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

PHASE 3 REPORT: STAFFING IMPLICATIONS AND SCENARIOS FOR HIV/AIDS SERVICES SCALE-UP

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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

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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.

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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.

ABBREVIATIONS

ANC	Antenatal Care
ART	Antiretroviral therapy
ARV	Antiretroviral
CCM	Country Coordinating Mechanism (Global Fund)
CDC	Centers for Disease Control and Prevention (United States)
DSS	Directorate of Healthcare
ESTHER	<i>Ensemble de Solidarité Thérapeutique Hospitalière en Réseau</i> (Lux Development)
EU	European Union
FOSA	<i>Formation Sanitaire</i> (Health Facility)
FTE	Full-time Equivalent
GFATM	Global Fund to Fight AIDS, Tuberculosis and Malaria
GOR	Government of Rwanda
HC	Health Center
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
IEC	Information, Education, and Communication
IMPACT	Implementing AIDS Prevention and Care (Family Health International)
M&E	Monitoring and Evaluation
MOH	Ministry of Health
NGO	Nongovernmental Organization
NRL	National Reference Laboratory
PEPFAR	President's Emergency Plan for HIV/AIDS Relief
PMTCT	Prevention of Mother-to-child Transmission
OI	Opportunistic Infection
QAP	Quality Assurance Project
TRAC	Treatment and Research AIDS Center
UNAIDS	Joint U.N. Programme on HIV/AIDS
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VCT	Voluntary Counseling and Testing
VCTI	Integrated Services for VCT, PMTCT, and Treatment of Opportunistic Infections
WHO	World Health Organization

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.¹

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
<u>7 days for training</u>
149 total days training and leave

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

¹ 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.² 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

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

VCT Lab Testing	VCT Annual Uptake Rate		
	4%	8%	12%
Laboratory Testing - HIV			
Number of Clients Tested	339,320	678,640	1,017,960
Batches of 10	33,932	67,864	101,796
Minutes to Process 10 Tests	28*	28	28
Total Lab Testing Hours Required	15,835	31,670	47,505
Total FTE Laboratory Staff Required	12	24	37

* 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

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

* 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.

Table 4: Task Time and FTE Counselors Required for PMTCT, 2005

PMTCT Counseling Services*	
Group IEC	
Number of clients	343,392
Average number of sessions	31,217**
Minutes per session	26
Pre-test Counseling	
Number of clients	343,392
Minutes per client	21
Post-test Counseling for HIV-negative Clients	
Number of Clients	312,831
Minutes per Client	11
Post-test Counseling for HIV-positive Clients	
Number of Clients	30,561
Minutes per Client	17
Total Counselor Hours Required	199,726
Total Counselor Days Required	33,288
Total FTE Required	154

* ANC clients are calculated as 92% of the crude birth rate 4.4%. Since the actual number of pregnancies will likely be higher than the crude birth rate, the number of women attending ANC will be slightly higher than what is represented.

** Assumes services are offered five days a week and an average group size of 11 clients.

*** HIV/AIDS FTE: It is assumed that each FTE service provider works 216 eight-hour days per year. In each eight-hour day, a worker is actively providing client service for six hours (75% efficiency); the other two hours are for other routine work, such as staff meetings and logistics management, or waiting time.

Table 5: Task Time and FTE Lab Staff Required for PMTCT, 2005

Laboratory Testing for HIV for PMTCT Clients	
Number of Clients Tested	343,392
Batches of 10	34,339
Minutes to Process 10 Tests	28
Total Lab Testing Hours Required	16,025
Total FTE Laboratory Staff Required	12

Table 6: PMTCT FTE Requirements over the Next Five Years (100% of ANC Clients Tested)

PMTCT	2005	2006	2007	2008	2009
ANC Clients	343,392	350,946	358,667	366,558	374,622
Counselors	154	158	161	165	169
Laboratory Staff	12	13	13	13	13

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

VCT/PMTCT Counseling Staffing Scenarios	Target	Year				
		2005	2006	2007	2008	2009
FTE = 216 days per year: Providers offer services on all of those days.	VCT uptake of 8%	305	311	318	325	332
	PMTCT 100% of ANC clients	154	158	161	165	169
	Total FTE Counselors	459	469	479	490	501
	Total FTE Lab Staff	36	37	39	39	40
FTE = 206 full-time service days (216 days per year less an additional 10 days allocated for training)	VCT uptake of 8%	319	326	333	340	348
	PMTCT 100% of ANC clients	162	265	169	173	176
	Total FTE Counselors	481	591	502	513	524
	Total FTE Lab Staff	39	39	40	41	42
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)	VCT uptake of 8%	380	389	397	406	415
	PMTCT 100% of ANC clients	192	197	201	205	210
	Total FTE Counselors	572	586	598	611	625
	Total FTE Lab Staff	46	47	48	49	50

* 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 *agrée* institutions.³

³ *Agrée* 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											
Population 2005 = 8,483,000 Assumes 2.2% population growth/year FTE analysis based on 216 workdays/FTE/year FTE analysis assumes six hours of counseling/day	8.9% Prevalence					5.1% Prevalence					
	4%	8%	12%	16%		4%	8%	12%	16%		
	2005	30,199	60,399	90,598	120,798		16,966	33,932	50,898	67,864	
	2006	30,864	61,728	92,592	123,455		17,339	34,679	52,018	69,357	
	2007	31,543	63,086	94,629	126,171		17,721	35,441	53,162	70,883	
	2008	32,237	64,474	96,710	128,947		18,111	36,221	54,332	72,442	
	2009	32,946	65,892	98,838	131,784		18,509	37,018	55,527	74,036	
Total number of HIV-positive clients identified over five years		157,789	315,578	473,367	631,156		88,646	177,291	265,937	354,582	
FTE VCT counselors required by 2009		166	332	498	664		165	331	496	661	
HIV/AIDS clients requiring ART = 17% (GOR HIV/AIDS Plan) ⁴		26,824	53,648	80,472	107,297		15,070	30,139	45,209	60,279	
HIV/AIDS clients requiring ART = 25% (alternate scenario)		39,447	78,895	118,342	157,789		22,161	44,323	66,484	88,646	
HIV/AIDS clients requiring ART = 33% (current NRL percentage)		52,070	104,141	156,211	208,282		29,253	58,506	87,759	117,012	
Estimated Number of HIV-positive Clients Identified per Year through PMTCT											
ANC coverage (at least one visit) 92% Crude birth rate 4.4% FTE analysis based on 216 workdays/FTE/year FTE analysis assumes six hours of counseling/day	8.9% Prevalence					5.1% Prevalence					
	2005	2006	2007	2008	2009		2005	2006	2007	2008	2009
Total number of HIV-positive clients identified over five years											
FTE counselors required by 2009											
HIV/AIDS clients requiring ART = 17% (GOR HIV/AIDS Plan) ⁵											
HIV/AIDS clients requiring ART = 25% (alternate scenario)											
HIV/AIDS clients requiring ART = 33% (current NRL percentage)											

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 9: Salary Costs for VCT and PMTCT, 2005

VCT/PMTCT Staffing Scenarios		VCT 4% Annual Uptake PMTCT 100% of ANC Clients		VCT 8% Annual Uptake PMTCT 100% of ANC Clients		VCT 12% Annual Uptake PMTCT 100% of ANC Clients	
		FTE	Annual Salary Cost	FTE	Annual Salary Cost	FTE	Annual Salary Cost
Based on 2005 staffing requirements	VCT counselors	152	\$152,246	305	\$304,491	456	\$456,738
	PMTCT counselors	154	\$154,109	154	\$154,109	154	\$154,109
All HIV testers are A2 lab technicians or nurses	Lab staff	24	\$24,313	37	\$36,535	49	\$48,753
Scenario 1 Total		330	\$330,668	496	\$495,135	659	\$659,600
Counselors are 50% A2 nurses and social workers and 50% auxiliary staff or lay counselors*	VCT counselors	152	\$112,983	305	225,965	456	\$338,948
	PMTCT counselors	154	\$114,365	154	114,365	154	\$114,365
HIV testers are 50% A2 lab technicians or nurses and 50% auxiliary staff	Lab staff	24	\$18,045	37	27,112	49	\$36,180
Scenario 2 Total		330	\$245,393	496	\$367,442	659	\$489,493
Counselors are 33.3% A2 nurses and social workers and 66.7% auxiliary staff or lay counselors	VCT counselors	152	\$99,869	305	\$199,737	456	\$299,606
	PMTCT counselors	154	\$101,091	154	\$101,091	154	\$101,091
HIV testers are 50% A2 lab technicians or nurses and 50% auxiliary staff	Lab staff	24	\$18,045	37	\$27,112	49	\$36,180
Scenario 3 Total		330	\$219,005	496	\$327,940	659	\$436,877

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

	Training Costs/ Participant*	Total Staff Trained As of December 31, 2004	Total Remaining Nurses, Social Workers, Lab Technicians, and Auxiliary Staff	Total Cost for Training Remaining Staff
Counselors	\$208	595	3825**	\$795,600
Laboratory Technicians	\$291	200	166***	\$48,306
Total Cost				\$843,906

* 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 (204⁶ active) in Rwanda today to handle 100% of the initiation and monitoring care for all ART clients, which will require at least 48⁷ 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.

Box 3: Classification of ART Clients

Initiating clients are defined as clients who receive one initiation visit and three standard follow-up visits. According to the national guidelines, these follow-up visits are to take place two weeks after initiation, three months after initiation, and six months after initiation. Thereafter the client is considered a *monitoring client* and is scheduled for routing monitoring visits every six months.

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

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).

Table 11: Staff Salary Costs, All HIV/AIDS Services

Service	Cadre	FTE	2005	FTE	2006	FTE	2007
VCT 8%	A2 Nurse/Social Worker	304	\$304,492	311	\$320,527	318	\$337,405
	A2 Lab Tech/Nurse	24	\$24,437	31	\$32,145	36	\$27,078
	Subtotal	328	\$328,929	342	\$352,672	354	\$364,483
PMTCT 100% ANC	A2 Nurse/Social Worker	154	\$154,110	158	\$162,225	161	\$170,768
	A2 Lab Tech/Nurse	12	\$12,098	13	\$13,016	13	\$14,423
	Subtotal	166	\$166,208	171	\$175,241	174	\$185,191
HIV/AIDS Care and Treatment 100,000 by 2007	Doctors	26	\$76,349	49	\$142,918	74	\$226,648
	A1 Nurses/Social Workers	17	\$26,153	33	\$51,796	52	\$85,359
	A2 Nurses/Social Workers*	19	\$19,290	37	\$39,738	76	\$81,860
	A1 Lab Tech	23	\$36,449	43	\$70,858	85	\$140,283
	A2 Lab Tech	47	\$46,652	89	\$90,694	169	\$179,554
	Subtotal	132	\$204,893	251	\$396,004	456	\$713,704
Total		626	\$700,030	764	\$923,917	984	\$1,263,378

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.

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 detracting 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).

Box 4: Data Recorded in Health Center Monthly Reports

- Total consultations—new cases
- Total consultations—old cases
- Total deliveries
- Total vaccinations
- Growth monitoring—new cases
- Growth monitoring—old cases
- Antenatal care—first visits
- Antenatal care—subsequent visits
- Family planning—new cases
- Family planning—continuing cases
- Health education meetings
- Hospitalization days
- Total lab activities

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 12: Staffing Requirements for VCT and PMTCT Scale-up: “Qualified” Staff Only

Site	Site Type	Population	Current FTE Qualified Staff		Current Staff Requirements: All Services		Staff Requirements: All Services If VCT at 2% and PMTCT at 100%		Staff Needed to Meet Targets and Provide Other Health Services	
			Care	Lab	Care	Lab	Care	Lab	Care	Lab
1	Public HC	15,000	9	1	4	1	5	1	-4	0
3	<i>Agréé</i> HC	29,205	14	2	9	4	9	4	-5	2
4	<i>Agréé</i> HC	34,389	12	3	17	9	17	9	5	6
7	Public HC	38,942	11	1	7	3	8	3	-3	2
9	Public HC	24,453	6	2	6	1	8	1	2	1
10	<i>Agréé</i> HC	31,647	10	2	7	2	8	2	-2	0
18	Public HC	71,071	16	3	12	8	16	8	0	5
19	Public HC	30,886	5	2	4	2	6	2	1	0

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

Site	Site Type	Population	Current FTE Staff Including Auxiliary Staff		Current Staff Requirements: All Services		Staff Requirements: All Services If VCT at 12% and PMTCT at 100%		Staff Needed to Meet Targets and Provide Other Health Services	
			Care	Lab	Care	Lab	Care	Lab	Care	Lab
1	Public HC	15,000	10	1	4	1	5	1	-6	0
3	<i>Agréé</i> HC	29,205	19	4	9	4	9	4	-10	0
4	<i>Agréé</i> HC	34,389	26	3	17	9	17	9	-9	6
7	Public HC	38,942	15	1	7	3	8	3	-3	2
9	Public HC	24,453	8	2	6	1	8	1	0	1
10	<i>Agréé</i> HC	31,647	14	2	7	2	8	2	-2	0
18	Public HC	71,071	24	3	12	8	16	8	-8	5
19	Public HC	30,886	12	2	4	2	6	2	-6	0

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.⁹ 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).¹⁰ 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 than 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

Staffing Scenario	Target	Year				
		2005	2006	2007	2008	2009
FTE is equivalent to 216 days per year	VCT coverage of 12%	1.22	1.38	1.41	1.44	1.47
	PMTCT 100% of ANC clients	0.44	0.45	0.46	0.47	0.48
	Total FTE Counselors	1.66	1.83	1.87	1.91	1.95
FTE is equivalent to 216 days per year but 10 days are allocated for training. Total full-time service delivery days = 206 service days	VCT coverage of 12%	1.28	1.44	1.47	1.51	1.54
	PMTCT 100% of ANC clients	0.47	0.48	0.49	0.50	0.51
	Total FTE Counselors	1.72	1.92	1.96	2.01	2.05
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	VCT coverage of 12%	1.52	1.72	1.76	1.79	1.83
	PMTCT 100% of ANC clients	0.55	0.57	0.58	0.59	0.60
	Total FTE Counselors	2.07	2.29	2.34	2.38	2.43

* 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

Staffing Scenario	Target	Year				
		2005	2006	2007	2008	2009
FTE is equivalent to 216 days* per year	VCT coverage of 12%	0.108	0.110	0.112	0.115	0.117
	PMTCT 100% of ANC clients	0.036	0.036	0.037	0.038	0.039
	Total FTE Lab Staff**	0.144	0.146	0.149	0.153	0.156
FTE is equivalent to 216 days per year but 10 days are allocated for training. Total full-time service deliver days = 206 service days	VCT coverage of 12%	0.113	0.116	0.118	0.121	0.124
	PMTCT 100% of ANC clients	0.037	0.038	0.039	0.040	0.041
	Total FTE Lab Staff	0.150	0.154	0.157	0.161	0.165
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	VCT coverage of 12%	0.135	0.138	0.140	0.144	0.147
	PMTCT 100% of ANC clients	0.044	0.045	0.046	0.047	0.049
	Total FTE Lab Staff	0.179	0.183	0.186	0.191	0.196

* 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.

Table 16: Continual Service Delivery Staffing: Counselors

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

Table 17: Continual Service Delivery Staffing: Laboratory Staff

Target	2005	2006	2007	2008	2009
VCT coverage of 12%	0.093	0.095	0.097	0.099	0.101
PMTCT 100% of ANC clients	0.031	0.031	.032	0.033	0.033
Total lab staff/service day VCT and PMTCT	0.124	0.126	0.129	0.132	0.134

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.

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 18: Concentrated Service Delivery Staffing (Two Days per Week/Service): Counselors

Target	2005	2006	2007	2008	2009
VCT coverage of 12%	2.53	2.86	2.92	2.98	3.05
PMTCT 100% of ANC clients	0.92	0.94	0.96	0.98	1.01

Table 19: Concentrated Service Delivery Staffing (Two Days per Week/Service): Laboratory Staff

Target	2005	2006	2007	2008	2009
VCT coverage of 12%	0.224	0.229	0.234	0.239	0.245
PMTCT 100% of ANC clients	0.074	0.076	0.077	0.079	0.080

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.

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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 A1: Task Time and FTE Care Providers Required for Different HIV/AIDS Care and Treatment Services, Assuming Five-year Targets

HIV/AIDS Care and Treatment	2005			2006			2007			2008			2009		
	50,000	75,000	100,000	50,000	75,000	100,000	50,000	75,000	100,000	50,000	75,000	100,000	50,000	75,000	100,000
Five-year Target	50,000	75,000	100,000	50,000	75,000	100,000	50,000	75,000	100,000	50,000	75,000	100,000	50,000	75,000	100,000
Total ART Clients	14,199	21,299	28,398	19,451	29,176	38,902	26,645	39,968	53,290	36,500	54,750	73,000	50,000	75,000	100,000
CD4 Count Monitoring Clients Not on ART	54,562	77,662	70,563	111,409	162,747	153,021	167,679	246,962	233,640	222,684	329,277	311,027	275,472	408,261	383,261
Time per visit – minutes	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Visits/year	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Total counseling minutes/year	1,527,743	2,174,540	1,975,753	3,119,441	4,556,903	4,284,591	4,695,004	6,914,948	6,541,918	6,235,157	9,219,763	8,708,763	7,713,205	11,431,299	10,731,299
Total FTE: CD4 Monitoring	20	28	25	40	59	55	60	89	84	80	119	112	99	147	138
ART Initiating Clients	6,199	13,299	20,398	5,252	7,878	10,503	7,194	10,791	14,388	9,855	14,783	19,710	13,500	20,250	27,000
Time per visit – minutes	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Visits/year	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Total counseling minutes/client/year	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Total counseling minutes	384,345	824,518	1,264,691	325,607	488,411	651,214	446,037	669,056	892,075	611,010	916,515	1,222,020	837,000	1,255,500	1,674,000
Total FTE: ART Initiation	5	11	16	4	6	8	6	9	11	8	12	16	11	16	22
ART Monitoring Clients	8,000	8,000	8,000	14,199	21,299	28,398	19,451	29,176	38,902	26,645	39,968	53,290	36,500	54,750	73,000
Time per visit – minutes	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Visits/year	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Total time/client/year	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
Total counseling minutes	224,000	224,000	224,000	397,575	596,363	795,151	544,624	816,936	1,089,248	746,060	1,119,090	1,492,120	1,022,000	1,533,000	2,044,000
Total FTE: ART Monitoring	3	3	3	5	8	10	7	11	14	10	14	19	13	20	26
ARV Dispensing	14,199	21,299	28,398	19,451	29,176	38,902	26,645	39,968	53,290	36,500	54,750	73,000	50,000	75,000	100,000
Times ART dispensed/year	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Visits/client/year	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Total time/client/year	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Total counseling minutes	851,947	1,277,921	1,703,894	1,167,051	1,750,577	2,334,102	1,598,700	2,398,050	3,197,400	2,190,000	3,285,000	4,380,000	3,000,000	4,500,000	6,000,000
Total FTE: Dispensing	11	16	22	15	23	30	21	31	41	28	42	56	39	58	77
ART total care hours	49,801	75,016	86,139	83,495	123,204	134,418	121,406	179,983	195,344	163,037	242,339	263,382	209,537	311,997	340,822
ART total care days	8,300	12,503	14,356	13,916	20,534	22,403	20,234	29,997	32,557	27,173	40,390	43,897	34,923	51,999	56,804
Total FTE: All Care and Treatment Tasks	38	58	66	64	95	104	94	139	151	126	187	203	162	241	263

Table A2: Task Time and FTE Laboratory Staff Required for Different ART Testing Services, Assuming Five-year Targets

	2005			2006			2007			2008			2009		
Five-year Target	50,000	75,000	100,000	50,000	75,000	100,000	50,000	75,000	100,000	50,000	75,000	100,000	50,000	75,000	100,000
Test: CD4															
Test time minutes	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Tests/year	137,523	197,922	197,922	261,719	383,846	383,846	388,647	573,860	573,860	518,368	768,054	768,054	650,943	966,521	966,521
Total minutes/year	825,136	1,187,530	1,187,530	1,570,313	2,303,074	2,303,074	2,331,885	3,443,159	3,443,159	3,110,210	4,608,327	4,608,327	3,905,659	5,799,128	5,799,128
Test: Viral Load*															
Test time minutes	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Tests/year	14,199	21,299	28,398	19,451	29,176	38,902	26,645	39,968	53,290	36,500	54,750	73,000	50,000	75,000	100,000
Total minutes/year	354,978	532,467	709,956	486,271	729,407	972,543	666,125	999,188	1,332,250	912,500	1,368,750	1,825,000	1,250,000	1,875,000	2,500,000
Test: Liver Function															
Test time minutes	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Tests/year	59,394	109,091	158,788	65,160	97,741	130,321	89,261	133,891	178,522	122,275	183,413	244,550	167,500	251,250	335,000
Total minutes/year	1,158,180	2,127,270	3,096,360	1,270,627	1,905,940	2,541,254	1,740,585	2,610,877	3,481,169	2,384,363	3,576,544	4,768,725	3,266,250	4,899,375	6,532,500
Test: Full Blood Count															
Test time minutes	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Tests/year	46,996	82,493	117,991	54,657	81,985	109,314	74,872	112,309	149,745	102,565	153,848	205,130	140,500	210,750	281,000
Total minutes/year	343,068	602,202	861,336	398,995	598,493	797,991	546,569	819,853	1,093,138	748,725	1,123,087	1,497,449	1,025,650	1,538,475	2,051,300
Test: Kidney Function															
Tests/year	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Test time minutes	22,199	29,299	36,398	33,650	50,475	67,300	46,096	69,144	92,192	63,145	94,718	126,290	86,500	129,750	173,000
Test minutes/year	421,783	556,675	691,567	639,349	959,024	1,278,699	875,821	1,313,732	1,751,642	1,199,755	1,799,633	2,399,510	1,643,500	2,465,250	3,287,000
Total minutes/year	3,103,145	5,006,144	6,546,748	4,365,556	6,495,938	7,893,559	6,160,984	9,186,809	11,101,359	8,355,552	12,476,340	15,099,011	11,091,059	16,577,228	20,169,928
Total testing hours	51,719	83,436	109,112	72,759	108,266	131,559	102,683	153,113	185,023	139,259	207,939	251,650	184,851	276,287	336,165
Total FTE days	8,620	13,906	18,185	12,127	18,044	21,927	17,114	25,519	30,837	23,210	34,656	41,942	30,808	46,048	56,028
Total FTE: All ART Lab Tasks	40	64	84	56	84	102	79	118	143	107	160	194	143	213	259

* 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)

	2005			2006			2007			2008			2009		
	50,000	75,000	100,000	50,000	75,000	100,000	50,000	75,000	100,000	50,000	75,000	100,000	50,000	75,000	100,000
FTE Care and Treatment Providers	38	47	56	64	73	82	94	106	117	126	142	158	162	184	206
Scenario 1: CD4 monitoring, ART initiation, and ART monitoring are done by doctors, while A1 nurses do ARV dispensing															
Total Cost/Year*	\$96,877	\$146,022	\$163,575	\$171,958	\$253,232	\$268,709	\$259,344	\$383,960	\$405,798	\$357,908	\$531,432	\$562,245	\$470,170	\$699,431	\$742,905
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	\$82,033	\$181,718	\$192,466	\$229,454	\$336,953	\$343,373	\$349,434	\$516,384	\$525,442	\$480,722	\$712,743	\$725,524	\$624,783	\$928,226	\$946,260
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	\$106,057	\$161,307	\$177,839	\$191,736	\$281,837	\$291,300	\$291,021	\$430,336	\$443,687	\$400,795	\$594,538	\$613,376	\$522,826	\$777,101	\$803,681

* 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)

	2005			2006			2007			2008			2009		
	40	64	84	56	84	102	79	118	143	107	160	194	143	213	259
FTE Laboratory Staff	40	64	84	56	84	102	79	118	143	107	160	194	143	213	259
Laboratory staff costs	50,000	75,000	100,000	50,000	75,000	100,000	50,000	75,000	100,000	50,000	75,000	100,000	50,000	75,000	100,000
Scenario 1: A1 laboratory technicians do all lab testing for HIV-positive clients															
Total Cost/Year*	\$62,170	\$100,296	\$131,162	\$90,086	\$134,048	\$162,889	\$130,950	\$195,263	\$235,957	\$182,923	\$273,137	\$330,554	\$250,094	\$373,803	\$454,815
Scenario 2: A1 laboratory technicians do 50% of testing, and A2 laboratory technicians do 50% of testing															
Total Cost/Year	\$77,606	\$114,528	\$149,773	\$112,452	\$167,329	\$203,330	\$163,462	\$243,742	\$294,539	\$228,338	\$340,950	\$412,622	\$312,186	\$466,609	\$567,735
Scenario 3: A1 laboratory technicians do 33% of laboratory testing and A2 laboratory technicians do 67% of testing															
Total Cost/Year	\$47,343	\$76,376	\$99,880	\$68,601	\$102,078	\$124,040	\$99,719	\$148,693	\$179,681	\$139,296	\$207,994	\$251,717	\$190,447	\$284,651	\$346,342

* 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

HIV/AIDS Care and Treatment	2005			2006			2007		
Three-year Target	50,000	75,000	100,000	50,000	75,000	100,000	50,000	75,000	100,000
Total ART Clients	12,500	18,750	25,000	25,000	37,500	50,000	50,000	75,000	100,000
HIV-positive: CD4 Monitoring but not ART	56,261	80,211	73,961	105,859	154,423	141,923	144,324	211,930	186,930
Time per visit in minutes	14	14	14	14	14	14	14	14	14
Visits/year	2	2	2	2	2	2	2	2	2
Total counseling minutes/client/year	28	28	28	28	28	28	28	28	28
Total counseling minutes/year	1,575,318	2,245,903	2,070,903	2,964,065	4,323,839	3,973,839	4,041,064	5,934,038	5,234,038
Total FTE: CD4-Count Monitoring	20	29	27	38	56	51	52	76	67
ART Initiating Clients	4,500	10,750	17,000	12,500	18,750	25,000	25,000	37,500	50,000
Time per visit	20	20	20	20	20	20	20	20	20
Visits/year	4	4	4	4	4	4	4	4	4
Total counseling minutes/client/year	62	62	62	62	62	62	62	62	62
Total counseling minutes	279,000	666,500	1,054,000	775,000	1,162,500	1,550,000	1,550,000	2,325,000	3,100,000
Total FTE: ART Initiation	4	9	14	10	15	20	20	30	40
ART Monitoring Clients	8,000	8,000	8,000	12,500	18,750	25,000	25,000	37,500	50,000
Time per visit	14	14	14	14	14	14	14	14	14
Visits/year	2	2	2	2	2	2	2	2	2
Total time/client/year	28	28	28	28	28	28	28	28	28
Total counseling minutes	224,000	224,000	224,000	350,000	525,000	700,000	700,000	1,050,000	1,400,000
Total FTE: ART Monitoring	3	3	3	5	7	9	9	14	18
ARV Dispensing	12,500	18,750	25,000	25,000	37,500	50,000	50,000	75,000	100,000
Times ART dispensed/year	5	5	5	5	5	5	5	5	5
Visits/client/year	12	12	12	12	12	12	12	12	12
Total time/client/year	60	60	60	60	60	60	60	60	60
Total counseling minutes	750,000	1,125,000	1,500,000	1,500,000	2,250,000	3,000,000	3,000,000	4,500,000	6,000,000
Total FTE: ART Dispensing	10	14	19	19	29	39	39	58	77
Care and treatment total care hours	47,139	71,023	80,815	93,151	137,689	153,731	154,851	230,151	262,234
Care and treatment total care days	7,856	11,837	13,469	15,525	22,948	25,622	25,809	38,358	43,706
Total FTE: All Care and Treatment Tasks	36	55	62	72	106	119	119	178	202

Table A6: Task Time and FTE Laboratory Staff Required for Different ART Testing Services, Assuming Three-year Targets

HIV Care and Treatment	2005			2006			2007		
Three-year Target*	50,000	75,000	100,000	50,000	75,000	100,000	50,000	75,000	100,000
Test CD4									
Test time in minutes	6	6	6	6	6	6	6	6	6
Tests/year	137,523	197,922	137,523	261,719	383,846	323,447	388,647	573,860	513,461
Total minutes/year	825,136	1,187,530	825,136	1,570,313	2,303,074	1,940,680	2,331,885	3,443,159	3,080,766
Test Viral Load									
Test time in minutes	25	25	25	25	25	25	25	25	25
Tests/year	12,500	18,750	25,000	25,000	37,500	50,000	50,000	75,000	100,000
Total minutes/year	312,500	468,750	625,000	625,000	937,500	1,250,000	1,250,000	1,875,000	2,500,000
Test Liver Function									
Test time in minutes	20	20	20	20	20	20	20	20	20
Tests/year	47,500	91,250	135,000	112,500	168,750	225,000	225,000	337,500	450,000
Total minutes/year	926,250	1,779,375	2,632,500	2,193,750	3,290,625	4,387,500	4,387,500	6,581,250	8,775,000
Test Full Blood Count									
Test time in minutes	7	7	7	7	7	7	7	7	7
Tests/year	38,500	69,750	101,000	87,500	131,250	175,000	175,000	262,500	350,000
Total minutes/year	281,050	509,175	737,300	638,750	958,125	1,277,500	1,277,500	1,916,250	2,555,000
Test Kidney Function									
Tests/year	19	19	19	19	19	19	19	19	19
Test time in minutes	20,500	26,750	33,000	37,500	56,250	75,000	75,000	112,500	150,000
Test minutes/year	389,500	508,250	627,000	712,500	1,068,750	1,425,000	1,425,000	2,137,500	2,850,000
Total minutes/year	2,734,436	4,453,080	5,446,936	5,740,313	8,558,074	10,280,680	10,671,885	15,953,159	19,760,766
Total FTE: All ART Lab Tasks**	35	57	70	74	110	132	137	205	254

* 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)

Staffing Scenarios Care and Treatment	2005			2006			2007		
	50,000	75,000	100,000	50,000	75,000	100,000	50,000	75,000	100,000
FTE	36	55	54	72	106	119	119	178	202
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)

Staffing Scenarios Care and Treatment Laboratory Testing	2005			2006			2007		
	50,000	75,000	100,000	50,000	75,000	100,000	50,000	75,000	100,000
FTE Laboratory Staff	35	57	70	74	110	132	137	205	254
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.

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