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Strategies for Family Planning Service Delivery In Bas Zaire

By Jane T. Bertrand, Nlandu Mangani, Matondo Mansilu,
Mark E. McBride and Jeffrey L. Tharp

Summary

An operations research project measured the impact and cost-effectiveness of two strategies for delivering family planning services in Bas Zaire: Supplying dispensaries and community distributors with contraceptives and at the same time undertaking an extensive outreach program, and supplying these sources but doing no outreach. Before the project began, only about 4–5 percent of urban women and 2–5 percent of rural women aged 15–44 who were living in union were using modern contraceptive methods. Within two years, this proportion had increased to 10–19 percent in four study areas. However, use of traditional methods decreased, suggesting that many women substituted modern methods for traditional ones. Prevalence in the areas that received outreach was only 2–3 percentage points higher than that in areas that received no outreach. A cost-effectiveness analysis shows that the cost of providing one couple with a month of contraceptive protection was higher in the rural area than in the urban area. In addition, the cost per couple-month of protection was slightly higher when outreach was included.

Introduction

Sub-Saharan Africa has been called a family planning frontier.¹ Population programs have had low priority in most countries of the region, where governments are struggling to provide even the most basic primary health care services. The barriers to family planning are well documented. At the family level, having a larger number of children adds to a couple's prestige in the community, strengthens the clan, provides labor for household tasks and agricultural work, represents security for parents in old age and guards against the effects of high infant and child mortality rates, to name just a few factors.² At the government level, accelerated population growth may in fact be viewed as positive, in that it contributes to the expansion of population into previously uninhabited areas or to the buildup of military strength.³ These obstacles have caused some researchers to predict little short-term change in the high fertility rates seen in Sub-Saharan Africa.⁴

On the other hand, there are several factors that suggest a potential for increased acceptance of modern contraceptive methods. First, the motivation for childspacing is already deeply ingrained in most of the Sub-Saharan countries.⁵ Second, the traditional method of achieving childspacing, a near-universal taboo on postpartum sexual relations that ranges anywhere from three months to three years in different societies, has gradually been eroding.⁶ Couples may be seeking alternative means of assuring adequate birthspacing, and several recent studies show that a sizable percentage of couples use withdrawal to achieve this end—possibly for lack of other, more effective methods.⁷ Finally, better-educated women in urban areas have begun to adopt modern contraceptives,⁸ and this behavior could spread to other segments of society if methods become more readily available.

There are several published reports of attempts to introduce family planning services into Sub-Saharan Africa. The programs were

developed in Ghana,⁹ in Calabar and Oyo State in Nigeria¹⁰ and in the Sudan.¹¹ Numerous smaller projects are also important to the diffusion of family planning in this region; however, because they are service-oriented rather than research-oriented, they have not been described in the published family planning literature. The project described here represents one of the first tests of community-based distribution of modern contraceptives in a francophone Sub-Saharan country in which the program's impact on contraceptive prevalence was closely monitored.

The Project

The Programme d'Education Familiale (PRODEF) has operated since 1981 in the Republic of Zaire's region of Bas Zaire. Researchers have suggested that women in this region might be receptive to family planning because of their proximity to a major urban center, Kinshasa.¹² The project is being carried out by the Hôpital Evangélique of Nsona Mpangu, a member of the Baptist Mission of West Zaire (Communauté Baptiste du Zaire Ouest), in collaboration with the Tulane University School of Public Health and Tropical Medicine. At the time of the follow-up evaluation reported here, the project had been in operation for 21 months. Its main objectives are to increase women's knowledge of modern contraceptive methods, to improve their attitudes toward family planning and to increase the percentage of married women of reproductive age who use modern contraceptives. The project's first phase consisted of testing two alternative strategies for achieving these aims and assessing their cost-effectiveness.

The PRODEF project was implemented in one urban and one rural area of Bas Zaire: the city of Matadi, with an estimated population of between 150,000 and 200,000, of which approximately 133,000 were included in the target area for the project; and the rural zone of Songololo, with an estimated population of 36,000. (In the latter area, the

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program covers 53 villages that have a total of about 25,000 inhabitants.) The urban program offered family planning services only, whereas in the rural program, these services were integrated with three health interventions for children under age five—the distribution of antimalarial drugs, antihelminthic drugs and rehydration salts.

In Zone A, government-operated and missionary-run dispensaries were stocked with contraceptives (and with the other products in the rural area). In addition, an extensive outreach program, consisting of group meetings,* home visiting and the household distribution of contraceptives, was undertaken. In Zone B, dispensaries were stocked with contraceptives, but there was no outreach.

In the rural area, a local resident, called a *matrone*, served as an additional source of supplies in certain villages. The matrone was a woman selected by a village and trained by PRODEF to serve as a supplier of contraceptives and of drugs for children under five in places lacking a dispensary (44 of the 53 villages). The matrones were first given a basic introduction to modern contraceptive methods and the PRODEF system in their homes. Then, as a group, they attended a two-week training session on the use of contraceptives and the other drugs. They also received annual refresher sessions.

The basic difference between the two approaches was in the outreach component. Teams of home visitors attempted to contact all households in the urban and rural areas of Zone A during three successive rounds of home visiting, which took place approximately six months apart. The home visitors were women between the ages of 20 and 35, a few of whom had some nursing training. (The project directors believe in retrospect that those without nursing training performed as well as those with it.) The home visitors un-

dertook a three-week course on family planning and on the administration of drugs to children under age five. The training included considerable role-playing as well as field practice in preparation for home-visiting.

In the rural area only, the home visit began with an extensive discussion of child health problems, specifically malaria, intestinal worms and dehydration due to diarrhea. Women who were interested could buy limited quantities of chloroquine, aspirin, mebendazole and rehydration salts from the visitors. In both urban and rural areas, the visit included a discussion of family planning, during which the husband was encouraged to be present. The talk covered the benefits of childspacing and a description of the different contraceptive methods available.† If the client was interested, the visitor provided her with one free cycle of pills, a free container of foam or vaginal tablets or a dozen free condoms, as well as a coupon entitling her to one month's free supply of any of these methods at a dispensary or from a matrone. After using the coupon, clients had to pay a nominal fee for resupply. (A more detailed description of service delivery in the project can be found elsewhere.¹³)

Community members gave a very favorable response to the home visitors. In the rural area, their visits represented a welcome diversion from daily routine, although by the third visit, some women complained that the visitors didn't tell them "anything new." In the urban area, women were often harder to find at home and to visit, but this problem seemed to be offset by their greater knowledge of and interest in family planning. In general, responses to the home visits could be classified in three categories: (1) The woman was genuinely interested and chose to use one of the products; (2) the woman appreciated the information and the visit, but did not take any immediate action; and (3) the woman disapproved of modern family planning or did not want to be visited.

Assessment by the project staff and by an outside consultant of the quality of the home visiting demonstrated that the content of the presentations was correct, although some home visitors found it difficult to give the same talk repeatedly without slipping into a somewhat rote version of it. As in most such projects, the performance of the individual visitors varied. The project directors generally found that the home visitors were doing their job as expected; the major constraint was the lack of access to the project's only vehicle, which limited the number of days that the rural team was actually in the field.

In all, 16 dispensaries were involved in the project, eight in the urban area and eight in the rural area, equally divided between Zone

A and Zone B. In addition, there were 10 home visitors in urban Zone A and five home visitors in rural Zone A. There were 34 rural matrones, 26 in Zone A and eight in Zone B. In 10 additional cases, either a rural village was close enough to another village that the two shared a matrone, or the village was unable to recruit a qualified woman to serve as a matrone. Finally, one village (Nsona Mpangu) had a hospital, but some women preferred to go to the matrone in a nearby village.

We used four sources of data to evaluate the project—a baseline survey and a follow-up survey to measure changes in key family planning variables among the target population, service statistics on the volume of contraceptives distributed and cost data from financial ledgers to determine the relative cost-effectiveness of the two strategies. The baseline and follow-up surveys involved a representative sample of women aged 15–49 living in the urban area of Matadi and in the neighboring rural area of Songololo.‡ In an attempt to interview all women of reproductive age in the selected urban households, at least three repeat visits were made. The interviewers, women 20–25 years of age, all received a two-week training course.

A total of 3,501 interviews were completed for the baseline survey, and 3,285 interviews were completed for the follow-up survey. A similar questionnaire was used for both of the surveys. It was developed in French, translated into Kikongo, the local dialect, for pre-testing, then translated back into French to ensure that the meaning of all survey items had been preserved. Service activities were initiated four and seven months after the completion of the baseline survey in the urban and rural areas, respectively. In both areas, the follow-up survey was conducted about 21 months after the onset of service activities.

Comparability of Survey Groups

In analyzing the changes that occurred between the time of baseline and follow-up surveys, we considered it important to determine the comparability of the two groups of women, in particular the comparability between the Zone A and B populations within the urban and rural areas. These groups were compared by age of respondent, education, literacy, occupation, nationality, religion, marital status, age at first marriage and type of marriage (monogamous vs. polygamous). Table 1 indicates the percentage distributions for each characteristic for women in Zones A and B, in both the urban and rural areas, at both points in time.

The mean age of women in all four groups at the time of both surveys was 27 or 28. At least four in 10 urban respondents had at-

*In rural Africa, it would be unheard of to enter a village without first obtaining the consent of the chief. He would then call a general meeting of the villagers, where a member of the PRODEF staff would explain the purpose of the home visitation program, how it would work and what services would be offered.

†The pill, foam, vaginal tablets and condoms, which the home visitor carried with her, and the IUD and female sterilization, for which she could make referrals.

‡In Matadi, the target area was divided into 109 equal quadrants, which then were stratified by population density. Sixty randomly selected quadrants were mapped and enumerated, and then 30 households in each quadrant were chosen at random. Because of the sampling procedure that was used, women from low-density quadrants had a higher probability of being selected. Weighting factors were applied to the urban data to adjust for this bias. In Songololo, the rural area, all 53 villages included in the project were mapped; every second house was selected for interview, and the interviewers attempted to contact every eligible woman in the selected households.

tended school beyond the primary grades, compared with less than a quarter of their rural counterparts. Urban respondents were primarily housewives or vendors, whereas the vast majority of rural women were agricultural workers. In the city of Matadi, most respondents (over 82 percent in every subgroup) were Zairian nationals, whereas there were fewer Zairians (60–66 percent) in Zone A of the rural area, due to the presence there of a large group of Angolan refugees. The large majority of women in all groups were either Catholic or Protestant.

The percentage of women who were currently married at the time of the interview ranged from 56 to 78 percent for the different groups. The mean age at marriage for each group was 17–18 years. In the urban area, 8–14 percent of the women reported that their husbands had another wife, compared with 18–26 percent of respondents living in the rural zones. (Polygamy has been illegal in Zaire for several decades, but the practice still exists in some areas.)

There were a number of statistically significant differences in the social and demographic characteristics of the baseline and follow-up survey populations. A higher proportion of women in the follow-up survey than in the baseline survey reported that they had completed primary school, and a higher percentage were literate. This was true of each zone and area. In both urban zones, the percentage of Angolan respondents increased, whereas in the rural area the percentage declined. In fact, changes in level of education and in nationality are related, at least in the rural area. There, Angolans had a significantly lower educational level than the Zairians; thus, the decrease in the rural Angolan population between the baseline and follow-up surveys resulted in an apparent increase in educational level. In the urban area, Angolan and Zairian respondents had similar educational levels; thus, nationality does not explain the urban changes.

In regard to marital status in the urban area, the percentage of women who were married or in union was slightly higher in the baseline than in the follow-up survey. In the rural area, the opposite was true, although this change is in fact a methodological artifact. During the rural baseline survey, women living in a consensual union were mistakenly classified as not married. The data from the follow-up survey include consensual unions as marriages, and thus more accurately reflect marital status in this area.

Finally, in the urban area the percentage of married women living in a polygamous union was slightly higher in the follow-up survey; in the rural area, the opposite was true. However, since these latter percentages are based only on married women, the apparent change may simply reflect coding problems. Of these significant differences in the study populations, educational status was of greatest concern, since this variable is known to correlate positively with contraceptive use. Thus, education is controlled for in subsequent analyses.

Changes in Knowledge and Practice

Given the very limited access to modern contraceptives that the population had prior to the PRODEF project, a surprisingly high percentage had heard of at least one modern method* at the time of the baseline survey—at least 85 percent of urban women and at least 75 percent of rural women. This percentage increased significantly in all zones between the baseline and follow-up surveys (see Table 2, page 111). The baseline survey found knowledge of traditional methods also to be very high in all groups; at least 94

Table 1. Percentage distribution of respondents by various characteristics, according to urban-rural residence and zone, Bas Zaire, baseline and follow-up surveys

Characteristic	Urban†				Rural			
	Zone A		Zone B		Zone A		Zone B	
	Base-line (N=928)	Follow-up (N=862)	Base-line (N=869)	Follow-up (N=932)	Base-line (N=924)	Follow-up (N=809)	Base-line (N=780)	Follow-up (N=738)
Mean age	27.0	26.9	26.6	26.7	28.2	27.6	28.4	27.9
Mean age at first marriage‡	17.7	17.3**	17.3	18.0***	17.0	16.9	17.0	16.8
Education (in years)								
0	20.7	13.5***	23.7	9.2***	40.4	31.1***	41.1	29.5***
1–6§	39.9	42.3	34.2	29.7	44.2	46.5	41.5	46.7
>6	39.4	44.2	42.0	61.2	15.5	22.4	17.3	23.8
Literate								
Yes	68.3	76.8***	65.4	83.3***	42.7	53.4***	44.5	51.8**
No	31.7	23.2	34.6	16.7	57.3	46.6	55.5	48.2
Occupation								
Housewife	64.4	45.4***	66.2	40.2***	2.4	2.1	3.5	3.0
Vendor	19.3	26.9	18.6	20.2	2.4	2.3	2.3	1.9
Agricultural worker	6.0	7.3	5.5	8.3	92.6	93.1	90.8	93.5
Other	10.1	20.5	9.7	31.1	2.6	2.5	3.4	1.6
Nationality								
Zairian	94.2	90.5***	89.4	82.5***	59.5	66.0***	83.8	90.5***
Angolan	5.8	9.1	10.6	17.2	40.5	33.7	16.0	9.5
Other	0.0	0.3	0.0	0.4	0.0	0.3	0.1	0.0
Religion								
Catholic	44.8	45.1***	39.7	35.9	37.3	36.3	32.6	34.3
Protestant	44.9	37.9	44.0	43.2	52.5	53.9	48.4	45.8
Other/none	10.2	17.0	16.4	20.9	10.2	9.8	18.9	19.9
Marital status††								
Currently married	70.5	61.5***	69.4	55.9***	62.0	77.4***	62.6	78.3***
Previously married	4.2	8.2	2.5	8.9	7.6	7.0	7.3	8.7
Never married	25.3	30.2	28.1	35.2	30.3	15.6	30.0	13.0
Number of co-wives‡‡								
0	90.4	87.4	92.2	85.7***	73.8	79.4*	75.6	82.4**
≥1	9.7	12.7	7.8	14.3	26.2	20.6	24.4	17.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

*Statistically significant at $p < 0.05$, using a t-test comparing the homogeneity of baseline and follow-up groups for each zone on each selected variable.

Statistically significant at $p < 0.01$. *Statistically significant at $p < 0.005$.

†The percentages for the urban area were weighted, while those for the rural sample were not. The Ns refer to the number of unweighted cases.

‡Based only on women who were married or in union.

§Including homemaker school.

††Currently married includes those in both legal and consensual unions; previously married includes divorced, widowed and separated women. In the rural baseline survey, women in consensual unions were mistakenly classified as single.

*Modern methods include the pill, the IUD, female sterilization, injectables, condoms and spermicides. Traditional methods include withdrawal, abstinence, rhythm and a belt believed to ward off pregnancy.

Table 2. Percentage of respondents who know of a method of contraception;† percentage who have ever used a method;‡ and percentage who are currently using a method,§ by type of method; according to urban-rural residence and zone, baseline and follow-up survey

Measure	Urban				Rural			
	Zone A		Zone B		Zone A		Zone B	
	Base-line	Follow-up	Base-line	Follow-up	Base-line	Follow-up	Base-line	Follow-up
Knowledge	(N=928)	(N=862)	(N=869)	(N=932)	(N=924)	(N=809)	(N=780)	(N=738)
Heard of at least one modern method††	87.0	97.3***	85.1	96.7***	75.4	91.6***	77.7	86.2***
Heard of at least one traditional method‡‡	94.3	99.0***	95.9	98.1**	94.4	97.3**	95.9	97.2
Ever-use	(N=693)	(N=583)	(N=625)	(N=602)	(N=643)	(N=684)	(N=546)	(N=643)
Modern method	10.2	48.0***	9.8	43.6***	7.9	35.4***	6.6	26.2***
Traditional method	77.8	82.4*	81.2	89.5***	80.5	85.5*	82.4	90.5***
Current use	(N=654)	(N=527)	(N=602)	(N=537)	(N=572)	(N=626)	(N=488)	(N=579)
Modern method	4.4	18.8***	4.5	16.2***	5.2	13.4***	1.6	10.4***
Traditional method	54.4	39.0***	50.7	34.5***	59.5	49.7***	64.5	54.4***
Any method	58.8	57.8	55.2	50.7	64.7	63.1	66.1	64.8
Withdrawal	35.6	23.9	30.4	20.4	20.9	20.6	35.5	31.1
Abstinence	12.4	13.6	15.7	12.5	28.3	26.4	20.7	19.5
Pill	2.5	7.8	1.0	7.7	0.5	2.2	0.2	2.6
Female steril.	0.8	4.9	2.2	4.7	3.7	2.4	1.0	3.3
Neosampon	0.0	3.3	0.0	0.9	0.0	1.6	0.0	0.9
Condom	0.6	1.8	0.5	0.3	0.3	3.4	0.2	2.2
IUD	0.0	0.5	0.0	0.6	0.5	0.5	0.0	0.3
Injectable	0.5	0.5	0.8	1.1	0.2	0.2	0.2	0.2
Rhythm	2.9	0.4	2.8	1.6	1.6	1.0	1.6	0.7
Foam or cream	0.0	0.1	0.0	0.8	0.0	3.2	0.0	0.9
Other	3.5	0.9	1.8	0.2	8.7	1.6	6.7	3.1

*p<0.05. **p<0.01. ***p<0.005.

†Women who mentioned a method spontaneously, claimed to have heard of it after they were prompted or reported having used the method at some point.

‡Ever-married women only. §Currently married women only.

††Modern methods are the pill, IUD, female sterilization, injectables, condoms and spermicides.

‡‡Traditional methods are withdrawal, abstinence, rhythm and folk methods, such as a belt believed to protect the wearer against pregnancy.

percent had heard of at least one such method. Levels of knowledge rose even higher by the time the follow-up surveys were conducted, and the increases were statistically significant in three of the four groups.

One objective of the project was to improve attitudes toward family planning. In the baseline survey, over 90 percent of the women in all four groups said they believed that it was good "for couples to use methods for spacing births or preventing pregnancy." By the follow-up survey, approval of family planning was close to 100 percent (not shown). This cannot necessarily be interpreted as approval of modern contraceptive methods, however, since the question was phrased so as to refer to both modern and traditional methods. However, these results do underscore the value placed on childspacing in this population.

Prior to the PRODEF project, 10 percent

of the ever-married urban respondents and even fewer of the rural respondents had ever used a modern method. This percentage increased dramatically in all groups, although more so in urban than in rural areas and more so in Zone A than in Zone B in each case. By the end of the project, almost half of urban respondents had tried some type of modern contraceptive. Ever use of traditional methods also increased, but less dramatically.

Of key importance as a measure of the impact of the PRODEF project was the use of a modern contraceptive method among currently married women 15–49 years of age. Prior to the project, only 4–5 percent of urban respondents and 2–5 percent of rural respondents were using a modern method. In the urban area, this percentage increased to 19 percent in Zone A (with outreach) and to 16 percent in Zone B (with no outreach). In the rural area, current use increased to 13

percent in Zone A and to 10 percent in Zone B. Although these levels are low compared with those found in most developing countries of Asia and Latin America, the urban prevalence levels are in fact higher than those reported in most published studies from Sub-Saharan Africa. Moreover, they are higher than prevalence rates for modern methods found in four urban and two rural zones of Zaire in the recently published contraceptive prevalence survey, in which such rates varied from two to 11 percent for women 13–49 years old who were in union.¹⁴

While use of modern methods increased, use of traditional methods decreased significantly in all zones. This suggests the substitution of modern for traditional methods. As the data in Table 2 indicate, the percentage using any type of method (modern or traditional) remained unchanged for all groups.

Despite the increase in use of modern methods and decrease in use of traditional methods, withdrawal and abstinence continue to be by far the most widely used methods among this population (Table 2). At the time of the follow-up survey, the modern methods most often used by urban respondents were the pill (by eight percent of married women of reproductive age), female sterilization (five percent) and Neosampon tablets (used by three percent in Zone A). Among rural women in the follow-up survey, the percentages who said that they used a modern method were fairly evenly divided among users of the pill, female sterilization, condoms and, in Zone A, foam (2–3 percent each).

Given that education is known to affect contraceptive use, we controlled for the effects of education in assessing changes in knowledge and use. Logistic regression was used to determine whether significant changes occurred between the baseline and follow-up surveys. The results indicate that changes in knowledge, ever-use and current use of both modern and traditional methods remained significant after education was controlled for (not shown).

In general, the changes seen in Zone A were slightly larger than those in Zone B. To determine whether such differences were significant, we used logistic regression analysis; the independent variables were length of time, zone and a time-zone interaction, while the dependent variable was one of the seven family planning indicators shown in Table 2. Of these, in only one case was the change in Zone A significantly greater than that in Zone B—the change in knowledge of modern methods in the rural area was significantly greater in Zone A than in Zone B.

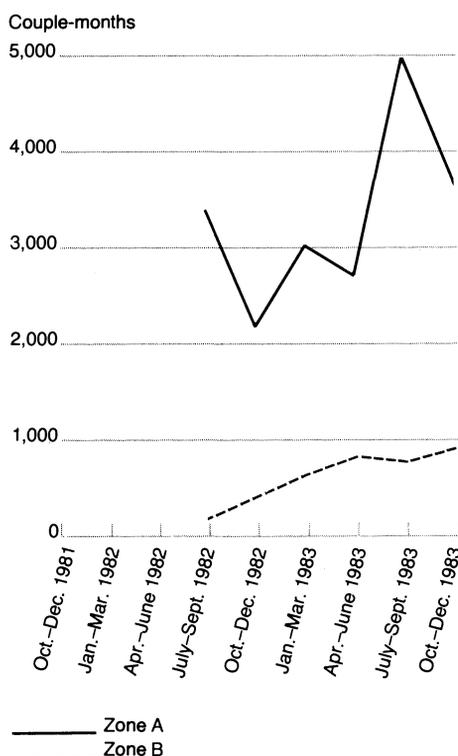
At the beginning of the project, we speculated that home visiting might be essential to achieving any increase in contraceptive prev-

absence, given that the population had had such limited access to modern contraceptives. This hypothesis was not borne out by our study findings; rather, increases similar to those observed in the areas with home visiting were found in areas with no outreach, suggesting that contraceptive accessibility is the key factor in increasing prevalence.

Cost-Effectiveness

We performed a cost-effectiveness analysis to determine the cost per unit of output for the two strategies that were tested. The unit of output used was the volume of contraceptives sold or distributed free of charge, which was later converted to a measure of couple-months of protection from pregnancy.¹⁵ Specifically, the number of each type of contraceptive distributed was multiplied by a conversion factor that approximates the amount of protection conferred by the method.* (Couple-months of protection is a useful summary indicator, especially in regard to trends in program achievement over time and comparisons between different components of a project.) Routine inventories of the quantities of each contraceptive method sold or distributed free by all three types of ser-

Figure 1. Number of couple-months of contraceptive protection provided by PRODEF project in urban area of Bas Zaire, by zone, Oct. 1981–Dec. 1983



Note: The urban component of the PRODEF project did not begin until July 1982.

vice provider yield the data for this analysis.

In the 27-month period under study (from October 1981, when the program began in the rural area, to December 1983, the cutoff date for this evaluation), contraceptives providing a total of 32,424 couple-months of protection were sold or distributed to the population. Almost three-quarters of this total (23,773 couple-months) involved urban couples. This finding is not surprising, given that the urban area's target population was about five times that of the rural area.

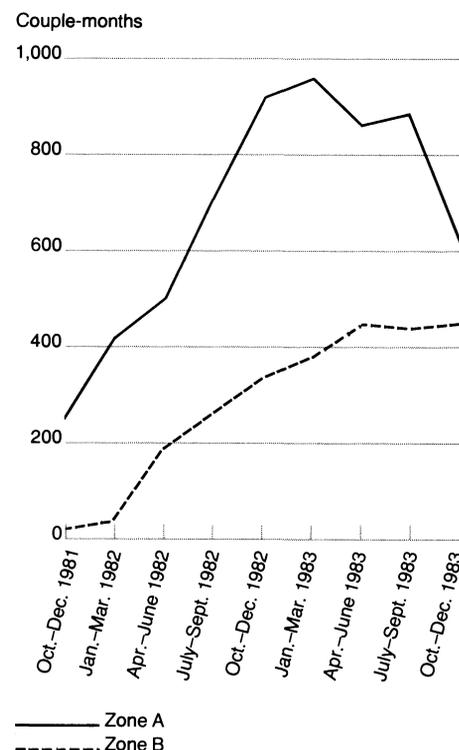
The level of protection provided in Zones A and B is shown in Figures 1 and 2. In both cases, the population of Zone A was greater than that of Zone B, which partially explains the differences in output between the zones. In the urban area (Figure 1), the three peaks for Zone A correspond to the periods in which the home visitors were in the field for all three months. By contrast, while the volume of contraceptives distributed in Zone B was much smaller, a steady upward trend over the life of the project suggests that few people knew of these services initially, but that demand grew as they learned of them.

Figure 2 contrasts the level of contraceptive protection achieved in Zones A and B in the rural area. Again, the volume of contraceptives distributed was higher in Zone A than in Zone B (reflecting in part the size of the population in each case). However, the curve plotted for Zone A shows a dramatic rise during the first 18 months of the project, which corresponded to the period of active outreach work (home visiting and group meetings). In subsequent periods, the number of couple-months of protection afforded in Zone A plateaued, and then began to decline. In contrast, the curve for Zone B is similar to that seen in Figure 1: There is a steady upward trend over time, which may reflect a gradual process of adoption as people learn that services are available.

The methodology used to derive input costs for the cost-effectiveness analysis is described in detail in the appendix. The purpose of the analysis is to compare the costs of the two alternative strategies for service delivery. However, 59 percent of the expenses for the PRODEF project were incurred in the research component, involving such costs as interviewers' salaries and per diems, transportation during the surveys, staff time in supervising the research and technical assistance on various aspects of the research, among others. These research costs are not incorporated into the cost-effectiveness analysis, since they are not essential to the replication of the project's service component.

Because of the arbitrary allocation of joint costs (see appendix), which is virtually unavoidable in this type of analysis, the results

Figure 2. Number of couple-months of contraceptive protection provided by PRODEF project in rural area of Bas Zaire, by zone, Oct. 1981–Dec. 1983



should be taken as approximate. One cannot and should not conclude from a cost-effectiveness analysis that the least costly alternative is necessarily the best or the only desirable option. Rather, the analysis is one of many criteria to be used in comparing the value of alternative approaches.

Table 3 (page 113) provides a breakdown of service-related costs, by region and by treatment group. Two-thirds of the costs could not be classified by region.† Of the costs that could be traced to specific urban or rural activities, about half were incurred in each

*The conversion factors used here are as follows: For the pill, because 28 pills per cycle provide contraceptive protection for 0.92 of a month, one cycle of pills yields 0.92 couple-months of protection; assuming that a container of foam or vaginal tablets contains 20 applications, and assuming that a couple engages in 12 acts of intercourse per month, then the foam or tablets provide 1.67 couple-months of protection; and, again assuming 12 acts of intercourse each month, provision of one condom offers 0.08 couple-months of protection.

†The percentage of costs that could not be allocated to urban or rural region was high, even though the system for coding costs was implemented at the start of the project and performed on a continuous basis by people familiar with the nature of the expenses. We do not believe that better coding would have substantially reduced this percentage.

Table 3. Cost (in U.S. dollars) of delivering family planning services, by region and zone, according to one-year periods

Region and zone	Oct. 1980– Dec. 1983	Oct. 1980– Sept. 1981	Oct. 1981– Sept. 1982	Oct. 1982– Sept. 1983	Oct. 1983– Dec. 1983	% dis- tribution
Total	\$245,798	\$41,458	\$94,305	\$93,985	\$16,000	100.0
Urban						
Zone A	26,299	0	10,041	14,955	1,303	10.7
Zone B	1,510	0	100	1,069	342	0.6
Not traceable	10,934	286	3,449	5,850	1,349	4.4
Rural						
Zone A	30,949	6,590	12,566	10,734	1,059	12.6
Zone B	4,709	128	940	2,963	678	1.9
Not traceable	7,547	367	3,012	3,845	323	3.1
Not traceable	163,849	34,087	64,197	54,569	10,996	66.7

area. Nontraceable costs were allocated on the basis of relative output in the two regions and the two treatment zones, as has been described elsewhere in detail.¹⁶ This procedure is equivalent to assuming that there is a nontraceable cost per couple-month of protection for the project as a whole, which is added to the cost per couple-month for each part. The cost for a given zone, then, includes the cost specific to the zone and that which could not be traced.

The cost-effectiveness ratio was then derived by dividing the costs of each approach by the amount of output for that zone. Table 4 shows that, as might be expected, in both the urban and the rural area the cost per couple-month of protection was higher in Zone A (outreach) than in Zone B (no outreach). In the urban region, one couple-month for Zone A cost \$6.82, compared with \$5.93 in Zone B; in the rural region, the respective amounts were \$11.02 and \$7.76.

The difference between Zones A and B declined over time to the point that there was almost no difference in costs in the last quarter of the analysis (see Table 4). However, it should be noted that by the last

three-month period, home visiting had been completed in the rural area and had dropped by half in the urban area. Given this situation, one would expect the cost of the two approaches to be roughly comparable. The most appropriate time period for making a valid comparison is the middle year (October 1982 to September 1983), when all aspects of the service project were in full operation. For this period, there was up to a \$1.00 difference per couple-month of protection in both the urban and rural regions between Zone A and Zone B.

It is also of interest to examine the cost per couple-month over time and by region. As shown in Table 4, the cost of providing an "average" couple-month of protection declined over the life of the project, a finding that reflects the high initial start-up costs of this type of program. As it continues, one would expect to see the cost per couple-month stay at this relatively low level. It should be noted that since we used nominal cost data the effect of inflation has not been removed. If inflation had been taken into account, the drop in the cost per couple-month would have been even greater.

Table 4. Cost (in U.S. dollars) of delivering family planning services per couple-month of contraceptive protection, by region and zone, according to one-year periods

Region and zone	Oct. 1980– Dec. 1983	Oct. 1980– Sept. 1981	Oct. 1981– Sept. 1982	Oct. 1982– Sept. 1983	Oct. 1983– Dec. 1983
Total	\$ 7.58	na	\$15.57	\$4.54	\$2.84
Urban					
Total	6.68	na	14.31	4.04	2.60
Zone A	6.82	na	14.45	4.16	2.59
Zone B	5.93	na	12.01	3.43	2.63
Rural					
Total	10.05	na	17.50	6.01	3.87
Zone A	11.02	na	18.60	6.36	3.96
Zone B	7.76	na	\$13.64	5.23	3.76

Note: na = not applicable, because program had not yet begun to provide services.

Regionally, the cost per couple-month of protection in the urban area was lower than the comparable cost in the rural area. This probably reflects the higher density of the population in the urban area, which resulted in higher utilization of services and yielded some economies of scale. The pattern of higher costs in the rural region is expected to persist as the PRODEF project continues into its second phase (from 1984 onward).

The difference in cost per couple-month between the urban and rural areas is surprisingly small (\$6.68 in the urban area vs. \$10.05 in the rural area), given that so many more contraceptives were distributed in the urban area, while the cost inputs were similar. This small differential is the result of an inability to allocate all costs specifically to either the urban or rural areas, as reflected in the high level of nontraceable costs. Of the \$6.68 cost per couple-month in the urban area, the component that could not be traced totaled \$5.05; in contrast, of the \$10.05 spent per couple-month in the rural area, the nontraceable component was also \$5.05. Thus, the region-specific cost in the urban area was 32 percent higher than the nontraceable part of cost, whereas in the rural project it was 99 percent higher. This demonstrates the high cost of operating in rural areas compared to urban areas, over and above the cost of providing the basic structure of the project.

Discussion

The results of the PRODEF project have several important implications. First, the project demonstrates that both household distribution of contraceptives and the use of community distribution posts are viable, culturally acceptable approaches to the delivery of family planning services in this region of Zaire. Neither approach met with resistance from local authorities or the communities involved. In addition, the project demonstrates that the use of modern methods can be significantly increased by making them more readily accessible to the population. The results show that many women abandoned traditional methods in favor of modern contraceptives when they became available at low cost. This change constitutes a substitution effect; the overall percentage of women using *any* type of method (modern or traditional) did not change.

Substitution of one type of method for another can have advantages and disadvantages. To the extent that a given population uses abstinence in its strictest form—total restraint from sexual relations for a period that can extend up to 24 or 36 months in some African societies—there is no better method for preventing pregnancy. Even the use of modern methods with high theoretical effec-

tiveness rates will result in some accidental pregnancies during the initial period of use, often due to incorrect use. Thus, in this respect, modern methods cannot compare with abstinence. However, it appears that with modernization, the practice of postpartum abstinence is giving way to the use of other traditional methods, including rhythm and withdrawal. Compared with these methods, the modern methods of birth control are far more effective, even taking into account the lower levels of use-effectiveness seen during the period of initial experimentation with a modern method. We believe that in this situation, substitution of modern methods for traditional ones is a positive step.

The project's experience also demonstrates the cultural acceptability of a vertical program (one providing family planning services only) in an urban area of Sub-Saharan Africa. At the same time, it should be emphasized that in the rural program, which included both family planning and child health interventions, the inclusion of the latter services greatly enhanced the value of the program in the eyes of the community. As was expected, the impact of the project was greater in the urban than rural area, and at a lower cost per couple-month of protection. In part, this can be explained by differences between the two populations in their motivation for fertility control or their propensity to try modern contraceptives. It is also a factor of the logistic feasibility of service provision in the two areas. PRODEF experienced serious problems in keeping the rural home visitors continuously in the field, since their work was dependent on use of the sole project vehicle. By contrast, the urban home visitors operated without this constraint.

To the surprise of the project directors, the impact of outreach work (above and beyond what was obtained simply by stocking service outlets with contraceptives) was relatively small. In both the urban and rural areas, the prevalence in the areas that received outreach was only 2–3 percentage points higher than (and not significantly different from) that in the areas that received no outreach.

One possible reason for the fact that the outreach program had relatively little additional impact is that there was probably a small group of women already motivated to use modern methods who took advantage of the program as soon as contraceptives became available at low cost. While the motivational efforts of the outreach workers were undoubtedly helpful to some women, these may not have been necessary to persuade the group already predisposed to using contraceptives. Rather, simple access was sufficient to increase method use among the women in this group. In short, the PRODEF project

may have “skimmed off the cream” in its initial efforts; the evaluation that will be done five years after project implementation will indicate whether prevalence levels continue to increase as a result of simple access to contraceptive supplies.

Given that the outreach program was more expensive—both in absolute terms and in cost per couple-months of protection—the following recommendation emerges from these findings. If this project were to be replicated in other areas of Zaire (assuming somewhat comparable social, demographic and cultural conditions), the stocking of outlets, accompanied by outreach, is recommended if the program operates in an urban area, where it is not necessary to provide transportation to the home visitors; if a main objective of the project is to increase contraceptive prevalence to the greatest extent possible; and if the cost of paying home visitors and the slight additional cost per couple-month of protection is not a concern.

In contrast, the simple stocking of outlets, accompanied by no outreach activities, is recommended if the program operates in a rural area, especially if transportation is likely to present a problem; if it is important to keep costs as low as possible; and if the funding agency or project administrators are willing to sacrifice some gain in contraceptive prevalence to keep costs low.

The PRODEF project was developed as a possible model for the delivery of family planning services in other areas of Sub-Saharan Africa. Within Bas Zaire, the project continues, although home visiting has been eliminated from its second phase. Moreover, the project has been expanded to a second site in Bas Zaire (the zone of Sona Bata).

If this project were to be replicated elsewhere with the research component, we strongly recommend that it be designed to have a control group (technically, a comparison area). A major shortcoming of the design of the PRODEF project in its original phase was the absence of a control group against which to measure the extent of change in the treatment zones. The decision to have all members of the target population in some type of treatment group was made in order to give a maximum number of people access to family planning services. Although this decision was preferable from the point of view of service provision, it was not optimal in regard to evaluating the project's impact.

This shortcoming is probably less serious in the context of Bas Zaire in the period from 1981 to 1983 than might have been the case in other countries. During this period, there was little other family planning activity in Bas Zaire that could have brought about these changes. While the effect of other factors,

such as changes in social and economic conditions, is unknown, informal observation would suggest that conditions have remained fairly constant over this period, despite a large devaluation of the Zairian currency in September 1983.

In summary, the PRODEF project demonstrates the feasibility of community-based distribution (including household distribution) in a francophone Sub-Saharan country. It also indicates the potential receptivity of the target population to the use of modern methods as a replacement for traditional ones and underscores the importance of accessibility in the adoption of family planning.

Appendix

The inputs into the project were measured according to the concept of opportunity costs,* which refers to a method of valuing resources in terms of what must be given up in alternative uses of resources in order to provide the services in the program.¹⁷ When a resource is traded openly and freely in a properly working market, the market price can be used as the value of the resource. In this analysis, two types of costs were included—the actual costs incurred in implementing the project, and the estimated cost of resources donated to the project (specifically, contraceptives donated by another agency), which is known as “shadow pricing.”

Every cost item for the project was coded on the basis of eight different variables: The location where the expense was incurred,† the date that the expense was incurred, the date that the expenditure was paid, the type of project activity‡ (research, service, administration, etc.), the description of the expense (salary, per diem, fuel, etc.), the type of service-related activity involved, the region and the treatment zone.

The cost data for expenses actually in-

*We measured the private opportunity cost to the funding agency, not the social opportunity cost to Zaire.

†Costs here were divided in three ways: Incurred in Zaire, incurred in the United States for items essential for replication of the project and incurred in the United States for technical assistance. Although the project could be replicated without external technical assistance, this could not be done without other items purchased in the United States, such as drugs, equipment, a vehicle, etc. Thus, this type of categorization permits us to distinguish between costs that could be eliminated in future replication and those that could not.

‡In some cases, this allocation was clear-cut, as in, for example, home visitor salaries, which were allocated to service provision. However, in other cases the allocation was unclear, since the item was used for more than one purpose, such as was the case with the project vehicle. When this occurred, the cost was split across the various activities. Using this procedure allowed us to separate out research-related costs that would be eliminated if only the service delivery part of the project was being replicated.

curred were obtained from financial ledgers maintained in the United States and monthly vouchers of expenses incurred in Zaire. (These tend to be complete, since only those costs listed on the vouchers were subsequently reimbursed.) All costs were recorded in nominal U.S. dollars (the actual cost of the item at the time it was purchased, without adjustment for inflation). Expenditures in Zaire were converted to U.S. dollars at the exchange rate prevailing at the time the expense was paid. Costs are left in nominal terms in this study, given the relatively short time period involved, the focus on the cost to the funding agency of replicating the project at current prices and the even shorter period during which the two approaches can be validly compared (a 12-month period between October 1982 and September 1983).

One problem common to this type of analysis involves joint inputs that produce several different outputs—e.g., the volume of contraceptives sold and the volume of drugs sold for children under age five. While the provision of drugs for children under five constituted an important part of the rural program and represented a considerable expense, it is viewed as enhancing the acceptability of the main program (family planning) in this analysis. As such, it does not enter into the measurement of output, but may alter the “quality” of the couple-months of protection, the output being provided.

Another problem involves joint inputs that provide a common type of output under alternative approaches (e.g., the salary of the directors in a project, such as PRODEF, that uses two approaches to service delivery). In such cases (which are very frequent), a given cost must be split and allocated appropriately to the two or more categories in question.¹⁸ (A detailed description of the allocation of joint costs in this study is available.¹⁹)

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Resumen

En el Bajo Zaire un proyecto de investigación de operaciones midió el efecto y la eficacia en función de los costos de dos estrategias para facilitar servicios de planificación familiar:

una, consistente en suministrar anticonceptivos a distribuidores de la comunidad y emprender un programa de divulgación amplia, y otra consistente en abastecer a esas fuentes pero sin actividades de divulgación. Antes de que comenzara el proyecto, sólo alrededor del 4-5 por ciento de las mujeres urbanas y del 2-5 por ciento de las rurales de 15-44 años que se encontraban viviendo en unión consensual estaban utilizando métodos anticonceptivos modernos. En un plazo de dos años esa proporción se había elevado del 10 al 19 por ciento en cuatro zonas de estudio. Sin embargo decreció la utilización de métodos tradicionales, lo que indica que muchas mujeres sustituyeron éstos con los modernos. La prevalencia en las zonas que recibieron servicios de divulgación fue de sólo 2-3 puntos porcentuales más alta que en las que no tuvieron esos servicios. El análisis de la eficacia en función de los costos muestra que el costo de proporcionar a una pareja un mes de protección anticonceptiva fue más elevado en las zonas rurales que en las urbanas. Además, el costo de protección por mes-pareja fue ligeramente más alto al incluir los servicios de divulgación.

Résumé

Un projet de recherche au Bas Zaire a mesuré deux stratégies de diffusion de services de planification familiale selon leur impact et leur efficacité en termes de sommes dépensées. La première stratégie s'engageait à fournir des contraceptifs aux dispensaires de soins de santé et aux centres de distribution d'entreprendre un programme d'éducation et de diffusion d'information. La deuxième stratégie n'impliquait que l'approvisionnement des centres de distribution.

Avant le début du projet, parmi les femmes en union âgées de 15 à 44 ans, il n'y avait que 4 à 5 pour cent parmi celles qui habitaient les zones urbaines et 2 à 5 pour cent des femmes des zones rurales utilisaient des méthodes modernes de contraception. En deux ans cette proportion est montée à 10 à 19 pour cent. Le niveau d'usage de méthodes traditionnelles a baissé, ce qui suggère qu'un grand nombre de femmes avait substitué des méthodes modernes aux dépens des méthodes traditionnelles. Néanmoins, dans les zones de diffusion des programmes d'éducation, le taux d'utilisation de méthodes modernes n'avait augmenté que de 2-3 points au dessus du niveau des zones qui n'avaient pas été l'objet d'un effort d'éducation. Le coût d'un mois de protection contraceptive fourni à un seul couple était plus élevé dans les zones rurales que dans les zones urbaines. De plus, le coût était légèrement supérieur pour le projet qui comprenait le programme d'éducation.