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Providing Low-Cost Sexually Transmitted Diseases Services in Two Semi-Urban Health Centers in Central African Republic (CAR): Characteristics of Patients and Patterns of Health Care-Seeking Behavior

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Abstract

Background:: **While treatment of symptomatic sexually transmitted diseases (STDs) has been shown to reduce the incidence of HIV infection, there are few published reports describing the delivery of high quality STD care in Africa.**

Goal:: **To test the feasibility of providing comprehensive, affordable STD services through the existing primary care infrastructure.**

Design:: **STD treatment services using a syndromic approach were established in two semi-urban hospital outpatient departments (OPD) in Central African Republic (CAR). A dedicated paramedical provider took a clinical history, performed an examination, explained the diagnosis and the importance of referring partners, dispensed drugs, and offered partner referral vouchers. A fee-for-service system was used to resupply drugs initially purchased with project funds.**

Results:: **Of 9,552 visits by index patients and partners over a 28-month period starting in October 1993, 60% were made by women; of these women, 90% were symptomatic, 77% had "vaginal discharge," 70% "lower abdominal pain," and 7% "genital ulcer." Among men, 64% were symptomatic, 38% had "urethral discharge," and 14% "genital ulcer." Half of all symptomatic patients presented within 1 week of the onset of symptoms; 44% of men compared to 18% of women had sought care elsewhere before the clinic visit. The average cost per STD treated with recommended drugs was $3.90. Etiologic data from subpopulations in both sites suggest that a high proportion of patients was infected with an STD.**

Conclusions:: **Comprehensive yet affordable care for STDs in persons (and their partners) who recognize symptoms is feasible and should be widely implemented in primary care systems to prevent the spread and complications of STDs and HIV in Africa.**

SEXUALLY TRANSMITTED DISEASES (STDs) are a major public health problem in the developing world. Recent analyses show that STDs, excluding HIV, collectively rank among the most important causes of healthy productive life-years lost in developing countries.[1,2] In Africa, STDs are an important problem because of their frequency, their impact on maternal and child health, and their social and economic consequences.[3–5] In addition, there is evidence that the risk of heterosexual HIV acquisition and transmission in Africa may be greatly increased in the presence of curable STDs and that this effect may be more pronounced for symptomatic than for asymptomatic infections.[6–12]

Providing improved STD treatment services has been advocated in recent years as a means to prevent HIV infection and because STDs are major causes of morbidity and mortality.[5,11–13] According to the World Bank, case management of STDs is one of five groups of interventions that constitute a "minimum package of essential clinic services" of high cost effectiveness.[1] The experience in Mwanza, Tanzania,[11,12] demonstrated that treatment of symptomatic STDs reduced the incidence of HIV infection by 42%. However, little is known about how to deliver STD treatment services at the community level in non-research settings.

In Central African Republic (CAR), "traditional" curable STDs have long been among the most common causes of morbidity reported from outpatient health facilities.[14–16] From 1978 to 1985 the World Health Organization (WHO) provided financial and technical support to the Ministry of Health to study the epidemiology of STDs in CAR, train personnel, and assist with the development of a national STD control program. Despite these efforts, HIV infection and AIDS cases continued to increase progressively into the early 1990s.[17,18] By 1991, HIV seroprevalence among pregnant women in three regional capitals of CAR was approximately 8%.[19]

The project described in this paper was designed by CAR's Ministry of Health to test the feasibility of providing comprehensive, affordable STD services through the existing primary care infrastructure with a minimum of outside resources. A successful model was being sought that could then be implemented throughout CAR, and possibly in other African countries. This paper presents an analysis of patient and cost data from hospital outpatient departments in two CAR towns recorded over a 28-month period (October 1993 through January 1996).

Methods

Development of the Enhanced STD Services

In 1990, the National AIDS/STD Control Program (PNLS) of the Ministry of Health and external consultants developed an STD control program in Region IV (population 357,931 in 1988),[20] one of five regions in the country. The choice of Region IV was based on 1989-1990 sentinel HIV surveillance data [18] showing HIV rates of 22% and 8.5% among patients with STDs and pregnant women, respectively, seen at the Regional Hospital. Region IV rates were the highest in the country for these two sentinel population groups. Bambari, the regional capital with 55,548 inhabitants,[20] is a busy transportation cross-roads and the second largest urban center in the country. After initial operational research in Bambari,[21–26] enhanced services were established in Bria (population 25,573),[20] a town located in the region's diamond mining area.

Description of the STD Treatment Services

Paramedical health workers (medical assistants or nurses) were selected at each site to receive training in three programmatic areas: clinical management of STDs using simple algorithms adapted from those recommended by the World Health Organization,[27] patient education and counseling,[28] and record-keeping and data management using laptop computers and Epi Info (CDC, Atlanta, GA; WHO, Geneva, Switzerland) software. A complementary step-by-step job aid detailing the sequence and content of the clinical encounter was given to the providers and their supervisors. A minimum of two workers were trained at each site to prevent the interruption of services in the event of illness, vacation, and attrition. One trained worker at each site was then dedicated to the delivery of STD care using a private consultation room designated for that purpose in the OPD building.

Patients presented at the outpatient registration and triage; they could be self-referred (with symptoms or referral vouchers) or referred by the maternal and child health clinic or school health service. After history taking and a clinical examination, the provider explained the diagnosis and treatment to each patient. Single dose oral therapy and initial doses of multidose therapy (e.g., ciprofloxacin and doxycycline, respectively) were taken in the provider's presence. Providers then offered partner referral vouchers and explained the importance of partner treatment. The visit ended with a discussion and demonstration of condom use using a wooden model of a penis. Patients received drugs for a complete treatment and a packet of four condoms. The provider confirmed the patient's understanding of the treatment regimen and use of the partner vouchers.

A 1,000 FCFA (US$ 2) fee-for-service (including medications and condoms) was established to treat each patient and his/her reported partner contacts. Subsequently, index and contact patients paid the 1,000 FCFA. In Bambari, the fee for contact patients was later reduced to 500 CFA, then increased again to 1,000 FCFA. The revenue was used to replenish an initial supply of drugs purchased with project funds. The collection of fees and the frequent changes in their amount occurred in the context of a policy decision by the government of CAR to implement cost recovery and decentralize health facility management and drug supply to the regional and local levels.

The National AIDS/STD Control Program in CAR had an active program for the social marketing of condoms that operated in Bambari and Bria during the reporting period. Condoms were available for purchase (a packet of four for the equivalent of US$ 0.10) at hotels and bars and from street vendors. They were promoted by providers as being as important as drugs for treatment of the current STD episode and as a way to prevent future infection. The distribution of a “free sample” to each patient with an STD at the OPD after a demonstration and discussion of use was designed to promote subsequent purchase of the condoms and correct use. The condoms could also be used by patients who could not abstain from sex during the period of treatment.

Other than a public meeting in Bambari about the introduction of STD services in the OPD in early 1993, there were no organized community education efforts to promote service use at either site. In the OPD there were no signs indicating the consultation room, although information about fees-for-service for index patients and their partners was posted on the door.

Data Collection and Analysis

A standard patient form at each site was used to record data on basic demographics, symptoms, duration of symptoms, use of prior treatment, number of sex partners in the last month, results of the clinical examination, syndromic diagnoses, treatment given, the number of partner referral vouchers accepted, and use of condoms. Analysis of data related to partner referral is presented in a separate paper.[29] The data were entered locally on laptop computers using Epi Info. Because data collection forms differed and the providers in Bambari and Bria considered their patient populations sufficiently different, data from the two sites were analyzed separately. Data analyses were carried out using SAS (SAS Institute, Cary, NC) from data collected on visits from October 1993 to January 1996, a period during which the form remained the same and there were few programmatic changes.

The cost of drugs for treating each case of five syndromic diagnoses (urethral discharge, vaginal discharge, lower abdominal pain, genital ulcer, and inguinal bubo) was calculated using 1994 prices from U.S. Public Health Service Medical Supply Depot * in Perry Point, MD, except that the cost of benzathine penicillin was based on the 1994 local price in CAR, and the cost of nystatin was the 1995 price from the United Nations International Packaging and Assembling Center (UNIPAC),† excluding shipping. Table 1 presents the treatment for each syndrome and associated costs. We assumed that each case was treated according to the national treatment guidelines adopted by CAR in May 1994, and we calculated the total costs of drugs for treating all of the reported diagnoses and the average cost per STD syndrome treated.

Syndrome	Treatment	Cost per Case Treated	Number of Diagnoses	Total Cost
Vaginal discharge (Nonpregnant women)	Gonorrhea ($1.80) ciprofloxacin 500mg, 1 tablet Chlamydia ($1.18) doxycycline 100 mg, 1 tablet twice daily × 7 days Trichomonas/bacterial vaginosis ($0.59) metronidazole 250 mg, 2 tablets twice daily × 7 days Candidiasis ($0.65) nystatin 100,000 IU × 14 days	$4.22	3181	$13,424
Vaginal discharge (Pregnant women/ 25% of total women diagnosed)	Gonorrhea ($4.60) cefixime 200 mg 2 tablets Chlamydia ($2.39) erythromycin 250 mg 2 tablets 4 times daily × 7 days Trichomonas/bacterial vaginosis (Same as above) Candidiasis (Same as above)	$8.23	1060	$8,724
Urethral Discharge, including scrotal swelling	Gonorrhea: ($1.80) ciprofloxacin 500 1 tablet Chlamydia: ($1.18) doxycycline 100 mg, 1 tablet twice daily × 7 days	$2.98	2659	$7,924
Genital Ulcer				
a. Men, nonpregnant women, nonallergic	Syphilis ($1.00) B. Penicillin G 2,4 M IU Chancroid ($0.73) Sulfamethoxazole-Trimethoprin 800 mg - 1 tablet twice daily × 7 days	$1.73	1602	$2,771
b. Pregnant women, nonallergic (15% of total)	Syphilis ($1.00) (Same as [a] above) Chancroid ($2.39) erythromycin 250 mg, 2 tablets four times daily × 7 days	$3.39	181	$614
c. Men, nonpregnant women, allergic (10% of total)	Syphilis ($2.53) doxycycline 100 mg, 1 tablet twice daily × 15 days Chancroid ($0.73) (Same as [a] above)	$3.26	178	$580
d. Pregnant women, allergic	Syphilis and chancroid ($5.12) erythromycin 250 mg, 2 tablets four times daily × 15 days	$5.12	20	$102
Pelvic Inflammatory Disease (PID)				
a. Nonpregnant women	Gonorrhea: ($1.80) ciprofloxacin 500 mg, 1 tablet Chlamydia: ($1.68) doxycycline 100 mg, 1 tablet twice daily × 10 days Anaerobics: ($0.84) metronidazole 250 mg, 2 tablets, twice daily × 10 days	$4.32	626	$2,704
b. Pregnant women	Gonorrhea: ($4.60) cefixime 200 mg, 2 tablets Chlamydia: ($3.42) erythromycin 250 mg, 2 tablets twice daily × 10 days Anaerobics: ($0.84) metronidazole 250 mg, twice daily × 10 days	$8.86	69	$611
c. Male contacts	Gonorrhea: ($1.80) (Same as [a] above) Chlamydia: ($1.68) (Same as [a] above)	$3.48	245	$853
Inguinal bubo	LGV ($2.53) doxycycline 100 mg, 1 tablet, twice daily × 15 days Syphilis ($1.00) B. Penicillin G 2.4 U IM	$3.53	1	$3.53
Total diagnoses: Average cost per STD case treated:			9,822	$38,311 $3.90

TABLE 1. National STD Treatment Guidelines in CAR and Cost in U.S. Dollars

Results

Overall results between Bambari and Bria were similar with some differences that will be highlighted. A total of 5,232 visits by index patients and partners were recorded in Bambari and 4,320 visits in Bria (Table 2). Most of the patients seen in both sites were women (58% vs. 42% and 63% vs. 37% in Bambari and Bria, respectively, $p < 0.01$ for both comparisons). Almost half of all patients were aged from 15 to 24 years (Bambari n = 2,516 [48.1%] and Bria n = 1,930 [44.7%], with the number of women in this age group being double that of men seen in the clinic in Bambari and almost triple that of men seen in Bria. Almost one fifth of all patients were younger than 20 years of age (n = 969 [18.5%] in Bambari and n = 759 [17.6%] in Bria); among patients in this age group, the ratio of women to men was 5 to 1. Although the number of patients younger than 15 years of age was small, more than 80% of these young patients were girls (88.6% in Bambari and 83.3% in Bria). Overall, slightly more than two thirds of patients in both sites were married to one or more partners. The proportion of patients in Bambari who reported being in a polygamous relationship was almost double that of Bria (8.7% vs. 4.4%). In both sites, a higher proportion of men than women reported being polygamous with the greatest difference between men and women being in Bria (11.1% vs. 0.4%). The percentage of women who were divorced, separated, or widowed was higher than men in Bambari and Bria. (4.8% vs. 1.7% and 5.1% vs. 0.9%, respectively).

	Bambari			Bria		
	Male n = 2,192 (%)	Female n = 3,040 (%)	Total n = 5,232 (%)	Male n = 1,614 (%)	Female n = 2,706 (%)	Total n = 4,320 (%)
Age group						
< 15 yrs	4 (0.2)	31 (1.0)	35 (0.7)	7 (0.4)	35 (1.3)	42 (0.9)
15–19 yrs	165 (7.5)	769 (25.3)	934 (17.9)	117 (7.2)	600 (22.2)	717 (16.6)
20–24 yrs	659 (30.1)	923 (30.4)	1582 (30.2)	380 (23.5)	833 (30.8)	1213 (28.1)
25–29 yrs	487 (22.2)	672 (22.1)	1159 (22.2)	341 (21.1)	609 (22.5)	950 (21.9)
30–34 yrs	368 (16.8)	329 (10.8)	697 (13.3)	269 (16.7)	344 (12.7)	613 (14.2)
35–39 yrs	240 (10.9)	186 (6.1)	426 (8.1)	203 (12.6)	167 (6.2)	370 (8.6)
40+ yrs	269 (12.3)	130 (4.3)	399 (7.6)	297 (18.4)	118 (4.4)	415 (9.6)
*Marital status**						
Married	1259 (57.4)	1839 (60.5)	3098 (59.2)	996 (61.7)	1817 (67.1)	2813 (65.1)
Polygamous	228 (10.4)	229 (7.5)	457 (8.7)	179 (11.1)	12 (0.4)	191 (4.4)
Single	629 (28.7)	771 (25.3)	1400 (26.7)	420 (26.0)	735 (27.2)	1155 (26.7)
Divorced	14 (0.6)	29 (0.9)	43 (0.8)	3 (0.2)	33 (1.2)	36 (0.8)
Separated	14 (0.6)	87 (2.9)	101 (1.9)	8 (0.5)	65 (2.4)	73 (1.7)
Widowed	11 (0.5)	31 (1.0)	42 (0.8)	3 (0.2)	41 (1.5)	44 (1.0)
*No. of partners**						
0	59 (2.7)	99 (3.3)	158 (3.0)	73 (2.7)	189 (11.7)	262 (6.1)
1	1538 (70.2)	2782 (91.5)	4320 (82.6)	957 (59.3)	2268 (83.8)	3225 (74.7)
2	471 (21.5)	96 (3.2)	567 (10.8)	426 (26.4)	162 (6.0)	588 (13.6)
3 or more	93 (4.2)	11 (0.4)	104 (1.9)	135 (8.4)	32 (1.2)	167 (3.9)
*Condom Use**						
within last week (4.3)	99 (4.5)	57 (1.9)	156 (3.0)	131 (8.1)	53 (2.0)	184
within last month	104 (4.7)	67 (2.2)	171 (3.3)	75 (4.6)	55 (2.0)	130 (3.0)
>1 month	890 (40.6)	585 (19.2)	1475 (28.2)	489 (18.1)	366 (22.7)	855 (19.8)
never	1069 (48.8)	2290 (75.3)	3359 (64.2)	907 (56.2)	2211 (81.7)	3118 (72.2)

* Total percentages do not equal 100 because of missing values and rounding.

TABLE 2. Patient Characteristics - Bambari and Bria

Almost all of the patients in both sites reported having sex in the last month. A higher percentage of men than women reported having two or more partners (25.7% vs. 3.6% in Bambari and 34.8% vs. 7.3% in Bria).

Condom use was low in both sites; 64.2% and 72.2% of patients reported never having used a condom in Bambari and Bria, respectively. The percentage of women who reported having never used a condom was higher than that of men (Bambari 75.3% vs. 48.8% and Bria 81.7% vs. 56.2%). Of those reporting any use, 82% of the users in Bambari and 73% of those in Bria had last used a condom more than a month ago.

A total of 3,940 patients seen in Bambari (75.3%) and 3,663 patients in Bria (84.8%) presented to the STD service with at least one symptom. In both sites, a much higher proportion of women than men had symptoms (n = 2,595 [85.4%] vs. n = 1,345 [61.4%] in Bambari and n = 2,568 [94.9%] vs. n = 1,095 [67.8%] in Bria), and these differences were significant, $p < 0.01$. Table 3 shows the symptoms reported by male and female patients. In both sites, the average number of symptoms reported by women was greater than that of men, with the greatest difference being in Bria (an average of 1.9 vs. 1.3 and 1.6 vs. 1.4 symptoms reported by women and men in Bria and Bambari, respectively). The most common complaints of the men were urethral discharge, burning during urination, and genital ulcer. The women's most common complaints were vaginal discharge, lower abdominal pain, and genital ulcer. Approximately one third of men in both sites had no symptoms, more than twice as high than women (14.6% and 5.1% in Bambari and Bria, respectively). Overall in both sites an average of 20% of patients were asymptomatic. This may represent the high proportion of referred partners.29 Table 4 shows the duration of symptoms before the patients came to the STD service. Overall, half of all symptomatic patients in both sites presented within 1 week of the onset of symptoms; two thirds presented within 2 weeks. However, a larger proportion of patients in Bambari (11.7%) than in Bria (5.4%) had symptoms for 30 days or more.

Bambari			
Presenting complaint	Men (n = 2,192)	Women (n = 3,040)	Total (n = 5,232)
Burning on urination	820 (37.4%)	31 (1.0%)	851 (16.3%)
Pelvic pain	5 (0.2%)	1801 (59.2%)	1806 (34.5%)
Urethral discharge	792 (36.1%)	—	792 (15.1%)
Vaginal discharge	—	2,151 (70.8%)	2,151 (41.1%)
Genital ulcer	323 (14.7%)	191 (6.3%)	514 (9.8%)
No symptoms	847 (38.6%)	445 (14.6%)	1,292 (24.7%)
Bria			
Presenting complaint	Men (n = 1,614)	Women (n = 2,706)	Total (n = 4,320)
Burning on urination	561 (37.8%)	84 (3.1%)	645 (14.9%)
Pelvic pain	12 (0.7%)	2233 (82.5%)	2245 (52.0%)
Urethral discharge	668 (41.4%)	—	668 (15.5%)
Vaginal discharge	—	2265 (83.7%)	2265 (52.4%)
Genital ulcer	224 (13.9%)	187 (6.9%)	411 (9.5%)
No symptoms	519 (32.2%)	138 (5.1%)	657 (15.2%)

* Total percentages do not equal 100 because of missing values and rounding. In addition, some patients reported more than one symptom.

TABLE 3. Presenting Complaints Symptomatic of STDs by Sex*

	Bambari (n = 3,386)				
	Duration of Symptoms (days)				
	0–3 (%)	4–7 (%)	8–14 (%)	15–30 (%)	30+ (%)
Male (n = 1,132)	137 (12.1)	387 (34.2)	227 (20.1)	249 (21.9)	132 (11.7)
Female (n = 2,254)	325 (14.4)	732 (32.5)	384 (17.0)	549 (24.4)	264 (11.7)
	Bria (n = 3,436)				
	Duration of Symptoms (days)				
	0–3 (%)	4–7 (%)	8–14 (%)	15–30 (%)	30+ (%)
Male (n = 1,001)	158 (15.8)	324 (32.4)	153 (15.3)	295 (29.5)	71 (7.1)
Female (n = 2,435)	439 (18.0)	961 (39.5)	314 (12.9)	606 (24.9)	115 (4.7)

* Based on patients for whom data on symptom duration were available.

TABLE 4. Reported Durations of Symptoms Before Coming to the STD Service by Sex*

Table 5 shows reported treatment for the presenting STD symptom(s) before the clinic visit by sex and by site. In both sites, approximately one quarter of all symptomatic patients reported seeking prior treatment. However, in both sites, a higher proportion of women than men reported no prior treatment (83.1% vs. 57.4% and 80.4% vs. 54.9% in Bambari and Bria, respectively). In a multivariate model controlling for quarter of the year, age group, and number of symptoms, the duration of symptoms (odds ratio [OR] = 1.6, 95% confidence interval [CI] 1.5-1.7), and number of partners (OR = 1.4, 95% CI 1.2-1.6) were associated with having sought prior treatment. Patients with diagnoses of genital ulcer (OR = 0.6, 95% CI 0.4-0.9) and vaginal discharge (OR = 1.4, 95% CI 1.2-1.6) were less likely to have sought prior treatment. In Bambari, the results were similar.

	Bambari (n = 3,869)			Bria (n = 3,641)	
	Yes (%)	No (%)		Yes (%)	No (%)
Male (n = 1,316)	560 (42.5)	756 (57.4)	Male (n = 1,084)	489 (45.1)	595 (54.9)
Female (n = 2,553)	431 (16.9)	2122 (83.1)	Female (n = 2,557)	502 (19.6)	2055 (80.4)
Total	991 (25.6)	2879 (74.4)		991 (27.2)	2650 (72.8)

* Based on patients for whom data on prior treatment were available.

TABLE 5. Prior Treatment Reported by Symptomatic STD Patients by Sex*

Overall, 9,822 syndromic diagnoses were recorded in both sites. Based on the number of each diagnosis treated, the total cost of drugs for the period was $38,311. The average cost per STD syndrome treated was $3.90 (Table 1) or 1.1% of the 1995 annual per capita income of $340.30

Discussion

While the Mwanza study showed that STD services can dramatically reduce HIV transmission in a rural African setting, there have been few published reports describing the delivery of comprehensive STD treatment services, including partner referral, as a part of the World Bank-recommended “minimum package of essential clinic services.”1 This experience in a semi-urban area of CAR suggests that affordable STD services can be delivered as part of routine primary care services and in a way that elicits prompt care-seeking behaviors by patients, especially women.

Effective STD control depends on infected persons being able to recognize symptoms early, seek and receive prompt treatment with effective drugs, and successfully refer their partners. An important finding in this regard from Bambari and Bria is that women can be competent users of STD services. In CAR, more women sought STD treatment in the health facilities than men, and this difference cannot be accounted for by the women reported as referrals from the MCH and school health services. A higher proportion of women than men were symptomatic and had more symptoms. However, we are unable to validate the reported STD symptoms because we do not know if clinicians examined all symptomatic patients. Despite the lack of any public education activities about the existing services and the need to seek prompt treatment for symptoms of STDs, slightly more than half of all symptomatic patients reported seeking care within 1 week of the onset of symptoms. Word of mouth is a common form of information dissemination in Africa, especially in rural areas, and we heard anecdotal reports of this occurring from staff at the two health facilities. For women, this care-seeking behavior suggests that they may be more aware of unusual discharges or secretions from the genital tract than previously thought and that, on learning about the availability of a “good” service through other satisfied patients, they are not hesitant to use it. Improving access to effective treatment by services that have a reputation for confidentiality, especially among women, is critical to reducing STD transmission.

Women reported far less use of prior treatment than men, which may be due to their prompt care-seeking at the health facilities or, more likely, their lack of access to alternative sources of care because of lack of information about where to find care, lack of money to purchase treatment elsewhere, or fear of breaches of confidentiality by other treatment providers. If we assume that male patients who reported seeking prior treatment purchased drugs from the *boubanguere* (the market and street vendors who operate in most of the rural towns of the CAR), then this finding again underscores the problem of diagnosis and treatment failures that prolong the infectious period and the possibility of continued transmission. Efforts must be made to promote more timely care-seeking in health facilities by educating the public about the adverse effects of untreated STDs and by increasing the overall quality of the services provided.

We do not know from these data the percentage of patients who engaged in sexual intercourse after the onset of symptoms and therefore were capable of transmitting infections to their partners. However, given that most of the patients in both sites were symptomatic, that 50% of them reported having symptoms for more than 1 week, that most reported at least one sexual partner in the last month, and that few patients reported condom use within the past month, the risk of disease transmission was high. Although nearly all of the men and women in the two sites reported at least one sexual partner in the last month, a higher percentage of women than men had never used a condom. Thus, women appeared to be at greater risk of acquiring an STD than men.

The national promotion of condoms did not seem to have an important effect on condom use, especially among women. Several steps could be taken to increase condom use such as intensive counseling of women to improve their negotiation skills and men with casual and regular partners, and more extensive use of health facilities as points of sale for the social marketing program.

In the Mwanza study, the reduction of HIV incidence was attributed to a reduction in the duration of infectiousness through improved management of symptomatic STDs over a 24-month period.12 The routine treatment of STD syndromes in index patients and their partners in Bambari and Bria during the 28-month period reported here may have helped to reduce the incidence of HIV in Bria and to avert an expected increase in HIV infection in Bambari. Figure 1 shows the evolution of HIV seroprevalence among pregnant women in five CAR towns, including Bambari and Bria, from 1990 to 1996 (Massanga and Mattera, unpublished data).18,19,31,32 Although the data are limited and cannot be considered a true evaluation, we are gratified to observe a reduction of HIV infection among pregnant women in Bria from 18.4% in 1995 to 12.8% in 1996. In Bambari, we note with optimism that the annual rate of increase in HIV infection appears to have been slowed, and peaks observed in the other towns of Berberati (19.9% in 1996) and Bangassou (19.2% in 1995) were not observed in the two program sites. If the rate of increase in HIV infection was slowed, then the Ministry of Health's strategy to treat symptomatic STDs in Bambari and Bria, using the approach proven by a randomized controlled trial for controlling HIV transmission,11 can be effective in the context of routine service delivery. Recent results from a trial in Rakai,33 based on an alternative strategy of intermittent mass treatment, showed no impact on HIV incidence.

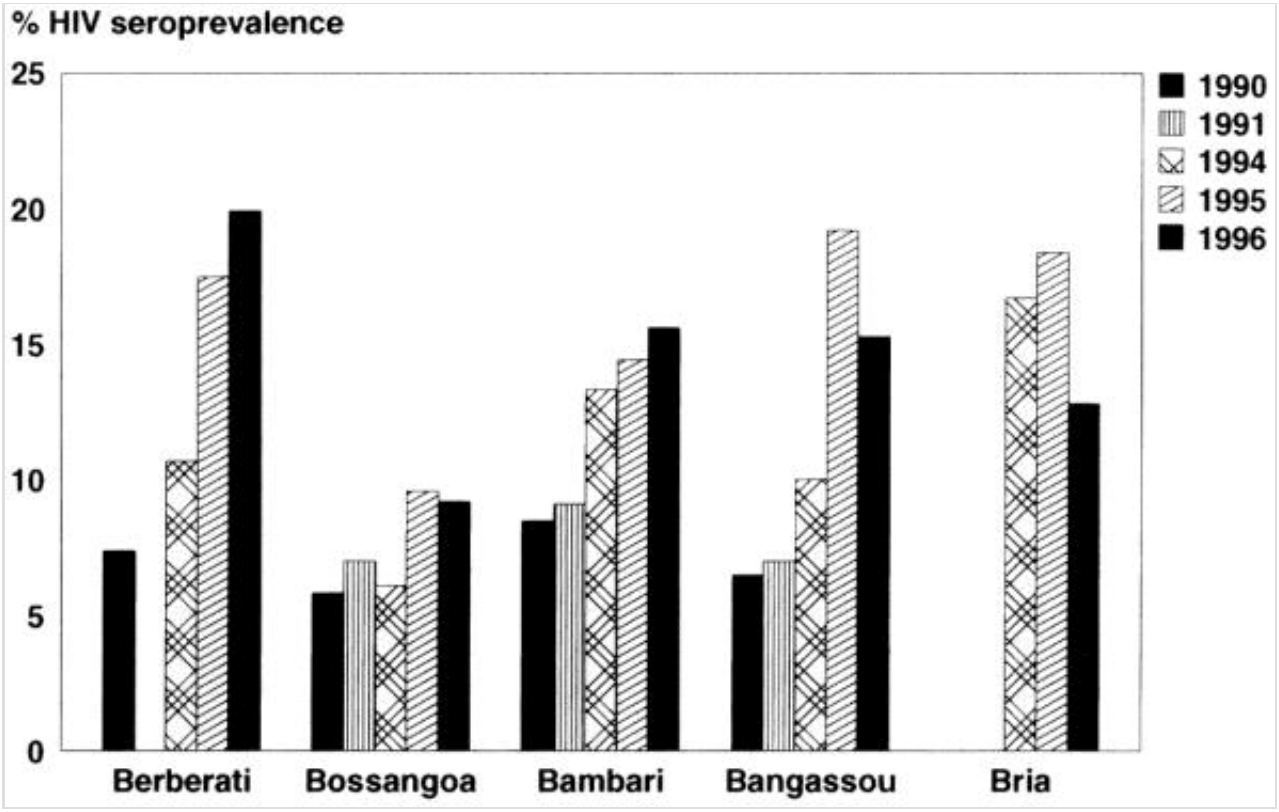

Fig. 1. HIV seroprevalence for pregnant women in semi-urban areas in CAR, 1990-1996.

The cost of drugs can be the largest part of the cost of STD management. Governments and donor agencies are continually challenged in their efforts to assure uninterrupted supplies of effective drugs at a cost that they can afford and the population is willing to pay. In the case of STD treatment, there are ever-increasing concerns about the widespread use (and misuse) of antibiotics in terms of development of microbial resistance, adverse reactions, and the change in microbial flora. Theft, spoilage, and shortages frequently plague drug distribution in the public sector. In Bambari and Bria, the cost of drugs to treat the 9,822 diagnoses in two outpatient settings in a resource-poor area is less than drug costs reported elsewhere.34–38 This is more significant given that the enhanced STD services used recommended first line drugs. The drug cost of $2.11 per STD case treated in Tanzania, for example, may have been caused by the use of less expensive co-trimoxazole to treat gonorrhea, chancroid, and pelvic inflammatory disease.39 While our cost calculations are based on prices from a traditional supplier of drugs in the United States, increasingly, high quality generic drugs are available from other reputable sources.

The average cost of $3.90 per syndrome treated (or 1,950 FCFA at 500 FCFA = $1) must be considered in the context of the health sector reform underway in CAR. A national survey conducted in CAR in the late 1980s to guide this reform revealed a median total health care expenditure (facility fee, pharmacy, and transportation) for modern (public and private) care of $4.34 (or 1,085 FCFA at 250 FCFA = $1 before 1994). Average expenditures in the public and private sector ranged from $3.20 (or 800 FCFA at 250 FCFA = $1 before 1994) for purchase of drugs with no visit to a facility to $8 (2,000 FCFA for a visit to a private facility.40

Of 59 total patients tested for GUD, 16 (27.1%) had chancroid, 20 (33.8%) had syphilis, 19 (32.2%) had herpes, 10 were infected with at least two organisms, and no specific diagnosis was made for 13 (D. Espey, unpublished data). Of 211 women tested for etiology of vaginal discharge, 29 (13.7%) had gonorrhea (PACE-2) and 13 (6.2%) had chlamydia (AMP-CT); of 75 men with urethral discharge, 39 (52.0%) had gonorrhea (PACE-2) and 3 (4.0%) had chlamydia (AMP-CT) (J. Lewis, unpublished data). It seems reasonable to assume that a significant proportion of symptomatic patients seeking services in Bambari and Bria were infected with an STD, and that syndromic treatment provided appropriate therapy and prevention of ongoing disease transmission. While the chlamydia rates in the substudy population may appear low, they are consistent with those reported from other studies in Africa.41–44

Analysis of routine data collected in two STD service units in a semi-urban area of a resource-poor country like CAR and then entered on-site by health workers has important limitations. Although nearly 10,000 patient record forms were available for analysis, the data sets from each site had some missing values. On-site supervision to ensure proper completion and entry of each patient record by the provider was inconsistent, and there was no resident user support.

These analyses suggest that a comprehensive and affordable model for STD control can be implemented as part of existing health care services in a resource-poor setting. The model should be quickly replicated within CAR and elsewhere in Africa, especially where we hope to halt the spread and complications of STDs including HIV.

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*The current name is HHS Supply Service Center. [Context Link]

†The current name is the United Nations Children's Emergency Fund Supply Division. [Context Link]

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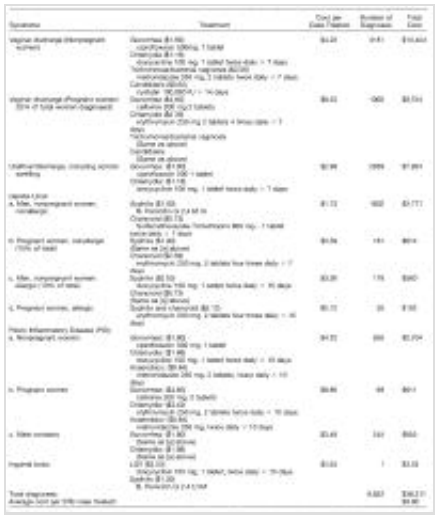

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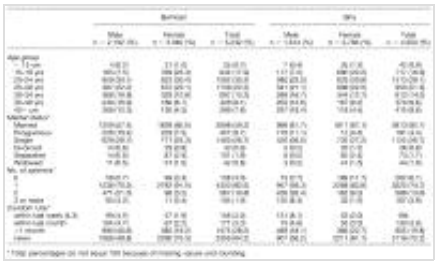

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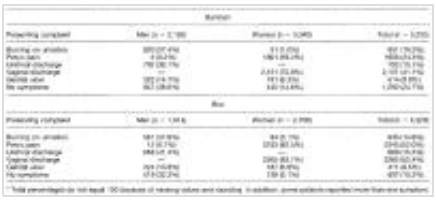

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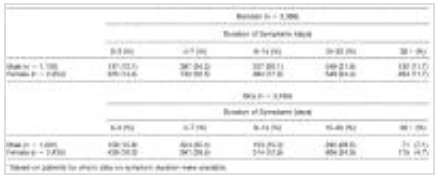

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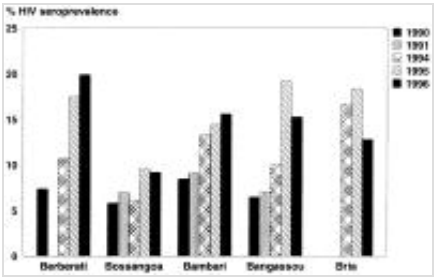

Fig. 1

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