

# The Impact of a Regional Family Planning Service Promotion Initiative in Sub-Saharan Africa: Evidence From Cameroon

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**Context:** *Sub-Saharan Africa has a considerable unmet need for contraception. In 1998–1999, the Gold Circle campaign—a regional initiative to promote and improve family planning service delivery sites—was launched in Cameroon.*

**Methods:** *During the last quarter of 1999, 571 women who had been interviewed during the 1998 Cameroon Demographic and Health Survey were reinterviewed regarding their exposure to the Gold Circle campaign and their perceptions on and use of contraceptives. The impact of the campaign was evaluated by assessing the panel data and by using an ideation model of behavior change. In addition, service statistics from Gold Circle and non-Gold Circle family planning delivery sites were contrasted to assess the effects of the campaign on clinic performance.*

**Results:** *More than one-third of the women surveyed reported exposure to the Gold Circle campaign, 52% of whom mentioned being exposed to the campaign through television. Those with primary or postprimary education were four and six times as likely, respectively, as those with no education to have been exposed to the campaign. Exposure was associated with a significant increase in the level of family planning ideation, as well as with an increased likelihood of using a modern contraceptive method (80%). The service statistics indicate that the campaign led to a significant increase in the demand for family planning services at Gold Circle clinics, with the number of new clients more than doubling immediately after the campaign launch.*

**Conclusions:** *The Gold Circle campaign had appreciable success in promoting family planning in Cameroon. The campaign had a considerable positive influence on both family planning ideation and contraceptive use.*

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Although there is some evidence that contraceptive use in Sub-Saharan Africa has increased in recent years, the region is still characterized by high levels of fertility and by considerable unmet need for contraception. In response, the U.S. Agency for International Development (USAID) initiated a regional reproductive and child health project in 1995. The project, Santé Familiale et Prévention du SIDA (SFPS), is currently being implemented in four French-speaking countries in the subregion: Burkina Faso, Cameroon, Côte d'Ivoire and Togo. Overall, the SFPS project seeks to contribute to the establishment and maintenance of quality reproductive health services in the target countries.\*

As part of its quality improvement efforts, in 1998–1999 SFPS implemented the first phase of a family planning quality-promotion initiative. Called Gold Circle

(GO), the initiative was designed and implemented with technical assistance from the Johns Hopkins University Center for Communication Programs. It sought to reward and promote family planning quality improvements in the four target countries. Through a certification process and by using a quality-of-care diagnostic tool to determine the current quality level of services provided, 10 or more SFPS sites were selected and designated as GO sites in each country. This article documents the impact of the campaign in Cameroon, using results of a panel study supplemented with service statistics.

Cameroon, located in Central Africa, has a population of approximately 15.4 million people, 44% of whom are younger than 15.<sup>1</sup> Fertility is high, with a total fertility rate of approximately 5.2 lifetime births per woman. A 1998 census of health facilities in the country identified 1,471 health facilities, ranging from hospitals to health centers, about three-quarters of which were public. In addition, there were some 230 registered pharmacies.<sup>2</sup>

Although family planning services are available in most of these health facilities, the contraceptive prevalence rate is only 8% for modern methods and 24% for all

methods.<sup>3</sup> Pharmacies and public hospitals are the predominant sources of contraceptives, while kiosks and other commercial outlets are also important sources.<sup>4</sup> There is evidence that the quality of services in the family planning clinics is very poor.<sup>5</sup> For example, most public family planning clinics are characterized by long waiting times, poor client-provider interactions, a lack of necessary supplies and equipment, and incompetent personnel.

## The GO Intervention

A series of preintervention focus-group discussions provided formative information for the design of the GO campaign. In each target country, SFPS conducted focus groups among male and female users of contraceptives, among nonusers and among service providers, to determine their expectations on the quality of family planning services and to document their perceptions about the family planning services available in the community. In addition, the study examined providers' perceptions about the needs and desires of their clients, their understanding of what constituted quality service and their perceptions about the importance of quality in service delivery. Findings from the focus-group discussions revealed that from the clients' perspective, six criteria were important determinants of quality service: having good client-provider interactions; having a competent provider; obtaining affordable services; waiting a reasonable amount of time; having one's

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\*Four U.S.-based institutions—Tulane University (for operations research), JHPIEGO Corporation (for training and service delivery), Population Services International (for social marketing) and the Johns Hopkins University Center for Communication Programs (JHU/CCP) (for behavior change communication)—work with more than 40 African regional institutions to achieve project goals and objectives.

service needs met; and having a variety of medications and contraceptive methods available.

Drawing upon the results of the formative research, the GO initiative consisted of a two-pronged strategy that focused on service delivery improvements (the supply side) and the promotion of these improvements (the demand side). On the supply side, the campaign attempted to increase the availability of family planning methods and to improve clinic management, client-provider interactions and infection prevention practices. On the demand side, the GO campaign strove to promote sites where quality services could be obtained. The campaign used mass media and community activities that specifically sought to empower clients and the community to expect and demand certain quality standards from clinics and providers. It also provided visibility for sites where services were available, created a demand for family planning services and increased utilization of existing service delivery sites.

The main features of the campaign were mass-media coverage (including television and radio jingles), print materials (including posters, a comic strip and a logo featuring a smiling provider inside a gold circle), a Gold Circle advocacy tool and community mobilization activities. Campaign messages promoted GO clinics as quality clinics that offer a variety of contraceptive methods, shorter waiting times, and listening and caring providers. In addition to specifically promoting GO sites, the messages encouraged the audience to visit the family planning clinic nearest to them.

Community participation was a unique aspect of the GO strategy. A team of providers and community representatives formed GO committees, which worked together to plan and implement their local campaign. These teams established a dialogue between the providers and the community, which gave community members a sense of ownership and helped empower them to demand that clinic improvements be maintained. The site-based launch typically lasted 2–5 days and included a formal ceremony presided over by a senior government official. The launch activities included concerts, football matches, traditional dances, speeches by various key community members and government officials, home visits and health talks by service providers. At varying intervals subsequent to the launch, service providers and other members of the GO committee organized community-

based activities to further sensitize the population.

In Cameroon, the campaign was launched nationally in May 1999. The national television station and two radio stations (one of which has national coverage) broadcast campaign messages for a period of three months. Each participating radio station aired the messages at least three times a day, while the national television broadcast the messages three times a week.

## Data and Methods

The data analyzed in this article are derived from two main sources: a follow-up survey of the 1998 Demographic and Health Survey (DHS) and SFPS site statistics collected between October 1998 and November 1999.

### Panel Data

A household survey (subsequently referred to as the follow-up) based on a panel design was conducted in December 1999 in eight provinces of Cameroon: Adamaoua, Centre, Extreme Nord, Littoral, Nord, Nord-Ouest, Ouest and Sud-Ouest. Covering 42 clusters, the follow-up survey involved identifying and interviewing all women of reproductive age in households surveyed during the 1998 DHS. The survey clusters were selected from among the DHS clusters in such a way as to have a representation within as well as outside the coverage area of GO.\*

Most questions in the follow-up were similar to those included in the 1998 DHS. In addition, the questionnaire included items that sought to assess exposure to the GO campaign. A total of 1,367 women were interviewed in the selected clusters during the DHS. During the follow-up survey, 1,150 women were successfully interviewed. Of these, 571 had been previously interviewed; thus, 42% of the women in the initial DHS sample were effectively reinterviewed during the follow-up between 18 and 22 months later.

Many baseline respondents could not be reinterviewed because they were no longer at their place of residence or because they refused to further participate in the survey. Such a high rate of loss to follow-up raises concerns about the in-

**Table 1. Mean values and percentages of study participants, by selected characteristics, according to interview status, Cameroon, 1998–1999**

Characteristic	Followed up (N=571)	Lost to follow up (N=796)	t- (or z-) statistic	p
Mean age (in years)	27.4	27.0	0.874	.382
% residing in rural area	9.5	10.0	-0.363	.716
Mean no. of years of education	7.1	7.3	-0.809	.419
Mean no. of children ever born*	2.7	2.2	3.352	.001
% single*	28.2	34.2	-2.334	.019
% exposed to family planning information on the media during last 12 months	56.4	52.8	1.328	.184
% who knew four or more modern contraceptive methods*	72.8	67.3	2.188	.029
% currently using any contraceptive method	37.1	36.0	0.406	.685
% currently using a modern contraceptive method	15.6	12.3	1.738	.082

\*Difference of means or percentages between groups is statistically significant at  $p=.05$ .

ferences that can be drawn from the survey data. Fortunately, using the 1998 DHS data, it is possible to compare the pertinent characteristics of the women who were followed up and those who were lost to the follow-up.

Table 1 shows that the women who were followed up are comparable to those who were not in terms of age, place of residence, education and exposure to family planning information. However, there are significant differences in parity, marital status and knowledge of modern methods. Moreover, although the difference in use of modern contraceptive between the two groups is not statistically significant, it does tend towards significance. The implications of this potential bias for the findings will be discussed later.

The panel data are an especially potent tool for assessing attitudinal and behavioral change at the individual level, since they provide relevant information on the same individual at different points in time. In this regard, they are particularly useful in addressing the issues of selectivity bias and reciprocal causation. Selectivity bias can cast a shadow on the evaluation of a communication program's impact, since it can be difficult to know which came first: the communication program, or the positive attitudes and behaviors that the communication program seeks to promote.<sup>6</sup> To test for the existence of possible selectivity bias in the data, we included indicators of prior family planning-related attitudes and behavior as independent variables in the model used to estimate exposure. Furthermore, to control for the possible effects

\*For the purpose of the sampling, living within the coverage area of a site was defined as residing within 15 kilometers of the site.

**Table 2. Percentage distribution of study participants and odds ratios showing likelihood of exposure to GO campaign, by social or demographic variable and prior family planning attitudes and practices**

Variable	%	Odds ratio	z
<b>SOCIAL/DEMOGRAPHIC CHARACTERISTICS</b>			
<b>Education</b>			
None (ref)	18.2	1.00	na
Primary	25.9	4.20***	3.099
≥secondary	55.9	5.82***	3.560
<b>Religion</b>			
Christian	77.1	0.53	-1.923
Non-Christian (ref)	22.9	1.00	na
<b>Region of residence</b>			
Southwest (ref)	18.6	1.00	na
North	27.1	1.60	1.292
West/Littoral	19.3	1.18	0.517
Center	35.0	2.12**	2.589
<b>Age-group</b>			
<25 years (ref)	41.3	1.00	na
25–34	28.9	0.77	-1.086
≥35	29.8	0.57*	-2.075
<b>Residence status</b>			
City/large town	53.1	1.20	-0.871
Small town/village (ref)	46.9	1.00	na
<b>Access to mass media</b>			
No. of communication media	1.15	1.44***	3.496
<b>PRIOR IDEATION &amp; CONTRACEPTIVE USE, 1998</b>			
<b>Prior contraceptive use</b>			
Modern	15.6	1.70	1.526
Traditional	22.2	1.33	0.883
None, intending to use modern	32.0	1.55	1.518
None, not intending to use modern (ref)	30.2	1.00	na
<b>Prior overall ideation</b>			
Mean score	2.31	1.11	1.208
<i>Pseudo-R<sup>2</sup></i>	13.99		
<i>Hosmer-Lemeshow <math>\chi^2</math>/prob.</i>	4.53/0.605		
<i>% correctly classified</i>	68.3		
<i>N</i>	571		

\*p≤.05. \*\*p≤.01. \*\*\*p≤.001. Notes: ref=reference group. na=not applicable.

of selectivity bias, prior values of family planning-related attitudes and behavior are included in the models estimating ideation and contraceptive use.

**Service Statistics**

The other data source used here is the SFPS service statistics from October 1998 to November 1999. The SFPS project helped develop a system for collecting and compiling family planning-related service statistics in project sites. While the quality of data is not uniform for all sites, most statistics reported are of relatively good quality. Using the interrupted time-series analytic method, which shows the change in the trend in the number of new clients before and after the campaign launch, we analyzed the service statistics to document

the effect of the GO launch on clinic performance in terms of the number of new clients.

**Analytic Framework**

The classical demographic transition theory emphasized the role of socioeconomic changes in the decline of fertility.<sup>7</sup> This theory attributed fertility decline to decreasing parental demand for children resulting from urbanization, industrialization and other structural economic changes; however, recent analyses of historical and contemporary fertility declines have challenged the claim that socioeconomic change precedes fertility decline.<sup>8</sup> Several Asian and Latin American countries (Bangladesh and Haiti, for example) that have recently experienced substantial declines in fertility also have low levels of industrialization and urbanization.<sup>9</sup> Indeed, empirical evidence from a variety of historical and geographic settings point to the fact that fertility change is a complex procedure, which is unexplainable by any simple set of social and economic parameters.<sup>10</sup>

More recent explanations of fertility decline have emphasized the importance of ideational change.<sup>11</sup> Ideational change refers to a shift in thinking and the diffusion of that new thinking through forces operating at the community level. The ideation model of fertility transition attributes fertility decline to the diffusion of new ideas and practices and emphasizes the role of communication in fertility-behavior change. There is an increasing body of literature proposing that communication has a significant impact on contraceptive behavior.<sup>12</sup>

The ideation model that we employ to assess the effects of the GO campaign is a predictive model derived from the diffusion of innovation theory;<sup>13</sup> however, unlike the diffusion of innovation model, which is basically a stage model, the ideation model recognizes that behavior change is influenced by a number of cognitive, emotional and social interaction variables operating synergistically. The model further posits that ideation is influenced by communication and that it depends on social and demographic variables such as education, religion, age, parity and place of residence.

Five factors representing the cognitive and social interactive aspects of ideation provide the basis for our analyses of the effects of the GO communication campaign on contraceptive use. These factors include knowledge of contraceptive methods, attitudes toward the practice of contracep-

**Table 3. Mean value or percentage of respondents reporting particular behavior, by baseline and follow-up values and percentage change, according to exposure to GO campaign (N=571)**

Variable	Total	Exposed	Not exposed
<b>Overall ideation score</b>			
Baseline	2.31	2.66	2.11
Follow-up	2.59	3.16	2.27
% change	12.1	18.4	7.5
t	4.606	4.757	2.131
p	.0001	.0001	.0338
<b>Mean no. of modern methods known</b>			
Baseline	4.72	5.18	4.45
Follow-up	4.74	5.70	4.18
% change	0.4	10.0	-5.8
t	0.284	4.042	-2.63
p	.776	.0001	.009
<b>% who approved of family planning</b>			
Baseline	70.7	80.0	65.4
Follow-up	72.8	85.7	65.4
% change	3.0	7.1	0.0
z	0.789	1.554	0.000
p	.430	.120	1.000
<b>% who discussed family planning with spouse or partner</b>			
Baseline	32.7	41.9	27.4
Follow-up	45.2	52.8	40.7
% change	38.2	26.5	48.5
z	4.308	2.248	3.789
p	.0001	.0246	.0002
<b>% who discussed family planning with others</b>			
Baseline	29.1	35.7	25.2
Follow-up	32.4	43.8	25.7
% change	11.3	22.7	2.0
z	1.219	1.695	0.171
p	.223	.090	.864
<b>% whose spouse or partner approves of family planning</b>			
Baseline	26.0	28.6	24.9
Follow-up	37.6	45.2	33.2
% change	43.8	58.0	33.3
z	4.125	3.539	2.458
p	.0001	.0004	.014

tion, discussion of family planning with peers, discussion of family planning with a spouse or partner, and the attitude of a spouse or partner toward family planning. In applying the ideation model, we are implicitly positing that communication influences contraceptive use not only directly, but also indirectly through ideation.

We obtained a measure of overall ideation by combining the five ideational variables. The variables were treated as categorical variables, taking on the value of 1 if the criterion is met and 0 if not. The resulting overall ideation score was simply the sum of these individual items. The internal reliability was measured by Cronbach's alpha (0.66 at the baseline and 0.74 at follow-up).

We start the analysis of the impact of campaign exposure by examining the changes in ideation between the baseline and the follow-up, while highlighting the role played by campaign exposure in the

observed change. To assess the independent effects of campaign exposure, we estimated static score or conditional change models with ideation and contraceptive use as the dependent variables.<sup>14</sup> The model predicting ideation related the dependent variables to campaign exposure, prior contraceptive use, prior ideation and selected social and demographic variables. In the case of contraceptive use, we related the dependent variable to campaign exposure, prior contraceptive use, current ideation and selected social and demographic variables. The inclusion of the lagged or initial value of contraceptive use is what makes the model a conditional change model, and in essence allows us to assess the effect of campaign exposure on the change in contraceptive use.

Much has been said about the advantage of the conditional change model over other methods of modeling change with panel data.<sup>15</sup> It is logical to assume that the previous value of a dependent variable is correlated with its current value. Therefore, by excluding the former from a model estimating the latter, one runs the risk of improper model specification, which may result in incorrect estimation of the effects of the independent variables included in the model.

Another justification for the conditional change model relates to the possible significant effects of extraneous variables. Since it is very likely that the same variables influence the value of a dependent variable at two points in time, the prior value should serve as a proxy for the extraneous variables that exert an influence on the dependent variable but that were omitted from the estimated model.

We use the Bollen endogeneity test to assess the extent to which campaign exposure and ideation are endogenous in the model predicting contraceptive use.<sup>16</sup> The test involves a two-step procedure, which in the first step predicts campaign exposure and ideation from a set of independent variables theoretically susceptible to influencing them. In the second step, the error terms from the equations estimated in the first step are included along with the observed values in a model predicting contraceptive use. To ensure that the model is properly identified, we excluded marital status (a variable that affects ideation) and access to media (a variable linked with campaign exposure) from the models used to predict contraceptive use.

\*Campaign exposure in this context is defined as either being able to recognize the GO logo or having heard about the campaign prior to the day of interview.

## Results

More than one-third (37%) of the respondents reported exposure to the campaign.\* Television was the predominant source for information on the campaign, with more than half (52%) of the sample mentioning being exposed to the campaign through television. Almost two-fifths (38%) mentioned exposure through interpersonal discussions or community mobilization activities, such as friends, relations, health workers and community meetings. Radio was the source of exposure for 29% of the respondents.

The results of a logistic regression analysis that identifies predictors of campaign exposure are presented in Table 2. Education, access to mass media, region of residence and age are all factors that have significant net effects on exposure. The odds of exposure are four times as high among respondents with primary education as among those with no education (odds ratio, 4.2). The effect of postprimary education is even more striking, with respondents with secondary education or more being nearly six times as likely as those without education to be exposed to the campaign (5.8). The Hosmer-Lemeshow goodness-of-fit statistic indicates that the specified model fits the data reasonably well (4.53). Moreover, the model correctly classifies 68% of the cases.

The data failed to show any significant link between prior attitudes or behavior (as reported during the 1998 DHS) and exposure to the campaign (Table 2). Indeed, neither prior ideation nor prior use of traditional methods is significantly associated with exposure to the campaign. Similarly, neither prior use of modern methods nor

**Table 4. Percentage distribution of study participants and regression coefficients estimating the impact of campaign exposure, selected characteristics and prior family planning related attitudes and practices on ideation (N=571)**

Independent variable	% dist.	Model 1†	Model 2‡
<b>SOCIAL/DEMOGRAPHIC CHARACTERISTICS</b>			
<b>Education</b>			
None (ref)	18.2	0.00	0.00
Primary	25.9	0.74***	0.49*
≥secondary	55.9	1.24***	0.83**
<b>Religion</b>			
Christian	77.1	0.15	0.24
Non-Christian (ref)	22.9	0.00	0.00
<b>Region of residence</b>			
Southwest (ref)	18.6	0.00	0.00
North	27.1	-0.53**	-0.66***
West/Littoral	19.3	-0.47**	-0.50**
Center	35.0	-0.45**	-0.65***
<b>Age-group</b>			
<25 years (ref)	41.3	0.00	0.00
25-34	28.9	0.06	0.15
≥35	29.8	0.01	0.15
<b>Residence status</b>			
City/large town	53.1	-0.06	-0.07
Small town/village (ref)	46.9	0.00	0.00
<b>Marital status</b>			
Single	24.2	-0.78***	-0.74***
Ever-married (ref)	75.8	0.00	0.00
<b>Visited health facility within last 12 months</b>			
Yes	73.2	0.33**	0.35**
No (ref)	26.8	0.00	0.00
<b>Exposure to other family planning interventions</b>			
Yes	36.1	0.38***	0.38***
No (ref)	63.9	0.00	0.00
<b>PRIOR ATTITUDES AND PRACTICES, 1998</b>			
<b>Prior contraceptive use</b>			
Modern	15.6	0.67***	0.53**
Traditional	22.2	0.62***	0.54**
None, intending to use modern	32.0	0.44**	0.32*
None, not intending to use modern (ref)	30.2	0.00	0.00
<b>Prior overall ideation</b>			
Mean score	2.31	0.27***	0.23***
<b>PROGRAM EXPOSURE</b>			
<b>Exposed to campaign</b>			
Yes	36.8	0.27**	na
No (ref)	65.2	0.00	na
Predicted campaign exposure	na	na	1.46*
R <sup>2</sup>	na	.511	.510
Ramsey regression specification error test (RESET) F/Prob>F	na	0.76/0.516	0.33/0.806
Mean variance inflation factor	na	1.99	2.84

\*p≤.05. \*\*p≤.01. \*\*\*p≤.001. †Model assumes that campaign exposure is exogenous. ‡Estimated error term from campaign exposure regression is used to test for exogeneity. Notes: ref=reference group. na=not applicable.

prior intention to use a modern method is a significant predictor of exposure.

### Exposure and Ideation

Women who were exposed to the GO campaign had greater increases in ideation (18%) than those not exposed (8%, Table 3). The effects of the campaign varied depending on the ideational variable being considered. Knowledge of modern contraceptive methods was the

**Table 5. Percentage of women using modern contraceptives at Waves 1 and 2, and percentage change between waves, by campaign exposure status.**

Variable	Total (N=571)	Exposed (N=210)	Not exposed (N=361)
Wave 1 (1998)	15.6	19.5	13.3
Wave 2 (1999)	18.7	27.1	13.8
% change	20.2	39.0	3.7
z-statistic	1.413	1.846	0.217
p	.0789	.0325	.4140

ideational factor most positively influenced by campaign exposure, with a 10% increase among women with exposure and a 6% decrease among those without. Spousal communication (38%) and spousal approval of contraception (44%) improved significantly, independent of exposure to the campaign.

In Table 4 (page 189), we adjusted for the confounding influence of other variables in a multiple regression model. The model in which campaign exposure was assumed to be exogenous (Model 1) accounted for 51% of the variance in ideation. Moreover, Model 1 did not show any evidence of omitted variables, as indicated by the Ramsey statistics.\* Since the mean variance inflation factor is not considerably greater than 1.0, there is no

\*The Ramsey statistics are produced by STATA and test for omitted variables in a model. A significant Ramsey statistic (F-value) indicates that the model has omitted important variables.

†The issue of proper identification is critical in a model of this type. The rule of thumb in ensuring proper identification is to have as many instrumental variables (variables without direct paths to the dependent variable in focus) as there are variables in reciprocal relationships in the model. To ensure proper model identification, we excluded access to media from the equation predicting ideation, and we excluded marital status from the equation used to estimate campaign exposure.

‡The inclusion of both current ideation and campaign exposure in the equation estimating contraceptive use is based on the premise that the campaign has both direct and indirect (through ideation) influence on contraceptive use. The specified model, in essence, estimates the residual effects of campaign exposure on contraceptive use irrespective of its indirect effects through ideation. Since ideation is a strong determinant of contraceptive use, excluding it from the equation estimating contraceptive use would lead to incorrect estimation of the effects of predictors in the equation. Given the fact that ideation and the campaign are closely related, one potential problem with including both in the same equation is that of multicollinearity. In the regression literature, there are a number of ways to detect the presence of multicollinearity in a model (see reference 17). One method consists of running a factor analysis of the predictor variables and then calculating the square root of the ratio of the largest eigenvalue to the smallest eigenvalue (condition number). A condition number higher than 30 suggests multicollinearity. In the estimated model the condition number is only 10. In sum, there is no evidence that multicollinearity is a threat in the estimated model.

strong evidence of multicollinearity among the independent variables.

Prior ideation and prior contraceptive use are strongly correlated with current ideation. Each unit increase in the level of prior ideation is associated with a 0.27 point increase in current ideation. Similarly, prior use of a traditional or modern contraceptive method and prior intention to use a modern contraceptive method are both positively associated with increased current ideation.

On average, the overall ideation score was 0.74 points higher among women with a primary education and 1.24 points higher among those with a postprimary education than among those without a formal education. Single women had a lower ideation score (-0.78) than those who were ever-married, but age had no noticeable influence. Compared with the women in other study regions, women in the Southwest had significantly higher ideation scores.

Use of a health facility during the last 12 months and exposure to other family planning messages in the media had strong positive effects on ideation, with scores 0.33 and 0.38 points higher, respectively, than for nonuse of a health facility or lack of exposure to other media messages. Finally, even though all of these variables had varying degrees of effects on ideation, exposure to the GO campaign maintained a strong positive influence on ideation (0.3).

Since ideation and campaign exposure were determined within the same time period, the direction of causation between the two variables should not be taken for granted. It is possible that the relationship between the two variables is reciprocal. It is also possible that there is an overlap between the sets of variables that affect ideation and campaign exposure. Under these conditions, campaign exposure cannot be assumed to be exogenous in the model predicting ideation, as we have done in the model reported above.

If campaign exposure is endogenous to ideation, the basic regression assumption concerning no correlation between the independent variables and the error term in the equation predicting the dependent variable is violated, and the estimated parameters would be biased and inconsistent.<sup>17</sup> However, given the high level of variance explained (49%), it is easy to argue that endogeneity is not a serious threat in this case.

Moreover, it can be assumed that the unobservables affecting current ideation were similar for prior ideation. Therefore,

to some extent, the inclusion of prior ideation in the estimated model helps to control for possible endogeneity in the data. Notwithstanding this, we estimated another model that explicitly controlled for endogeneity.<sup>18</sup> In this model (Model 2), the predicted value of campaign exposure was included in place of the observed value. The effect of the predicted variable, which is purged of all extraneous influences, is significant, indicating that the campaign has a causal effect on ideation.<sup>†</sup>

### **Change in Modern Contraceptive Use**

Contraceptive prevalence for all women increased by 20% between the baseline and the follow-up (Table 5). While the prevalence of contraceptive use increased slightly among women who were not exposed to the campaign (4%), among those who were exposed there was a considerable and significant increase (39%). Women who were exposed to the campaign contributed the large majority (89%) of the overall increase in contraceptive use (not shown).

We also gauged the effects of the campaign on contraceptive use by analyzing the women's change in contraceptive status between the two surveys. Thirteen percent of the women not using a modern method in the DHS were doing so by the follow-up. More importantly, the proportion of women who started using a modern contraceptive method since the DHS baseline was almost three times as high among women exposed to the campaign (23%) as among those who were not exposed (8%).

Results of the conditional change model are reported in Table 6. Two different models were estimated: one with current overall ideation (Model 1) and the other with individual elements of current ideation (Model 2).<sup>‡</sup> Each of the models explains approximately 20% of the variance in modern contraceptive use.

The single most significant correlate of modern contraceptive use was prior use of a modern method. Women who were previously using a modern method were almost six times as likely as previous nonusers to have been currently using a modern method in both Model 1 (odds ratio, 5.8) and in Model 2 (5.6). Although their effects were positive, neither prior use of traditional method nor prior intention to use a modern method was a significant determinant of current contraceptive use. As expected, Model 1 shows that current ideation was strongly and positively associated with modern contraceptive use (1.4), indicating that an increase of one unit

**Table 6. Percentage distribution and selected mean values of study participants by selected characteristics, and odds ratios showing likelihood of modern contraceptive use, according to model (N=571)**

Characteristic	%/mean	Odds ratio		
		Model 1†	Model 2‡	Model 3§
<b>IDEATION/PRIOR METHOD USE</b>				
<b>Prior contraceptive use</b>				
Modern	15.6	5.76***	5.58***	7.40***
Traditional	22.2	1.27	1.18	1.48
None, intending to use modern	32.0	1.49	1.46	1.83
None, not intending to use modern (ref)	30.2	1.00	1.00	1.00
<b>Current ideation</b>				
Mean	2.6	1.41***	na	1.04
Estimated error	na	na	na	1.41
<b>No. of modern methods known</b>	4.7	na	3.11**	na
<b>Approves of family planning</b>				
Yes	72.8	na	1.48	na
No (ref)	18.2	na	1.00	na
<b>Partner/spouse approves of family planning</b>				
Yes	37.6	na	1.10	na
No (ref)	62.4	na	1.00	na
<b>Discusses family planning with partner/spouse</b>				
Yes	45.2	na	1.34	na
No	54.8	na	1.00	na
<b>Discusses family planning with other people</b>				
Yes	32.4	na	1.42	na
No	67.6	na	1.00	na
<b>SOCIAL/DEMOGRAPHIC CHARACTERISTICS</b>				
<b>Education</b>				
No education (ref)	18.2	1.00	1.00	1.00
Primary	25.9	0.87	0.85	1.07
≥secondary	55.9	0.73	0.63	1.06
<b>Religion</b>				
Christian	77.1	4.11**	4.18**	4.37**
Non-Christian (ref)	22.9	1.00	1.00	1.00
<b>Region of residence</b>				
Southwest (ref)	18.6	1.00	1.00	1.00
North	27.1	0.59	0.65	0.46
West/Littoral	19.3	0.81	0.73	0.69
Center	35.0	0.82	0.84	0.67
<b>Age-group</b>				
<25 years (ref)	41.3	1.00	1.00	1.00
25–34	28.9	0.99	0.95	1.11
≥35	29.8	1.20	1.09	1.35
<b>Parity</b>				
0 (ref)	26.4	1.00	1.00	1.00
1–3	37.1	0.75	0.68	0.88
4–6	22.1	0.85	0.77	1.04
≥7	14.4	1.35	1.33	1.66
<b>Prior exposure to family planning messages</b>				
Mean no.	1.35	1.04	1.01	1.09
<b>% exposed to other messages in past 12 months</b>				
Yes	36.1	1.16	1.07	1.19
No (ref)	63.9	1.00	1.00	1.00
<b>CAMPAIGN</b>				
<b>Campaign exposure</b>				
Exposed	36.8	1.80*	1.75*	2.48
Not exposed	63.2	1.00	1.00	1.00
Estimated error from campaign exposure	na	na	na	0.89
<b>% of variance explained (pseudo-R<sup>2</sup>)</b>				
Hosmer-Lemeshow $\chi^2$ (8 groups)		20.1	21.3	20.3
p of $\chi^2$		4.58	7.44	6.14
% correctly classified		.599	.282	.407
		82.5	83.2	82.7

\*p≤.05. \*\*p≤.01. \*\*\*p≤.001. †Campaign exposure and ideation assumed exogenous; overall ideation score used. ‡Campaign exposure and ideation assumed exogenous; various components of ideation introduced individually. §Campaign exposure and ideation assumed endogenous. Notes: ref=reference group. na=not applicable.

in the score for overall ideation was associated with about a 40% increase in the odds of using a modern method.

Religion was the only social or demographic characteristic that had a considerable influence on contraceptive use. Compared with other religious affiliations, Christianity was associated with a more than fourfold increase in women's odds of modern method use (4.1–4.2). Curiously, the effect of education appears negative, although not statistically significant.

Finally, Model 1 shows that even when prior contraceptive use and current overall ideation were taken into account, having been exposed to the GO campaign had a significant positive influence on contraceptive use. Exposure to the campaign was associated with an 80% increase in the odds of using a modern method (1.8). When the ideational factors were introduced individually in Model 2, the effects of campaign exposure remained positive and significant (1.8). As can be seen from the results of Model 3, the Bollen test did not provide any statistical evidence of endogeneity.\*

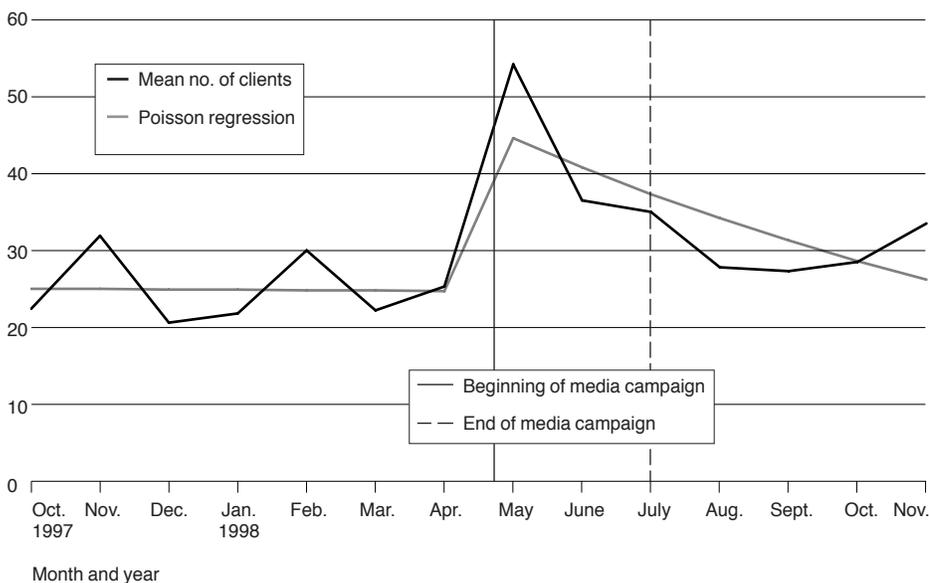
#### **Evidence from Service Statistics**

Service data from eight of the 12 GO sites provide supplementary evidence of the impact of the GO campaign. For the purpose of comparison, data from non-GO sites within the same region as the GO sites are also presented.

Figure 1 (page 192) shows the variation in the mean number of new clients per clinic in GO sites during the reference period. Obviously, the campaign launch led to a conspicuous increase in clinic performance, as measured by the number of new clients. The mean number of new clients per month increased significantly, from 25.1 for the six months preceding the launch to 34.9 for the six months following the launch ( $t=2.22$ ,  $p≤.05$ ). Much of the increase in client flow, however, occurred at the very beginning of the campaign, immediately following the onset of launch activities. The mean number of clients for May 1999 (52.4), which marked the beginning of launch activities, was more than double the figure for the previous month (25.5). The spike in client flow was promptly followed by a decline in mean number of clients; however, six months after the launch, clinic performance still

\*The test of endogeneity is the z-statistic associated with the coefficients of the error term of the endogenous variable. In the presence of endogeneity, the error term would be expected to be significant. We can therefore conclude that the results presented under models 1 and 2 adequately describe the influence of campaign exposure on contraceptive use.

**Figure 1. Mean number of clients and Poisson regression model for GO sites, Cameroon, 1998–1999**



remained above its prelaunch level.

Results of a Poisson regression analysis provide a better understanding of the relationship between the campaign and client flow. In the estimated model, the mean number of new clients is regressed on time in months, “GO campaign” (a categorical variable which takes the value of 1 if the campaign has been launched and 0 if not) and the interaction between GO campaign and time. As shown in Table 7, in GO sites, approximately 18% of the variance in the number of new clients is explained by the independent variables. Moreover, the goodness-of-fit statistics indicate that the data are not significantly different from the model.

The Poisson regression model confirms that the sharp increase in client flow accompanying the campaign launch was statistically significant. Holding the other independent variable constant, campaign launch was associated with a six-fold increase in client flow; time had no influence on client flow. In other words, had the GO campaign not taken place, the number of new clients would have remained at more or less the same level over time. In non-GO sites, although the campaign appears to have had a positive influence on client flow, the relationship was not statistically significant. (Mass media messages directed the audience to the family planning clinic nearest to them. The fact that the campaign had a considerably larger impact in GO sites points to the important role played by community mobilization activities.)

### Conclusion

This article has examined the effects of a family planning promotion campaign in Cameroon using data from household surveys as well as clinic statistics. Analyses of the household surveys focussed on women who were interviewed during the 1998 DHS and during the follow-up survey in 1999. More than one-third of the respondents reported campaign exposure, indicating that the campaign had appreciable success in terms of reach. It is not surprising that the most frequently reported source of exposure was the television, considering that the primary target for the campaign was urban residents.

The campaign had a considerable positive influence on both family planning ideation and contraceptive use. Exposure to the campaign was associated with improved contraceptive ideation. The ideational variable that appears to have been most sensitive to campaign exposure

was knowledge of modern contraceptive methods. This is not surprising, considering that all visual campaign materials contained information on specific modern methods.

Women exposed to the campaign were responsible for a disproportionately large proportion of the increase in contraceptive use. Women not practicing contraception who were exposed to the campaign were considerably more likely to begin using modern contraceptives. The net effects of the campaign on contraceptive use were significant and independent of its impact on ideation.

Furthermore, prior contraceptive use had a strong effect on current use. In other words, those who had used a modern method in the past were very likely to continue doing so in the future. This finding underscores the importance of identifying and adequately addressing all factors that are likely to impede the use of contraceptive methods for the first time.

Evidence from service statistics confirmed the significant effects of the campaign on contraceptive use. The campaign clearly resulted in immediate significant gains in clinic performance at GO sites. On the other hand, the campaign did not appear to have had any significant impact in non-GO sites. Since the mass media messages were accessible to everyone irrespective of access to a GO site, and since the messages referred the listener to visit the nearest family planning clinic, the fact that GO sites witnessed a significant increase in client flow, whereas non-GO sites did not, points to the contribution of community mobilization activities. Staged models of behavior change recognize the importance of interpersonal communication in motivating people to adopt new behaviors. While the mass media are generally effective in raising awareness about specific issues, interpersonal communication channels are particularly potent at the postknowledge stages.

**Table 7. Incidence rate ratio of mean number of new clients, by time, according to health service site**

Variable	GO sites (N=8)			Non-GO sites (N=42)		
	Rate ratio	z	95% CI	Rate ratio	z	95% CI
GO campaign launched	6.01*	2.701	1.64–22.10	1.86	0.992	0.54–6.37
Time in months	0.99	-0.052	0.93–1.07	1.04	0.686	0.94–1.15
Interaction term	0.92	-1.736	0.83–1.01	0.92	-1.151	0.80–1.06
% of variance explained/pseudo-R <sup>2</sup>	18.4			2.3		
Goodness of fit $\chi^2$	10.76			2.24		
Prob. > $\chi^2$	0.377			0.994		
df	10			10		
No. of months	14			14		

\*p<.01. Note: CI=confidence interval.

Nonetheless, the initial sharp increase in client flow in GO sites was not sustained over time, potentially an indication of weakness in the community mobilization activities. Reports from the various GO sites indicated that beyond the first few months and for a variety of logistic and other reasons, community-based activities were implemented only to a limited extent. Appropriately organized and sustained community mobilization efforts are necessary to build on and consolidate the gains achieved through the electronic media.

The GO campaign provided an opportunity to demonstrate the advantage of regional projects. Such projects allow the same promotional materials to be distributed in many countries through a variety of media, thereby helping to minimize the cost. Since the cost of producing campaign materials was shared among the four SFPS countries, the total cost of implementing the campaign in Cameroon (including materials, distribution, community events and consultants' time) was only \$36,000. Considering that 37% of an estimated 3.5 million women of reproductive age in Cameroon were reached through the campaign, the cost was only about three cents per woman reached.

One limitation of the findings presented in this article was that we were unable to follow up with a large proportion of the baseline respondents. There were some important differences between those included in the follow-up and those lost to follow-up. The fact that the women lost to follow-up were significantly more likely to be single, to have fewer children and to have lower contraceptive knowledge raises questions about the generalizability of the reported findings. Indeed, there are some indications that the reported findings may understate the impact of the campaign. For example, separate regression analyses for women who knew at least five modern methods (the median) and those who knew fewer methods revealed that the campaign had much larger effects among the latter.

Another limitation of this study is that because the required data were unavailable, we could not explicitly address the issue of the relationship between specific quality improvements in GO clinics and contraceptive use. Nonetheless, it is noteworthy that we have been able to demonstrate that the promotion of the quality improvements among the target audience is associated with increased contraceptive use.

## References

1. Population Reference Bureau, *World Population Data Sheet*, Washington, DC: Population Reference Bureau, 1999.
2. République du Cameroun, *Carte Sanitaire du Cameroun*, Yaounde, Cameroon: Ministry of Public Health, 1998, p. 5.
3. Fotso M et al., *Enquête démographique et de santé, Cameroun 1998*, Calverton, MD, USA: Bureau Central des Recensements et des Etudes de Population et Macro International Inc., 1999, p. 69.
4. Ibid.
5. Traoré-Serie R and Aghi AB, *La Qualité des Services en Afrique de l'Ouest et du Centre-Burkina Faso, Cameroun, Côte d'Ivoire, Togo: Rapport Final*, Abidjan, Côte d'Ivoire: Santé Familiale et Prévention du SIDA, 1999.
6. Piotrow PT et al., *Health Communication: Lessons From Family Planning and Reproductive Health*, Westport, CT, USA: Praeger, 1997.
7. Thompson WS, *Population Problems*, New York: McGraw-Hill, 1930; Notestein F, Population: the long view, in: Schulz TW, ed., *Food for the World*, Chicago, IL, USA: Chicago University Press, 1945, pp. 36-57; and Easterlin RA, The economics and sociology of fertility: a synthesis, in: Tilly C, ed., *Historical Studies of Changing Fertility*, Princeton, NJ, USA: Princeton University Press, 1978, pp. 57-133.
8. Cleland J, Marital fertility decline in developing countries: theories and evidence, in: Cleland J and Hobcraft J, eds., *Reproductive Change in Developing Countries: Insights from the World Fertility Surveys*, Oxford, UK: Oxford University Press, 1985, pp. 223-252; Coale AJ and Watkins SC, eds., *The Decline of Fertility in Europe*, Princeton, NJ, USA: Princeton University Press, 1986; and McDonald P, Fertility transition hypothesis, in: Leete R and Alam I, eds., *The Revolution in Asian Fertility: Dimensions, Causes, and Implications*, Oxford, UK: Clarendon Press, 1993, pp. 3-14.
9. Mason KO, Explaining fertility transition, *Demography*, 1997, 34(4):443-454; Amin S et al., *Socio-economic Change and the Demand for Children in Rural Bangladesh*, Research Division Working Papers, New York: The Population Council, 1995, No. 70; and Zavala de Cosío ME, The demographic transition in Latin America and Europe, in: Guzman JM et al., eds., *The Fertility Transition in Latin America*, Oxford, UK: Clarendon Press, 1996, pp. 95-109.
10. Cleland J and Wilson C, Demand theories of the fertility transition: an iconoclastic view, *Population Studies*, 1987, 41(1):5-30; Coale AJ, The demographic transition reconsidered, in: International Union for the Scientific Study of Population (IUSSP), *International Population Conference, Liege, 1973*, Liege, Belgium: IUSSP, 1973, p. 53-72; and Bongaarts J and Watkins SC, Social interactions and contemporary fertility transitions, *Population and Development Review*, 1996, 22(4):639-82.
11. Cleland J and Wilson C, 1987, op. cit. (see reference 10); and Cleland J, 1985, op. cit. (see reference 8).
12. Bankole A, Rodriguez G and Westoff C, Mass media messages and reproductive behavior in Nigeria, *Journal of Biosocial Science*, 1996, 28(2):227-239; Westoff CF and Bankole A, *Mass Media and Reproductive Behavior in Africa*, Demographic and Health Surveys Analytic Reports, Calverton, MD, USA: Macro International, 1997, No. 2; Piotrow PT et al., 1997, op. cit. (see reference 6); Storey D et al., Impact of the integrated radio communication project in Nepal, 1994-1997, *Journal of Health Communication*, 1999, 4(4):271-294; and Kincaid DL, Social networks, ideation, and contraceptive behavior in Bangladesh: a longitudinal analysis, *Social Science and Medicine*, 2000, 50(2):215-231.

13. Rogers EM, *Diffusion of Innovations*, New York: Free Press, 1995.

14. Plewis I, *Analyzing Change: Measurement and Exploration Using Longitudinal Data*, Chichester, UK: John Wiley, 1985; and Finkel SE, *Causal Analysis with Panel Data*, Sage University Paper on Quantitative Applications in the Social Sciences, Thousand Oaks, CA, USA: Sage, 1995, 07-105.

15. Plewis I, 1985, op. cit. (see reference 14); Finkel SE, 1995, op. cit. (see reference 14); and Kincaid DL, Mass media, ideation and behavior: longitudinal analysis of contraceptive change in the Philippines, *Communication Research*, 2000, 27(6):723-763.

16. Bollen KA, Guilkey DK and Mroz TA, Binary outcomes and endogenous explanatory variables: tests and solutions with application to the demand for contraceptive use in Tunisia, *Demography*, 1995, 32(1):111-131.

17. Maruyama GM, *Basics of Structural Equation Modeling*, London: Sage Publications, 1998.

18. Bollen KA, Guilkey DK and Mroz TA, 1995, op. cit. (see reference 16).

## Resumen

**Contexto:** El África Subsahariana tiene una necesidad insatisfecha considerable en materia de anticonceptivos. En 1998-1999, se lanzó en Camerún una campaña denominada el Círculo de Oro, una iniciativa regional para promover y mejorar los lugares de distribución de los servicios de planificación familiar.

**Métodos:** Durante el último trimestre de 1999, 571 mujeres que habían sido entrevistadas en la Encuesta Demográfica y de Salud (EDS) de Camerún, de 1998, fueron entrevistadas nuevamente para evaluar su nivel de conocimiento sobre la campaña Círculo de Oro, y para conocer sus percepciones sobre la anticoncepción y el nivel de uso de métodos anticonceptivos. El impacto de la campaña fue evaluado mediante los resultados del panel de datos y mediante el uso de un modelo de ideación de cambios en la conducta. Además, se compararon los servicios estadísticos de los lugares de servicios de distribución de planificación familiar del Círculo de Oro con otros que no pertenecían a esa campaña para evaluar los efectos de la campaña en el rendimiento de las clínicas.

**Resultados:** Más de un tercio de las entrevistadas indicaron que habían estado expuestas a la campaña del Círculo de Oro, y el 52% de ellas mencionaron que habían tenido conocimiento de esta actividad a través de la televisión. Aquellas con educación primaria y pos-primaria eran cuatro y seis veces más proclives, respectivamente, que aquellas que no tenían ninguna instrucción, a haber estado expuestas a la campaña. Este nivel de exposición fue relacionado con un significativo aumento de la ideación en materia de planificación familiar, así como con una creciente probabilidad de un mayor uso de métodos anticonceptivos modernos (80%). Las estadísticas de servicio indican que la campaña causó un aumento significativo en la demanda de servicios de

(continued on page 216)