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**MINI-SURVEY IN MATRIX FORMAT:
AN OPERATIONS RESEARCH TOOL**

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INTRODUCTION

In the design and management of health programs -- especially innovative programs -- there is a need for fast, inexpensive and flexible methods of monitoring and assessing various aspects of program performance. The standard methods of evaluation are service statistics and surveys. Neither of these fulfill the above criteria.

In this paper we describe a new method, the matrix-format mini-survey, which we believe holds considerable promise. ^{1,2} While other researchers have used various types of mini-surveys, we believe that the simplicity and flexibility of this format is particularly well-suited to projects in developing countries.

An early version of the mini-survey in matrix format was developed and is still being used by the Community-Based Family Planning Services Program (CBFPS) in Thailand. It has been adopted and further developed by staff of the Center for Population and Family Health (CPFH) of Columbia University and their colleagues in countries where CPFH provides technical assistance in program development. In particular, the staff of the Community-Based Family Health Project of the University of Khartoum has made use of this method.

THE LIMITATIONS OF SURVEYS AND SERVICE STATISTICS

People involved in program development and management have long felt the need for a way to evaluate performance as programs progress. The standard methodologies have serious drawbacks which make them, in most instances, unsuitable for this task. Advantages of the matrix-format mini-survey are the speed with

which data can be gathered and analysed, its relatively low cost, and its flexibility.

The inability to gather and analyse information quickly is a major weakness of the traditional methods of program evaluation. Service statistics are widely dispersed in most programs. Therefore, compiling the raw data usually takes a substantial amount of time. Raw data have to be condensed and sorted -- often an especially time-consuming and burdensome process with service statistics. A streamlined system for utilizing service statistics as a routine management tool can and should be developed. However, this is not an objective easily achieved, nor can the limited amount of data available from service statistics always satisfy management needs. The data-gathering process for surveys is more condensed in time, and the resultant data more comprehensive. However, questionnaire design, sample selection, and training of interviewers is a lengthy process. Therefore, while a survey may produce high-quality data, these may nonetheless be of little use in correcting problems of program design and implementation, due to the long delay in producing the survey findings.

Surveys are, of course, notoriously expensive. They entail months of preparation, implementation and analysis. In practice, the use of computers to facilitate rapid and sophisticated analysis of survey data often causes lengthy delays. Theoretically, using service statistics should be inexpensive, since they are produced as a matter of course. However, compiling and analysing them for special studies generally

requires extra staff effort, and therefore, extra costs.

Flexibility is a key issue in program evaluation. Many of the questions that need to be asked can neither be predetermined nor precoded. Important questions arise during the life of a program, after a system of service statistics has been established, but long before an evaluation survey is scheduled to take place. Depending on the phase of program implementation, the program design, and the setting, the aspects which need to be evaluated vary greatly. Surveys can be designed to evaluate almost any aspect of a program, although (as pointed out above) the results may come too late for timely corrective action to be taken. Service statistics, on the other hand, often do not contain the kind of information which managers and evaluation personnel require. For example, service statistics cannot be used to identify communication problems among program personnel, misconceptions about the program in the community at large, or the frequency with which a new health procedure (such as oral rehydration therapy) is used in the home.

ADVANTAGES OF THE MINI-SURVEY

The mini-survey is one way of gathering quantitative information quickly and efficiently. It consists of a short questionnaire -- 10 to 15 questions -- focused on one or several clearly and narrowly defined aspects of the program or program environment. Mini-surveys of different types have been used by program managers and evaluators in a numbers of settings. In this paper we present the mini-survey employed within a particular matrix format.

Responses are recorded on forms designed to facilitate compilation and tabulation of the data: the answers given by up to 15 respondents can be recorded on a single sheet, with column totals at the bottom. (See Appendix A.) The sample size is usually smaller than that of a traditional survey, and depends on the question under study, as well as on the size of the program or of the population being served.

A mini-survey costs much less than does a conventional survey. The major saving is in terms of staff time. Interviews for a mini-survey require only about five minutes each, compared to 20-60 minutes each for conventional survey interviews. The time required for coding, editing and analysis of data is also greatly reduced. Savings on printing and paper for interview forms may be substantial as well. Furthermore, due to the efficiency of the mini-survey process, the cost may even be less than that of a study using service statistics, where the latter is possible.

The flexibility of the mini-survey is one of its most attractive features. This format can be used to gather information on almost any aspect of a program. Using the mini-survey, information can be elicited from program clients, staff, even people in the community who do not utilize the program. Similarly, there is almost no limit to the kinds of information this format can be used to gather -- from needs assessment, utilization and program effectiveness data, to community or staff attitudes, knowledge and practices. In some settings -- for example, when the service providers are not literate -- an elaborate service statistics system may unduly burden the program

personnel. In such cases, the mini-survey can be a desirable supplement.

The simplicity of the mini-survey format also expands the range of personnel who can be used to carry out studies. One approach is to use the regular program workers to administer the questionnaire. This is possible when they are literate, and does not require extensive additional training, as does a conventional survey. Another approach is to maintain a special evaluation team which can mount and implement a mini-survey, and analyse the data very rapidly, without disrupting the normal duties of program workers. The latter approach may be especially suitable for the early stages of innovative programs (where it is desirable to address a number of questions in quick succession as the program gets underway), or in large, complex programs to monitor performance. Both approaches have been tested in programs in which CPFH was involved. Examples will be described below.

While the mini-survey, we believe, fills a gap in evaluation methodology, it does have certain limitations. First of all, it is not a substitute for either service statistics or conventional surveys. It cannot provide the depth or detail of standard surveys, nor the breadth or continuity of data provided by service statistics. The questions asked in mini-survey format must necessarily be simple and straightforward. It is clearly not an instrument to plumb the subtleties of attitudes or value systems. Nor is it an instrument that can probe or overcome problems of enumeration. Service statistics are still required

to provide a continuous flow of information on program output. Surveys, on the other hand, are necessary when detailed information on a number of topics is required; when it is important to obtain incidence or prevalence data with more precision than a mini-survey can provide; or when the object is document change in broad or complex parameters, such as fertility or mortality.

Though quick and relatively easy, the mini-survey still has all the pitfalls and difficulties of any survey. Questions must be carefully phrased and pretested, as must the logical flow of questions. Sampling procedures must be clear and scrupulously followed. Interviewers must be carefully trained and supervised. Interview forms must be checked and rechecked. Tabulations need to be verified. Unexpected or unusual findings in particular need to be scrutinized.

EXAMPLE: THAILAND

Community-Based Family Planning Services (CBFPS) of Thailand is a non-profit service agency. It distributes contraceptives through 10,000 village workers in about one-third of the villages in the country.

In 1979, the matrix-format mini-survey was developed by CBFPS as a tool for routine monitoring of program performance. District supervisors conduct the survey in 1-2 villages each month. They visit every household in the village and interview all women of reproductive age. The mini-survey covers the following topics: number of children living and desired; age; pregnancy status; and contraception (current use by type and

source, and plans for future use). (See Appendix B.) The completed questionnaires are collected at monthly meetings of district supervisors and taken to Bangkok, where the data are analysed by province, district and village. These data provide useful information on program coverage.

In addition to program surveillance and evaluation, the mini-survey can be used for analysis of program design. For example, mini-survey data were employed to test several hypotheses about what kinds of people make the best contraceptive distributors. It was possible to do this relatively quickly and inexpensively by combining existing information about the characteristics of village distributors with data from the routine mini-surveys on contraceptive prevalence.

The data used in this analysis concern 95 distributors and 118 villages. (Some distributors serve more than one village if these are located close together.) The personal characteristics of the distributors include sex, age, and occupation. Level of performance is measured by use of oral contraceptives by married women aged 15-49 in the villages served by these 95 distributors. Because contraceptive use varies considerably with region, women's age, parity and desire for more children, these factors are used as control variables. The mini-survey data were collected during the last quarter of 1979.

It is important to consider validity when using the mini-survey, especially when a small sample is drawn from a large population, as was true in this case. To check on the representativeness of the data, the results of the mini-survey were compared with those of the National Contraceptive Prevalence

Survey (CPS) conducted in January 1979. The distribution of women by age group was quite similar for each geographic region. The average number of living children was almost identical (3.4 in the CPS and 3.6 in the mini-survey). The proportion of women using the pill was somewhat higher in the mini-survey (58.1 percent) than in the CPS (53.8 percent). However, this is not entirely surprising since the mini-survey was conducted nearly a year later than the CPS, and included only villages served by the CBFPS (and thus, in which contraceptives were easily available). In short, comparison of general findings of the mini-survey and the CPS suggest that the mini-survey data were of reasonable quality.

Hypotheses about the effects of three distributor characteristics were tested:

Sex: Women are more effective distributors than are men. We did not expect that this would necessarily be so in Thailand, where it is even acceptable for men to be birth attendants.

Age: Respect for age and experience makes older distributors more effective than younger ones.

Occupation: Shopkeepers are more effective than farmers as distributors. Shopkeepers seem to be in a particularly advantageous position to promote and distribute contraceptives. (Shopkeepers and farmers are the two largest occupational groups among distributors, comprising one-half of the sample in this study.)

The data do not support any of these hypotheses when women's age, number of living children, desire for additional children,

and geographic region are controlled. The analysis was done using a statistical procedure call multiple classification analysis, which also controlled the two out of three independent variables (distributors' age, sex and occupation) not being tested at the time.

Sex: Taking all these factors into account, men proved to be more effective than women as distributors. In villages served by men, 44 percent of married women aged 15-49 were using oral contraceptives, compared to 35 percent in villages served by women distributors.

Age: Younger people seemed to be more effective than older people: the prevalence of pill use was 43 percent in villages served by distributors younger than 35; 40 percent in those served by distributors aged 35-44; and 36 percent in villages with distributors aged 45 or older.

Occupation: Contrary to our expectations, shopkeepers did not prove to be more effective than farmers. In villages where distributors were shopkeepers, 38 percent of eligible women were using the pill, compared to 41 percent in villages served by farmers.

EXAMPLE: THE SUDAN

The Sudan Community-Based Family Health Project was developed by the staff of the Department of Community Medicine, Faculty of Medicine, University of Khartoum, in collaboration with CPFH. The objective of the project is to teach trained government midwives to provide maternal/child health and family planning services. The project staff at the University consists

of the project director and two full-time project coordinators who are responsible for training and implementation. In addition, four social workers attached to the Department have been utilized in various project activities, including the mini-survey. The use of the matrix-format mini-survey in the Sudan project was inspired by the work of CBFPS in Thailand.

In May 1981, a mini-survey was conducted to determine the impact of the project on the use of oral rehydration solution (ORS) and oral contraceptives in the area. Family planning services had been initiated one month earlier, and ORS instruction two months earlier. A 1:15 sample was drawn from the lists (compiled by midwives) of village women younger than 50 and with children under five years of age. The interviews were conducted over a three-week period by social workers. Some of the results are presented in Figure 1. The mini-survey form and the questions (translated from the Arabic) are provided in Appendix A.

The mini-survey data show that the oral rehydration component of the project was progressing well. More than 90 percent of women who had been visited by a midwife recognized the ORS packet and were able to correctly prepare the solution. Furthermore, almost all women who said that a child of theirs had recently had diarrhea had used ORS therapy. Some improvement could be made in the proportion of households which had a container calibrated for the preparation of ORS, although more than eight in 10 households did have such a container.

FIGURE 1

Results of the Mini-Survey of Women Previously Visited by Project Midwives, West Bank Area, Sudan Community-Based Family Health Project, May 1981.

Oral Rehydration		8	
Women who recognized the oral rehydration solution (ORS) packet.	97	(141/145)	
Women who correctly prepared ORS.	93	(135/145)	
Households with a container calibrated for the preparation of ORS.	84	(122/145)	
Women whose children recently had diarrhea who used the ORS treatment.	98	(46/47)	
 Family Planning			
Eligible women who reported that the midwife had explained family planning to them.	76	(106/139)	
Women in favor of oral contraceptives.	94	(100/106)	
Current pill users.	17	(18/106)	
Pill users who correctly described how to take the pill.	89	(16/18)	

Note: 145 women who had been visited by a project midwife were interviewed. Of these, 139 were eligible for family planning counseling under the project guidelines (i.e., were married and living with their husbands).

The midwives were instructed to take a very conservative approach in introducing family planning. This accounts, in part, for the fact that midwives had explained family planning to only three-quarters of the women they had visited. Despite the fact that the number of women using the pill was relatively small, the mini-survey results were of value in indicating the extent of initial success and areas for possible program improvement. The data show that some women who had had family planning explained to them were not familiar with the pill packet. However, of those who were using the pill, almost all knew how to use it correctly.

Given the success of this initial application of the matrix-format mini-survey, it was utilized on several subsequent occasions. In one instance, a version of the mini-survey was used to get rapid feedback on pill users and program drop-outs by village and supplier. All the necessary data were collected with the simple matrix format.

Because the midwives are predominantly non-literate, they use ciphers, symbols, and colors to record the client's name, age, number of children, age of youngest child, and whether she received a packet of pills that month. These records are collected routinely to provide service statistics for the project. It was learned, however, that the midwives often knew whether women had ever used the pill before, and if they stopped receiving pills through the project, the reason for this. Consequently, a mini-survey form was developed to record for each acceptor (one to a line) whether she was a first-time pill user, and if she had stopped getting pills from the midwife, the reason

why. The supervisors conducted the survey by visiting each of the midwives they supervised. The data were used to assess performance of individual midwives, as well as to provide an overview of program accomplishments to date.

The average midwife had 22 acceptors, eight of whom were active at the time of the survey. Of the active users, more than six out of 10 were believed to be first-time users.

Sixty-three percent of pill users had dropped out of the program in the 13 months since pill distribution was begun. While this rate is higher than we might wish, it is not discouraging since modern contraceptives are relatively new in this area, and since many of these women continued to use contraception, as will be shown below. Furthermore, the project emphasizes birth spacing, so a sizeable proportion of women are expected to discontinue use of contraception because they wish to become pregnant again.

The reason for drop out was known in more than eight out of 10 cases. Among women whose reasons for discontinuation were known, three reasons predominated. One-third of dropouts had switched to a brand of pill being provided by a clinic on the edge of the project area, near Khartoum. Another third dropped out because of side effects. And one-sixth stopped because their husbands objected to their practicing contraception.

These findings led the project managers to consider providing a second brand of pill. Also under consideration is a study of the side effects of pill use experienced by the project's acceptors. Finally, in planning for expansion of the

project, more attention has been paid to motivating males and convincing them of the importance of birth spacing.

SUMMARY & CONCLUSIONS

The mini-survey in matrix format has proven to be a useful instrument for making quick, quantitative assessments of activities and accomplishments in community-based programs. It provides data that are midway between those provided by surveys and those provided by service statistics. What the mini-survey lacks in depth and breadth of coverage, it more than makes up for in speed, focus and flexibility. Specific areas of interest or concern can be readily addressed through mini-surveys.

The mini-survey has been successfully applied both to program supervision and mid-point assessment. As with surveys generally, the objectives of any particular mini-survey need to be clearly defined and the questions rigorously pretested. Likewise, the interviewers must be well-trained and supervised, and sampling procedures must be carefully planned and precisely followed. Putting the survey into matrix format facilitates the collection and collation of the data.

APPENDIX A

Translation of Questions Asked in Mini-Survey of Women Who Had Been Visited by Project Midwives, West Bank Area, Sudan Community-Based Family Health Project, May 1981.

1. Do you know what this is? (Shows ORS packet) Yes/No
2. Has the midwife explained to you the use of this ORS packet?
Yes/No
3. Can you demonstrate for me how you make the ORS?
Correct/Incorrect
4. Can you tell me when and how it should be used?
Correct/Incorrect
5. Have any of your children had diarrhea since you were told about ORS? Yes/No
6. Did you use the ORS treatment? Yes/No
7. How many packets have you used altogether since midwife's first visit?
8. Has the midwife explained family planning to you? Yes/No
9. Do you know what this is? (Shows packet of oral contraceptives) Yes/No
10. Can you tell me how a person would take these pills?
Correct/Incorrect
11. Are you taking these pills now? Yes/No
12. Are you satisfied with these pills? Yes/No
13. Have you had any side effects? Yes/No

SHEET NO: _____
 VILLAGE: _____
 NAME: _____
 AGE: _____

19/11

Knows ORS (Show packet)	Midwife explained ORS	Can Demonstrate ORS	How to use ORS	Child with diarrhea since midwife's 1st visit?	USED ORS?	Packets used since midwife's 1st visit?	Midwife explained Family Planning	Knows P111 (show)	Explained how P111 supposed to be used	Presently Using P111	Satisfied with P111	Why not satisfied
Yes No	Yes No N/A	Correct Incorrect N/A	Correct Incorrect N/A	Yes No N/A	Yes No N/A	No. of packets _____ N/A	Yes No	Yes No N/A	Correct Incorrect N/A	Yes No N/A	Yes No N/A	Comment N/A
TOTAL												

APPENDIX A (continued)

APPENDIX B

Data Obtained Using Routine Mini-Surveys, CBFPS of Thailand.

The routine mini-survey in the Thai CBFPS program consists of two pages: the household data sheet, with spaces for nine households per sheet; and a sheet on which village characteristics are recorded, and the data from the household interviews are summarized. The following kinds of information are recorded on these two forms:

Household Data Sheet

Household address and number.

Husband's name.

Wife's name and age.

Reproductive history:

Number of living children: male; female.

Additional children desired: yes/no.

Currently pregnant: yes/no.

Current contraception:

Pill; IUD; DMPA (an injectable); condom; sterilization (male/female); other.

Type of pill: Norinyl; Ovostat; Eugynon; other.

Source of pill: CBFPS; health center; shop; other.

Future Contraception:

Pill; IUD; DMPA; condom; sterilization (male/female); other.

Additional questions: (spaces for three additional questions).

Village Data Sheet

Program.

Province; district; subdistrict.

Village name and number; name of headman.

Number of households.

Households not interviewed: identification number and reason.

Two most important sources of supplementary income for villagers.

Is there a health center in village?:

Number of health personnel.

Is there a primary school in village?: Name of headmaster;
number of teachers; number of students; highest grade.

Is there a cistern in the school?

Number and percent of married women aged:

15-24; 25-34; 35-44; 45-49; total.

Number and percent of eligible women currently pregnant.

Living children: Number and percent of eligible women with
0-2; 3-4; 5-6; 7+; total.

Number and percent of eligible women who desire more children.

Currentcontraception: Number andpercent ofeligiblewomen using:

Pill: Norinyl; Ovostat; Eugynon; other.

Source of pill: CBFPS; health center; shop; other.

IUD; DMPA; condom; sterilization (male/female); other.

All methods.

Future contraception: Number and percent of eligible women who
intend to use the pill; IUD; DMPA; sterilization
(male/female); other.

Remarks:

Name of supervisor; name and code of distributor; date.

References

1. R.T. Ravenholt and O.H. Ravenholt, "Multi-State Birth Surveys," paper presented at the annual meeting of the American Public Health Association, Los Angeles, Nov.4, 1981.
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