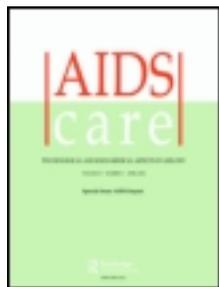


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Integrating HIV clinical services into primary health care in Rwanda: a measure of quantitative effects

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Background. With the intensive scale-up of care and treatment for HIV/AIDS in developing countries, some fear that intensified attention to HIV programs may overwhelm health care systems and lead to declines in delivery of other primary health care. Few data exist that confirm negative or positive synergies on health care provision generally resulting from HIV-dedicated programs. *Methods.* Using a retrospective observational design we compare aggregate service data in Rwandan health facilities before and after the introduction of HIV care on selected measures of primary health care. The study tests the hypothesis that non-HIV care does not decrease after the introduction of basic HIV care. *Findings.* Overall, no declines were observed in reproductive health services, services for children, laboratory tests, and curative care. Statistically significant increases were found in utilization and provision of some preventive services. Multivariate regression, including introduction of HIV care and two important health care financing initiatives in Rwanda, revealed positive associations of all with observed increases. Introduction of HIV services was especially associated with increases in reproductive health. While hospitalization rates increased for the whole sample, declines were observed at health facilities that offered basic HIV care plus highly active antiretroviral therapy. *Interpretation.* Our results partially counter fears that HIV programs are producing adverse effects in non-HIV service delivery. Rather than leading to declines in other primary health care delivery, our findings suggest that the integration of HIV clinical services may contribute to increases.

Keywords: scaling-up AIDS care; primary health care; integration

Introduction

Launch of the World Health Organization's "3 by 5" initiative in 2003 and the simultaneous increase in funding to scale-up HIV/AIDS care and treatment worldwide represents a uniquely important global commitment to combating a single disease (UNAIDS, 2006). However, after only a few years of this effort, some experts fear that the focused attention to HIV programs may produce negative effects on primary health care systems. Major concerns are that a focus on HIV-specific programming targets may undermine country efforts to strengthen integrated health systems (Segall, 2003), crowd out attention to other important health needs (Shiffman, 2006), and cause internal "brain drain" from the public health sector to donor-funded HIV programs (De Maeseneer et al., 2008). Funding disparities caused by large donor contributions and "stovepipe financing" mechanisms to support HIV-dedicated programs are at the root of the issue (Garrett, 2007; Shiffman, 2008).

On the other hand, some global health leaders foresaw a boost to the health system as a prerequisite to offering clinical HIV care (Buvé, Kalibala, & McIntyre, 2003; Chatterjee, 2001; WHO, 2004). In a particularly thorough review, Buvé et al. (2003) argued that strengthening health care systems could increase the impact of HIV programs and, in turn, the integration of HIV programs could have a positive effect on health care systems. There is limited but growing evidence bearing out both dimensions of this argument.

In this paper we present new evidence from a targeted study in Rwanda. Since 2003, Rwanda has received substantial donor support to scale-up clinical care for HIV (UNAIDS, 2008). Some health authorities and professionals in the country have expressed concerns that this influx of HIV-specific funding has created an imbalance in the health sector. Specifically, some fear that this new focus on HIV may be diverting attention away from and possibly causing declines in the delivery of other primary healthcare, notably family planning and child vaccinations. This

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study was designed to examine the situation and to respond to these concerns using extant service data.

Methods

We compare the volume of non-HIV services delivered at 30 primary health centers (PHCs) before and after the introduction of basic HIV care. Our study tests of the hypothesis that the introduction of basic HIV care into the PHC service portfolio does not result in declines in the delivery of non-HIV care.

Design

We use a retrospective observational design, which compares aggregate service data before and after the introduction of “basic HIV care” on selected measures of primary healthcare. The data were derived from monthly activity reports that PHCs are required to submit to the Rwandan government. At a minimum, “basic HIV care” includes voluntary counselling and testing (VCT), prevention of mother-to-child transmission services (PMTCT), and preventive therapy with cotrimoxazole for all eligible patients. “Non-HIV services” include reproductive health, primary care for children, in- and out-patient consultations, non-HIV laboratory tests, nutrition, and health education.

“Time 1” is the six-month period before the first client was tested for HIV at the health facility. Because the facilities launched their HIV services at different times, the Time-1 dates varied with each health facility. “Time 2,” in contrast, does not vary. As data collection began in June 2006, Time-2 data were derived from the facilities’ December 2005 to May 2006 activity reports. All the health facilities in the sample had been offering basic HIV care for all six months of the Time-2 period.

The sample

We collected data from a convenience sample of PHCs who were receiving PEPFAR-funded technical assistance from Family Health International (FHI) to introduce HIV care. We included all FHI-assisted PHCs that had at least six months’ experience offering basic HIV care as defined above. Thirty PHCs met these criteria. Because we were concerned with the delivery of primary healthcare, we excluded hospitals. The 30 PHCs in the sample represent four provinces and 14 districts throughout Rwanda. In addition to basic HIV care, nine of these centers also offered physician-supervised highly active antiretroviral therapy (HAART) for a period of 2–6 months during Time-2.

Variables

For Time-1 and Time-2 we extracted information from PHCs’ monthly reports. Our data points included monthly service totals on laboratory tests, out-patient consultations, hospitalizations, reproductive health, services for children, nutrition, and health education. Given inconsistency in food support at PHCs and that the health education indicator is estimated by the PHCs, we excluded the latter two service areas from the present analyses.

Analyses

We calculated the mean quantities of services delivered per PHC per month for Time-1 and Time-2, and tested for significant increases or decreases in Time-2 using the Paired-Samples *T*-Test or the Wilcoxon Signed-Ranks Test depending on tenability of the normality assumption.

We also considered two important nationally coordinated health care financing programs and their potential influence on the observed results. Rwanda’s primary health insurance system, *mutuelle de santé*, has recently achieved nationwide coverage and a 75% family enrolment rate (Mariko, 2007). The Ministry of Health has also begun roll-out of a performance based financing (PBF) program that pays health facilities on nationally defined performance indicators for services delivered. At the time of data collection, all PHCs in the sample had been receiving PBF payments for indicators in general primary health care. PBF payments for HIV indicators were not being made at any health facilities in the country at this time. In each case where a significant change was found between Time-1 and Time-2, we simultaneously regressed the difference on three independent experience variables: (i) months *mutuelle* in place; (ii) months receiving performance-based payments for non-HIV indicators; and (iii) months offering basic HIV care. Each of these experience variables were measured in months (Table 1).

To partially address the possibility that improved data recording in Time-2 could influence the results, we evaluated data completeness for both time periods. In the present analysis, each time period involves 3768 data points: 21 variables \times six months \times 30 PHCs, less six data points on maternity and six data points on hospitalization for one PHC that does not offer these services. In Time-1 there were 70 (1.86%) missing data points compared to 17 (0.45%) in Time-2. While Time-2 data completeness is slightly better than Time-1, this is not substantial and does not suggest major improvements in data recording in Time-2.

Table 1. PHCs' experience offering basic HIV care, participating in the *Mutuelle*, and receiving performance based payments for non-HIV indicators as of May 2006.

	Basic HIV care	<i>Mutuelle de Santé</i>	Performance based financing
6 months	4	0	23 (≤ 6 mo)
7–12 months	11	5	1
13–18 months	7	7	6
19–24 months	4	6	0
>24 months	4	12	0
	30	30	30

Finally, we note that the Ministry of Health has identified family planning as a priority and has implemented strong policies and programs to strengthen uptake and service delivery. Data for Time-2 were collected prior to nationwide training of service providers in family planning and prior to the launch of a promotional campaign.

Results

Our findings suggest that HIV-focused health care is not associated with declines in the delivery of other primary health care and may be associated with increases in key preventive services, particularly in reproductive health. Table 2 shows mean quantities of services delivered per PHC per month in Time-1 and Time-2. In the column entitled “p value,” we present results from the corresponding paired tests. For variables showing a significant increase in Time-2, the final column of the table presents results from a multivariate regression model including months' experience offering basic HIV care, participating in the *mutuelle*, and receiving PBF payments for non-HIV indicators.

On 13 reproductive health service delivery indicators, no decreases were observed in Time-2, and 10 out of the 13 increases were found to be statistically significant ($p < 0.05$). PHC experience offering HIV services was positively associated with increases observed in seven of these reproductive health indicators, while experience in PBF and *mutuelle* programs were positively associated with increases in three of the indicators. The number of preventive services offered for children was also greater during Time-2. Experience with *mutuelle* and PBF was positively associated with these observed increases. Curative services – non-HIV laboratory tests, out-patient consultations, and hospitalizations – also increased during Time-2, but only increases in out-patient consultations were significant and none of the covariates were associated with this increase. While suggestive of relative contributions to observed increases in Time-2, given that experience variables

were time-dependent, we note limitations to interpretation of regression results.

We found no differences between PHCs managed by the public sector ($N = 9$) and those managed by faith-based organizations ($N = 21$), with the exception that public sector PHCs have significantly ($p = 0.011$) more new clients who accept a family planning method (“acceptors”) in Time-2 (Mann–Whitney Test) compared to faith-based PHCs.

To explore the additional effect of offering HAART, we compared outcomes by sites offering basic HIV care plus HAART with those that provided only basic HIV care. Nine of the PHCs in the sample were offering HAART for part or all of Time-2 (one site for two months, two sites for five months, and six sites for all six months). Table 3 shows mean and median differences (Time-2 minus Time-1) in service provision at HAART and non-HAART sites. Overall, increases between the two time points in preventive services were greater at sites that offered HAART. However, PHCs that offered HAART conducted fewer non-HIV laboratory tests in Time-2. While out-patient consultations increased in both HAART and non-HAART sites, hospitalizations decreased in the former and increased in the latter. It was not possible to account for patients' HIV status from in- and out-patient data.

Discussion

Our study adds to limited but growing evidence of positive synergies between HIV care and the delivery of other primary health care. An early review found significant demand for integrated services that offered VCT alongside other medical care (Population Council, 2000). Retrospective studies in Haiti provide further evidence of benefits of integrated HIV services (Peck et al., 2003; Walton et al., 2004). Based on service data from a stand-alone VCT center that progressively added primary health services, Peck et al. (2003) demonstrated that offering other primary care attracted a patient population in need of services for sexually transmitted infections (STIs), tuberculosis (TB), and reproductive health care.

Table 2. Mean quantities or coverage rates of services provided per PHC per month and associations on observed increases from months experience with *mutuelles*, PBF, and provision of basic HIV care.

Service indicators	Time-1	Time-2	<i>p</i> -value	Positive associations on time-2 increases
Reproductive Health				
Total new ANC clients	74	84	<0.001 ^a	None
Coverage rate new ANC clients	68%	81%	<0.001 ^a	PBF (<i>p</i> = 0.007)
First trimester ANC visit	5	10	0.001 ^b	HIV (<i>p</i> = 0.010)
Second trimester ANC visit	36	52	<0.001 ^a	HIV (<i>p</i> = 0.040)
7–8 month ANC visit	51	54	0.513 ^a	–
9 month ANC visit	15	17	0.699 ^b	–
All four ANC visits completed	3.2	5.2	0.013 ^b	None
Coverage rate all four ANC visits	3%	4.7%	0.016 ^a	HIV (<i>p</i> = 0.019)
Syphilis screening within ANC	1	79	<0.001 ^a	HIV (<i>p</i> < 0.001) PBF (<i>p</i> = 0.009)
New family planning acceptors	9	13	0.012 ^b	HIV (<i>p</i> < 0.001)
Returning family planning acceptors	91	141	0.002 ^b	HIV (<i>p</i> < 0.001)
Total family planning acceptors	100	155	0.001 ^b	HIV (<i>p</i> < 0.001)
Births at health centre	17	23	<0.001 ^b	Mutuelle (<i>p</i> = 0.049) HIV (<i>p</i> = 0.068)
Services for children				
Vaccinations completed	72	79	0.019 ^a	None
Vaccination coverage rate	79%	87%	0.025 ^a	Mutuelle (<i>p</i> = 0.023)
New growth monitoring clients	109	106	0.869 ^b	–
Returning growth monitoring clients	653	929	0.001 ^b	Mutuelle (<i>p</i> = 0.002) PBF (<i>p</i> = 0.045)
Total growth monitoring	760	1038	0.001 ^b	Mutuelle (<i>p</i> = 0.012)
Curative services				
Non-HIV lab tests performed	545	619	0.116 ^a	–
Out-patient consultations	943	1173	0.003 ^a	None
Hospitalizations	79	93	0.066 ^b	–

^aPaired Samples *T*-Test.^bWilcoxon Signed-Ranks Test.

In turn, these additional care options attracted more people to VCT, including populations at high risk for HIV.

Offering treatment for HIV further intensifies the need to invest in health care infrastructure and to improve delivery of all the essentials of care (Mukherjee, 2003; Walton et al., 2004). After a year of implementing an “AIDS project” through a public clinic in Haiti, Partners In Health (PIH) researchers found substantial improvements and increases in essential drug supply, laboratory capacity, prenatal care, diagnosis and management of STIs, TB and HIV, and vaccination rates (Walton et al., 2004).

The results from Rwanda are consistent with these findings. Offering new services to test for HIV, prevent secondary transmission, and care for HIV patients requires fundamental improvements to the infrastructure and capacity at PHCs, including the training of laboratory technicians and nurses, provision of medical supplies and equipment, and revitalization of lab rooms, clinic buildings and surroundings (Figure 1). While we cannot generalize to other contexts, for the PHCs included in this

sample, we consider the HIV-related improvements in health worker skills and in facility infrastructure as important contributors to increases in non-HIV service utilization.

In particular, the Rwanda study suggests that HIV-focused health care is associated with increases in use of antenatal care. We believe this quantitative increase also reflects an improvement in quality of care. The World Health Organization sets standards for the provision of effective antenatal care (WHO, 2006). Three of these indicators – proportion of pregnant women that (i) have at least one visit to an antenatal clinic (ANC); (ii) have four or more ANC visits; and (iii) are screened for syphilis – increased with the introduction of HIV services. Given that women in Rwanda tend to come to antenatal care late in their pregnancies, if at all (INSR, 2005), we find the significant increases in first and second trimester ANC visits encouraging. However, more research is needed to understand the reasons underlying this positive result.

The observation that service delivery increases as much or more at HAART sites compared to non-HAART sites suggests that adding HIV treatment

Table 3. Mean and (median) differences (Time-2 minus Time-1) in service provision at HAART and non-HAART sites.

Service indicators	HAART not offered (N = 21)	HAART offered (N = 9)	p-value*
Reproductive health			
Total new ANC clients	7 (5)	19 (15)	0.002
Coverage rate new ANC clients	1.8%	1.0%	0.440
First trimester ANC visit	2 (2)	12 (14)	0.210
Second trimester ANC visit	13 (10)	21 (18)	<0.001
7-8 month ANC visit	18 (10)	17 (13)	<0.001
9 month ANC visit	2 (-0.67)	2 (-0.33)	0.114
All four ANC visits completed	2 (5)	3 (2)	0.298
Coverage rate all four ANC visits	2% (0.5)	1% (2%)	0.280
Syphilis screening within ANC	73 (61)	89 (75)	<0.001
New family planning acceptors	4 (0)	7 (1)	0.421
Returning family planning acceptors	21 (0)	117 (32)	0.032
Total family planning acceptors	24 (4)	126 (35)	0.017
Births at health centre	5 (4)	10 (11)	0.002
Services for children			
Vaccinations completed	5 (4)	13 (16)	0.066
Vaccination coverage rate	4% (6%)	13% (16%)	0.106
New growth monitoring clients	2 (-1)	-13 (-0.67)	0.614
Returning growth monitoring clients	150 (67)	571 (384)	0.001
Total growth monitoring	157 (68)	559 (412)	0.002
Curative services			
Non-HIV lab tests performed	138 (137)	-74 (-2)	0.027
Out-patient consultations	268 (271)	141 (374)	0.003
Hospitalizations (excludes two HAART sites: one without a hospital unit and another with only two months experience offering HAART)	25 (15)	-24 (-15)	0.148

*Two-sample Wilcoxon test on means.



Figure 1. Patient waiting area before and after renovations made with funds to scale-up HIV and AIDS care.

does not negatively impact the delivery of other primary health care at PHCs. Furthermore, fewer hospitalizations at HAART sites may indicate that HIV treatment has an added benefit of lowering the HIV-related disease burden in the PHC's population and thus strain on the health care system. The link between HAART and reduced hospitalization rates has been documented elsewhere (Gebo, Fleishman, & Moore, 2005; Jerene, Naess, & Lindtjörn, 2006; Krentz, Dean, & Gill, 2006; Sherer et al., 2002). While more research is needed to understand the findings in Rwanda, they indicate a potential for strengthening primary care through facility upgrades and provider skills required for HAART delivery.

An important difference between the prior research and the current study should be noted. The similar findings reported from Haiti are from one clinic receiving substantial inputs for facility upgrades, clinical care, staffing (including paid community workers), and direct management from PIH (Walton et al., 2004). On the other hand, the data from Rwanda are from 30 geographically dispersed PHCs receiving modest levels of support and no direct management by FHI.

For basic HIV care, we estimate FHI's initial investment to be around \$63,000/PHC in the first year, of which approximately 80% is for infrastructural upgrades, equipment and medical supplies. FHI also supports on average two additional nursing-level staff, recruited and supervised by the PHC and paid according to the PHC's salary scale. Further upgrades and additional staffing are provided in follow-on years, but the level of support goes down to approximately \$32,000/PHC/year (figures provided by FHI/Rwanda). This creates incremental but cumulative improvements in infrastructure and PHC capacity. While the PHCs directly manage these inputs and the new HIV services offered, in collaboration with district health teams, FHI provides formal and on-site training in all technical areas, ongoing supportive supervision and mentoring, and assistance with a variety of site-specific issues related to HIV and beyond. Because the PHCs directly manage and are accountable for the HIV services they provide, we believe that the findings from Rwanda reflect realistic possibilities of positive synergies within an ordinary context of PHCs operating under a nationally coordinated program to scale-up HIV services.

In interpreting positive synergy, however, we need to be mindful of the study's limitations. The small, non-randomized sample of PHCs is the most important of these. As all of the PHCs included in the sample were receiving technical and material assistance from the same PEPFAR-funded agency, we

cannot assume that they are representative of all PHCs. Second, although we controlled some potential confounding factors with regression analyses, it was not possible to control for others, such as seasonal fluctuations in malarial incidence, which might account for increased use of health care facilities. Third, although a time measure of experience with *mutuelles* and PBF is useful, it does not fully clarify the impact of these programs on health care utilization. Fourth, other factors – such as one-off donor gifts, intermittent food aid, and personnel changes – are difficult to track and measure, especially given the variable number of months between Time-1 and Time-2 periods. These factors were therefore not adequately addressed. Finally, our data are limited by focusing solely on intermediate indicators of health care utilization. We do not consider outcome indicators, such as maternal mortality rates and congenital syphilis incidence. Furthermore, patient satisfaction measures might have enhanced our understanding of the effect of HIV service delivery processes.

Future research should address some of these shortcomings. We propose employing stronger designs, including prospective studies with longer follow-up and where possible, random assignment of clinics to the sample. We also advise future studies to ascertain impact on quality of care. Finally, we specifically would recommend research to examine the impact of HAART on disease burden and hospitalization rates, which might also include an assessment of net costs and benefits to the health care system.

Whether HIV programs are overwhelming already weak health systems or strengthening them represents the most recent iteration of enduring public health debates about single-purpose programming versus investments in “the health system, as a system” (Freedman, 2005; Freedman, Waldman, de Pinho, & Wirth, 2005), about disease control versus universal primary health care (Unger, de Paepe, & Green, 2003; Van Balen, 2004), and about vertical implementation structures versus horizontally integrated ones (Segall, 2003). While the findings presented here and elsewhere suggest a positive potential from introducing HIV/AIDS care to primary health care, they do not adequately address the major concerns articulated in these debates. We recognize the risk of possible distortions to the health system through vertical funding flows, parallel delivery systems, and “brain drain” to HIV-specific programs. In order to avoid perverse effects and to ensure positive spill-over from HIV service scale-up, we agree with De Maeseneer et al. (2008) that these issues merit serious attention.

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