analysis shows how the shorter the time set to reach targets, the greater the number of care providers and laboratory technicians required. Similarly, the lower the prevalence, the more difficult it will be to rapidly identify HIV-positive clients, requiring either a higher uptake of VCT, a longer time-line to reach treatment targets, or revised treatment targets. The analysis leads to the conclusion that an uptake rate for VCT services of at least 8% and testing of 100% of antenatal care clients are needed to identify 300,000 HIV-positive clients in three years, the volume of patients needed to produce 100,000 patients on ART, which has been cited as a target by the Treatment and Research AIDS Center (TRAC).

In order to provide VCT for 8% of the population and 100% of antenatal care clients, 459 FTE counselors and 36 FTE laboratory staff would be required in 2005. The report examines the salary costs of these staff, based on different assumptions of staffing mix. In order to assess the implications of the government’s proposal to provide VCT and PMTCT training to all nurses and social workers working in public and agréé health facilities, the cost of training all currently active nurses, social workers, and lab technicians who have not yet received the needed training is also projected. The report then analyses staffing requirements for scaled-up HIV/AIDS care and treatment services—specifically, CD4-count monitoring, ART initiation, ART monitoring, and antiretroviral (ARV) drug dispensing—and documents time and cost requirements for these care and treatment services under different staffing mix scenarios. The staffing needs for all HIV/AIDS services are presented for several scenarios. The analysis shows that, although FTE represents 216 eight-hour days, many staff are absent for training beyond the seven days included in the FTE calculation. These absences result in a higher number of staff being required to provide the targeted VCT and PMTCT coverage.

The report then offers an illustrative example of staffing requirements at one health center under various prevalence and targeting conditions. The table is intended to help local and national planners understand how to analyze FTE requirements for individual health facilities based on their specific catchment populations.
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANC</td>
<td>Antenatal Care</td>
</tr>
<tr>
<td>ART</td>
<td>Antiretroviral therapy</td>
</tr>
<tr>
<td>ARV</td>
<td>Antiretroviral</td>
</tr>
<tr>
<td>CCM</td>
<td>Country Coordinating Mechanism (Global Fund)</td>
</tr>
<tr>
<td>CDC</td>
<td>Centers for Disease Control and Prevention (United States)</td>
</tr>
<tr>
<td>DSS</td>
<td>Directorate of Healthcare</td>
</tr>
<tr>
<td>ESTHER</td>
<td><em>Ensemble de Solidarité Thérapeutique Hospitalière en Réseau</em> (Lux Development)</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>FOSA</td>
<td><em>Formation Sanitaire</em> (Health Facility)</td>
</tr>
<tr>
<td>FTE</td>
<td>Full-time Equivalent</td>
</tr>
<tr>
<td>GFATM</td>
<td>Global Fund to Fight AIDS, Tuberculosis and Malaria</td>
</tr>
<tr>
<td>GOR</td>
<td>Government of Rwanda</td>
</tr>
<tr>
<td>HC</td>
<td>Health Center</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome</td>
</tr>
<tr>
<td>IEC</td>
<td>Information, Education, and Communication</td>
</tr>
<tr>
<td>IMPACT</td>
<td>Implementing AIDS Prevention and Care (Family Health International)</td>
</tr>
<tr>
<td>M&amp;E</td>
<td>Monitoring and Evaluation</td>
</tr>
<tr>
<td>MOH</td>
<td>Ministry of Health</td>
</tr>
<tr>
<td>NGO</td>
<td>Nongovernmental Organization</td>
</tr>
<tr>
<td>NRL</td>
<td>National Reference Laboratory</td>
</tr>
<tr>
<td>PEPFAR</td>
<td>President’s Emergency Plan for HIV/AIDS Relief</td>
</tr>
<tr>
<td>PMTCT</td>
<td>Prevention of Mother-to-child Transmission</td>
</tr>
<tr>
<td>OI</td>
<td>Opportunistic Infection</td>
</tr>
<tr>
<td>QAP</td>
<td>Quality Assurance Project</td>
</tr>
<tr>
<td>TRAC</td>
<td>Treatment and Research AIDS Center</td>
</tr>
<tr>
<td>UNAIDS</td>
<td>Joint U.N. Programme on HIV/AIDS</td>
</tr>
<tr>
<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
</tr>
<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
</tr>
<tr>
<td>VCT</td>
<td>Voluntary Counseling and Testing</td>
</tr>
<tr>
<td>VCTI</td>
<td>Integrated Services for VCT, PMTCT, and Treatment of Opportunistic Infections</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
</tbody>
</table>
I. INTRODUCTION

The Government of Rwanda has already begun developing strategies for the scale-up of voluntary counseling and testing (VCT), prevention of mother-to-child transmission (PMTCT), and HIV/AIDS care and treatment services. Donors and support agencies such as the U.S. Agency for International Development (USAID), the President’s Emergency Plan for HIV/AIDS Relief (PEPFAR) Fund, the European Union (EU), the World Bank, the Global Fund, the Centers for Disease Control and Prevention (CDC), the Clinton Foundation, and others have contributed to the creation of both short- and long-term strategies.

This report focuses on the staffing implications, and their associated costs, of HIV/AIDS services scale-up. The human resources projections included here are based on the average time taken to provide specific HIV/AIDS services as documented in observations conducted at 20 sample sites in Phase 2 of the study. The times observed in only those counseling and treatment sessions that met 70% or more of the national quality standards were used to calculate the average times included in this analysis. The key findings of this report are divided into five sections. The first addresses staffing requirements for VCT and PMTCT services, including HIV/AIDS testing for VCT and PMTCT clients. This section details the time taken for associated services, the number of full-time equivalent (FTE) staff required to fulfill service needs, and the salary and training costs of supporting these FTE staff. The next section presents staffing requirements for HIV/AIDS care and treatment services, specifically for CD4-count monitoring, antiretroviral therapy (ART) initiation, ART monitoring, and antiretroviral drug (ARV) dispensing. It also documents time and cost requirements for these care and treatment services. Staffing needs and attendant training and salary costs are then summarized for all HIV/AIDS services as a whole. The fourth findings section examines the staffing implications of HIV/AIDS services scale-up at a selection of sample sites. It analyzes total FTE required at these sites for all health services and the staffing implications of the addition of HIV/AIDS services. The final section of this report offers an illustrative example of staffing requirements at one health center. This example is intended to help planners understand how an analysis of FTE requirements can be done for individual health facilities based on their specific catchment populations.

II. METHODOLOGY

The data presented in this report were gathered from findings of Phases 1 and 2 (Furth et al. 2005 and 2006, respectively) of this study. Numbers of staff currently working in Rwanda were collected from records kept at the Directorate of Planning of the Ministry of Health. Staff salaries were estimated based on payroll records from November 2004 and from interviews with health facility managers and staff. Task times for VCT, PMTCT, and HIV/AIDS care and treatment services are based on observations of VCT, PMTCT and ART service provision conducted in Phase 2 of the study. Calculations of visits for ART are based on national care and treatment guidelines.

Box 1: Full-time Equivalent (FTE) Calculations

In accordance with the national personnel standards, public sector health workers in Rwanda are granted the following days of training and leave each year:

- 104 weekend days
- 10 public holidays
- 22 days of vacation
- 6 days of sick leave
- 7 days for training
- 149 total days training and leave

FTE = 365 – 149 = 216 Days (8 hours/ day) per year

These standards are defined by the Treatment and Research AIDS Center (TRAC), the national coordinating body for HIV/AIDS in Rwanda. See Tables 23, 25, and 30 in Furth et al. 2006.
Staff requirements in this report are analyzed as full-time equivalents (see Box 1). The definition of FTE within the Rwandan context is presented below. The scenarios presented in this report were created and analyzed on Excel spreadsheets.

III. STAFFING REQUIREMENTS FOR VCT AND PMTCT SERVICES

A. VCT

The number of clients that will require counseling annually for the government to reach its ART target of 100,000 will depend on HIV prevalence and the percentage of HIV-positive clients requiring ART. At present, national plans are based on a prevalence of 8.9%, although this may be revised. According to TRAC, health centers currently offering VCT see an average of 250 clients per month or 3,000 clients per year (data from TRAC). With an average population served by health centers in Rwanda of roughly 25,000, an annual client load of 3,000 is equivalent to 12% of the population. The government is in a phase of rapid scale-up, and it is likely that this rather high uptake will decline over time as the number of sites increases. Perhaps more importantly, this high uptake rate assumption may not be necessary.

Taking a target of 100,000 ART clients (TRAC, 2004), one can work back to roughly 8% or 4% uptake rates depending on the assumed percentage of HIV-positive clients requiring ART and the number of years (three or five) the government sets to reach this target. The National Reference Laboratory (NRL) in Kigali estimates that roughly 33% of clients who receive CD4 tests require ART (personal communication with the director of the NRL). This would suggest that should the government want 100,000 HIV-positive clients on treatment, then at least 300,000 HIV-positive clients would have to be identified through VCT or PMTCT programs. In fact, the number will likely have to be higher, since those currently seeking testing include many who are already sick. Over time, the percentage of HIV-positive patients who require ART will probably decline, and a larger pool of HIV-positive patients will have to be identified to reach national targets for ART treatment and care. For this reason, the Government of Rwanda’s HIV/AIDS plan estimates that 17% of HIV-positive clients will require counseling annually.

| Box 2: Reaching Targets under Different Uptake and Treatment Assumptions |
|-----------------|-------------|-------------|----------|---------------|
| Total population: 8,483,000 Assumes HIV prevalence of 8.9% |
|                  | VCT Uptake | VCT and ART Clients Identified | PMTCT and ART Clients Identified | Total Identified for ART |
| If 33% of HIV-positive persons require ART: |
| Target reached in three years | 4% | 29,897 | 30,256 | 60,154 |
|                                | 8% | 59,795 | 30,256 | 90,051 |
|                                | 12% | 89,692 | 30,256 | 119,949 |
| Target reached in five years   | 4% | 49,829 | 50,427 | 100,256 |
|                                | 8% | 99,658 | 50,427 | 150,085 |
|                                | 12% | 149,487 | 50,427 | 199,915 |

| If 17% of HIV-positive persons require ART: |
| Target reached in three years | 4% | 15,402 | 15,587 | 25,670 |
|                                | 8% | 30,803 | 15,587 | 51,339 |
|                                | 12% | 46,205 | 15,587 | 77,009 |
| Target reached in five years   | 4% | 25,670 | 25,978 | 51,647 |
|                                | 8% | 51,339 | 25,978 | 77,317 |
|                                | 12% | 77,009 | 25,978 | 102,986 |

2 See section III.D Implications of Reduced HIV Prevalence for Staffing Requirements and Client Identification for an alternate scenario.
ART, necessitating that nearly 600,000 HIV-positive clients be identified to reach 100,000 with ART (MINISANTE & Foundation, 2003).

Box 2 shows the number of clients that will be identified in three or five years given 4%, 8%, and 12% uptake rates, accounting for PMTCT clients and assuming 17% and 33% of HIV-positive clients require ART.

These calculations are crude but provide a reasonable means for approximating the VCT uptake rates needed to achieve a target of 100,000 patients on ART in different scenarios. The bulk of the analysis in this report uses an uptake rate of 8% to provide a reasonable basis for estimating the human resources implications of HIV/AIDS scale-up.

In addition to offering VCT, the Government of Rwanda has established universal HIV testing of pregnant women in antenatal care (ANC) as a key strategy for identifying HIV-positive individuals. Currently, an estimated 92% of pregnant women have at least one ANC consultation. In 2005, this represented 343,392 women. With 8.9% prevalence, 30,562 HIV-positive pregnant women will be identified per year.

The ART, VCT, and PMTCT targets the government chooses will depend on how rapidly it wants to identify HIV-positive patients requiring treatment and how many staff can be allocated to provide services. While targets for ART will likely remain fixed, targets for VCT uptake rates and PMTCT coverage of ANC clients may vary over time depending on the revision or maintenance of prevalence estimates, the percentage of HIV-positive clients requiring ART, and staff capacity. VCT uptake targets may also start off larger and then wane in later years as the government approaches its ART target.

Tables 1, 2, and 3 show how many FTE staff would be required to fulfill counseling and HIV/AIDS testing needs of clients assuming 4%, 8%, and 12% uptake of VCT. The uptake rates presented here are based on current HIV/AIDS service provision and on ART client targets, since the Government of Rwanda has not yet defined a target for VCT services.

| Table 1: Task Time and FTE Counselors Required for Different VCT Uptake Rates, 2005 |
|---------------------------------|----------|----------|----------|
| VCT Counseling Service         | VCT Annual Uptake Rate |
|                                | 4%       | 8%       | 12%      |
| Group Information, Education, and Communication (IEC) |
| Number of clients              | 339,320  | 678,640  | 1,017,960|
| Average number of sessions     | 22,621   | 45,242   | 67,864   |
| Minutes per session            | 38       | 38       | 38       |
| Pre-test Counseling            |
| Number of clients              | 339,320  | 678,640  | 1,017,960|
| Minutes per client             | 20       | 20       | 20       |
| Post-test Counseling for HIV-negative Clients* |
| Number of clients              | 309,121  | 618,241  | 927,362  |
| Minutes per client             | 12       | 12       | 12       |
| Post-test Counseling for HIV-positive Clients |
| Number of clients              | 30,199   | 60,399   | 90,598   |
| Minutes per client             | 16       | 16       | 16       |
| Total Counseling Hours Required| 197,310  | 394,622  | 591,932  |
| Total FTE**                    | 152      | 305      | 456      |

* Assumes that 91.1% of VCT clients will test negative and 8.9% will test positive, based on current national HIV prevalence.

** HIV/AIDS FTE: It is assumed that in each eight-hour day a worker is actively providing client service for six hours (75% efficiency) and that two hours are for other routine work, such as staff meetings and logistics management, or waiting time.
Table 2: Task Time and FTE Lab Staff Required for Different VCT Uptake Rates, 2005

<table>
<thead>
<tr>
<th>VCT Lab Testing</th>
<th>VCT Annual Uptake Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory Testing - HIV</td>
<td>4%</td>
</tr>
<tr>
<td>Number of Clients Tested</td>
<td>339,320</td>
</tr>
<tr>
<td>Batches of 10</td>
<td>33,932</td>
</tr>
<tr>
<td>Minutes to Process 10 Tests</td>
<td>28*</td>
</tr>
<tr>
<td>Total Lab Testing Hours Required</td>
<td>15,835</td>
</tr>
<tr>
<td>Total FTE Laboratory Staff</td>
<td>12</td>
</tr>
</tbody>
</table>

VCT Annual Uptake Rate

|                             | 8%         | 12%        |
|-----------------------------|------------|
| Number of Clients Tested    | 678,640    |
| Batches of 10               | 67,864     |
| Minutes to Process 10 Tests | 28         |
| Total Lab Testing Hours     | 31,670     |
| Total FTE Laboratory Staff  | 24         |

* Based on the average time it takes laboratory technicians to run initial and confirmatory tests and record results for 10 clients. All testing methodologies observed were rapid tests. Tests used in the observations from which this time was calculated included Abbott Determine for Screening and Capillus or Unigold for confirmatory tests. This does not include quality control or second level confirmation that might take place at the district or national level.

Table 3: VCT FTE Requirements over the Next Five Years for Different Uptake Rates

<table>
<thead>
<tr>
<th>Year*</th>
<th>Total VCT Staffing</th>
<th>4% Counselors</th>
<th>8% Counselors</th>
<th>12% Counselors</th>
<th>4% Lab Staff</th>
<th>8% Lab Staff</th>
<th>12% Lab Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>Total VCT Clients</td>
<td>339,320</td>
<td>678,640</td>
<td>1,017,960</td>
<td>152</td>
<td>305</td>
<td>456</td>
</tr>
<tr>
<td></td>
<td>Total FTE Required</td>
<td>152</td>
<td>12</td>
<td>305</td>
<td>24</td>
<td>25</td>
<td>37</td>
</tr>
<tr>
<td>2006</td>
<td>Total VCT Clients</td>
<td>346,785</td>
<td>693,570</td>
<td>1,040,355</td>
<td>156</td>
<td>311</td>
<td>467</td>
</tr>
<tr>
<td></td>
<td>Total FTE Required</td>
<td>156</td>
<td>12</td>
<td>311</td>
<td>25</td>
<td>25</td>
<td>37</td>
</tr>
<tr>
<td>2007</td>
<td>Total VCT Clients</td>
<td>354,414</td>
<td>708,829</td>
<td>1,063,243</td>
<td>159</td>
<td>318</td>
<td>477</td>
</tr>
<tr>
<td></td>
<td>Total FTE Required</td>
<td>159</td>
<td>13</td>
<td>318</td>
<td>26</td>
<td>26</td>
<td>38</td>
</tr>
<tr>
<td>2008</td>
<td>Total VCT Clients</td>
<td>362,211</td>
<td>724,423</td>
<td>1,086,634</td>
<td>163</td>
<td>325</td>
<td>488</td>
</tr>
<tr>
<td></td>
<td>Total FTE Required</td>
<td>163</td>
<td>13</td>
<td>325</td>
<td>26</td>
<td>26</td>
<td>39</td>
</tr>
<tr>
<td>2009</td>
<td>Total VCT Clients</td>
<td>370,180</td>
<td>740,360</td>
<td>1,110,540</td>
<td>166</td>
<td>332</td>
<td>498</td>
</tr>
<tr>
<td></td>
<td>Total FTE Required</td>
<td>166</td>
<td>13</td>
<td>332</td>
<td>27</td>
<td>27</td>
<td>40</td>
</tr>
</tbody>
</table>

* Based on a 2005 population of 8,483,000; assumes a 2.2% increase in the total population per year over the five years represented.

B. PMTCT

The Rwandan Government’s target for PMTCT is to provide services to all (100%) women who seek ANC services. An estimated 92% of pregnant women receive ANC. Tables 4 and 5 provide data on the number of FTE staff that would be required for PMTCT counseling and HIV testing for pregnant women in 2005. Table 6 projects these needs over the next five years.
The calculati

C. VCT/PMTCT Staffing Scenarios

The calculations above assume that health workers work 216 days per year as stipulated in the national personnel standards. However, many health workers spend more than seven days in training, away at workshops, or at offsite meetings. It is estimated that as much as 20% of worker days are spent off site at trainings, workshops, or other events. While these activities may be important in improving health worker skills, they also detract from service delivery time. Table 7 below shows differences in FTE requirements given three scenarios of actual service delivery days. The table is based on an 8% VCT uptake rate as an example of an uptake that will bring the government close to its ART target in a three-year period.
Table 7: Effect of Different Scenarios of Actual Service Provision Days on FTE Staff Required for VCT and PMTCT

<table>
<thead>
<tr>
<th>VCT/PMTCT Counseling Staffing Scenarios</th>
<th>Target</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2005</td>
</tr>
<tr>
<td>FTE = 216 days per year: Providers offer services on all of those days.</td>
<td>VCT uptake of 8%</td>
<td>305</td>
</tr>
<tr>
<td></td>
<td>PMTCT 100% of ANC clients</td>
<td>154</td>
</tr>
<tr>
<td></td>
<td>Total FTE Counselors</td>
<td>459</td>
</tr>
<tr>
<td></td>
<td>Total FTE Lab Staff</td>
<td>36</td>
</tr>
<tr>
<td>FTE = 206 full-time service days (216 days per year less an additional 10 days allocated for training)</td>
<td>VCT uptake of 8%</td>
<td>319</td>
</tr>
<tr>
<td></td>
<td>PMTCT 100% of ANC clients</td>
<td>162</td>
</tr>
<tr>
<td></td>
<td>Total FTE Counselors</td>
<td>481</td>
</tr>
<tr>
<td></td>
<td>Total FTE Lab Staff</td>
<td>39</td>
</tr>
<tr>
<td>FTE = 173 full-time service days (216 days/year less 20% [43 days] spent on non-service related tasks, such as off-site training, meetings, and workshops, or on additional days of sick* leave)</td>
<td>VCT uptake of 8%</td>
<td>380</td>
</tr>
<tr>
<td></td>
<td>PMTCT 100% of ANC clients</td>
<td>192</td>
</tr>
<tr>
<td></td>
<td>Total FTE Counselors</td>
<td>572</td>
</tr>
<tr>
<td></td>
<td>Total FTE Lab Staff</td>
<td>46</td>
</tr>
</tbody>
</table>

* Sick leave here includes maternity leave, leave for caring for a relative, or leave for an extended illness, all beyond the six days allotted.

D. Implications of Reduced HIV Prevalence for Staffing Requirements and Client Identification

HIV prevalence is under review in Rwanda. In 2002, the prevalence was estimated at 8.9%. However, more recent estimates from the Joint UN Programme on HIV/AIDS (UNAIDS) put the prevalence much lower, at 5.1% (UNAIDS/WHO 2004). The significance of prevalence with regard to human resources requirements lies in the need to identify HIV-positive clients. The lower the prevalence, the more difficult it will be to rapidly identify HIV-positive clients, requiring either a higher uptake of VCT, a longer timeline to reach treatment targets, or revised treatment targets. Higher VCT uptake will demand a larger investment of human resources. Table 8 shows the effects of different VCT uptake and HIV prevalence scenarios on estimated numbers of HIV-positive clients identified and the attendant implications for staffing requirements.

It should be noted that the FTE requirement for specific VCT uptake percentages vary very little under different prevalence scenarios. This is because regardless of prevalence, the same number of clients will need to undergo counseling and testing given a particular uptake scenario. However, the uptake scenario a country chooses to adopt may change depending on prevalence and on the estimated percentage of HIV-positive clients requiring ART, and these factors could have dramatic effects on FTE requirements. For example, in Rwanda, the government aims to treat 100,000 clients. If prevalence is 8.9%, and we assume an average of 17% of HIV-positive clients require ART, then a VCT uptake of 12% per year and successful achievement of 100% of all ANC clients receiving PMTCT services would be necessary in order to ensure that an adequate number of HIV-positive clients needing ART are identified for the government to reach its targets by the end of 2009. On the other hand, if prevalence is assumed to be 5.1% and 17% of all HIV-positive clients are estimated to require ART, then a VCT uptake of 16% and a successful achievement of 100% of all ANC clients receiving PMTCT would identify only 75,000 clients requiring ART but would necessitate an additional 162 FTE counselors (828 versus 666 FTE) and 13...
additional FTE HIV-testers (66 versus 53). The additional cost would come to approximately US$182,000/year for counselors and a US$15,000/year for laboratory staff.

If prevalence is revised to 5.1%, careful thought should be given to setting reasonable expectations for VCT uptake. For example, an uptake of 16% is likely not realistic given the human resources it would demand and the difficulty of attracting such a high percentage of the Rwandan population to VCT services every year. In addition, targets will need to be made with reasonable timelines such that clients can be identified within the time required for the country to reach treatment goals. Lastly, national targets may need to be revised to ensure that the necessary human resources can be trained and functional at service sites and that strategies for bringing clients to VCT and PMTCT services can become operational within the determined time-frame.

**E. Salary Cost Scenarios for VCT and PMTCT Counseling and Testing**

The salary costs associated with the FTE counselor and lab staff needs under the various VCT uptake scenarios are a function of the cadre of health worker assigned to perform the counseling and lab test tasks and of the type of employment contract the health worker has. As was described in the Phase 1 report (Furth et al. 2005), health providers in Rwanda are classified according to their level of training and experience. Salaries paid to each cadre of health provider also vary by employment mechanism (i.e., civil service or contract) and employer (e.g., government clinic, NGO, donor agency).

Roughly 45% of the health workforce in Rwanda is paid through the civil service; other staff is paid through contracts and health facility funds. Civil service salaries are generally higher than salaries paid through health facility contracts financed with user fees but lower than average salaries paid by donor agencies and agréé institutions.³

---

³ Agréé sites are public sector health facilities that are managed by a religious institution. See Table 7 in Furth et al. 2005 for salary comparison.
### Table 8: Implications of Different Estimates of HIV Prevalence on Number of HIV-positive Clients Identified per Year through VCT and PMTCT

#### Estimated Number of HIV-positive Clients Identified per Year through VCT

<table>
<thead>
<tr>
<th>Population 2005 = 8,483,000</th>
<th>8.9% Prevalence</th>
<th>5.1% Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assumes 2.2% population growth/year</td>
<td>4% 8% 12% 16%</td>
<td>4% 8% 12% 16%</td>
</tr>
<tr>
<td>FTE analysis based on 216 workdays/FTE/year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>30,199</td>
<td>60,399</td>
</tr>
<tr>
<td>2006</td>
<td>30,864</td>
<td>61,728</td>
</tr>
<tr>
<td>2007</td>
<td>31,543</td>
<td>63,086</td>
</tr>
<tr>
<td>2008</td>
<td>32,237</td>
<td>64,474</td>
</tr>
<tr>
<td>2009</td>
<td>32,946</td>
<td>65,892</td>
</tr>
<tr>
<td>Total number of HIV-positive clients identified over five years</td>
<td>157,789</td>
<td>315,578</td>
</tr>
<tr>
<td>FTE VCT counselors required by 2009</td>
<td>166</td>
<td>332</td>
</tr>
<tr>
<td>HIV/AIDS clients requiring ART = 17% (GOR HIV/AIDS Plan)</td>
<td>26,824</td>
<td>53,648</td>
</tr>
<tr>
<td>HIV/AIDS clients requiring ART = 25% (alternate scenario)</td>
<td>39,447</td>
<td>78,895</td>
</tr>
<tr>
<td>HIV/AIDS clients requiring ART = 33% (current NRL percentage)</td>
<td>52,070</td>
<td>104,141</td>
</tr>
</tbody>
</table>

#### Estimated Number of HIV-positive Clients Identified per Year through PMTCT

<table>
<thead>
<tr>
<th>ANC coverage (at least one visit) 92%</th>
<th>8.9% Prevalence</th>
<th>5.1% Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crude birth rate 4.4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FTE analysis based on 216 workdays/FTE/year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>30,562</td>
<td>17169.6</td>
</tr>
<tr>
<td>2006</td>
<td>31,234</td>
<td>17547.3</td>
</tr>
<tr>
<td>2007</td>
<td>31,921</td>
<td>17933.4</td>
</tr>
<tr>
<td>2008</td>
<td>32,624</td>
<td>18327.9</td>
</tr>
<tr>
<td>2009</td>
<td>33,341</td>
<td>18731.1</td>
</tr>
<tr>
<td>Total number of HIV-positive clients identified over five years</td>
<td>159,683</td>
<td>89,709</td>
</tr>
<tr>
<td>FTE counselors required by 2009</td>
<td>168</td>
<td>167</td>
</tr>
<tr>
<td>HIV/AIDS clients requiring ART = 17% (GOR HIV/AIDS Plan)</td>
<td>27,146</td>
<td>15,251</td>
</tr>
<tr>
<td>HIV/AIDS clients requiring ART = 25% (alternate scenario)</td>
<td>39,921</td>
<td>22,427</td>
</tr>
<tr>
<td>HIV/AIDS clients requiring ART = 33% (current NRL percentage)</td>
<td>52,695</td>
<td>29,604</td>
</tr>
</tbody>
</table>

---

4 (MINISANTE & Foundation, 2003: 7)

5 (MINISANTE & Foundation, 2003: 7)
Table 9 projects health worker salary costs based on civil service salaries, for providing VCT and PMTCT services with 4% VCT uptake, 8% uptake, and 12% uptake under three different staffing mix scenarios: 1) using only A2-level staff for all counseling and testing tasks; 2) using 50% A2 staff and 50% auxiliary staff for counseling and testing, and 3) using 33% A2 staff and 67% auxiliary staff for counseling tasks and 50% A2 and 50% auxiliary staff for testing tasks.

<table>
<thead>
<tr>
<th>VCT/PMTCT Staffing Scenarios</th>
<th>Based on 2005 staffing requirements</th>
<th>VCT 4% Annual Uptake PMTCT 100% of ANC Clients</th>
<th>VCT 8% Annual Uptake PMTCT 100% of ANC Clients</th>
<th>VCT 12% Annual Uptake PMTCT 100% of ANC Clients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FTE</td>
<td>Annual Salary Cost FTE</td>
<td>Annual Salary Cost FTE</td>
<td>Annual Salary Cost FTE</td>
</tr>
<tr>
<td>All counselors are A2 nurses and social workers</td>
<td>VCT counselors 152</td>
<td>$152,246</td>
<td>305</td>
<td>$304,491</td>
</tr>
<tr>
<td></td>
<td>PMTCT counselors 154</td>
<td>$154,109</td>
<td>154</td>
<td>$154,109</td>
</tr>
<tr>
<td>All HIV testers are A2 lab technicians or nurses</td>
<td>Lab staff 24</td>
<td>$24,313</td>
<td>37</td>
<td>$36,535</td>
</tr>
<tr>
<td>Scenario 1 Total</td>
<td>330</td>
<td>$330,668</td>
<td>496</td>
<td>$495,135</td>
</tr>
<tr>
<td>Counselors are 50% A2 nurses and social workers and 50% auxiliary staff or lay counselors</td>
<td>VCT counselors 152</td>
<td>$112,983</td>
<td>305</td>
<td>$225,965</td>
</tr>
<tr>
<td></td>
<td>PMTCT counselors 154</td>
<td>$114,365</td>
<td>154</td>
<td>$114,365</td>
</tr>
<tr>
<td>HIV testers are 50% A2 lab technicians or nurses and 50% auxiliary staff</td>
<td>Lab staff 24</td>
<td>$18,045</td>
<td>37</td>
<td>$27,112</td>
</tr>
<tr>
<td>Scenario 2 Total</td>
<td>330</td>
<td>$245,393</td>
<td>496</td>
<td>$367,442</td>
</tr>
<tr>
<td>Counselors are 33.3% A2 nurses and social workers and 66.7% auxiliary staff or lay counselors</td>
<td>VCT counselors 152</td>
<td>$99,869</td>
<td>305</td>
<td>$199,737</td>
</tr>
<tr>
<td></td>
<td>PMTCT counselors 154</td>
<td>$101,091</td>
<td>154</td>
<td>$101,091</td>
</tr>
<tr>
<td>HIV testers are 50% A2 lab technicians or nurses and 50% auxiliary staff</td>
<td>Lab staff 24</td>
<td>$18,045</td>
<td>37</td>
<td>$27,112</td>
</tr>
<tr>
<td>Scenario 3 Total</td>
<td>330</td>
<td>$219,005</td>
<td>496</td>
<td>$327,940</td>
</tr>
</tbody>
</table>

Costs are in U.S. dollars.
* Assumes lay counselors would receive the same salary as auxiliary staff. This salary is quite low (US$40.35/month) and may not be sufficient to attract people to counseling. Other possibilities could include paying trained lay counselors 75% of an A2-level salary, which would come to about US$62.50/month, or simply pay them an A3-level salary (US$65.79/month).
F. In-service Training Costs

The Government of Rwanda seeks to create integrated HIV/AIDS services. To do so, it plans to train all nurses and social workers in VCT and PMTCT. In the early stages of PMTCT and VCT training, TRAC provided training to counselors at the central level. In 2004, the process of decentralizing training to the district level began. To support training at the district level, 78 trainers were trained. These trainers are responsible for conducting trainings at the district level, but the number of trainings per year and number of trainees per training have not been specified. Table 10 calculates the total cost for training all nurses, social workers, lab technicians, and auxiliary staff who have not yet been trained in VCT/PMTCT. Per capita training costs are based on costs for centralized training by TRAC and the NRL, since costs of training in districts were unavailable. It should be kept in mind, however, that training costs for decentralized, district-level training will be less than what is represented here.

### Table 10: In-service Training Costs for Integrated VCT and PMTCT Services

<table>
<thead>
<tr>
<th>Training Costs/Participant*</th>
<th>Total Staff Trained As of December 31, 2004</th>
<th>Total Remaining Nurses, Social Workers, Lab Technicians, and Auxiliary Staff</th>
<th>Total Cost for Training Remaining Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counselors</td>
<td>$208</td>
<td>595</td>
<td>$795,600</td>
</tr>
<tr>
<td>Laboratory Technicians</td>
<td>$291</td>
<td>200</td>
<td>$48,306</td>
</tr>
<tr>
<td>Total Cost</td>
<td></td>
<td></td>
<td><strong>$843,906</strong></td>
</tr>
</tbody>
</table>

* Per capita training costs are based on average cost of in-service training in Kigali reported by TRAC and the NRL; see Table 52 in Furth et al. (2006).

** Assumes 3014 A1, A2, and A3 nurses (2314 current + an additional 700 A1 and A2 nurses which the government planned to hire as of March 2005); 258 social workers; and 1148 auxiliary staff. Although the government has set a minimum requirement of A2 nurse or A2 social worker status for counseling, auxiliary staff is being trained both at the central level and, more commonly, in district trainings. Therefore, the cost of training these staff has been included in this table.

*** Assumes one laboratory technician will be trained for each of the 366 health centers.

IV. STAFFING REQUIREMENTS FOR HIV CARE AND TREATMENT SERVICES

Several different national targets for ART have been listed in existing documents. The “Government of Rwanda HIV/AIDS Treatment and Care Plan 2003-2007” lists a target of 58,000 adult and pediatric patients, while the TRAC document, “Scaling up Antiretroviral Therapy (ART): Experience in Rwanda,” lists a target of 100,000 by 2007. Rather than select one of these targets over another for the staffing analysis, three possible targets—50,000, 75,000, and 100,000—are analyzed. In addition, two different time scenarios are represented. In the first, targets are reached in five years (end 2009), and in the second, targets are reached in three years (end 2007). The speed with which ART clients are identified and put on treatment will affect how rapidly staff will need to be trained, deployed, and possibly recruited.

Tables A1-A8 in Appendix 1 detail HIV care and treatment staffing FTE requirements and costs for five-year targets and three-year targets for both initiating and monitoring ART clients (see Box 3). Tables A1 and A2 are based on reaching targets in five years. Table A1 details the task time and FTE requirements for monitoring CD4 counts for HIV-positive clients not requiring ART, initiating clients on ART, monitoring ART clients, and dispensing ARV medications to clients. Table A2 details the task time and FTE requirements for performing CD4, viral load, and other blood tests required for ART monitoring. Tables A5 and A6 provide the same information but are based on the assumption of reaching targets in three years. These tables assume that health providers are offering services 216 days per year and that
they are working at 75% efficiency (six hours a
day) with the remaining 25% (two hours per day)
spent on organizing materials, waiting for clients,
completing routine administrative tasks, and staff
meetings. The analysis represented in these tables
also assumes that no clients will stop CD4
monitoring or ART services due to death or other
reasons. While it is clear that some HIV care and
treatment patients will drop out or die, the
potential treatment discontinuation rate estimated
in the “Treatment and Care Plan,” 1.5%, is so
small that it would not have a measurable impact on staffing requirements. Lastly, these tables begin with
8,000 ART monitoring clients. For the purposes of this study, the total number of ART clients recorded in
Rwanda as of September 30, 2004, (6,230) was used to estimate the number of clients at the end of 2004.
In the interest of simplicity, the tables are based on the assumption that all clients on ART in one year will
be monitoring clients in the following year.

Tables A3 and A4 project yearly staffing salary costs for ART care providers and lab staff, respectively,
for reaching ART client targets in five years, under three different staffing mix scenarios: 1) using only
doctors for CD4 monitoring, ART initiation, and ART monitoring and A1 nurses for all ARV dispensing;
2) having doctors perform 63% of CD4 monitoring and ART initiation and 33% of ART monitoring tasks
and having A1 nurses perform 37% of CD4 monitoring and ART initiation tasks, 67% of ART
monitoring, and 100% of ART dispensing; and 3) having doctors perform 63% of CD4 monitoring and
ART initiation and 33% of ART monitoring tasks, having A1 nurses perform 37% of CD4 monitoring
and ART initiation tasks, and 67% of ART monitoring, and having A2 nurses do all ARV dispensing.
The scenarios highlight for policy makers the cost savings that may be obtained by delegating certain
tasks to lower-level healthcare providers. Tables A7 and A8 project salary costs for ART care providers
and lab staff under these same staffing mix scenarios but reaching ART client targets in just three years.

A. HIV Care and ARV Dispensing

Tables A3, A4, A7, and A8 in Appendix 1 show that many different combinations of staff could perform
CD4 count monitoring for clients not yet requiring ART, ART initiation, ART monitoring, and ARV
dispensing tasks and that different combinations of staff have very different cost implications. The largest
input for HIV care and treatment, in terms of staff time, is the continual monitoring of HIV-positive
clients not yet requiring ART, but needing biannual CD4 counts. A large number of staff is required for
this activity because the number of clients will be much greater than the number of HIV-positive clients
on ART. The monthly dispensing of ARVs to ART clients will require the second largest number of FTE
staff. If this task can be handled by A2 nurses, auxiliary staff, or even community members, then the
burden of ART care will be greatly reduced for doctors, A1 nurses, and social workers. Realistically,
there are too few doctors (204\(^6\) active) in Rwanda today to handle 100% of the initiation and monitoring
care for all ART clients, which will require at least 48\(^7\) FTE personnel when a target of 100,000 clients is
reached. Having nurses take responsibility for selected tasks related to initiation and monitoring may be
one way to reduce the need for doctors and reduce cost as well.

\(^6\) Active refers to medical personnel engaged in service provision, as opposed to administration. The numbers here
reflect only personnel in the public health system.

\(^7\) Based on a five-year target; see Table A1, last column, for 100,000 target in 2006. If a three-year target is to be
achieved, then 58 FTE staff will be required (see Table A5).
Tables A5 and A6 show that the shorter the time to reach targets (i.e., three years rather than five), the greater the number of care providers and laboratory technicians required. Although the target for these two scenarios (100,000) is the same, more FTE staff is required to care for clients initiating ART, who are scheduled for four routine visits with a care provider as opposed to ART monitoring clients, who receive two routine visits with a provider per year. The faster ART services are scaled up, the greater the number of clients initiating ART per year.

**B. Opportunistic Infection Care**

Estimating staff required for providing care for opportunistic infections (OIs) is difficult because various infections require different types of care and investments of provider time and because it is difficult to estimate the number of clients who will require services for specific OIs. It is estimated, however, that a significant number of in-patients in hospitals require treatment for OI. The National Care and Treatment Plan 2003-2007 notes that 60% of all hospital beds are occupied by AIDS patients (MINISANTE & Foundation, 2003). Adequate staff will be required to address these patients’ needs as well. Calculations of FTE staff requirements presented in Tables A1-A8 do not include staff needed for OI care.

**C. Laboratory Testing**

Table A6 shows that a large number (254) of FTE laboratory personnel would be required to carry out routine testing for initiating and monitoring 100,000 ART clients. Currently, there are only 16 A1 and 162 A2 laboratory technicians active in Rwanda. The number of required laboratory technicians may change if equipment that can process tests more quickly and in larger batches is made available. Consideration will have to be given as to how the laboratory gap can be filled. Kigali Health Institute is graduating approximately 80 trained laboratory technicians per year, which will help. Assuming that laboratory technicians working on routine testing are posted at the three referral hospitals and 33 district hospitals, a minimum of six FTE laboratory technicians would be required per site in order to fulfill the routine testing requirements of 100,000 ART clients.

**D. ART Care and Treatment Staffing Costs**

Which types of staff are allocated to carry out CD4 count monitoring, ART initiation, ART monitoring, and ARV dispensing tasks will influence the cost of supporting ART services. Tables A3, A4, A7, and A8 provide costs for staff salaries in three different staffing mix scenarios and according to different ART client targets. For example, doctors might focus on performing physical examinations of patients, ordering lab tests, and reviewing test results, while nurses could interview clients for medical history and symptoms, take weight and blood pressure, and dispense ARVs to clients. The last scenario, scenario 3, considers the same division of CD4 count monitoring, ART initiation, and ART monitoring among doctors and A1 nurses but includes A2 nurses doing all dispensing. Since ARV dispensing requires the greatest number of FTE of all ART services, using lesser-paid staff for dispensing activities greatly reduces cost. Using less-skilled staff to perform certain tasks is also a more realistic approach for reaching the numbers of personnel required to provide ART services as the scale envisioned in Rwanda, since doctors and A1 nurses are in short supply.

It should be noted that the costs included in these tables and in Table 9 for VCT and PMTCT are based on current civil service salaries. The Government of Rwanda is in the process of developing a plan to increase these salaries, which are generally considered low; thus, real costs in the future may be greater than those represented here.

**E. In-service Training Costs**

Assuming that both doctors and nurses (A1 and A2) will be providing ART services, the cost of in-service training of existing staff will reach US$184,004. This would cover the cost of training 202 FTE
staff for care and treatment and 254 laboratory staff. As noted above, very few trained laboratory technicians are currently employed in Rwanda. Data from Phase 1 of this study indicate that there are only 16 A1 laboratory technicians and 162 A2 laboratory technicians active in the Rwandan public health system.

V. SUMMARY OF FTE REQUIREMENTS AND ANNUAL STAFF SALARY COSTS ALL HIV/AIDS SERVICES

This summary is based on an 8% uptake of VCT, 100% of ANC clients provided with PMTCT, and a three-year target of 100,000 clients. Table 11 aggregates the total annual salary costs for all HIV/AIDS services. It is based on an ART target of 100,000 clients in three years (by 2007). The table illustrates the substantial human and financial cost of HIV/AIDS service provision. The 74 FTE doctors it will require to provide care and treatment for initiating and monitoring ART clients represent 36% of the 204 doctors providing health services nationwide (see Phase 1 report). This estimate relies on the assumption that doctors would provide 63% of initiation care and only 33% of monitoring care. If doctors were to provide 100% of those services, at least 126 FTE doctors would be required, which would be equivalent to roughly 62% of active doctors nationwide. As the government scales-up and decentralizes ART services, staff distribution will also have to be carefully considered. Differences in prevalence in rural and urban areas should be taken into consideration when staff distribution is planned.

In addition to physician requirements, 607 nurses and social workers would be required for VCT, PMTCT, and HIV/AIDS care and treatment services, a number representing 22% of those cadres currently active in the Rwandan health system (2812). Laboratory technicians are the most under-represented category of staff required for HIV/AIDS services. Nationwide there are currently only 235 laboratory technicians, while Table 11 suggests that 303 FTE laboratory staff will be required to fulfill HIV/AIDS testing requirements.

It should be kept in mind that this analysis covers provision of standard ART initiation and monitoring care and does not include care for opportunistic infections.

The US$1,263,378 required to support the salaries of these FTE staff that would be needed to provide HIV/AIDS services represents 23% of the 2004 MOH health human resources budget for Rwanda (US$5,400,000). Salaries are currently considered quite low, despite recent pay increases through primes, and the government is working on plans to further increase the salaries of civil service employees as part of its health reforms (GOR-MPSSDL, 2004). Thus it is possible that the total costs could increase substantially in the upcoming years.  

---

8 Plans for salary changes have not yet been implemented and are not expected in the next year (personal communication with the national coordinator for the Rwandan health reform project).
num
the num
reduce VCT
CD4-count monitoring. Over time, PMTCT and VCT, in turn, lead to higher num
required and t
faster the govern
HIV/AIDS.
Future staffi
y
result in appr
m
y
A1 and A2 nurses. Without a clear sense of how m
education and
growth in the
Nursing schools, training
Medicine graduates approx
strengthened, allowing for
Growth of the health workforce:
* Co
medications.

<table>
<thead>
<tr>
<th>Service</th>
<th>Cadre</th>
<th>FTE</th>
<th>2005</th>
<th>FTE</th>
<th>2006</th>
<th>FTE</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>VCT</td>
<td>A2 Nurse/Social Worker</td>
<td>304</td>
<td>$304,492</td>
<td>311</td>
<td>$320,527</td>
<td>318</td>
<td>$337,405</td>
</tr>
<tr>
<td></td>
<td>A2 Lab Tech/ Nurse</td>
<td>24</td>
<td>$24,437</td>
<td>31</td>
<td>$32,145</td>
<td>36</td>
<td>$27,078</td>
</tr>
<tr>
<td></td>
<td>Subtotal</td>
<td>328</td>
<td>$328,929</td>
<td>342</td>
<td>$352,672</td>
<td>354</td>
<td>$364,483</td>
</tr>
<tr>
<td>PMTCT</td>
<td>A2 Nurse/Social Worker</td>
<td>154</td>
<td>$154,110</td>
<td>158</td>
<td>$162,225</td>
<td>161</td>
<td>$170,768</td>
</tr>
<tr>
<td></td>
<td>A2 Lab Tech/ Nurse</td>
<td>12</td>
<td>$12,098</td>
<td>13</td>
<td>$13,016</td>
<td>13</td>
<td>$14,423</td>
</tr>
<tr>
<td></td>
<td>Subtotal</td>
<td>166</td>
<td>$166,208</td>
<td>171</td>
<td>$175,241</td>
<td>174</td>
<td>$185,191</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>Doctors</td>
<td>26</td>
<td>$76,349</td>
<td>49</td>
<td>$142,918</td>
<td>74</td>
<td>$226,648</td>
</tr>
<tr>
<td>Care and Treatment</td>
<td>A1 Nurses/Social Workers</td>
<td>17</td>
<td>$26,153</td>
<td>33</td>
<td>$51,796</td>
<td>52</td>
<td>$85,359</td>
</tr>
<tr>
<td></td>
<td>A2 Nurses/Social Workers*</td>
<td>19</td>
<td>$19,290</td>
<td>37</td>
<td>$39,738</td>
<td>76</td>
<td>$81,860</td>
</tr>
<tr>
<td>100,000 by 2007</td>
<td>A1 Lab Tech</td>
<td>23</td>
<td>$36,449</td>
<td>43</td>
<td>$70,858</td>
<td>85</td>
<td>$140,283</td>
</tr>
<tr>
<td></td>
<td>A2 Lab Tech</td>
<td>47</td>
<td>$46,652</td>
<td>89</td>
<td>$90,694</td>
<td>169</td>
<td>$179,554</td>
</tr>
<tr>
<td></td>
<td>Subtotal</td>
<td>132</td>
<td>$204,893</td>
<td>251</td>
<td>$396,004</td>
<td>456</td>
<td>$713,704</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>626</td>
<td>$700,030</td>
<td>764</td>
<td>$923,917</td>
<td>984</td>
<td>$1,263,378</td>
</tr>
</tbody>
</table>

Costs are in U.S. dollars.

* In this case, these nurses or social workers would dispense ARVs and provide counseling on taking medications.

**Growth of the health workforce:** In recent years several training institutions have been created or strengthened, allowing for a rapid growth in the number of trained healthcare workers. The School of Medicine graduates approximately 70 new physicians every year. If this trend continues, over 200 new physicians could be available to work in hospitals and health centers in the next three years.

Nursing schools, training on average 20–40 students per institution per year, are also responsible for growth in the health workforce. The Ministry of Health is in the process of reorganizing nursing education and has plans to reduce nursing schools from 21 to 5 and to upgrade required qualifications for A1 and A2 nurses. Without a clear sense of how many nursing schools will be operational in the next few years, and how many students they will be able to accommodate, it is difficult to determine how many more nurses will enter the health workforce in the next few years.

Kigali Health Institute is graduating laboratory technicians at the rate of about 80 per year. This could result in approximately 250 new laboratory technicians being added to the workforce in the next three years.

**Future staffing needs:** While the human resource and financial requirements for the rapid scale-up of HIV/AIDS services are substantial, staffing requirements may level off or even decline over time. The faster the government seeks to reach a target of 100,000 clients on ARVs, the higher the VCT uptake required and the greater the percentage of ANC clients tested. Greater numbers of clients provided with PMTCT and VCT, in turn, lead to higher numbers of identified HIV-positive clients who will require CD4-count monitoring. Over time, after initial targets have been met, the government may be able to reduce VCT uptake, thereby decreasing the need for VCT counselors and lab staff. The pace of increasing the number of staff serving ART clients may also slow if VCT uptake rates are reduced, although the total number of FTE staff needed to provide HIV/AIDS treatment and care will continue to increase.

14 · Rwanda HIV/AIDS Human Resources Assessment – Phase 3
VI. COMPARISON OF SAMPLE SITE DATA WITH HIV/AIDS SERVICES SCALE-UP REQUIREMENTS

Assembling the staff required to provide HIV/AIDS services will be extremely challenging, especially given the short timeframe in which the Government of Rwanda and its partners want to reach ART targets. If the necessary staff can be assembled, then a corresponding question arises: Will the staff be sufficient to address HIV/AIDS service provision needs without deterring from other important health services?

As reported in the Phase 2 report (Furth et al. 2006), the study team collected service statistics from sample sites that enable some illustrative examples of the effect of HIV/AIDS services scale-up on staffing requirements. The team collected service site statistics for a 12-month period from November 2003 through October 2004. The national staffing norms for health facilities note expectations for how much staff time should be spent on care, administration, and other health-related activities, but do not detail the average time providers are expected to take per client for particular health services (MINISANTE, 1997). In the absence of activity standards for the services recorded, times for health center services were taken from a Tanzania example (Shipp, 1998). Hospital staff time for Tanzania did not adequately conform to the available statistics to permit a reasonable analysis of service statistics recorded in the health center monthly reports (see Box 4).

Table 12 analyzes staffing requirements based on involvement only of “qualified” healthcare providers: nurses, social workers, laboratory technicians, and physicians. It assumes that staff work 216 days per year, according to national personnel standards. It shows that current staffing of counseling and care providers at five of the eight health facilities observed are sufficient to cover scale-up of VCT and PMTCT counseling activities, but only three facilities have adequate laboratory staff. If staff works fewer than 216 days per year, more staff would be required to cover service demands.

The Rwandan Ministry of Health is trying to expand the training and employment of qualified personnel, but most health facilities continue to rely heavily on “non-qualified” staff: auxiliary staff and aides. Most of these staff members are paid directly by health facilities from user fees. Auxiliary staff currently represents 23% of the health workforce and is the second largest group of health personnel next to nurses. Table 13 shows that if auxiliary staff and aides are permitted to provide VCT and PMTCT counseling, no health facilities in this sample will require additional counseling staff in order to meet VCT and PMTCT targets and continue providing other health services. Laboratory staff will still be required in four out of the eight sample facilities, but auxiliary staff could also be trained (and are in some facilities) to carry out HIV testing and reduce the requirement for hiring additional laboratory staff.

<table>
<thead>
<tr>
<th>Box 4: Data Recorded in Health Center Monthly Reports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total consultations—new cases</td>
</tr>
<tr>
<td>Total consultations—old cases</td>
</tr>
<tr>
<td>Total deliveries</td>
</tr>
<tr>
<td>Total vaccinations</td>
</tr>
<tr>
<td>Growth monitoring—new cases</td>
</tr>
<tr>
<td>Growth monitoring—old cases</td>
</tr>
<tr>
<td>Antenatal care—first visits</td>
</tr>
<tr>
<td>Antenatal care—subsequent visits</td>
</tr>
<tr>
<td>Family planning—new cases</td>
</tr>
<tr>
<td>Family planning—continuing cases</td>
</tr>
<tr>
<td>Health education meetings</td>
</tr>
<tr>
<td>Hospitalization days</td>
</tr>
<tr>
<td>Total lab activities</td>
</tr>
</tbody>
</table>
Table 12: Staffing Requirements for VCT and PMTCT Scale-up: “Qualified” Staff Only

<table>
<thead>
<tr>
<th>Site</th>
<th>Site Type</th>
<th>Population</th>
<th>Current FTE Qualified Staff</th>
<th>Current Staff Requirements: All Services</th>
<th>Staff Requirements: All Services If VCT at 2% and PMTCT at 100%</th>
<th>Staff Needed to Meet Targets and Provide Other Health Services</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Care</td>
<td>Lab</td>
<td>Care</td>
<td>Lab</td>
</tr>
<tr>
<td>1</td>
<td>Public HC</td>
<td>15,000</td>
<td>9</td>
<td>1</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Agrée HC</td>
<td>29,205</td>
<td>14</td>
<td>2</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Agrée HC</td>
<td>34,389</td>
<td>12</td>
<td>3</td>
<td>17</td>
<td>9</td>
</tr>
<tr>
<td>7</td>
<td>Public HC</td>
<td>38,942</td>
<td>11</td>
<td>1</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>Public HC</td>
<td>24,453</td>
<td>6</td>
<td>2</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>Agrée HC</td>
<td>31,647</td>
<td>10</td>
<td>2</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>18</td>
<td>Public HC</td>
<td>71,071</td>
<td>16</td>
<td>3</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>19</td>
<td>Public HC</td>
<td>30,886</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 13: Staffing Requirements for VCT and PMTCT Scale-up: “Qualified” Staff, Aides, and Auxiliary Staff

<table>
<thead>
<tr>
<th>Site</th>
<th>Site Type</th>
<th>Population</th>
<th>Current FTE Staff Including Auxiliary Staff</th>
<th>Current Staff Requirements: All Services</th>
<th>Staff Requirements: All Services If VCT at 12% and PMTCT at 100%</th>
<th>Staff Needed to Meet Targets and Provide Other Health Services</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Care</td>
<td>Lab</td>
<td>Care</td>
<td>Lab</td>
</tr>
<tr>
<td>1</td>
<td>Public HC</td>
<td>15,000</td>
<td>10</td>
<td>1</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Agrée HC</td>
<td>29,205</td>
<td>19</td>
<td>4</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Agrée HC</td>
<td>34,389</td>
<td>26</td>
<td>3</td>
<td>17</td>
<td>9</td>
</tr>
<tr>
<td>7</td>
<td>Public HC</td>
<td>38,942</td>
<td>15</td>
<td>1</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>Public HC</td>
<td>24,453</td>
<td>8</td>
<td>2</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>Agrée HC</td>
<td>31,647</td>
<td>14</td>
<td>2</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>18</td>
<td>Public HC</td>
<td>71,071</td>
<td>24</td>
<td>3</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>19</td>
<td>Public HC</td>
<td>30,886</td>
<td>12</td>
<td>2</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

VII. HEALTH CENTER EXAMPLE

The FTE calculations in the previous section address FTE needs for the total population of Rwanda and do not address needs for particular health facilities. HIV/AIDS service provider requirements for individual health facilities will vary depending on the size of the population served by the facility. This section offers an illustrative example of VCT and PMTCT staffing requirements at a health facility with a population of 25,000, which is roughly the average population served by each of the 366 health centers in Rwanda.

According to TRAC, in 2004 health centers offering VCT and PMTCT averaged 250 clients/month/service or 3000 clients/year for each service. The average health center population in Rwanda is 25,000, of which 3,000 is 12%. To show the implications of current government policies and practices, the following analysis is based on a VCT uptake rate of 12%. The table also assumes a target of 100%

---

9 The sample of 20 sites showed an average quite close to this—233 clients/month—for the 12 months of service delivery studied (November 2003-October 2004).
coverage of ANC clients (92% of all pregnant women). Table 14 shows how many staff would need to be allocated full time (216 days per year) to VCT and PMTCT to serve the targeted number of clients.

Tables 14 and 15 show that the more time VCT and PMTCT counselors and laboratory staff spend away from their posts, the more FTE counselors and laboratory staff will be required to fulfill client needs. Table 14 also demonstrates that the allocation of two full-time counselors to VCT and PMTCT services will be sufficient to cover service demand if services are offered continually (see below) and if counselors spend no more that two weeks of work time per year away from their posts for trainings or other events.

**Table 14: FTE VCT/PMCT Counselors Required per Average Health Center**

<table>
<thead>
<tr>
<th>Staffing Scenario</th>
<th>Target</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTE is equivalent to 216 days per year</td>
<td>VCT coverage of 12%</td>
<td>1.22</td>
<td>1.38</td>
<td>1.41</td>
<td>1.44</td>
<td>1.47</td>
</tr>
<tr>
<td></td>
<td>PMTCT 100% of ANC clients</td>
<td>0.44</td>
<td>0.45</td>
<td>0.46</td>
<td>0.47</td>
<td>0.48</td>
</tr>
<tr>
<td></td>
<td><strong>Total FTE Counselors</strong></td>
<td><strong>1.66</strong></td>
<td><strong>1.83</strong></td>
<td><strong>1.87</strong></td>
<td><strong>1.91</strong></td>
<td><strong>1.95</strong></td>
</tr>
<tr>
<td>FTE is equivalent to 216 days per year but 10 days are allocated for training. Total full-time service delivery days = 206 service days</td>
<td>VCT coverage of 12%</td>
<td>1.28</td>
<td>1.44</td>
<td>1.47</td>
<td>1.51</td>
<td>1.54</td>
</tr>
<tr>
<td></td>
<td>PMTCT 100% of ANC clients</td>
<td>0.47</td>
<td>0.48</td>
<td>0.49</td>
<td>0.50</td>
<td>0.51</td>
</tr>
<tr>
<td></td>
<td><strong>Total FTE Counselors</strong></td>
<td><strong>1.72</strong></td>
<td><strong>1.92</strong></td>
<td><strong>1.96</strong></td>
<td><strong>2.01</strong></td>
<td><strong>2.05</strong></td>
</tr>
<tr>
<td>FTE is equivalent to 216 days per year, but 20% (43 days) of working time is spent on non-service related tasks (off-site training, meetings, workshops) = 173 service days</td>
<td>VCT coverage of 12%</td>
<td>1.52</td>
<td>1.72</td>
<td>1.76</td>
<td>1.79</td>
<td>1.83</td>
</tr>
<tr>
<td></td>
<td>PMTCT 100% of ANC clients</td>
<td>0.55</td>
<td>0.57</td>
<td>0.58</td>
<td>0.59</td>
<td>0.60</td>
</tr>
<tr>
<td></td>
<td><strong>Total FTE Counselors</strong></td>
<td><strong>2.07</strong></td>
<td><strong>2.29</strong></td>
<td><strong>2.34</strong></td>
<td><strong>2.38</strong></td>
<td><strong>2.43</strong></td>
</tr>
</tbody>
</table>

* Public sector health workers have, on average, the following days of leave each year: 104 weekend days, 10 public holidays and 35 days of vacation or sickness. Full time workers are expected to work eight hours a day. For this calculation it is assumed that in each eight-hour day, a worker is actively providing services to clients for six hours and that two hours are for other routine work, such as staff meetings and logistics management, or spent as waiting time.

---

10 Pregnant women are calculated here based on a crude birth rate of 4.4%.
Table 15: FTE VCT/PMTCT Laboratory Staff Required per Average Health Center

<table>
<thead>
<tr>
<th>Staffing Scenario</th>
<th>Target</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTE is equivalent to 216 days* per year</td>
<td>VCT coverage of 12%</td>
<td>0.108</td>
<td>0.110</td>
<td>0.112</td>
<td>0.115</td>
<td>0.117</td>
</tr>
<tr>
<td></td>
<td>PMTCT 100% of ANC clients</td>
<td>0.036</td>
<td>0.036</td>
<td>0.037</td>
<td>0.038</td>
<td>0.039</td>
</tr>
<tr>
<td></td>
<td>Total FTE Lab Staff**</td>
<td>0.144</td>
<td>0.146</td>
<td>0.149</td>
<td>0.153</td>
<td>0.156</td>
</tr>
<tr>
<td>FTE is equivalent to 216 days per year but 10 days are allocated for training. Total full-time service deliver days = 206 service days</td>
<td>VCT coverage of 12%</td>
<td>0.113</td>
<td>0.116</td>
<td>0.118</td>
<td>0.121</td>
<td>0.124</td>
</tr>
<tr>
<td></td>
<td>PMTCT 100% of ANC clients</td>
<td>0.037</td>
<td>0.038</td>
<td>0.039</td>
<td>0.040</td>
<td>0.041</td>
</tr>
<tr>
<td></td>
<td>Total FTE Lab Staff</td>
<td>0.150</td>
<td>0.154</td>
<td>0.157</td>
<td>0.161</td>
<td>0.165</td>
</tr>
<tr>
<td>FTE is equivalent to 216 days per year, but 20% (43 days) of working time is spent on non-service related tasks (off-site training, meetings, workshops) = 173 service days</td>
<td>VCT coverage of 12%</td>
<td>0.135</td>
<td>0.138</td>
<td>0.140</td>
<td>0.144</td>
<td>0.147</td>
</tr>
<tr>
<td></td>
<td>PMTCT 100% of ANC clients</td>
<td>0.044</td>
<td>0.045</td>
<td>0.046</td>
<td>0.047</td>
<td>0.049</td>
</tr>
<tr>
<td></td>
<td>Total FTE Lab Staff</td>
<td>0.179</td>
<td>0.183</td>
<td>0.186</td>
<td>0.191</td>
<td>0.196</td>
</tr>
</tbody>
</table>

* Public sector health workers have, on average, the following days of leave each year: 104 weekend days, 10 public holidays, and 35 days of vacation or sickness. Full-time workers are expected to work eight hours a day. For this calculation it is assumed that in each eight-hour day, a worker is actively providing services to clients for six hours and that two hours are for other routine work, such as staff meetings and logistics management, or spent in waiting time.

** The time required by laboratory staff includes only the time for conducting rapid tests and completing client records and/or register books. It does not include any additional time the laboratory technician might spend preparing samples to be sent to the national laboratory for quality control.

A. Daily VCT and PMTCT Staffing at Service Sites

How services are organized will affect the number of counselors required per service day. While the total FTE required throughout the year will be the same, regardless of how services are scheduled, the number of staff available to fulfill client demand on any particular day would vary depending on whether the services were offered continually (251 days per year)\(^{11}\) or concentrated (in the example below, two days per week or 104 days per year).

**Continual service – daily staffing:** For a site with continual service—that is, service offered every day the facility operates—the number of VCT and PMTCT providers counseling clients for six hours per day with two hours allotted for waiting for clients, organizing materials, and compiling records or reports, is shown in Table 16. Table 17 shows the number of lab staff required in an average health center for continual VCT and PMTCT services.

---

\(^{11}\) Service site days of operation are calculated as 365 days per year minus 104 weekend days and 10 public holidays = 251.
For sites with concentrated services—service only offered on particular days of the week—the number of service providers available on service days would be greater because client loads would be concentrated on specific days, rather than spread out over the week.

Most facilities the study team visited offered VCT two days a week and PMTCT two days a week. For example, VCT was offered Wednesdays and Fridays, and PMTCT on Tuesdays and Thursdays. Offering services only a few days of the week can be very convenient for service providers and for clients, but it also means that client loads will increase for those specified days. As a result of these higher client loads, a greater number of HIV/AIDS service delivery staff will be required on these service days to fulfill client need. Tables 18 and 19 below illustrate how many staff would have to be dedicated to VCT and PMTCT per service day, if each service were only offered two days a week. The total number of counselors per day listed in Tables 18 and 19 are not aggregated since the services are offered on separate days.

### Table 16: Continual Service Delivery Staffing: Counselors

<table>
<thead>
<tr>
<th>Target</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>VCT coverage of 12%</td>
<td>1.05</td>
<td>1.18</td>
<td>1.21</td>
<td>1.24</td>
<td>1.26</td>
</tr>
<tr>
<td>PMTCT 100% of ANC clients</td>
<td>0.38</td>
<td>0.39</td>
<td>0.40</td>
<td>0.41</td>
<td>0.42</td>
</tr>
<tr>
<td>Total counselors/service day VCT and PMTCT</td>
<td>1.43</td>
<td>1.57</td>
<td>1.61</td>
<td>1.65</td>
<td>1.68</td>
</tr>
</tbody>
</table>

### Table 17: Continual Service Delivery Staffing: Laboratory Staff

<table>
<thead>
<tr>
<th>Target</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>VCT coverage of 12%</td>
<td>0.093</td>
<td>0.095</td>
<td>0.097</td>
<td>0.099</td>
<td>0.101</td>
</tr>
<tr>
<td>PMTCT 100% of ANC clients</td>
<td>0.031</td>
<td>0.031</td>
<td>0.032</td>
<td>0.033</td>
<td>0.033</td>
</tr>
<tr>
<td>Total lab staff/service day VCT and PMTCT</td>
<td>0.124</td>
<td>0.126</td>
<td>0.129</td>
<td>0.132</td>
<td>0.134</td>
</tr>
</tbody>
</table>

### Concentrated service –daily staffing:

For sites with concentrated services—service only offered on particular days of the week—the number of service providers available on service days would be greater because client loads would be concentrated on specific days, rather than spread out over the week.

On VCT service days, 2.53 counselors would be required for 2005 and 2.86 counselors for 2006 as opposed to 1.05 and 1.18 counselors, respectively, for these years for sites with continual service delivery. For a site with six full-time qualified staff members (not including laboratory technicians), this would mean that 42% of staff would have to be dedicated to VCT two days a week, a potential burden on other services provided at the health facility. In addition, three counseling rooms would need to be available so that these staff could counsel the clients within a six-hour period. While VCTI and other donors are in the process of constructing counseling facilities, few health centers currently have an adequate number of counseling rooms to provide services to clients.

In either scenario, little time is required of laboratory technicians to complete the required tests. In the continual service deliver model a laboratory technician would spend forty-five minutes per day in 2005 and just under 50 minutes per day in 2009. For VCT service delivery days in the concentrated model, one hour and thirty minutes of laboratory staff time would be required in 2005 and one hour and forty-five minutes in 2009.
REFERENCES


APPENDIX 1: HIV/AIDS CARE AND TREATMENT STAFFING AND COST TABLES FOR REACHING TARGETS IN FIVE YEARS AND THREE YEARS

The data in Tables A1-A8 are based on the following:

FTE days per year: 216

One day of HIV/AIDS service: Six hours of client contact and two hours of administration, preparation, waiting, and staff meetings.

Population in 2005: 8,483,000

Populations growth: 2.2% per year

Crude birth rate: 4.4%

ANC first attendance: 92%

HIV prevalence: 8.9%

Definition: ART initiating clients are those clients who start ARVs for the first time. Clients are considered initiating clients for the first 6 months of treatment after which they become ART monitoring clients. ART monitoring clients are those clients who have had their initial visit, two-week follow-up visit, three-month follow-up visit, and six-month follow-up visit and who have reached the point of routine biannual visits.

For illustrative purposes, the number of clients on ART per year was derived by reducing from the target number by 27% per year for the five-year target or 50% per year for the three-year target.

To calculate the number of HIV-positive patients that will be identified per year, a VCT uptake rate of 4% and 100% ANC clients receive PMTCT was applied for a target of 50,000 ART clients and a VCT uptake rate of 8% and 100% ANC clients receive PMTCT was applied for the targets of 75,000 and 100,000 ART clients.

Assumptions

1. HIV-positive clients identified through VCT and PMTCT receive CD4 counts every six months

2. All ART initiating clients complete the full course of initiating services in one calendar year

3. All clients who started ARVs or were already on ARVs in 2004 become monitoring clients in 2005; all clients initiating or monitoring in 2005 become monitoring clients in 2006, and so on, until the target is reached.

4. At the end of 2004, 8000 clients were on ARVs. These clients are counted as monitoring clients in 2005, while all other ART clients will be considered initiating clients.

5. No clients on ARVs will die or permanently stop taking ARVs over the next 5 years. While “exits” from the ART program due to death or other reason will likely occur—the Clinton Foundation estimates a 1.5% death rate/year of ARV patients—the number is not substantial enough to have an impact on the number of FTE required.

6. All staff are paid according to the government salary scale, and salaries increase at a steady rate of 3% per year.
<table>
<thead>
<tr>
<th>HIV/AIDS Care and Treatment</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Five-year Target</td>
<td>50,000</td>
<td>75,000</td>
<td>100,000</td>
<td>50,000</td>
<td>75,000</td>
</tr>
<tr>
<td>Total ART Clients</td>
<td>14,199</td>
<td>21,299</td>
<td>28,398</td>
<td>19,451</td>
<td>29,176</td>
</tr>
<tr>
<td>CD4 Count Monitoring Clients Not on ART</td>
<td>54,562</td>
<td>77,662</td>
<td>70,563</td>
<td>111,409</td>
<td>162,747</td>
</tr>
<tr>
<td>Time per visit – minutes</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Visits/year</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Total counseling minutes/year</td>
<td>1,527,743</td>
<td>2,174,540</td>
<td>1,975,753</td>
<td>3,119,441</td>
<td>4,556,903</td>
</tr>
<tr>
<td>Total FTE: CD4 Monitoring</td>
<td>20</td>
<td>28</td>
<td>25</td>
<td>40</td>
<td>59</td>
</tr>
<tr>
<td>ART Initiating Clients</td>
<td>6,199</td>
<td>13,299</td>
<td>20,398</td>
<td>5,252</td>
<td>7,878</td>
</tr>
<tr>
<td>Time per visit – minutes</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Visits/year</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Total counseling minutes</td>
<td>384,345</td>
<td>824,518</td>
<td>1,264,691</td>
<td>325,607</td>
<td>488,411</td>
</tr>
<tr>
<td>Total FTE: ART Initiation</td>
<td>5</td>
<td>11</td>
<td>16</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>ART Monitoring Clients</td>
<td>8,000</td>
<td>8,000</td>
<td>8,000</td>
<td>14,199</td>
<td>21,299</td>
</tr>
<tr>
<td>Time per visit – minutes</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Visits/year</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Total time/client/year</td>
<td>28</td>
<td>28</td>
<td>28</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>Total counseling minutes</td>
<td>224,000</td>
<td>224,000</td>
<td>224,000</td>
<td>397,575</td>
<td>596,363</td>
</tr>
<tr>
<td>Total FTE: ART Monitoring</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>ARV Dispensing</td>
<td>14,199</td>
<td>21,299</td>
<td>28,398</td>
<td>19,451</td>
<td>29,176</td>
</tr>
<tr>
<td>Times ARV dispensed/year</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Visits/client/year</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Total time/client/year</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Total counseling minutes</td>
<td>851,947</td>
<td>1,277,921</td>
<td>1,703,894</td>
<td>1,167,051</td>
<td>1,750,577</td>
</tr>
<tr>
<td>Total FTE: Dispensing</td>
<td>11</td>
<td>16</td>
<td>22</td>
<td>15</td>
<td>23</td>
</tr>
<tr>
<td>ART total care hours</td>
<td>49,801</td>
<td>75,016</td>
<td>86,139</td>
<td>83,495</td>
<td>123,204</td>
</tr>
<tr>
<td>ART total care days</td>
<td>8,300</td>
<td>12,503</td>
<td>14,356</td>
<td>13,916</td>
<td>20,534</td>
</tr>
<tr>
<td>Total FTE: All Care and Treatment Tasks</td>
<td>38</td>
<td>58</td>
<td>66</td>
<td>64</td>
<td>95</td>
</tr>
</tbody>
</table>
### Table A2: Task Time and FTE Laboratory Staff Required for Different ART Testing Services, Assuming Five-year Targets

<table>
<thead>
<tr>
<th>Five-year Target</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Test: CD4</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test time minutes</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Tests/year</td>
<td>137,523</td>
<td>197,922</td>
<td>197,922</td>
<td>261,719</td>
<td>383,846</td>
</tr>
<tr>
<td>Total minutes/year</td>
<td>825,136</td>
<td>1,187,530</td>
<td>1,187,530</td>
<td>1,570,313</td>
<td>2,303,074</td>
</tr>
<tr>
<td><strong>Test: Viral Load</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test time minutes</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Tests/year</td>
<td>14,199</td>
<td>21,299</td>
<td>28,398</td>
<td>19,451</td>
<td>29,176</td>
</tr>
<tr>
<td>Total minutes/year</td>
<td>354,978</td>
<td>532,467</td>
<td>709,956</td>
<td>486,271</td>
<td>729,407</td>
</tr>
<tr>
<td><strong>Test: Liver Function</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test time minutes</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Tests/year</td>
<td>59,394</td>
<td>109,091</td>
<td>158,788</td>
<td>65,160</td>
<td>97,741</td>
</tr>
<tr>
<td>Total minutes/year</td>
<td>1,158,180</td>
<td>2,127,270</td>
<td>3,096,360</td>
<td>1,270,627</td>
<td>1,905,940</td>
</tr>
<tr>
<td><strong>Test: Full Blood Count</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test time minutes</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Tests/year</td>
<td>46,996</td>
<td>82,493</td>
<td>117,991</td>
<td>54,657</td>
<td>81,985</td>
</tr>
<tr>
<td>Total minutes/year</td>
<td>343,068</td>
<td>602,202</td>
<td>861,336</td>
<td>398,995</td>
<td>598,493</td>
</tr>
<tr>
<td><strong>Test: Kidney Function</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tests/year</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td>Test time minutes</td>
<td>22,199</td>
<td>29,299</td>
<td>36,398</td>
<td>33,650</td>
<td>50,475</td>
</tr>
<tr>
<td>Tests/year</td>
<td>421,783</td>
<td>556,675</td>
<td>691,567</td>
<td>639,349</td>
<td>959,024</td>
</tr>
<tr>
<td>Total minutes/year</td>
<td>3,103,145</td>
<td>5,006,144</td>
<td>6,546,748</td>
<td>4,365,556</td>
<td>6,495,938</td>
</tr>
<tr>
<td><strong>Total testing hours</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total FTE days</td>
<td>8,620</td>
<td>13,906</td>
<td>18,185</td>
<td>12,127</td>
<td>18,044</td>
</tr>
</tbody>
</table>

* Viral load tests were not being conducted in Rwanda at the time study observations were made. The time noted in this table is the time estimated for viral load tests conducted in Zambia (see Huddart et al. 2003).
Table A3: Cost Scenarios for ART Care Providers (Five-year Analysis)

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50,000</td>
<td>75,000</td>
<td>100,000</td>
<td>50,000</td>
<td>75,000</td>
</tr>
<tr>
<td>FTE Care and Treatment Providers</td>
<td>38</td>
<td>47</td>
<td>56</td>
<td>64</td>
<td>73</td>
</tr>
<tr>
<td></td>
<td>126</td>
<td>142</td>
<td>158</td>
<td>162</td>
<td>184</td>
</tr>
</tbody>
</table>

Scenario 1: CD4 monitoring, ART initiation, and ART monitoring are done by doctors, while A1 nurses do ARV dispensing

**Total Cost/Year**

- 2005: $96,877
- 2006: $146,022
- 2007: $163,575
- 2008: $171,958
- 2009: $184,400

Scenario 2: Doctors do 63% of CD4 monitoring and ART initiation tasks and 33% of monitoring tasks. **Nurses do 37% of CD4 monitoring and ART initiation tasks, 67% of ART monitoring tasks, and all ARV dispensing**

**Total Cost/Year**

- 2005: $82,033
- 2006: $181,718
- 2007: $192,466
- 2008: $229,454
- 2009: $363,939

Scenario 3: Doctors do 63% of CD4 monitoring and ART initiation tasks and 33% of ART monitoring tasks. A1 Nurses do 37% of CD4 monitoring and ART initiation tasks and 67% of ART monitoring tasks. A2 nurses or social workers do all dispensing

**Total Cost/Year**

- 2005: $106,057
- 2006: $161,307
- 2007: $177,839
- 2008: $191,736
- 2009: $213,108

* Costs are in U.S. dollars and are based on an average salary for these categories of worker according to current (November 2004) salaries paid by the civil service: Doctors at FR138,000 (US$2,905/year), A1 nurses at FR74,000 (US$1558/year), and A2 nurses at FR47,500 (US$1000/year).

** The percentages represented here imagine a scenario in which doctors do some tasks—such as patient examinations, ordering of tests, and prescribing ARVs—while nurses take care of other tasks, such as interviewing the client regarding medical conditions, weighing the client, taking blood pressure, and counseling the client on taking his/her medication, etc.

Table A4: Annual Staffing and Salary Cost Scenarios for ART Laboratory Staff (Five-year Analysis)

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>40</td>
<td>64</td>
<td>84</td>
<td>56</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td>107</td>
<td>160</td>
<td>194</td>
<td>143</td>
<td>213</td>
</tr>
<tr>
<td>FTE Laboratory Staff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laboratory staff costs</td>
<td>50,000</td>
<td>75,000</td>
<td>100,000</td>
<td>50,000</td>
<td>75,000</td>
</tr>
</tbody>
</table>

Scenario 1: A1 laboratory technicians do all lab testing for HIV-positive clients

**Total Cost/Year**

- 2005: $62,170
- 2006: $100,296
- 2007: $131,162
- 2008: $90,086
- 2009: $134,048

Scenario 2: A1 laboratory technicians do 50% of testing, and A2 laboratory technicians do 50% of testing

**Total Cost/Year**

- 2005: $77,606
- 2006: $114,528
- 2007: $149,773
- 2008: $112,452
- 2009: $167,329

Scenario 3: A1 laboratory technicians do 33% of laboratory testing and A2 laboratory technicians do 67% of testing

**Total Cost/Year**

- 2005: $47,343
- 2006: $76,376
- 2007: $99,880
- 2008: $68,601
- 2009: $102,078

* Costs are in U.S. dollars and are based on an average salary for laboratory technicians according to current (November 2004) salaries paid by the civil service: A1 laboratory technician at FR74,000 (US$1558/year) and A2 laboratory technician at FR47,500 (US$1000/year).
### Table A5: Task Time and FTE Care Providers Required for Different HIV/AIDS Care and Treatment Services, Assuming Three-year Targets

<table>
<thead>
<tr>
<th>HIV/AIDS Care and Treatment</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three-year Target</td>
<td>50,000</td>
<td>75,000</td>
<td>100,000</td>
</tr>
<tr>
<td>Total ART Clients</td>
<td>12,500</td>
<td>18,750</td>
<td>25,000</td>
</tr>
<tr>
<td>HIV-positive: CD4 Monitoring but not ART</td>
<td>56,261</td>
<td>80,211</td>
<td>73,961</td>
</tr>
<tr>
<td>Time per visit in minutes</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Visits/year</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Total counseling minutes/client/year</td>
<td>28</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>Total counseling minutes/year</td>
<td>1,575,318</td>
<td>2,245,903</td>
<td>2,070,903</td>
</tr>
<tr>
<td>Total FTE: CD4-Count Monitoring</td>
<td>20</td>
<td>29</td>
<td>27</td>
</tr>
<tr>
<td>ART Initiating Clients</td>
<td>4,500</td>
<td>10,750</td>
<td>17,000</td>
</tr>
<tr>
<td>Time per visit</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Visits/year</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Total counseling minutes/client/year</td>
<td>62</td>
<td>62</td>
<td>62</td>
</tr>
<tr>
<td>Total counseling minutes</td>
<td>279,000</td>
<td>666,500</td>
<td>1,054,000</td>
</tr>
<tr>
<td>Total FTE: ART Initiation</td>
<td>4</td>
<td>9</td>
<td>14</td>
</tr>
<tr>
<td>ART Monitoring Clients</td>
<td>8,000</td>
<td>8,000</td>
<td>8,000</td>
</tr>
<tr>
<td>Time per visit</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Visits/year</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Total time/client/year</td>
<td>28</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>Total counseling minutes</td>
<td>224,000</td>
<td>224,000</td>
<td>224,000</td>
</tr>
<tr>
<td>Total FTE: ART Monitoring</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>ARV Dispensing</td>
<td>12,500</td>
<td>18,750</td>
<td>25,000</td>
</tr>
<tr>
<td>Times ART dispensed/year</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Visits/client/year</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Total time/client/year</td>
<td>60</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Total counseling minutes</td>
<td>750,000</td>
<td>1,125,000</td>
<td>1,500,000</td>
</tr>
<tr>
<td>Total FTE: ART Dispensing</td>
<td>10</td>
<td>14</td>
<td>19</td>
</tr>
<tr>
<td>Care and treatment total care hours</td>
<td>47,139</td>
<td>71,023</td>
<td>80,815</td>
</tr>
<tr>
<td>Care and treatment total care days</td>
<td>7,856</td>
<td>11,837</td>
<td>13,469</td>
</tr>
<tr>
<td>Total FTE: All Care and Treatment Tasks</td>
<td>36</td>
<td>55</td>
<td>62</td>
</tr>
<tr>
<td>HIV Care and Treatment</td>
<td>2005</td>
<td>2006</td>
<td>2007</td>
</tr>
<tr>
<td>------------------------</td>
<td>------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td><strong>Three-year Target</strong>*</td>
<td>50,000</td>
<td>75,000</td>
<td>100,000</td>
</tr>
<tr>
<td><strong>Test CD4</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test time in minutes</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Tests/year</td>
<td>137,523</td>
<td>197,922</td>
<td>137,523</td>
</tr>
<tr>
<td>Total minutes/year</td>
<td>825,136</td>
<td>1,187,530</td>
<td>825,136</td>
</tr>
<tr>
<td><strong>Test Viral Load</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tests/year</td>
<td>12500</td>
<td>18750</td>
<td>25000</td>
</tr>
<tr>
<td>Total minutes/year</td>
<td>312500</td>
<td>468750</td>
<td>625000</td>
</tr>
<tr>
<td><strong>Test Liver Function</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test time in minutes</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Tests/year</td>
<td>47500</td>
<td>91250</td>
<td>135000</td>
</tr>
<tr>
<td>Total minutes/year</td>
<td>926250</td>
<td>1779375</td>
<td>2632500</td>
</tr>
<tr>
<td><strong>Test Full Blood Count</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test time in minutes</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Tests/year</td>
<td>38500</td>
<td>69750</td>
<td>101000</td>
</tr>
<tr>
<td>Total minutes/year</td>
<td>281050</td>
<td>509175</td>
<td>737300</td>
</tr>
<tr>
<td><strong>Test Kidney Function</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tests/year</td>
<td>19</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td>Test time in minutes</td>
<td>20500</td>
<td>26750</td>
<td>33000</td>
</tr>
<tr>
<td>Test minutes/year</td>
<td>389500</td>
<td>508250</td>
<td>627000</td>
</tr>
<tr>
<td>Total minutes/year</td>
<td>2734436</td>
<td>4453080</td>
<td>5446936</td>
</tr>
<tr>
<td><strong>Total FTE: All ART Lab Tasks</strong></td>
<td><strong>35</strong></td>
<td><strong>57</strong></td>
<td><strong>70</strong></td>
</tr>
</tbody>
</table>

* For the 50,000 target, the model assumes a 4% VCT uptake rate per year and 100% of ANC clients receiving PMTCT services. For the targets of 75,000 and 100,000 the model assumes a VCT uptake rate of 8% per year and 100% of ANC clients receiving PMTCT services. The number of people being tested in VCT and PMTCT will enable the achievement of ART targets but will also influence the number of HIV-positive clients whose CD4 counts are being monitored on a biannual basis.

** This calculation of FTE lab staff is based on the time it takes laboratory technicians to carry out the specified lab tests given current technology and laboratory practices. Technology that allows for quicker processing or testing in batches will reduce FTE laboratory staff requirements.
### Table A7: Annual Salary Cost Scenarios for HIV Care and Treatment Providers (Three-year Analysis)

<table>
<thead>
<tr>
<th>Staffing Scenarios Care and Treatment</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50,000</td>
<td>75,000</td>
<td>100,000</td>
</tr>
<tr>
<td>FTE</td>
<td>36</td>
<td>55</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td>72</td>
<td>106</td>
<td>119</td>
</tr>
<tr>
<td></td>
<td>119</td>
<td>178</td>
<td>202</td>
</tr>
</tbody>
</table>

**Scenario 1:** CD4 monitoring, ART initiation, and ART monitoring done by doctors; ARV dispensing done by A1 nurses.

**Total Cost/Year***: $92,676, $139,721, $155,173, $188,312, $277,763, $301,418, $313,125, $464,631, $513,359

**Scenario 2:** Doctors do 63% of CD4 monitoring and ART initiation tasks and 33% of monitoring tasks. A1 nurses do 37% of CD4 monitoring and ART initiation tasks, 67% of ART monitoring tasks, and all ARV dispensing.

**Total Cost/Year***: $88,084, $118,464, $132,554, $179,706, $265,031, $287,029, $298,205, $442,441, $487,758

**Scenario 3:** Doctors do 63% of CD4 monitoring and ART initiation tasks and 33% of ART monitoring tasks. A1 nurses do 37% of CD4 monitoring and ART initiation tasks and 67% of ART monitoring tasks. A2 nurses or social workers do all ARV dispensing.

**Total Cost/Year***: $72,822, $110,393, $121,793, $148,377, $218,667, $234,452, $243,693, $361,351, $393,866

* Costs are in U.S. dollars and are based on average annual net pay (salary plus primes and standard benefits) provided to health workers; assumes average salary increases of .3% per year.

### Table A8: Annual Staffing and Salary Cost Scenarios for HIV Care and Treatment Laboratory Staff (Three-year Analysis)

<table>
<thead>
<tr>
<th>Staffing Scenarios Care and Treatment Laboratory Testing</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50,000</td>
<td>75,000</td>
<td>100,000</td>
</tr>
<tr>
<td>FTE Laboratory Staff</td>
<td>35</td>
<td>57</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>74</td>
<td>110</td>
<td>132</td>
</tr>
<tr>
<td></td>
<td>137</td>
<td>205</td>
<td>254</td>
</tr>
</tbody>
</table>

**Scenario 1:** All lab testing for ART clients done by A1 laboratory technicians.

**Total Cost/Year***: $54,783, $89,216, $109,127, $118,455, $176,602, $212,149, $226,828, $339,081, $420,010

**Scenario 2:** A1 laboratory technicians do 50% of testing, and A2 laboratory technicians do 50% of testing.

**Total Cost/Year***: $50,802, $73,241, $89,588, $109,847, $163,768, $196,732, $210,345, $314,439, $389,488

**Scenario 3:** A1 laboratory technicians do 33% of laboratory testing, and A2 laboratory technicians do 67% of testing.

**Total Cost/Year***: $41,718, $67,938, $83,101, $90,204, $134,482, $161,551, $172,730, $258,210, $319,838

* Costs are in U.S. dollars and are based on average annual net pay (salary plus primes and standard benefits) provided to health workers; assumes average salary increases of 3% per year.