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Family Planning Program Effort and the Initiation of Contraceptive Use : A Multi - Level Analysis

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Introduction

In the evaluation of family planning and population programs, the case of Thailand is significant because of the speed and pervasiveness with which contraceptive practice has increased and fertility has declined since the initiation of the Thai family planning program. A number of studies have clearly established the decisive role that government services have played in contributing to Thailand's fertility decline (Chao,1984; Khoo, 1979; Knodel, 1987). However, to the knowledge of the authors, there are no studies which assess the relative importance of specific components of the Thai family planning program as they relate to improvements in program performance. Without this knowledge, little can be learned from the Thai example for application in other countries where program managers might wish to adapt successful elements of the Thai program for local implementation.

This is a report of a three-year project funded by the Rockefeller Foundation to identify key components of the Thai family planning program, obtain measures of how they are implemented in the field and, by statistical analysis, determine which components in what settings are associated with superior program performance. The research team has undertaken a phased series of investigations, employing both qualitative and quantitative methods, to identify and refine a parsimonious set of measures of program effort at the district (*amphoe*) and sub-district (*tambon*) levels and to study their relationship with various indicators of performance, both directly and as

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mediated by local variations in setting. In the first phase, exploratory individual and group interviews with district officials and sub-district health workers were conducted in two districts. On the basis of these interviews and field observation, questionnaires were developed for obtaining information on program effort from district health officers (DHOs), district hospital directors (DHDs), and sub-district health center workers (HCWs). Program effort was measured in terms of policies and activities of rural staff of the district health offices, district hospitals, and sub-district health centers as well as inputs by outside agencies (other government entities, private family planning associations, and other private-sector sources) which are directed toward increasing the number of users of contraception.

In the second phase, these questionnaires were applied in eight districts and validated by means of interviews and focus-group discussions with family planning acceptors, village health volunteers, and village leaders. The effort variables obtained from the questionnaires were divided into four categories: demand creation indicators, service accessibility indicators, management indicators, and outside support indicators. A scoring procedure was employed for measuring relative performance of the districts in terms of each of the four major categories of program effort and in terms of overall effort. Correlation analysis was employed to study the relationship between individual effort variables and composite effort scores, on the one hand, and measures of program performance obtained from service statistics on the other. The performance measures focused on contraceptive prevalence and change in the prevalence over a one-year period. During this phase, various approaches to obtaining measures of setting at the district level were also explored.

In the third phase, after further refinement on the basis of the findings from the second phase, the questionnaires were administered in a nationally representative sample of 145 districts. In addition, setting measures were obtained for each of these districts using techniques developed in the second phase, and a variety of performance measures (mostly measures of contraceptive prevalence, change in contraceptive prevalence, or number of new acceptors, with regard to both specific methods and all methods taken as a whole) was obtained from service statistics. The data were analyzed at the district

level by means of correlation and multiple regression analysis to determine which effort measures (independent variables) were associated with different performance measures (dependent variables); setting measures were employed as control variables.

The findings from the first three phases were compiled in three reports each of which was presented and discussed at a workshop specially convened for the purpose (Institute for Population and Social Research, 1987; 1988a).

This fourth report presents the results of the final phase of analysis. In this phase, data at the district and sub-district levels from the third-phase data collection are combined with individual-level and village-level survey data from another study conducted about the same time, the Determinants and Consequences of Contraceptive Use Patterns in Thailand (CUPS), supported by the World Health Organization and conducted by the Institute for Population and Social Research, Mahidol University, to permit simultaneous consideration of measures at different levels (Institute for Population and Social Research, 1988b). The purpose of this analysis is to determine which effort measures at either the district or sub-district level are associated with use of contraception at the individual level, controlling for variations in setting at the district and village level and for variations in individual background characteristics. Multiple regression analysis and analysis of variance are employed.

Conceptual Framework

The analysis in this report is predicated on the assumption that variations in program performance are related to variations in a number of variables at both macro and micro levels. Program performance is gauged in terms recent initiation of use of a contraceptive method. The other variables viewed as explanatory are characteristics of respondents and measures of program effort and setting. Thus recently initiated contraceptive use is viewed as the dependent variable and these other variables as independent (or explanatory) variables.

At the individual level, socio-economic and demographic characteristics are considered to play an important role in determining who are potential users and who are not. For the present study, available measures of individual characteristics of the individual respondents include their age, parity, income (low/high), education, wage versus non- wage employment, whether or not place of residence is electrified, and distance from place of residence to nearest health center or hospital.

The setting variables reflect degree of economic development in the areas under study. They are of two levels, namely, village and district. A small number of setting variables at each level has been selected for the present study on the basis of strength of correlation with contraceptive use. Those variables whose degree of correlation with contraceptive use was so weak that the bivariate correlation coefficient failed to achieve statistical significance have been excluded. The village-level measures employed in the analysis are the presence or absence in the village of electricity, presence or absence of piped water, and distance (in kilometers) from the village to the nearest market center. At the district level, the analysis includes the infant mortality rate, distance from the district to the provincial center, and region where the district is located. In their study comparing national family planning programs, Lapham and Mauldin found that the setting variables were the most influential in predicting the program performance (Lapham and Mauldin, 1985).

The program effort measures at both the district and sub-district levels are classified into four major categories. First, a strong family planning program must be able *to create demand* for family planning among the potential users. Second, in order to meet the demand of the clients *access to* family planning, *services* must be made easily available to the wider public. Third, the *program management* needs to be effective and efficient. And finally, where resources are limited, the program may need to mobilize *outside support* in order to achieve its goals.

Methodology

Three major sources of data are used for the analysis here : (1) district and sub-district data from interviews with rural health administrators and service providers, (2) individual, household and village-level data from the CUPS survey, and (3) district-level data from secondary sources on socio-economic level, infrastructure, and cultural, geographic, and demographic features.

The survey of health workers provides data for the measures of program effort while the survey of MWRA provides data on the characteristics of the women for whom program services are intended, on contraceptive practice among those women (for measuring program performance at the individual level) and village-level setting variables. Setting at the district level is measured in terms of the data obtained from secondary sources.

The sample villages for CUPS were the same as for the 1984 round of the Thailand Contraceptive Prevalence Survey (Kamnuansilpa and Chamratrithirong, 1985). Districts in Bangkok and sample districts containing a provincial capital were not included in the subsample for the current analysis.

In Thailand each district has a health officer (DHO) who is responsible for administering public health activities in the district. These activities include supervision, evaluation and logistics of the peripheral health centers, which provide most contraceptive resupply in Thailand. Over 70% of the districts have a district hospital, ranging in size from 10 to 30 beds. These hospitals are the major source of IUD and sterilization services throughout Thailand. Each district has an average of 10 sub-districts, and each sub-district contains at least one health center. The health center is staffed by at least one auxiliary midwife who has high school education and two years' training.

The CUPS survey sampled two sub-districts in each sample district. To obtain information on family planning program services in the sampled districts and

sub-districts, interviews were conducted with each district's DHO and hospital director (DHD) and each sub-district's chief health center worker. In the event that one of these individuals was not available for interview, his or her assistant was interviewed instead.

The numbers of respondents available for the multi-level analysis were as follows:

District Health Officers (DHO)	50
District Hospital Directors (DHD)	46
Sub-district Health Center Workers (HCW)	100
Married women in the ages 15 to 44 (MWRA)	6,314

However, since the dependent variables in the multi-level study are concerned with recent initiation or resumption of contraceptive practice, the analysis disregards all respondents who had used contraception continuously for more than one year before the interview date and were still using at the time of interview. Furthermore, since contraceptive use is not expected among currently pregnant women or among those who perceive themselves to be infecund, respondents in these categories have been removed as well. As a result of these exclusions, the sample of MWRA included in the analysis reported below is only 1,977.

The measures of program effort at the district level are grouped under four headings: measures of demand creation, measures of accessibility of services, measures of management quality, and measures of outside support. These groups are adapted from the Lapham-Mauldin framework but the individual variables were developed in the first two phases by focus group, in-depth interviews and some statistical analysis.

The measures of setting refer to two levels: the district and the village. Of 22 district-level variables that were studied in the macro analysis of Phase 3, only three were retained for the multi-level analysis, since preliminary tabulation indicated that the others were not significantly correlated with key dependent variables at the individual level.

For the multi-level analysis, three dependent variables are employed. These are (1) contraceptive use among all MWRA initiated in the past year, (2) use of sterilization initiated within the past year among all MWRA and (3) use of sterilization initiated in the past year among contracepting MWRA. The data for these items comes from the CUPS survey.

Findings

The impact of family planning program effort on the initiation of contraceptive use is presented here. Program efforts are measured both at the district level and at the health center (tambon) level. The socio- economic setting at various levels is controlled at the individual, household, village, district and regional levels. The multi-level approach is used in this study.

In addition to the multi-level approach and technique, this study also uses the step-wise hierarchical regression analysis for the investigation of the relationship between the dependent and the independent variables. The hierarchical regression allows for the introduction of different sets of independent variables, one at a time. The individual and household characteristics form the first set of variables because they are the most proximal variables influencing the dependent variable. They are then followed by village and district setting, then by family planning program factors at the tambon and district levels respectively.

The setting and program variables are allowed to enter the regression equation at $p <= 0.10$. That is, any independent variable that accounts for variation in the dependent variable above that which has already been explained, and is significant at $p < = 0.10$, is retained in the overall equation.

The first regression run is presented in Table 1. Among eight individual and household variables hypothesized to be associated with current, recently initiated use of contraception, five are significant. These include the respondent's age (AGE), number of children living at home (PARITY), whether the respondent had any formal schooling

(LOWED), whether the respondent had completed primary school (HIGHED) and whether the respondent's household income is greater than 30,000 baht ($1,200) per year (HIINCOME). Three variables are negatively correlated with recent use: AGE, LOWED and HIINCOME. All five variables are retained in the equation as the regression proceeds to the next hierarchy, the village setting.

Of four community setting variables only one, ELECTRIC, adds significant explanatory power. ELECTRIC refers to the number of years that the respondent's village has had electricity.

In the third hierarchy, four district setting variables are introduced: Geographical region of residence (two variables); the infant mortality rate of the district (LOWIMR) and the number of kilometers by road from the district capital to the provincial capital (KMPRO). This step results in the addition of the two regional attributes, NONS and NONNE, and increases the size of the cumulative set of independent variables to eight. NONS and NONNE defines the population by whether they live in the South or the Northeast, two regions with traditionally high fertility and low contraceptive use norms. At this stage in the hierarchical regression, a total of 7% of the variance in the dependent variable is explained. The variance of explained of 7% is not low considering the dependent variable being dichotomous variable.

The full range of family planning program factors at the tambon, or sub-district, health center level are introduced during the fourth level of the hierarchy. The 30 variables range from demand creation factors to service delivery and management factors. It is at this stage in the step- wise regression that the marginal effect of program factors on the dependent variable is assessed.

This step results in four new variables to the equation and the addition of two percentage points of explanatory power. First, VHCRTGH, the local health worker's rating of the performance of village motivators becomes a significant variable This is followed sequentially by HCSOLVEH, the health center's freedom from higher authorities in managing government resources to resolve local problems; TAVSHELH,

the contribution of the Thailand Association for Voluntary Sterilization to health center case recruitment, and RACONVH, the proportion of villages in the health center catchment area with very convenient access to the health center. These variables are measures of short-term effort in the case of TAVSHELH and VHCRTGH, and longer-term program effort as in HCSOLVEH and, especially, RACONVH. The variable TAVSHELH becomes the fourth negative correlate with contraceptive prevalence in the equation.

The step-wise regression now moves from the health center to the district level. A total of 37 program input variables are entered one by one and six are retained in the cumulative equation. These variables include VHVRTG and HCSTFRTG (the district manager's rating of overall village volunteer and tambon health center performance in family planning); VASTRANS and MOBVAS (whether the district provides transportation for acceptors of vasectomy to and from the local hospital or takes the service to the village); VHVDENS (the number of village health volunteers per 10,000 population); and HCSOLVE (the freedom of the health centers in the district to determine the means to solve local obstacles to family planning performance).

The resulting multiple R square reaches 11.2% at the fifth and final level.

Table 1. Step-wise hierarchical regression run dependent variable initiation versus non-initiation of contraceptive use in past year among those eligible

	Variables entering at P < .10	Beta	Sig. 1*	Sig. 2**	Multiple R square
Hierarchy 1.	AGE	-.21	.000	.000	
	PARITY	.20	.000	.000	
	LOWED	-.04	.002	.078	.035
	HIGHED	.06	.007	.019	
	HIINCOME	-.05	.009	.034	
Hierarchy 2.	ELECTRIC	.03	.014	.364	.038
Hierarchy 3.	NONS	.13	.000	.000	.067
	NONNE	.13	.000	.000	
Hierarchy 4.	VHCRTGH	.10	.000	.000	
	HCSOLVEH	.09	.001	.000	
	TAVSHELH	-.09	.010	.001	.087
	RACONVH	.05	.043	.091	
Hierarchy 5.	VHVRTG	.08	.005	.005	
	HCSTFRTG	.09	.001	.001	
	VASTRANS	.06	.013	.013	
	VHVDENS	.06	.016	.016	.112
	MOBVAS	.05	.049	.049	
	HCSOLVE	.05	.083	.083	

Note : 1* Significant within hierarchy
2** Significant at the end of the 5th hierarchy

Table 2 now examines the same groups of independent variables with recent initiation of male and female sterilization among those eligible as the dependent variable. There is considerable overlap with the first regression run for the setting variables but considerably less overlap for the significant program factors.

In hierarchy one, four variables explain a significant amount of variance in the level of recent sterilization prevalence in the district: AGE, LOWINCOM (whether the respondent's household income is less than or equal to 10,000 baht ($400) per year, LOWED (a negative correlate), and ELECTRC (whether the respondent's household has electricity or not). The two variables HIINCOME and respondent's age, which appeared in the first run, are now absent when sterilization prevalence is the dependent variable.

As in the first run, the village characteristic of ELECTRIC is retained in the second regression equation. By hierarchy three, two more variables, NONS and KMPRO join the equation at the level of $p <= 0.10$. The distance from the provincial capital, KMPRO, is inversely related to sterilization prevalence.

Of the 13 variables in the fourth hierarchy of the regression, six are program effort variables. These include two variables that were present in the first run, TAVSHELH and RACONVH, but also include the following four new effort variables: PATHELPH measures whether the tambon health center received support from the Planned Parenthood Association of Thailand in the previous year; FPTIMEH is the proportion of time that the health center staff spends on family planning; PVHVDENH is the proportion of VHVs who have been trained to prescribe the pill, and VHVRTGH is the local staff rating of the VHV performance in family planning. It is noted that, once again, TAVSHELH, is negatively associated with the dependent variable as is FPTIMEH.

The fifth hierarchy of the second regression run adds six variables that did not appear in the first run and repeats VHVRTG as a significant associate of sterilization prevalence. The six new variables include CDOSTMT, whether the Chief District Officer has made favorable public statements on family planning; PMINCEN, the provision of cash or in-kind incentives; MOAHELP and MOEHELP, family planning assistance from Agriculture or Interior Ministry officials; IUDHC, the percentage of health centers offering IUD insertion and PCLNDENS, the number of private clinics per 10,000 MWRA. The variables CDOSTMT and MOEHELP occur more in districts with low sterilization prevalence and are both negative correlates of sterilization prevalence.

Over the five hierarchical steps 20 variables make their way into the equation and explain a total of 8% of the variation in sterilization prevalence compared to 18 variables and 12% in the first run. It is noted that 13 out of the 20 variables are program factors. In the first run 10 out of 18 variables represented family planning program inputs.

Table 2. Step-wise hierarchical regression run dependent variable: initiation versus non-initiation of sterilization in the past year among those eligible

	Variables entering at P < .10	Beta	Sig. 1*	Sig. 2**	Multiple R square
Hierarchy 1.	PARITY	.18	.000	.000	
	LOWINCOM	.07	.002	.005	
	LOWED	-.03	.053	.209	.024
	ELECTRC	.03	.067	.305	
Hierarchy 2.	ELECTRIC	.02	.000	.626	.034
Hierarchy 3.	KMPRO	.01	.006	.831	
	NONS	.08	.016	.008	.040
Hierarchy 4.	TAVSHELH	-.22	.000	.000	
	RACONVH	.10	.000	.003	
	PATHELPH	.15	.002	.000	
	FPTIMEH	-.10	.007	.000	.055
	PVHVDENH	.08	.016	.011	
	VHVRTGH	.06	.048	.020	
Hierarchy 5.	CDOSTMT	-.05	.062	.062	
	PMINCEN	.09	.003	.003	
	MOAHELP	.06	.058	.058	
	MOEHELP	-.08	.004	.004	.069
	VHVRTG	.07	.021	.021	
	IUDHC	.05	.050	.050	
	PCLNDENS	.04	.080	.080	

Note : 1* Significant within hierarchy
2** Significant at the end of the 5th hierarchy

In Table 3 the focus is on variance in recent initiation of sterilization as a proportion of all recent users of contraception. Whereas the previous two dependent variables reflect the level of contraceptive prevalence which has accumulated over years of program effort and socio-economic development, the sterilization method mix is independent of district contraceptive prevalence level and duration of program effort. At the same time, recent initiation of sterilization is one of the most sensitive indicators of program effort because almost all acceptors of sterilization in Thailand receive services from government outlets and because program staff and equipment must be well developed in order to provide effective sterilization services.

The analysis is relatively more successful for this variable and the step-wise regression ultimately accounts for nearly 20% of the variance in the sterilization method preference. Individual and household characteristics account for a larger proportion of the variance in the dependent variable than for the previous two regression runs. Four variables, PARITY, LOWINCOM, ELECTRC and AGE account for more than double the variance in the dependent variable than in either of the previous two runs (8.4%).

Two community setting variables ELECTRIC and KMPRO add another 1.6 percentage points of explanatory power to the equation. District setting, on the other hand, explains little variance in the choice of sterilization and adds the single variable, KMPRO, a negative correlate, to the equation.

The cumulative R square is boosted significantly by the addition of six tambon level effort variables in the fourth step of the regression. These six include private sector inputs of PATHELPH and TAVSHELH (negative), access to the service outlet (RACONVH and VASTRANH), staff time devoted to family planing work (FPTIMEH) (negative) and the percentage of local VHVs who can provide the pill (PCTVPILH).

In the final step, seven more variables are added with 4.3 percentage points of explanatory power. Three district effort variables which are negatively associated

with sterilization prevalence are assistance by Ministry of Education staff (MOEHELP), freedom of health centers in the district to request materials and supplies (HCREQST) and whether commercial firms in the district provided cash or in-kind support during case recruitment campaigns (PRIVDON). The four positive correlates include IUDHC, PMINCEN, HCTRGTS (health center freedom in setting performance targets) and MOBVAS.

Table 3. Step-wise hierarchical regression run dependent variable: initiation versus non-initiation of sterilization in the past year as a ratio of recent users of other methods of contraception

	Variables entering at P < .10	Beta	Sig. 1*	Sig. 2**	Multiple R square
Hierarchy 1.	PARITY	.27	.000	.000	
	LOWINCOM	.10	.002	.007	
	ELECTRC	.07	.021	.101	.079
	AGE	.05	.097	.223	
Hierarchy 2.	ELECTRIC	.02	.001	.622	.093
Hierarchy 3.	KMPRO	-.05	.046	.285	.097
Hierarchy 4.	VASTRANH	.09	.009	.060	
	RACONVH	.15	.000	.003	
	TAVSHELH	-.29	.000	.000	.129
	PATHELPH	.29	.001	.000	
	FPTIMEH	-.17	.003	.000	
	PCTVPILH	.14	.018	.004	
Hierarchy 5.	IUDHC	.11	.012	.012	
	PMINCEN	.08	.079	.079	
	MOEHELP	-.14	.002	.002	
	HCREQST	-.11	.005	.005	.164
	HCTRGTS	.11	.012	.012	
	MOBVAS	.08	.028	.028	
	PRIVDON	-.07	.093	.093	

Note : 1* Significant within hierarchy
2** Significant at the end of the 5th hierarchy

Table 4 summarizes the three runs and the incremental contribution of each set of independent variables to explaining variance in the three dependent variables. In equation one, seven setting and ten effort variables explain 12% of the variance in the proportion of eligible married couples in the district that initiated any method of contraception in the past year. Next, in the second equation, 20 variables account for 8% of the variance in recent acceptance sterilization in the district. When recently initiated sterilization use as a proportion of all recently initiated contraceptive use is the dependent variable, then 19 out of a total of 83 variables have a cumulative R square of approximately 19%.

Table 4. Increment in R square percentage points of variance explained by the independent variables (number of independent variables in the equation)

Independent variables (number)	Dependent variables Independent		
	Initiation in the past year of:		
	any method as % of eligibles	sterilization as a % of eligibles	sterilization as a % of users of other methods
Individual Characteristics			
Individual/household (8)	3.8 (4)	2.7 (4)	8.4 (4)
Sub-total (8)	3.8 (4)	2.7 (4)	8.4 (4)
Setting			
Community (4)	0.4 (1)	0.9 (1)	1.6 (1)
District (4)	3.0 (2)	0.8 (2)	0.5 (1)
Sub-total (8)	3.4 (3)	1.7 (3)	1.1 (2)
Program Effort			
Tambon (30)	2.1 (4)	1.8 (6)	3.9 (6)
District (37)	2.9 (6)	1.9 (7)	4.3 (7)
sub-total (67)	5.0 (10)	3.7 (13)	8.2 (13)
Total (83)	12.2 (17)	8.1 (20)	18.7 (19)

Discussion

The strategy employed here implicitly assumes that characteristics of the individual and household will exert the most influence on contraceptive decision-making. Next, socio-economic setting at the tambon and district level are hypothesized to have a secondary association with family planning practice. Finally, actual family planning program inputs are tested to see how much more change in recent contraceptive use behavior they can account for. This hierarchy is consistent with the findings of previous impact studies in Thailand and elsewhere which point to the important role that setting plays in influencing contraceptive use while demonstrating that program inputs play a significant, if not equally important role.

This analysis shows that social and economic setting explain only slightly more of the variance in contraceptive initiation than program inputs. Both groups of variables display their greatest explanatory power when recent sterilization acceptors as a percent of contracepting couples is the dependent variable.

It is noted that, as the regression proceeds up through the hierarchy, certain variables that are initially highly significant become much less significant as new variables are introduced. Thus, introducing program effort variables last ensures that spurious associations with the dependent variable are minimized. Further, at the end of each of the three regression runs, the tambon level effort variables, introduced in the fourth hierarchy, all retain their significance at the 90% level and most at the 95% level. District input variables that enter the equation in the fifth hierarchy are all significant at 90%. These findings argue that independent, positive contributions to program achievement are made by the tambon health center and the district above and beyond the impact of socio-economic development.

In each equation there are a number of negative correlations between effort variables and performance. Without attempting to rationalize these findings, it is highly likely that, in some cases, such as TAVSHELH, resources are directed to areas of low achievement which creates a reverse effect. In other cases, interpretation is more

difficult, such as with the negative Beta values for MOEHELP and HCREQST. The possibility that these are random associations should not be overlooked. It is interesting to note that, among the three groups of setting variables, individual characteristics increase in importance as the dependent variable changes from initiation of any method to sterilization to sterilization as a ratio of temporary contraception. Correspondingly, district setting decreases in importance as a determinant of variation in the dependent variable. Of course, acceptance of sterilization presumes a certain number of children and, thus, parity is the dominant characteristic and achieves a Beta value of .27 by the fifth hierarchy.

For the sterilization initiation rate, the district and tambon are equally influential but the total amount of variance explained is small. The program role across all three equations is most substantial in directing acceptors to sterilization.

The input variables measured in this study that have the most consistently positively association with performance include the following:

1) Measure of demand creation:

PMINCEN: Provision of cash or in-kind incentives for service providers or motivators of female sterilization, to vasectomy acceptors, or to IUD acceptors in the district during the past year.

2) Measures of accessibility of services:

RACONVH: The proportion of villages with very convenient access to the local health center.

MOBVAS: The occurrence of mobile vasectomy services in the district during the past year.

IUDHC: The percent of all health centers in the district that are able to provide IUD insertion.

3) Measures of management quality:

VHVRTG: The district health officer rating of the family planning performance of the local village health volunteers.

The above variables were significant in two of the regression runs; one variable, RACONVH, was retained in all three equations. Thus, these factors are not likely to be the result of spurious associations. It is also noteworthy that three of the variables measure access to services (RACONVH, MOBVAS, IUDHC).

Although Thailand's NFPP has no official policy to provide incentives to acceptors or case motivators, the provinces apparently use local resources to provide cash or in-kind compensation for acceptance of permanent and semi-permanent contraception. This practice has a positive association with use of sterilization.

The rating of VHV performance by the district manager is a subjective measure. If valid, it is likely to reflect program management of the district activities generally. First, that the district health officer has a good attitude toward the VHVs suggests that there is a good relationship between the district management and local villagers. Secondly, good VHV performance reflects good recruiting, training and supervision practices in the district. However, this variable is not easily put into practice by central managers who wish to raise contraceptive prevalence.

Two additional variables were significant in at least two equations but the Beta values are negative. TAVSHELH was retained in all three equations and relects the policy of the Thailand Association for Voluntary Sterilization policy to direct resources to areas of low performance. MOEHELP appeared in two equations and was negatively associated with sterilization use. The significance of this variable may be a random association or the result of a reverse effect as noted with TAVSHELH. Since both negative correlates are "help" variables it is likely that a outside resources were being directed to areas of low use in 1987.

Conclusions and Recommendations

This study has confirmed that the demand at the individual is the most important factor and that between program effort and setting, the program effort accounts for more variance in the dependent variable. However the multi-level analysis

reported in this paper has shown that the difference in contribution between setting and effort is not great: Thailand's family planning program share of variance explained ranges from 40 to 46%. In the multi-level analysis between eight to 20% of the variance in the dependent variables is accounted for by individual characteristics, setting and program effort combined which is not low considering the nature of this analysis in which the dependent variables are dicotomous.

The findings do offer the following advice to the Thai program and others with similar characteristics:

(1) National program evaluation systems need to take socio-economic setting into account when programming resources. Data on proxy variables for setting should be routinely processed along with performance data for the smallest unit of analysis. Areas with high values for setting variables will be expected to achieve greater gains in family planning performance for the same level of input than areas with lower values for setting variables.

(2) Program inputs that improve access to services have had the greatest impact on performance in Thailand although demand creation and management aspects significantly contributed to differential achievement in the Thai case as late as 1987. Outside (non-Ministry of Public Health) support was not positively associated with superior program achievement in 1987. The scale of outside support rather than its mere existence should be taken into consideration for target achievement.

(3) Any study of program effort and performance should be conducted while the program is young and growing (or by focusing on the sub- population where the performance is lagging behind). By the time the service delivery infrastructure has matured, and contraceptive prevalence approaches high levels it becomes increasingly difficult to show (statistically) the independent contribution that program effort certainly does make to improved performance.

(4) This paper puts an end to the argument between the Demand and the Supply campaigners. It is shown in the same model that both demand and supply sides are almost equally imprtant. Governament programs to promote both sides should be encouraged.

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