Measuring the Performance of Family Planning Programs

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Prepared by: P. S. Mohapatra, Consultant
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MEASURING THE PERFORMANCE OF FAMILY PLANNING PROGRAMS

This paper provides administrators and observers of population programs with a clear picture of the data system they need to judge how well programs are doing. There is an extensive literature on this topic, much of it highly technical, most of it hidden away in journals and libraries where it is accessible mainly to specialists. This posthumous paper by a recognized expert surveys the whole field in clear, non-technical language. Anyone concerned with reviewing the adequacy of existing reporting systems, or establishing new ones, should find much help in Dr. Mohapatra's three essays.

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Partha S. Mohapatra died of a heart attack on June 26, 1976, while on a trip to Singapore with his family. With his untimely passing at the age of 43, the world lost an analyst, researcher, and writer of uncommon ability and experience.

Dr. Mohapatra was born in Balasore, India in 1933. He received his undergraduate education at Utkal University in Balasore and an M.A. from Patna. His early specializations were in the fields of statistics, mathematics and economics; subjects he taught at Utkal from 1956 to 1960, when he left teaching to pursue higher studies in demography and sociology.

In 1961 he received a Certificate in Demography from what is now the International Institute for Population Studies in Bombay. The following year he entered the University of Michigan where he received M.A. and Ph.D. degrees in sociology, with a major in population and human ecology. Returning to India, he joined the Central Family Planning Institute in New Delhi, where he worked for four years. In 1971, Dr. Mohapatra joined ESCAP, the Economic and Social Commission for Asia and the Pacific (then known as ECAFE, the Economic Commission for Asia and the Far East). For the next five years he was one of the leading consultants and researchers in ESCAP's Population Division. He traveled widely throughout Asia organizing studies and advising on program organization, service statistics systems, and program evaluation activities. Six months before his death he left ESCAP to accept a post as Evaluation Advisor to the Malaysian National Family Planning Program in Kuala Lumpur.
MEASURING THE PERFORMANCE OF

FAMILY PLANNING PROGRAMS

Three Essays

by

Dr. P. S. Mohapatra
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FOREWORD

For a period of about two years preceding his death, P. S. Mohapatra served as a part-time consultant to the World Bank, producing for us a series of essays on the monitoring and evaluation of national family planning programs. We believe that these essays are of sufficient interest to deserve a wider distribution.

Dr. Mohapatra writes on the interrelationships among ultimate program objectives, the setting of activity targets, the monitoring and evaluation of program performance, and the design of service statistic systems. Much has been written on these topics, but rarely with the clarity, simplicity, and sound judgment which Dr. Mohapatra brought to the task. As a past program manager, I myself have benefited greatly from reading these essays. I therefore commend them to program managers, the staffs of program evaluation units, representatives of donor agencies, and general government officers concerned with the effectiveness and efficiency of national population programs. The essays also provide excellent reading materials for training courses concerned with the conceptual basis for measuring the effectiveness of national family planning programs.

In my own reading of these essays I have been particularly struck by the following points:

- the need to recognize the hierarchy of objectives used to justify family planning programs, with the higher objectives being more difficult to evaluate than the lower objectives;

- the way of looking at the hierarchy of objectives as a chain of input/output relationships, which raises questions about where best to cut into the chain for purposes of "measuring results;"

- the usefulness, and the limitations, of program targets, and the problems involved in setting these;

- the need to define what we mean by "program output," and how this can best be measured, taking into account individual population characteristics and different methods of contraceptive practice;

- the inability of service statistics alone to provide an adequate basis of comparison for judging program results and the great need for supplementary surveys (e.g., fertility surveys, pregnancy outcome surveys, community practice surveys) and special analysis (e.g., continuation-rate studies, acceptor characteristic studies) to provide the needed standards of comparison;
the value of making estimates of "births averted" in order to measure program effectiveness, but the danger of assuming that all fertility declines should be attributed to the use of contraceptive methods (Dr. Mohapatra adds another voice to those who warn us that it is impossible to measure with confidence the exact contribution of family planning programs to fertility declines);

- the large number of primary forms and records which exist in all delivery systems and the need to aggregate these into a set of periodic service statistics, meaningful yet simple, for use by program managers and interested outsiders.

Dr. K. Kanagaratnam, Director
Population Projects Department
SUMMARY

These three essays deal with the conceptual and practical problems of measuring the performance of family planning programs. They treat the subject from the separate viewpoints of managerial control and of judging progress toward program goals. The essays are intended primarily for program administrators and for those in Research and Evaluation Units responsible for designing, maintaining, and presenting evaluation measures.

Essay I is concerned with the definition of program objectives, the development of an operational plan, and the setting of targets for measuring achievement. All family planning programs involve a hierarchy of objectives, conveniently grouped into three classes—ultimate, intermediate, and program-execution objectives. The most common ultimate objective is the reduction of fertility, although improved maternal and child health, and the spread of fertility-control as a basic human right, are others. Intermediate objectives refer to the accomplishment of attitudinal and behavioral changes needed to realize ultimate objectives—for example, spreading knowledge of fertility-control possibilities through films, radio, or schools, or the acceptance and use of family planning services by the public. Program-execution objectives refer to the performance of the specific activities carried out in pursuit of the intermediate goals. The mobilization of resources (staff, buildings, vehicles, films, supplies, funds, etc.) and the actual provision of services or the showing of films would be examples—the first called "program input" objectives, the latter "program output" objectives.

The hierarchy of objectives is linked together in a series of input-output chains in which lower-order outputs (e.g. newly-trained graduates of training programs or radio "spots" ready for airing) become inputs in higher-order activities (e.g. the provision of family planning services or the spread of fertility-control knowledge). Any program can be analyzed in terms of the large number of input-output chains of which it is composed; indeed, the soundness of a program can be judged by the realism of the assumptions—explicit or implicit—used to construct these linkages. Since it is impossible to monitor the progress of all inputs and outputs in the system, decisions must be made about where it is most useful to cut into the system to measure performance.

An operational plan will benefit greatly from the careful establishment of targets. Without targets, the only standard of current performance is past performance. Targets, if realistically set, provide a second and independent set of performance standards. But the establishment of targets involves many problems, which the text discusses.

Essay II concentrates on the measurement of program output, particularly on the trend analysis of acceptor data. It is not sufficient to work with aggregate acceptor figures, since good program control, and future
planning, will require knowing something of the method-mix being used by acceptors, their age, parity, location, and other socio-economic characteristics. In addition, numbers of recorded acceptors are not the same as numbers of users or "contraceptive prevalence," nor is overall "prevalence" a good measure of the "degree of protection" achieved. Sample surveys and/or the use of life-tables which adjust acceptor figures for method-specific drop-out rates must be used to translate acceptor figures into estimates of protection being achieved by the program. Finally, estimates of protection are not sufficient to measure a program's demographic impact. To estimate the latter, data must be collected on the method-mix being used, the age-distribution of users (since fertility varies greatly with age in the absence of contraception), and adjustment for normal pregnancy wastage (still-births, miscarriages, and abortions). These (annual) estimates of ultimate demographic impact should be checked, at about five-year intervals, by sample demographic surveys of actual fertility and mortality.

Essay III is devoted to service statistics. These are data that are routinely generated by family planning programs, i.e., excluding data generated by special surveys, outside normal program operations. The text lists the key inputs, activities, and outputs for which service statistics should normally be collected. It also identifies and discusses the basic records from which service statistics are compiled; problems of data tabulation, processing, and presentation; and the organization of service statistics into periodic internal and published reports.
ESSAY I

OBJECTIVES, PLANS AND TARGETS IN A NATIONAL FAMILY PLANNING PROGRAM

A. OBJECTIVES

The Ultimate Objective

1. There are three main reasons why individuals and governments support family planning programs: (a) to slow population growth, (b) to protect the health of women and children, and (c) to implement the right of couples to exercise control over their fertility. Identical programs could be based on these quite different objectives, although the statistics gathered to measure progress in realizing program objectives would presumably be somewhat different. In practice, of course, these objectives overlap: a program designed to serve only one of the three objectives would inevitably serve the other two. Thus the question of objectives is primarily political and semantic, a matter of individual and government motives, which are often mixed and change over time. Nevertheless, there are distinctive differences among the principal regions of the developing world with respect to the dominant motives underlying government family planning programs.

2. The high birth rates found in many developing countries generally are considered to be serious obstacles to the achievement of economic objectives. The reduction of fertility is therefore the primary objective of family planning programs in these countries. Most national family planning programs in Asia, for example, have clearly stated demographic goals of fertility reduction.

3. The health of mothers and children is stressed in other programs. Too short an interval between pregnancies is harmful to the health and well-being of both mothers and children. In some countries, particularly in Latin America, the prevalence of criminal abortion is a serious public health problem, and combating it in order to protect the health of mothers is an important concern of their family planning programs. The human rights goal of family planning is that couples should be free to choose whether, and when, to have children, and therefore, should be entitled, irrespective of socio-economic status, to information on the use of contraceptive methods and the accessibility of family planning services. The idea that family planning is a basic human right was endorsed, unanimously, at the 1974 World Population Conference in Bucharest.

4. The need for family planning is not confined to developing countries, however. The industrialized or developed nations also have population problems, but they take different forms--such as increasing urbanization, environmental pollution, and unwanted or out-of-wedlock pregnancies--and their program objectives are therefore different.
5. For the purpose of these essays, it will be assumed that the primary objective of a family planning program is to bring about a reduction of the growth rate of population by means of a reduction in fertility. This emphasis exerts some influence upon the kinds of statistics needed to judge the success of the program in achieving its objectives.

6. The rate of growth of population depends not only upon fertility, but also upon mortality and international migration as well as the age and sex distribution of the population. In most countries, however, international migration is negligible, and the future course of mortality can be predicted reasonably well. The goal of a given reduction in the growth rate of population within a specified period can therefore be converted into a required reduction in fertility (e.g., in the crude birth rate), and the performance of a program can be assessed from time to time in these terms. However, such a goal does not provide the administrator with standards for judging the progress of his day-to-day operations. It is not practical to collect statistics on fertility trends as frequently and regularly as updated material is needed by administrators in order to judge how well a program is doing; furthermore, fertility is not determined solely by the performance of family planning programs. For these reasons administrators require data on performance targets (such as the recruitment of new acceptors, and their continued use of family planning methods) which relate directly to program efforts on the one hand, and help to reduce the birth rate on the other. Thus program statistics that do not measure fertility, but do measure things that strongly affect it, are the chief means of "keeping sure" on program activities.

A Hierarchy of Objectives

7. Once the main objective of a program has been specified, preferably in quantitative terms, a plan of operations must be drawn up. A family planning program consists of a program of action designed to produce changes in the attitude and behavior of individual couples which will be reflected in progress toward the ultimate objective of a reduction in fertility. The plan of operations, therefore, should be framed in terms of the intermediate objectives whose attainment will lead to the attainment of the ultimate objective. Inspired by Knutson 1/ and James, 2/ Chandrasekaran and Freymann 3/ have devised a simple model to facilitate program evaluation, based on the idea of a "hierarchy of objectives" in which a descending and branching series of sub-objectives are derived from the ultimate objective of the program.

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"Each of the sub-objectives is a means of achieving the objective at the next higher level, and is the goal of an objective (or set of objectives) at the next lower level. Each objective is formulated on the basis of certain assumptions about the best means of achieving the objective above. The ultimate success of a program would depend upon two major factors: the extent to which the objectives in the program network are met, and the validity of the assumptions upon which the various objectives are based."

8. All the changes expected to occur in the population as the result of a program may be called program impact objectives, and can be classified on three levels: (a) ultimate impact objective, (b) intermediate impact objectives, and (c) program execution objectives. In a family planning program, the ultimate objective is the desired reduction in fertility, while the intermediate objectives are such changes as increases in (a) acceptance of small family size norms, (b) knowledge of contraceptive methods and their uses, (c) knowledge of availability of supplies, and (d) acceptance and practice of contraception. Program execution objectives can be subdivided into two categories: (a) effort objectives, and (b) performance objectives. The former includes the mobilization of various inputs, such as personnel, supplies, equipment and finance, and the latter comprises activities carried out with the help of these inputs in order to achieve the intermediate objectives.

Input–Output Chains in Family Planning Programs

9. Although only a few broad levels have been identified in the model described, the various objectives can be conceived as parts of a long chain of input-output relationships in which output is the intended input for the next higher level. An illustration is the short input-output chain shown in the diagram below:

10. The chain in the above diagram can obviously be extended in both directions. To obtain the starting inputs, more basic inputs such as money,
organizational infrastructure and the recruitment of trainers are necessary. On the other hand, the final output in the diagram can be considered as the input for such outputs as higher acceptance or higher contraceptive continuation rates. Moreover, further along the input-output chain, the "output" becomes dependent upon inputs from other chains. For example, "improvement in the quality of services" depends not only upon trained workers, but also upon the availability of supplies and physical facilities needed for the provision of these services.

11. The day-to-day operations of a family planning program are mainly concerned with the achievement of the program execution objectives, each of which can be converted into input-output chains as illustrated. The detailed planning of a program must take into consideration each element in these chains. At the next higher level, several of these chains will presumably act together for the realization of the intermediate objectives, and so on.

12. Links in any chain could be weak if based on wrong assumptions about cause and effect. For example, consider the following link:

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INPUT
 Establishment of Clinic Service
 Outlets

→

OUTPUT
 Acceptance of Contra-
 ceptive Services by
 the Population
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13. In one program it was found that the given input did not automatically lead to the desired output, so that there was idle clinic capacity. The situation was remedied only when the clinics were reorganized. Similarly, in another program, the efficient and speedy processing of clients in a clinic, usually accepted as highly desirable, was resented by a section of the clientele who had come to regard an occasional clinic visit as a relief from the monotony of household chores.

14. It is necessary in a family planning program, therefore, to test the assumptions made in formulating the objectives, in addition to measuring the extent to which the objectives at different levels are being realized. This is not necessarily an easy task. If we try to convert each of the objectives into finely detailed input-output chains and attempt to evaluate each link, the task may become overwhelming. On the other hand, if we skip intermediate links between a basic input and some later output, we may not be able to evaluate the underlying assumptions whose weakness might have caused a failure in output. A careful and judicious selection of factors to be evaluated must therefore be made.
15. Testing the underlying assumptions and assessing the realization of the objectives are the major functions of the evaluation and research component of any family planning program. These functions should be part of a process of continuously feeding the planning unit of the program with prompt and relevant information.

B. OPERATIONAL PLANS

Identifying Activities

16. We have just seen how the operational plan for a family planning program can be constructed by combining a number of input-output chains in which each desired output can be considered as the objective of the preceding input. The operational plan would take these chains into consideration and give them time and magnitude dimensions in the light of resources available. In other words, a good operational plan allocates available resources for generating the input-output chains through a series of program activities with the expectation of achieving specified outputs within a given period. For example, the plan for the training component of a program may include the task of earmarking personnel, facilities and equipment sufficient to produce, say, 5,000 trained field workers within five years.

17. Program activities may be divided into direct and supporting activities. The former category includes all activities intended to create demand for contraceptive services, (e.g., information, education and communications--IEC) and to meet this demand (e.g., the provision of services and supplies). The latter--supporting activities--includes training, research and evaluation, budgeting and financing. A third type of activity not generally considered to be part of the managerial function in family planning consists of pursuits outside the normal boundary within which a program operates. These activities include the provision of incentives and disincentives in such forms as tax laws, housing priorities, maternity benefits, and bonus and educational bond schemes. While such activities fall outside the normal scope of family planning programs, the program manager plays a role in identifying possible action in these areas and approaching the appropriate agencies.

18. For proper planning, it is necessary to identify not only the activities, but also the agents responsible for these activities. Planning for the coordination of activities is in itself an important element of overall planning since several activities are often aimed at a single objective (e.g., various IEC activities which are designed to create public awareness of the availability of family planning services). Further complexity develops when the agents responsible for some of these activities are outside the control of the program manager.
Criteria for a Feasible Plan

19. A good plan should be comprehensive, specific, consistent, flexible, and realistic. This description means that the plan should cover all components of the program, such as delivery of service, motivation and other IEC activities, training and evaluation and, for each component, should specify each element of the input-output chain in quantitative terms as far as possible. It should be internally consistent, within each component as well as between components, so that the various activities are complementary. The plan should be flexible in the sense that if the originally specified procedure fails, alternative procedures could be used for any component, without jeopardizing the total plan. Thus the process of planning should be continuous, always taking advantage of new information and new resources, and adapting itself to new situations. Above all the plan should be realistic, i.e., capable of being executed within the existing environment and with the available resources.

20. Laing 4/, following Berelson and others, has identified several criteria for the selection of a realistic plan. These include:

(a) Resource feasibility (Are the necessary resources available?);

(b) Technological feasibility (Is the technology sufficiently developed?);

(c) Administrative feasibility (Can the plan be implemented effectively?);

(d) Economic capability (Can the program afford this alternative?);

(e) Political viability (Will there be strong opposition?);

(f) Ethical acceptability (Is the plan consistent with existing social norms?); and

(g) Congruence (Is the plan consistent with the goals and activities of other programs).

In addition he has listed four other criteria as helpful in program planning. These are:

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(a) Effectiveness (Will the plan have the desired effect?);

(b) Efficiency (Will it utilize resources more efficiently than the alternatives?);

(c) Speed (Will it achieve the desired effect most rapidly?); and

(d) Coverage (Can it be applied to the entire population?).

These criteria can be applied, not only to the overall program strategy or strategy for each component, but also to each sub-objective within each component.

C. OPERATIONAL TARGETS

The Nature of Family Planning Targets

21. The development of an operational plan implies the setting-up of a series of achievement targets within each input-output chain. The adequacy of the over-all plan can be determined by assessing the extent to which these targets are being reached, and serious shortfalls averted by the use of contingency procedures already incorporated in the plan. For the sake of simplicity, targets can be divided into three broad groups: basic input targets, targets for activities generated through these inputs, and targets for the ultimate output. The basic input targets would be related to the in-flow of funds, recruitment of personnel, (e.g., hiring 200 fieldworkers and 40 doctors this year), the building and renting of physical facilities (e.g., constructing 20 primary health center buildings by the end of the year), and the purchase and storage of equipment and contraceptives. These targets are an essential part of planning, if only for the purpose of preparing the program budget.

22. The second group of targets are set with respect to the activities generated through the basic inputs. For example, the recruitment and positioning of field workers is expected to generate motivational worker-hours, the placement of doctors and nurses in clinics to provide staff-days for clinic service, and the deployment of information personnel using audiovisual equipment and software is expected to produce a certain volume of IEC activity. For example, the target for a mobile audiovisual unit staffed with a driver and a projector operator could be 20 film shows per month. When the actual output falls short of the target, the administrator should investigate the cause (e.g., the projector operator left his post and the vacancy has not yet been filled, or, the audiovisual vehicle was not operational during the monsoon because of bad roads).

23. Finally, all the above activities presumably help to generate acceptors of family planning methods and to motivate the acceptors to continue
to use the methods. Output targets, therefore, can be set in terms of acceptance or continuation, even though acceptance may depend in part upon factors outside the program.

24. Evaluation through targets is possible only if they are expressed in quantitative terms. However, not all targets can be so expressed. For example, leadership on the part of the doctor on the clinic team or ingenuity on the part of the field worker in motivational work, or organizational features encouraging improvement in team work cannot be measured through routine service statistics, and therefore it is difficult to set quantitative targets for these. Nevertheless, quantitative targets can be assigned to a sufficient number of key program elements to enable the administrator to monitor progress adequately.

Advantages of Setting Targets

25. The chief advantage of assigning targets is that a target-oriented program based on realistic assumptions provides its own guidelines for evaluation. Quantitative targets facilitate the prompt detection and investigation of shortfalls in performance.

26. Targets also form the basis for the allocation of scarce program resources, each input being calculated as the minimum needed to yield the required output. In addition, the extent to which targets are achieved in one year serves as a guideline for adjusting the inputs for the next year.

27. Targets for family planning acceptance permit the efficient scheduling of the production or procurement of supplies and their storage and distribution. For example, while the procurement of contraceptives can be based on the target for the whole program, the subdivision of the target into targets for smaller areas helps to determine the quantities needed at intermediate storage points.

28. Operational targets for family planning acceptance are more meaningful for program managers as immediate goals than a reduction in fertility; e.g., managers may evaluate the work of individuals or teams under their supervision by assigning these personnel acceptance targets.

29. Finally, targets help in determining accountability for performance. Failure to reach the target at one point in an input-output chain could sometimes be due to a failure at an earlier point in the same chain or in another chain converging on the same point. If the acceptance target in a particular district falls consistently short of target the program manager should check to determine whether the approved number of personnel has been in position during the period, whether there have been too many recent transfers into and out of the area, and whether there have been breakdowns in motivational inputs, before investigating other possible causes of the shortfall.
D. TARGETS FOR FAMILY PLANNING ACCEPTANCE

Unit for Expressing Output Targets

30. All family planning efforts are aimed at maintaining or raising the level of contraceptive practice in the community. The ultimate operational target for the program is therefore best expressed in terms of some measure of contraceptive prevalence. In most countries, however, the program management information system is not adequate to measure prevalence directly, so that to set targets in these terms would not serve any useful purpose. Family planning program acceptance is the next best measure, although it is not a complete substitute for prevalence, since a high rate of acceptance with a low rate of continuation might contribute less to birth prevention than low acceptance with high continuation. Particularly where the responsibility of a clinic is to promote both acceptance and continuation, the evaluation of program sub-units in terms of acceptance only can lead to undesirable effects. At the national level, however, most programs try to estimate prevalence indirectly (through couple-years of protection, couples currently practicing contraception, etc.,) on the basis of available data.

31. In some countries attempts have been made to elicit information on current contraceptive practice. In India each primary health center maintains a target couple register for married women in the area it serves. In Fiji, where the ratio of doctors and nurses to the total population is high, practice is ascertained and recorded through home visiting. However, because these records are not regularly updated, and vary in completeness and coverage, they do not provide reliable estimates of current practice. Until ways are designed to ensure the routine collection of acceptable prevalence data, targets will continue to be set in terms of numbers of acceptors. Because of the difficulty in obtaining data on continuation rates—and thus a firm figure for prevalence—we will henceforth define output targets in terms of acceptance only.

Deriving Acceptance Targets from Fertility Reduction Goal

32. Analytical procedures can be used to determine the amount of family planning acceptance required over a given period to achieve the desired reduction in fertility. Several computer programs have been devised for this purpose. The process of deriving acceptance targets from fertility reduction targets is the reverse of determining the reduction in fertility due to

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5/ Reference may also be made to another computer model, "Contraceptive Practice Required to Meet a Prescribed Crude Birth Rate Target: a Proposed Macro-Model (TABRAP), and Hypothetical Illustrations," by Dorothy Nortman and John Bongaarts (a forthcoming book publication of the Population Council).
past or expected future acceptance. Both processes depend on the same data—the likely acceptance in selected age groups of married women, the degree of infertility among acceptors, the expected fertility of women if they had not accepted contraception, the effect of postpartum amenorrhea, etc.

33. In practice, the derivation of acceptor targets by working backwards from fertility targets may be difficult since allowance must be made for client preference for contraceptive methods, the availability of facilities for clinical and surgical methods of contraception, and the ages at which women actually wish to limit or space childbearing. In the initial stages of a program assumptions will have to be made regarding the above constraints, since there is no precedent to follow. In an ongoing program, however, it may be more practical to use observed trends in age at acceptance and method preference, together with estimates of future increases in facilities and the corresponding increase in demand, to arrive at a set of acceptor targets broken down for each of the years over the period for which the demographic target has been set. The decline in fertility if these targets are achieved can then be calculated and, if it falls short of what is desired, the targets can be revised upward as necessary. Such upward revision will, of course, call for additional inputs. Given the availability of appropriate computer programs, this repetitive process of calculating acceptance targets is both simple and practical.

34. ESCAP has completed a multinational study of methodologies for setting family planning targets \(^6/\) in eight countries of the ESCAP region mainly to answer two questions:

(a) To what extent can established acceptor targets achieve a desired reduction in birth rates?

(b) What acceptor targets will be required to achieve a given desired reduction of fertility within a given period?

Another purpose of this study is to demonstrate that there may be a wide gap between the demographic goal set by national planners and what can be achieved if current acceptance trends (which also represent current input levels) are projected reasonably into the future.

35. It is unnecessary to give here the technical details of the procedures for deriving acceptance targets, which are easily available from the

sources referred to in this essay. More important, from the program manager's point of view, is to be aware of the prerequisites of target-setting and the major pitfalls associated with the use of acceptance targets.

Reconciling Acceptor Targets with Inputs

36. A problem arises when acceptor targets, computed so as to be compatible with the desired long-term reduction of fertility, are inconsistent with the resources available for achieving these targets. The problem becomes clearer if we consider two extreme approaches to target-setting. The first approach is to derive a set of acceptor targets compatible with the demographic goal of the economic planners, determine the necessary additional inputs, and provide these inputs irrespective of the cost. The other extreme is to set annual targets on the basis of best utilization of available resources irrespective of whether they will reach the demographic goal. Most often, this would mean revising the demographic target downwards. The first approach may run into two difficulties: (a) the likelihood that resources for family planning are not unlimited, and (b) even if they were, the provision that the calculated inputs may not necessarily lead to attainment of the targets in a demand-oriented program. The second approach, on the other hand, ignores the long-term demographic objective, and to that extent detaches the program from the higher-level goals of social and economic development. Further, assuming that different "optimum" input combinations can be developed for the different sub-units or areas of a program it may not be practicable to use all of these combinations since a certain degree of standardization of input patterns facilitates administrative control and coordination.

37. A more reasonable approach to target-setting begins with the levels of inputs and acceptances in the recent past. These, considered together with whatever strengthening of the program is projected in the future, may provide estimates of likely future acceptance which can form the basis of targets. If the expected reduction of fertility computed from these targets is inadequate, it may be necessary perhaps to revise the demographic goal accordingly. This, however, should be a last resort. Often there is scope for increasing program output within the available resources or with small additional inputs if program components need strengthening. The program manager should be on the lookout for these opportunities.

38. It is often possible to reach targets previously considered unachievable by changing methods or shifting emphasis from one method to another, within the limits of available resources. Sometimes such changes in strategy may call for bold experiment or drastic alteration of input patterns. If the soundness of the new strategies is borne out through action-research or experiment, program managers need not hesitate to use them.

39. Proper program monitoring can identify weaknesses in the program, the removal of which can sharply increase performance, often at little extra cost. In one program where IUD acceptance was unusually low in spite of the availability of doctors, investigation showed that (a) women were reluctant to
have IUDs inserted by male doctors, (b) female doctors were available only in some of the clinics, and (c) positions for the female field workers responsible for motivating women were only about 50 percent filled in most of the clinics. By transferring some female field workers from clinics with male doctors to fill the vacant posts in clinics with female doctors, it was possible almost to double IUD acceptance. In Malaysia, closing down clinics with low productivity and strengthening other clinics (where there was a higher demand for services) was also found to increase total performance.

40. The provision of a few extra inputs can sometimes help to tap potential but yet undiscovered demand for certain types of contraception. There is often sufficient idle personnel capacity in clinics to cater to such demand. For example, there may be idle doctor capacity in an area, but no provision for conducting tubectomies. The provision of facilities for this purpose, even on a small scale, can bring in unexpected potential acceptors of female sterilization.

41. As a program matures, certain types of inputs and activities can become obsolete, even though they are continued because of bureaucratic inertia. The funds used for such activities can be shifted away to strengthen other activities more likely to increase acceptance. Above all, adequate supervision and coordination by themselves can often increase program output by ensuring that workers of all categories perform their duties properly.

E. PROBLEMS IN SETTING ACCEPTANCE TARGETS

42. The setting of acceptance targets raises multifarious and wide ranging problems, the analysis of which has attracted a number of authors. 7/ This section touches on only a few of these problems, and its treatment of them is illustrative rather than exhaustive.

Detailed Specification of Acceptance Targets

43. Many programs specify acceptance targets in terms of total numbers of acceptors only, irrespective of method. In a program where multiple methods are offered, it becomes necessary to break down the total into method-specific targets. When a long-term demographic goal is being pursued, it is essential to set targets for each method because the birth prevention potential of each "acceptance" varies from one method to another. In some programs

the problem is further compounded by the fact that, while the acceptance of certain methods (e.g., sterilization and the IUD) is counted in terms of numbers of acceptors, for other methods it is only possible to measure the number of contraceptives issued. In the latter case, the figures are converted into estimates of the equivalent number of users by multiplying by an appropriate fraction. Thus targets for such methods can only be set in terms either of numbers of contraceptives or of estimated equivalent users.

Furthermore, if targets are used on subnational levels, it is necessary to make them method-specific in order to assess the comparative performance of units. The future birth prevention achievement of a clinic with a given number of pill acceptors could be lower than that of another with a far lower number of acceptors, but all of whom have accepted sterilization. Also, when targets are set on the basis of estimates of current non-users (as in Turkey, for example) it is important to keep sterilization acceptors, who accept the method only once, separate from acceptors of other methods. This approach is necessary because the former group never re-enters the "current non-users" ranks, while the latter generally does at one time or another.

Targets can also be specified in terms of age or some other suitable demographic characteristic (e.g., number of live births) which influences future fertility. While converting acceptance targets into fertility reduction targets or vice-versa, calculations of future births prevented are made on the basis of an assumed age distribution of acceptors. It is thus important to bear in mind the age distribution of acceptors (if not specified in the targets) when comparing achievements with targets in order to ensure that the actual acceptors do not come from older cohorts (since older couples have lower fertility than younger ones).

A related problem arises from the observation that new acceptors tend to be concentrated within a narrow age-range. Furthermore, acceptors of specific methods may be drawn from an even narrower age-range. Therefore, unless acceptance targets are specified keeping estimates of current non-users in each age group in view, there is a danger of eventually accumulating more target acceptors than there are women in a specific age group. Even though the age groups are replenished each year by new entrants, many of them could already be acceptors, so that they would not add to the number of potential new acceptors (current non-users) in their new age groups.

In many programs there are special projects (e.g., hospital postpartum projects, camps, and incentive projects within specific communities), in addition to the normal program activities for the recruitment of acceptors. Whenever the special projects are likely to compete with the normal program, targets for each should be set separately and judiciously. This is particularly important when targets are set for smaller administrative units, since a special project in one unit can woo a substantial proportion of potential acceptors away from neighboring units.
Acceptance Targets for Subnational Levels

48. Some programs set national acceptance targets simply to provide a means of estimating progress towards the demographic goal. In these programs targets for smaller administrative divisions may be determined solely as a means of arriving at a realistic national target and are not assigned to the sub-units as operational objectives. In most programs, however, targets are routinely assigned to program sub-units and even to individual workers. The desirability of strict adherence to targets for the assessment of individuals or clinic performance is still a debated issue. With certain precautions, however, targets for lower-level administrative units can serve adequately as a managerial tool.

49. In the first place, the assigned targets must be based on realistic assumptions about the availability of the facilities and other inputs on which their achievement may depend. It is therefore desirable to specify these assumptions, so that an investigator seeking the reasons for failure to reach the target can begin by checking whether the appropriate inputs were available. Before holding the clinic responsible for poor achievement, the possibility of the existence of unexpected local conditions, such as organized resistance, rumors, dislocation of work due to natural causes (heavy rains, severe winter, etc.) must also be investigated.

50. Secondly, the targets must be achievable. A target set too high may result in frustration and loss of initiative on the part of the workers. On the other hand, they must not be so low as to cause complacency. It should, however, be noted that a realistic target cannot be set for each sub-unit without looking at past trends as well as the performance of similar units elsewhere in the program. Sometimes the achievement of the best performing unit may be given as a target to the others, provided that conditions are similar.

51. Thirdly, it is usually better to set a target for a team of workers of different kinds (such as the staff of an entire clinic) than to assign targets to individual field workers. This approach is entirely logical, since the performance of one type of worker can influence the efficiency, and the credibility, of other types. For example, if the service at the clinic is poor, the field workers’ ability to recruit acceptors may be hampered. Furthermore, when targets are given to a clinic team, the responsibility for achievement normally will lie with the team leader (e.g., the clinic doctor who therefore must be given enough scope for the exercise of authority and initiative).

52. Targets for sub-units are often set on the basis of the number of eligible women, without taking into consideration the socio-economic environment. People in areas which rank high in average income, literacy, and other measures of modernity are likely to be more receptive to the notion of family planning than people in other areas. Each worker can cover larger numbers of people in more densely populated areas. Socio-economic differences among
areas therefore should be reflected in sub-unit targets. Guidelines for this purpose can be developed from data obtained through the analysis of past performance with the help of appropriate statistical techniques. 8/

53. Finally, certain types of contraceptives may be more popular than others in a given area. Sub-unit targets based on the assumption of a uniform method mix in all areas may not be consistent with client preferences in particular areas. Equivalence relationships among methods, based either on their demographic effectiveness or on the relative amounts of effort required to recruit acceptors, should be used to allow the sub-units to substitute the targets of one method for those of another. Such equivalence may take the form:

\[
\begin{align*}
\text{One Sterilization} &= x \text{ IUD insertions} \\
&= x^1 \text{ oral pill acceptors} \\
&= x^2 \text{ conventional contraceptives distributed}
\end{align*}
\]

54. The same principle can also be extended to the age distribution of acceptors. Thus a clinic, which recruits a comparatively larger proportion of younger acceptors, may be given more credits for performance than another where the acceptors are older.

Other Considerations in Setting Acceptance Targets

55. **Non-Program Effects:** Some level of contraceptive practice exists in all countries at the start of a program. This level is generally low, and is already reflected in current fertility. During the period of the official program the number of non-program contraceptors may increase, sometimes through the use of methods not offered by the program, but more often through the use of program methods obtained from non-program sources. The calculation of acceptance targets from fertility reduction goals rarely takes the possible effects of non-program contraception into consideration, mainly because the relevant data are not available. If the targets continue to be achieved, additional fertility reduction due to non-program effects is a bonus. On the other hand, it may become increasingly difficult to achieve the program targets if the incidence rate of non-program contraception in the community is very high, and to that extent program targets may be unrealistic.

56. **Indirect Effects of the Program:** A related problem is that of accounting for couples who were fully or partially motivated through activities generated by the program, but ultimately accepted a method offered

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8/ An ESCAP-sponsored collaborative study of "Input-Output Relationships in Family Planning Programmes" in four countries of the ESCAP region--India, Malaysia, the Philippines and the Republic of Korea--is exploring this possibility.
by a non-program source (e.g., private practitioner or commercial channel). A difficulty here is that of assigning credit to the appropriate program as the source of motivation. In addition, as these acceptors also are not reported through routine service statistics, their contribution to fertility reduction is not within the scope of program accounting, and therefore not generally considered in target calculations.

57. **Effects of Substitution:** Substitution can take place at three levels. First, a non-program acceptor may switch to a program source (perhaps because of free contraceptive service). This redistribution can contribute to acceptor target achievement without a corresponding contribution to fertility reduction. On the other hand, a program acceptor may eventually become a program dropout, but may change to a non-program source (because of better accessibility, availability and convenience of commercial purchase). If program targets for methods that are also available from commercial sources are set in terms of the number of contraceptives distributed, the effect of such substitution is to make the target unrealistically high. A second type of substitution is to replace one method with another within the program. If the service statistics system does not identify such substitution, the degree of target attainment will be overestimated. A similar type of substitution with the same implications occurs when a woman is counted as a new acceptor merely because she changes clinics. This problem is common in most programs, although the extent varies.

58. **Changes in the Characteristics of Non-User Population:** In a relatively successful program the character of the non-user population may change over time. For instance, a program might be forced to draw increasingly from younger couples or from the hard-core resisters. The size of the non-user population may diminish, making recruitment increasingly difficult. Also, the non-user population may be located in less accessible areas. These changes in the population should be reflected in target size and method mix, if the targets are to be realistic. Most of the current programs (with the exception perhaps of Hong Kong and Singapore), however, have not yet reached this stage.

59. **Data Inadequacies:** Acceptor targets are always derived from demographic targets with a certain number of assumptions, foremost among which is that of the potential fertility of the acceptors had they not accepted contraception. This, of course, can never be ascertained empirically. In addition, dropouts of certain methods (e.g., oral pills) may run a higher risk of immediate pregnancy after discontinuation than before acceptance. If these acceptors are protected for a short period of time only, their acceptance may have little demographic effect, but data for measuring these effects are

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9/ A discussion of direct and indirect programs effects has been given by W. P. Mauldin in "Births Averted by Family Planning Programs," paper prepared for the Conference on Turkish Demography, Izmir, Turkey, 1968.
not easy to come by. These factors, as well as inaccuracies in reporting the number of acceptors, and their characteristics, particularly age, can render acceptor targets inconsistent with demographic objectives.

60. In conclusion, it may be said that the setting of acceptance targets is a double-edged tool in the hands of a family planning program administrator. Despite the considerable difficulties in setting realistic acceptance targets, they can provide valuable guidelines for program planning and management. The danger lies in allowing the targets to become ends in themselves, which can cause frustration and deliberate misreporting. Also, targets must be kept flexible—between successive years of a plan period as well as between administrative sub-units within the same year—to permit periodic revision in view of the many uncertainties likely to be faced in practice.
ESSAY II
THE MONITORING AND EVALUATION OF PROGRAM OUTPUT

A. THE NATURE OF PROGRAM OUTPUT

1. Program outputs are the results of specific program inputs. These inputs may be classified first in terms of the functional components of a program, such as the provision of client services, communications, training, research, evaluation, administration, and supporting services. Several kinds of physical inputs are related to each of these functional activities, e.g., finance, personnel, facilities, supplies, equipment, and transportation. Each type of input, either singly or in conjunction with one or more other inputs, implies specific activities, which are expected to have certain results. For example, an input of extension workers implies visits to the homes of prospective clients for the purpose of motivating them. The immediate expected outcome of this activity is an expression of interest in adopting family planning, as evidenced by, say, acceptance by the client of a letter of referral to the clinic. A more remote outcome is an actual visit to the clinic. At this point a further input activity—that of medical or paramedical personnel explaining the pros and cons of individual methods and dispelling the client’s misgivings about a particular method—would probably result in acceptance, which is an outcome of the above activities. Here the particular input of personnel (medical or paramedical) must be combined with other inputs such as facilities, equipment (for medical examinations) and contraceptive supplies, to make the expected outcome possible.

2. Each program component can be subdivided into inputs, activities and outputs in the above manner. It is clear that the attainment of the ultimate goal of a program—a reduction in fertility—is the result of a linked series of "input-activity-output" chains where each output is the input for the next activity until the ultimate goal is reached (see Essay I).

3. It is possible to quantify most of the inputs, activities and outputs, although some (such as the qualities of personnel) may be more difficult to quantify than others. A second point to note is that it is impossible for top management to keep fully informed of all individual inputs, activities and outputs at every step without becoming over-burdened. As a rule, therefore, a compromise is necessary: that of monitoring key inputs (i.e., maintaining regular statistics) and outputs (acceptance and continuation rates, usually). In the initial stages of a program, detailed studies of all aspects are valuable in determining the quantities of inputs required to generate a given amount of activity; but a program where there has been time for the inputs to become standardized, the regular assessment of outputs alone would give sufficient indication of the continuing good health of the program. Such assessment would also identify areas, facilities, seasons and methods for which output is unusually high or low, so that these elements can be subjected to a more detailed investigation.
4. The following sections are concerned with the measurement and interpretation of "output" data on (a) the acceptance of methods from program sources, (b) the use of program methods and (c) changes in fertility.

B. ACCEPTANCE OF FAMILY PLANNING METHODS
FROM PROGRAM SOURCES

5. Program acceptance statistics are continuously generated and regularly reported in any family planning service statistics system. The statistics are broadly of two kinds: (a) the numbers of acceptors of individual methods, and (b) the characteristics of these acceptors. The former can be used for the analysis of acceptance trends and the latter for studying qualitative aspects of acceptance; both provide useful management information.

6. Trends in Program Acceptance: Trends in family planning program acceptance can provide a wealth of information if examined imaginatively. During the initial years of a program, acceptance trend analysis is of particular importance because of the scarcity of other data and because in most countries family planning practice outside the program is minimal. Such analysis is a simplistic but useful way of assessing the outcome of total program efforts.

7. The Study of Numbers of Acceptors: The simplest form of trend analysis is the study of numbers of acceptors without the help of other data. This study can be carried out for each method by plotting graphs or preparing simple charts of each region and sub-region in the country. The need for regional or sub-regional analyses arises particularly in large countries with local variations in administrative practices and community characteristics.

8. Acceptance trends can be studied to observe:

(a) Comparative performance over time (e.g., trends in total annual acceptance, cumulative acceptance in the current year compared with the previous year, etc.);

(b) Shifts in contraceptive preference (e.g., comparing percentage distributions of method-specific acceptance over time); and

(c) Seasonal variations in acceptance (i.e., certain months of the year could be repeatedly characterized by markedly low or high acceptance).

9. Each of the above types of observations may have administrative implications. For example, it may be discovered that repeated low acceptance in particular months is associated with obstructions to the flow of funds for
incentive or salary payments, due to some peculiarity of financial management in the country in question. Also, acceptance might be associated with the harvest or the monsoon, which would imply that those periods could be devoted more effectively to other purposes (such as sending field workers to training courses) rather than recruitment of acceptors. In a heavily postpartum-oriented program such variations could be linked with seasonality in hospital births. In a sterilization-oriented program they might mean that people prefer to avoid surgery in the hot season. In any event, it is important to discover the unusual from the data so that steps may be taken to remove the cause, or take advantage of the situation, as the case may be.

10. The Standardization of Acceptance Data: A more effective way of looking at acceptance figures is by standardizing them with respect to the size or some other characteristic of the population served, expressing the statistic as a ratio. Obviously this method requires additional data, available only from sources outside the family planning service statistics system.

11. If reliable population data are available, the following indicators can be useful for program monitoring:

(a) Number of acceptors per 1,000 population;

(b) Number of acceptors per 1,000 women in childbearing ages (usually 15-44 years);

(c) Number of acceptors per 1,000 married women aged 15-44;

(d) Number of acceptors per 1,000 net gain in married women aged 15-44.

12. These indices can be used for comparing performance over time for the nation as a whole as well as for each smaller administrative area. More importantly, however they permit comparison of performance among administrative areas differing widely in population and in age, sex and marital status composition. Dividing the number of acceptors by the total population eliminates differences among areas due to differences of population. Dividing by the numbers of women aged 15-44 and married women aged 15-44 takes into consideration differences in the age-sex distribution and in the proportion married, and thus permits the study of acceptance in terms of the real target group—married women of childbearing age.

13. Efforts to recruit new acceptors are directed to the entire group of married women of childbearing age. If the number of acceptors each year is consistently less than the number added to this target group, a backlog of considerable proportion can accumulate in a few years. Thus the number of acceptors per 1,000 net gain in married women aged 15-44 (number of new marriages to women aged 15-44 minus attrition to already-married women aged 15-44 due to widowhood, death, divorce and reaching age 45) indicates whether the program is "catching up" or falling behind" over the years.
14. The additional data required for deriving indices (a), (b), and (c) are estimates of total population, female population aged 15-44 and married females aged 15-44, which form the denominators of the ratios. The usual sources of these estimates are projections based on data from censuses or national surveys. More rarely, where the national family planning program requires its field workers to maintain up-to-date registers on all households in their areas, the data from the registers can be combined to provide these estimates. In some countries with an effective system of registering all individuals, these estimates are easy to obtain. In any case, a reliable mid-year estimate of the relevant denominator is adequate, since the denominator changes only slightly from month to month.

15. The denominator for index (d)—net gain in number of married women—is likely to be more difficult to estimate. If the country has a reliable vital registration system which includes marriages and divorces, the denominator in this particular index can be estimated fairly accurately. Sometimes the estimate can be obtained by using data from a recent census, perhaps supplemented by a separate survey, provided there are no rapid changes in age at marriage or in divorce rates. It is better to calculate this index for the whole year than for months or quarters, since it is likely to be sensitive even to small errors in the denominator.

16. The usefulness of the above indices depends upon the reliability of the denominators, which are obtained from sources outside the family planning program. Each successive index is more sensitive to errors in the denominator than the preceding one, since the denominator becomes increasingly smaller (though more relevant) while the numerator (the number of acceptors) remains the same. Sometimes it may be preferable to use a crude index rather than a refined one of questionable reliability.

17. Comparison of Performance with Acceptance Targets: Acceptance data can also be profitably compared with pre-assigned acceptance targets. Targets can be assigned, not only at national or regional levels, but also at lower levels, such as clinics, or even individual workers. Shortfalls in national or regional performance can be investigated by examining conditions in specific small areas or units within the region of gross under-achievement. The usefulness, however, of comparing performance in relation to targets depends upon how realistically the targets have been set, because the achievement of targets is often affected by factors outside the program.

18. An index of the nature of "proportion of target achieved" can be derived monthly, quarterly or cumulatively throughout the financial year, for the purpose of studying trends. It can also be used to compare performance between regions. The examination of such an index, followed if necessary by further investigation, can lead to prompt identification of problems in the field. On the other hand, it may lead to the conclusion that the targets were inappropriate initially.
19. **Use of a Composite Index of Acceptance:** Individual family planning methods differ in clinical effectiveness (i.e., some methods, such as the pill or IUD, are "safer" than, say, condoms or foam tablets). Furthermore, the average period of continued use can vary from one method to another within the same society. Therefore, when comparing performance among regions, the administrator is faced with a problem if there is a significance difference between the numbers or proportions of acceptors of the various methods. A similar problem may arise when achievements are compared on a year-by-year basis.

20. Thus, there may be a need to establish a standard of comparison among methods for measuring achievement. This is particularly necessary when contraceptive preference in a given area does not correspond to the method-specific targets assigned, so that under-achievement in one method can be compensated by over-achievement in another.

21. Such a standard can be developed by converting each acceptance into a figure that specifies the length of time the acceptor of the method is expected to be protected from pregnancy (often expressed as couple-months or couple-years of protection), taking into consideration both clinical effectiveness and length of use. Alternatively, one particular program method can be designated to represent all other program methods by using conversion factors of the nature: one sterilization = \( x_1 \), IUD insertions = \( x_2 \), pill acceptors = \( x_3 \), years of condom use, etc., the parameters \( x_1, x_2, \ldots \) representing the relative effectiveness of the corresponding method in providing protection from pregnancy compared with sterilization.

22. Requirements and sources of data for obtaining estimates of "couple-years of protection" are given in a later section, together with brief outlines of procedure and interpretation. However, caution is needed in using these conversion formulas. For example, if workers are to be evaluated on the basis of how much effort they have extended (rather than on how many couple-years of protection have resulted from their efforts), these formulas cannot be used, because the relative efforts required to recruit acceptors of two individual methods may not be proportional to the relative effectiveness of such acceptance in terms of protection from pregnancy.

23. **Tabulation of Characteristics of Acceptors:** In addition to the need for data on the total numbers of acceptors by area and method for monitoring program progress, there is a need to know who these acceptors are. Periodic tabulations of acceptor characteristics available from client records not only tell the administrator about the kinds of people accepting various methods, but also the extent to which the goal of recruiting acceptors with specific attributes is being achieved, if such a goal exists. For example, the focus of a program is often on the recruitment of younger women with fewer children in order to achieve greater demographic impact. Thus, those with less education and lower incomes are less likely to be protected in the absence of a program. The analysis of such characteristics can show whether and to what extent the program is reaching these groups.
Generally, demographic characteristics of clients which are recorded in most countries include age, parity (or number of living children), duration of marriage, interval since termination of last pregnancy (or live birth); while those of socio-economic significance cover education, income, occupation, and rural-urban residence. Other areas of general interest include past contraceptive practice, source of motivation, purpose of practicing contraception, among others. In some countries, information on the acceptors’ religious affiliation and/or race has been collected and found useful. The most frequently used characteristics, however, are age, education, parity and residence.

**Trends in Acceptor Characteristics:** Simple percentage distributions of acceptors of each method with respect to each of the above characteristics are often adequate. These data provide the administrator with a broad description of the kind of people the program is able to attract. An examination of these percentage distributions at intervals (say, six months or one year) usually reveals shifts in the composition of the acceptors with respect to specific characteristics. For example, it might be found that over one-half dozen six-month periods the proportion of acceptors under thirty years of age had increased from 40 percent to 50 percent, indicating that the program is attracting relatively younger acceptors.

**Comparisons with the General Population:** The percentage distribution of acceptors with any given characteristic does not, by itself, indicate very much about the quality of acceptance unless such percentages are compared over a period of time so as to throw light on the trend. The distribution at a given moment, however, can be fruitfully compared with the distribution of all women within the childbearing ages. The finding that 50 percent of the acceptors had, say, less than a primary education becomes more meaningful if it is also known that only 40 percent of the married females aged 15-44 years had less than a primary education. These data signify that the program is reaching a higher proportion of the less-educated females. If, on the other hand, the proportion in the general female population is 70 percent, the opposite is true.

Acceptor characteristics can be compared with those of the general female population for various significant demographic and socio-economic attributes, such as age, parity, education, income, religion, ethnic background, and residence (rural/urban), if relevant tabulations from a recent census or national survey are available. Since characteristics of the general population are not likely to change significantly over short periods of time, data obtained from a recent census or survey can be used to compare acceptor characteristics over several years.

If reliable estimates of the numbers of married women within the childbearing ages in specific demographic and socio-economic categories can be obtained, the proportions of acceptors in each group can be computed regularly, say, quarterly or semi-annually, as well as cumulatively from the beginning of the program. Collected over a period of time, these data can be of great
value in determining whether the program should focus attention on some other groups, or use a different strategy for the original target groups. For example, after monitoring the program for two years, the administrator may discover that 40 percent of the women over 30 years of age have, at one time or another, accepted a program method, while the corresponding proportion of women under 30 years is only 20 percent. Such a finding may indicate the need for a change in strategy, such as providing improved facilities for methods more acceptable to women who have not yet reached their desired family size.

29. The Use of Bivariate Tabulations: Cross tabulations of two or more characteristics of acceptors, even without using comparable data for the general population, often can provide valuable management insight. These data can suggest answers to such questions as:

(a) Has the source of motivation for IUD acceptors shifted in favor of family planning field workers as opposed to doctors over the last two years?

(b) Is it true that more rural than urban acceptors have been motivated by face-to-face communication?

(c) Are more pill acceptors motivated toward family limitation than spacing?

(d) At the same level of education, is there a higher proportion of urban than rural acceptors?

30. Experience in countries with established family planning programs indicates that an annual analysis of acceptor characteristics is sufficient, except during the early years of a program, or when a new contraceptive or new strategy (for motivation or for service delivery) is introduced. Before reducing the frequency of such analyses, however, it is necessary to confirm empirically that the distributions of characteristics are, in fact, fairly constant over short periods of time.

31. In short, this section has reviewed the kinds of analyses possible with acceptance data easily obtainable from routine program statistics, and the advantages of analyzing them in conjunction with data available from external sources, such as censuses, national surveys conducted by other agencies, and vital registration systems. It has also indicated that the monitoring of acceptance trends by method can easily be undertaken monthly as well as cumulatively over parts of a year or over one or more years. On the other hand, acceptor characteristics usually do not need to be analyzed as frequently, unless the data are also being used for such administrative purposes as evaluation of individual worker performance. 1/ Most of the indicators suggested

1/ For example, the worker may earn higher credits for recruiting relatively younger women or women in lower parities.
C. THE USE OF PROGRAM METHODS

32. Acceptance trends, while providing administrators with an easy means of monitoring performance, do not necessarily give a clear indication of the effectiveness of the program, i.e., the extent to which it has been successful in preventing births that otherwise might have occurred. A step in that direction is to attempt estimating the protection from pregnancy conferred on the acceptors without actually trying to calculate births prevented. As mentioned above, the need for estimating protection arises because all methods, even if conscientiously used, are not equally effective (rhythm, jelly, foam tablets, and condoms are known to be more fallible than IUDs, pills and sterilization). Secondly, the communities in question may obtain varying degrees of protection from the same method, depending upon the strictness of their adherence to it. The acceptors of the IUD in one community may continue to use the method for a longer period of time on the average than those in another. Thus the mere numbers of IUD acceptors in the two communities do not reflect the full story about the relative effectiveness of the IUD program. Sometimes in the same community acceptance may increase, but continuation of use after acceptance may decline to an extent that outweighs the effect of the increased acceptance. Sometimes protection is redundant; for example, postpartum IUD insertions do not begin to provide protection until a few months after confinement, since the acceptors are not likely to become pregnant during the period of postpartum amenorrhea.

Estimating Period of Protection

33. The period of protection can be estimated from data on the duration of use of one or more methods by individual couples. These data are obtained from clinic records (collected at the time of acceptance as well as during follow-up visits), or by making periodic follow-up surveys of acceptors.

34. Estimation of Protection Using Clinic Data:

(a) Sterilization: A sterilized woman may be considered to be protected during the entire period from sterilization to the end of her childbearing (i.e., 45 years of age). The wife of a sterilized man is considered to be protected until she reaches 45, provided she does not re-marry following widowhood or divorce. Thus, if the age of an acceptor (or of the wife of a male acceptor) noted
on the clinic record is reliable, it can be used to estimate the period of protection, except where divorce and remarriage are prevalent.

(b) **IUD**: IUD acceptors may be considered to be protected from the time of insertion until expulsion or removal of the device, except for the small percentage who become pregnant with the device in situ. If all acceptors reported IUD expulsion or pregnancy to the clinic or came to the clinic for removal of the IUD for whatever reason, protection then could be calculated from clinic data. In actual practice, however, many IUD acceptors do not come back to the clinic after the initial visit or after one or two follow-up visits. After some time, these women could still be using the IUD, they could have expelled it, had it removed elsewhere or removed it themselves, or might have become pregnant without reporting the fact to the clinic. Therefore, if an IUD acceptor does not report back to the clinic it is not known whether she continues to be protected by the IUD, is "unprotected" or is protected by some other means after discontinuing the IUD.

(c) **Oral pill**: The pill differs from the IUD in that the pill is not a "one-time" method. Acceptance of the pill does not presuppose its use, and use does not necessarily mean ability to follow its strict regimen. Most pill programs insist that the acceptor come to the clinic for a re-supply. It may be assumed, therefore, that a woman who takes the trouble to visit a clinic for a re-supply is likely to use the pill. So long as these acceptors keep coming to the clinic, the protection they are receiving is known from clinic records alone. But if a woman does not come back after some time, it is difficult to establish whether she is pregnant, not protected, protected by pills from another source (perhaps another program clinic) or protected by another method.

(d) **Condoms**: The estimation of protection from condom use based on any kind of clinic record is unreliable mainly because these acceptors have a tendency to use non-clinic sources as alternatives, and they are likely to be counted as new acceptors when (if at all) they come back to the clinic after an interval. Furthermore, condoms are likely to become more popular in some countries as a result of marketing them at subsidized prices, as in India. Such a marketing program is legitimately part of the national family planning program, even though the distribution channels may not be
the usual clinics or family planning workers. If, as suggested, alternative sources of distribution are used, the data for estimating protection from condoms must be sought elsewhere than the clinic.

(e) **Other conventional contraceptives:** These include foam tablets, diaphragms, jelly, rhythm and other non-clinical methods. It is difficult to obtain estimates of protection from these methods from clinic data for two main reasons: First, they are coitus-related methods, and the collecting of supplies from clinics even with the best of intentions does not ensure their use at the appropriate time. Second, clinics in most programs only record information on the number of pieces of contraceptives distributed and do not maintain a continuing folder or card for each individual acceptor. The proportion of acceptors using these methods for an appreciable time is small in most countries, and considering the clinical effectiveness of these methods, the contribution of these acceptors to the level of total protection from all methods is insignificant.

35. For methods such as the IUD or the pill, updating clinic records by means of follow-up home visits at frequent and regular intervals may be considered. This procedure has been tried in several programs, however, but has not been successful. Additional record-keeping in the field is never popular with field workers. Furthermore, while the number of workers in an area does not usually increase over a short period of time, the number of women requiring follow-up visits can increase many times over in the same time span. As a result, recruitment and follow-up visits compete for the same worker-hours.

36. **Estimating Protection Through Follow-up Surveys:** Except where there is a high worker/population ratio, it is unrewarding to attempt the estimation of protection, based on clinic records supplemented by follow-up home visits. As an alternative, most programs have tried to measure protection by means of periodic follow-up surveys of samples of acceptors of specific methods. A national sampling will yield data that can be used to estimate method-continuation rates, and to measure the use-effectiveness and extended use-effectiveness of contraceptive practice. The last two terms refer respectively to the effectiveness of a contraceptive method during the period of its use, and

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to the avoidance of pregnancy in the interval between acceptance of the method and the next pregnancy, when this interval may include periods of non-use, or the use of other methods.

37. Follow-up surveys have generally been confined to acceptors of the IUD and the oral pill, partly because in many countries these are the chief methods, and partly because clinic records provide a useful sampling frame for selecting respondents to the survey. Surveys are particularly useful in measuring changes in contraceptive practices among a group of past acceptors. For example, former acceptors who are no longer in a clinic's active file may: (a) still be using the last reported method, (b) have switched to another method, or (c) not be currently using any method. When a sample of these acceptors is interviewed by trained interviewers in a follow-up survey, a wealth of useful information can be obtained, apart from measurements of continuation of use or protection. The interviews could reveal reasons for discontinuing the initial method accepted, such as attitudes toward the clinic service provided, difficulties experienced by clients in availing themselves of the services, the extent of contraceptive practice by other methods, pregnancies or abortions after initial acceptance, and the use of non-program methods of contraception.

38. A follow-up survey helps to estimate the protection provided, not only by the method initially accepted, but by whatever methods the acceptors used after initial acceptance of a particular method. It can also provide estimates of the potential fertility of acceptors essential for calculating the demographic effectiveness of acceptance. Thus, follow-up surveys can be recommended for any program, even if clinic data alone provides a reliable measure of protection. A fairly extensive body of literature is available on follow-up surveys including suggested designs, potential uses, and significant findings from actual surveys.

3/ Follow-up surveys of sterilized cases are considered by many to be unnecessary for the purpose of measuring effectiveness or protection, because with minor exceptions sterilization is an "irreversible" (and therefore a 100 percent effective) method. As yet, a large-scale follow-up survey of condom acceptors has never been undertaken, although there is no reason why it would not prove to be helpful.

Measurement and Uses of Protection Estimates

39. **Measurement**: One of the indices most commonly used in recent years for measuring protection is that developed by Wishik. Known as couple-years of protection (CYP), it tries to convert each unit of contraception into a common denominator of program output. It can be expressed in the form:

\[
\text{CYP} = \frac{\text{Sterilizations} + C_2 \text{ IUD insertions} + C_3 \text{ Pill acceptors} + l \text{ conventional contraceptives distributed}}{C_4}
\]

CYP can be calculated separately for sterilizations performed, IUD and pill acceptors recruited, and contraceptives distributed during the year, and then the results added up. It may be noted that the acceptance of some methods, such as sterilization or the IUD, during a given year provides protection, not only during the same year, but also through some future years. The weights \( C_1 \), \( C_2 \), \( C_3 \) and \( C_4 \) denote the number of years a woman is protected from pregnancy after accepting the respective method. For example, if pill acceptors continue to use the pill for an average of two years after first acceptance, the CYP to be assigned to each pill acceptor is two years, part of the protection being received beyond the year of acceptance.

40. Stated in simple terms, the weight \( C_1 \), for sterilization, is the difference between 45 (the age when childbearing ends) and the average age of the wife at the time of sterilization of either spouse. The weights \( C_2 \) and \( C_3 \) represent the average durations of use of the IUD and the pill after first acceptance, and are based on continuation rates. Theoretically, the weight \( C_4 \), for conventional contraceptives, could be determined in a manner similar to \( C_2 \) and \( C_3 \). However, because of the absence of appropriate data, \( C_4 \) is usually expressed as the number of pieces required to protect a couple for one year after making allowances for non-use, wastage and method failure.

41. Obviously, of the four weights, \( C_4 \) is the most difficult to estimate, and is based on little more than an informed guess in most countries where it is used. Error from this source is probably negligible where few condoms or foam tablets are provided from program sources. However, it is essential to develop a realistic estimate of protection from these methods in countries, such as India, where they form a substantial part of the program. This estimate is best based on a follow-up survey of a representative sample of acceptors of each important conventional method.

42. **Uses**: The estimate of protection has two principal uses: First, as a rough measure of program output it helps the administrator to evaluate the relative performance of sub-units. Second, when the crude estimate of protection is corrected for certain inherent biases, it can be used to calculate the ultimate effect in terms of births averted by the program. This second aspect is discussed in detail in Section D of this essay.

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43. Protection can be divided into: (a) current protection, i.e., the total woman-months of protection conferred during the current year by past acceptance and (b) future protection, i.e., the total amount of protection conferred this year as well as in the future years by the acceptances received during the current year. In calculating current protection, it must be remembered that the weights assigned to each method during preceding years are likely to be different from those for the current year. Estimates of future protection sometimes can be useful in evaluating annual output in terms of inputs. Also, the former approach can be used to estimate the number of women protected at a point in time (such as at the end of each month, each quarter, or each year) as a result of the cumulative effects of past acceptance. Once a reliable figure is obtained, it can be expressed as a percentage of all women eligible for protection 6/ to project an idea of the program's coverage from time to time.

44. Protection, as measured by CYP, can be used to compare the program outputs of successive years, or the outputs of various regions during the same year if a suitable denominator, such as the number of married women of childbearing age, is available. Used this way, CYP is a more effective index for this purpose than numbers (or proportions to married females 15-44) of total acceptors. It is highly suitable for use in cost-effectiveness analyses of family planning programs, since it avoids the problems caused by differences between the protection provided by individual contraceptive methods.

45. CYP is open to the criticism that it does not take into consideration age—the most important determinant of the demographic effect of protection. (It is, nevertheless, possible to incorporate age in the computation of the weights.) A second criticism is that it treats, say, five women protected for 20 months each as being equivalent to one woman protected for 100 months, which may not be true. As an administrative tool, however, for comparing output over time or between regions, CYP is adequate and is superior to mere acceptance data. As mentioned above, with the aid of several refinements a CYP measure can be converted into a measure of births averted from which the demographic effects of the program in terms of a reduction in fertility can be derived.

D. MEASURING DEMOGRAPHIC IMPACT OF FAMILY PLANNING PROGRAM ACCEPTANCE

46. The most frequently used method of measuring the demographic impact of a program is the indirect one of successively converting acceptance data into periods of protection, births averted by such protection, and the decline in fertility due to births averted.

6/ See Ross, et. al., op. cit.
47. There is a large and growing body of literature which describes the methodology, data needs, scope for refinement, and the conceptual as well as operational pitfalls in using this indirect approach, either for estimating acceptance targets from demographic targets or for estimating demographic effects from achieved acceptance. 7/ There are many examples of the application of this approach to specific countries. 8/ The several package computer programs now available make it possible to apply computer analysis to widely different data mixes. 9/ While it is possible that the current methodology can be improved, it is also true that appropriate data, even for the present level of sophistication, are not found in most countries. A brief description of the procedure for applying this approach and some suggestions for refinements are given below.

Description of the Procedure

48. Periods of protection are first calculated separately for each age group, each method and for each annual cohort of acceptors, and then spread over successive program years, starting with the year of acceptance until protection ends because of the discontinuation of contraception during the wife's childbearing years, the death of either wife or spouse before the wife reaches the age of 45, or the wife becoming 45 years of age while the couple is still practicing contraception. From these figures is derived the level of total protection received during each program year by the cohorts of acceptors who accepted in that and previous years. From these data the number of births averted each year can be estimated.

7/ For example, see R.G. Potter, "Contraceptive Impact Over Several Generations," in Population Dynamics, Academic Press Inc., New York, 1972. The references given at the end of this article comprise a fairly comprehensive bibliography of the subject. A chapter entitled "Births Averted" by David Wolfers in Issues Studying the Impact on Fertility of Family Planning Programs, a soon-to-be-published volume edited by C. Chandrasekaran, is an up-to-date comprehensive review of this approach and also includes a good bibliography.

8/ At least three mimeographed documents prepared by the staff of the World Bank provide a brief discussion on the use of this approach with illustrative methodology. These are papers by Mr. Roberto Cuca (illustrative data for Tunisia), Mr. Monowar Hussain (illustrative data for Iran) and the yellow cover appraisal report for the proposed Bank-assisted population project in Kenya.

9/ For example, see D.J. Bogue, S. Edmunds, and M. Rafiq, A Technique for Projection of Family Planning Targets, and Quotas Required to Attain Demographic Objectives, Family Planning Evaluation Manual No. 6, Community and Family Study Center, University of Chicago; Operational Manual for FMPLN2 prepared by International Statistical Program Center, U.S. Bureau of the Census, Washington, D.C.; and the programs ABREV 1, ABREV 2 and PROJ 5 developed by R. G. Potter for UN/ECAFE, Bangkok.
49. The basic acceptance data required are the annual numbers of acceptors classified according to age (five-year age groups are adequate) and the methods accepted. If there is a steadily increasing or decreasing trend of a highly pronounced seasonal pattern of acceptance, monthly acceptance data can help to improve estimation. Analytical techniques can also be used to take such trends or seasonality into consideration although, as a rule the effects on overall periods of protection are not significant.

Estimation of Length of Protection for Different Methods

50. **Sterilization:** The sterilization of either husband or wife normally confers protection from pregnancy until either spouse dies while the wife is still under 45 years of age, or until the wife becomes 45. Therefore, additional data will be required, i.e., estimates of the average age difference between husband and wife and of the probability that both husband and wife, with a given average age difference, will survive until the wife becomes 45. The first can be obtained from family planning service statistics if ages of both husband and wife are recorded, or from IUD or pill follow-up surveys, or from a census or a survey of the general population.

51. Estimates of the probability of survival for husband and wife can be derived from recent census data allowing for any decline or mortality recorded in the recent past or that which is likely to occur in the near future. In the absence of census data, a suitable model life-table can be used. 10/

If divorces and remarriages, particularly during the ages when a couple would accept contraception, are frequent, further data and refinements in methodology are necessary to adjust for the consequent loss or gain of protection.

52. **IUD and Oral Pill:** Since the IUD and the oral pill are not irreversible methods, a cohort of acceptors can be depleted for reasons--personal or medical--other than mortality. It is therefore necessary to know how long, on the average, acceptors of these methods continue to practice them. These "continuation rates" provide a measure of protection through IUD or oral pill use.

53. Continuation rates are best obtained from follow-up surveys of acceptors, although they may also be obtained from service statistics, provided that the records for all acceptors are up-to-date and complete. Because the latter is not generally so, the records tend to over-estimate continuation. The data required to calculate continuation rates are simply the dates of acceptance and of discontinuation (i.e., duration of use) for each acceptor;

the procedure for this calculation is well-documented. Continuation rates generate a "decay curve" which shows how many from an initial cohort are dropping out with the passage of time until no one is left as "still continuing." These data provide an estimate of the average duration of protection received by each annual cohort of acceptors of the IUD and the oral pill.

For IUD and oral pill users it is preferable to know continuation rates for four or five years, although this coverage is obviously not possible in the early years of a program. However, if continuation rates for, say, 12 months can be obtained, a decay curve can be borrowed from another country which has had similar experience with acceptors during their first 12 months of use—until the program yields data over a sufficient time period. It may therefore be recommended that IUD and pill follow-up surveys be undertaken one year after the start of a program, and every two years thereafter. The latter is recommended, not only to obtain knowledge about the continuation rate of the initial cohort after four or five years of use, but also because continuation patterns for acceptors for succeeding cohorts may differ from those of their predecessors. Furthermore, follow-up surveys yield a variety of other management-oriented information in addition to continuation rates.

Conventional Contraceptives: The most difficult duration of time to estimate is the period of protection conferred by the use of conventional contraceptives related to single events of coitus. The conventional female methods, such as foam tablets, jelly, diaphragms, and rhythm, have now given way to more efficient reversible methods, such as the IUD and particularly the oral pill, and thus the relative contribution of the conventinals is insignificant. The condom, the only conventional method for males, (excluding coitus interruptus), is, however, a substantial contributor in some programs, and is likely to become more significant in the future.

Because of the limitations of data on condoms (number distributed rather than number of acceptors), the derivation of protection from this source can be derived only in an indirect manner: by dividing the number distributed by an estimate of the number needed to protect a couple, for one year. This estimate is based on several factors, such as average frequency

11/ For example, see R.G. Potter, "The Multiple Decrement Life Table as an Approach to the Measurement of Use-Effectiveness and Demographic Effectiveness of Contraception," Contributed Papers, IUSSP (Sydney, 1967). Publications by Christopher Tietze, in Studies in Family Planning (Population Council) and elsewhere.

of coitus, number of times condoms are likely to be used during coitus, number of coituses unprotected because of non-use or method failure, or use during period already protected (e.g., postpartum amenorrhea). An acceptable estimate of the number of condoms required to protect a couple for one year can be made only from a follow-up survey of condom users. Based on distribution figures, this number needs to be inflated by a factor representing wastage (lost, damaged) or "not-yet-used." The final figure thus obtained then can be divided into the number of condoms distributed to derive the length of protection.

57. In some cases (as in India), most of the condoms provided through programs are distributed through subsidized commercial channels. Then, information on the number of condoms reaching the users must be obtained from sources other than service statistics—such as the annual inventory figures of a representative sample of retailers (number received from wholesaler minus stock in hand) and the records of wholesalers (quantity supplied to the retailer minus an estimated fraction not yet sold by the retailer). Even the quantity ordered and the frequency of ordering by the wholesalers from the distributor can provide a fair estimate of the number reaching customers once a pattern for time-lag and quantity in pipeline is established.

58. The period of protection provided by conventional contraceptives can be estimated separately for each year. (Other methods generally protect each acceptor for more than a year, and the periods of protection therefore need to be apportioned for each year.) Once this estimation has been completed, the total number of woman-years of protection during a given year is obtained by summing up the year's protection from each method. Since the propensity for childbearing varies at different ages, protection needs to be estimated separately for each age group in order to derive births averted. Age-specific protection from conventional contraceptives is not obtained directly through the procedure described in the preceding paragraphs. An approximation can be obtained by pro-rating the total length of protection from these methods according to the age distribution of conventional contraceptive users obtained from a survey. The derived figure which represents woman-years of protection also typifies the number of women who normally would have been subject to the same chance of pregnancy as other women, but are not fully protected during the year under consideration.

Refinements in Estimating Protection from the IUD and Oral Pill

59. While the scope for improving the quality of the data required for estimating protection is very great, only a few important causes of over-estimation are discussed here. The discussion is mainly confined to the IUD and the oral pill, although passing references are made to other methods.

60. Overlap with Postpartum Amenorrhea: The protection due to the IUD and the pill can be over-estimated unless care is taken to allow for the overlap of their use with periods of anovulation. This over-estimation can be serious if a large proportion of acceptors are postpartum acceptors. The
problem is not so great in the case of sterilization, where the anovulatory period is only a small fraction of the total period of protection. Data required for the necessary correction represent: (a) the interval between the termination of the last pregnancy and the date of acceptance, and (b) estimates of the interval following the termination of pregnancy during which a non-contracepting fecund woman is not likely to become pregnant in the community in question, for different types of termination—abortion, still birth and live birth. Data for (a) can be obtained from service statistics records or follow-up surveys (the surveys are more liable to error due to lapses of memory). Data for (b) can be derived from follow-up surveys (if the women have had sufficient time to discontinue, become pregnant, have a pregnancy termination and remain without contraception for a sufficient time period thereafter), or from carefully conducted fertility surveys of the general population with pregnancy history data.

61. **Accidental Pregnancy during Use of Method:** Another factor likely to lead to over-estimation of the period of protection is accidental pregnancy while using contraception. Let us assume that two women are practicing contraception for equal lengths of time, say 30 months. At the end of that time one discontinues although not pregnant, while the other discontinues because she has become pregnant (because of method failure or her own carelessness). It cannot be said that both women have received the same protection, although both practiced contraception for the same period, because the first woman will take a few months on the average to become pregnant after discontinuation, while the second is already pregnant at the time of discontinuation. If the average time required for a woman in a susceptible state (i.e., just stopped practicing contraception, not pregnant and not in postpartum amenorrhea, such as the first woman in the example) to become pregnant is six months, then the period of protection assigned to the second woman should be reduced by six months. The argument is that, if the second woman had dropped out six months earlier in a susceptible state, she would have needed to wait six months to become pregnant. Thus the protection she received was 24 months rather than the 30 months the first woman received.

62. **Accidental pregnancy cannot occur in cases of sterilization.** It has been shown from Taiwan data that, for the IUD, correction for accidental pregnancy does not reduce the period of protection by more than five percent. In the case of the oral pill, the reduction will be even less if this method is practiced properly. Thus for these three methods the correction factor can be safely ignored if the required data, which are usually obtained from follow-up surveys, are not available. In the case of conventional contraceptives, however, which are less effective because of generally irregular practice, non-correction can lead to serious over-estimation of the period of protection. A high rate of discontinuation due to pregnancy also renders the overlap with postpartum amenorrhea more important when contraception is resumed after the termination of pregnancy than it would otherwise be.

63. **Overlap with Secondary Sterility:** A further refinement is introduced by taking into consideration the overlap of contraception with secondary
sterility, since contraception offers an already sterile woman no additional protection. If the proportion of sterile women among users is the same as among non-users, this factor can be ignored. But it is often found that the incidence of secondary sterility among users is lower. Thus the protection assigned to the users if they are treated in the same way as non-users is less than they actually receive through contraception. This means that, without appropriate correction, the period of protection is under-estimated, i.e., biased toward the "safe" side. Obviously this bias will be less for younger acceptors, say, under the age of 30 or even 35, but more for older acceptors. The bias is also less for those acceptors for whom the interval between the termination of their last pregnancy and acceptance is substantial. In other words, the older the acceptor at age of acceptance or the shorter the interval between pregnancy termination and acceptance, the more likely it is that the period of protection will be under-estimated.

64. Data for the required correction can be obtained from a carefully designed fertility survey of a cross section of the general population. The correction can be ignored unless there is a high proportion of postpartum acceptors in the older age groups; in this case the under-estimation sometimes can be serious.

Estimation of Change in Fertility

65. Computation of Births Averted: After estimating the amount of protection, the next step is to apply the (unprotected) age-specific fertility rates of the women who were thus protected to their age-specific couple-years of protection. This procedure would give the number of births that would have occurred after a corresponding time lag, but did not because of the protection received (the time lag is there because the women protected from pregnancy now are protected against live birth nine months later). Although this looks simple, the problem is that nobody really knows what those age-specific fertility rates in question would have been in the absence of contraception through the program. A schedule of the potential fertility of the users must therefore be used, since their real fertility is not known because pregnancy did not occur. The simplifying assumption that the potential fertility of the users is the same as that of the non-user married women (assuming also that all users are married) in the corresponding age groups of the general population is open to two serious criticisms. 13/ First, users of contraception,

being a specially selected group, have a potential fertility different from
that of non-users and, second, in the absence of program contraceptive facil-
ities, some of these users would have used other facilities or methods, or
would have resorted to induced abortions.

66. There is no simple way to estimate the degree to which program
facilities are simple substitutes for others. It may be suggested, however,
that the problem of estimating exactly how much credit should be given to the
program for the births averted need not cause the administrator serious
concern. The first criticism, that of selectivity, is more serious, however,
because acceptors often do have a higher than average fecundity, and generally
have had a birth shortly before acceptance. Adjusting the period of protection
for overlap with postpartum amenorrhea accounts for most of the effects of
such a recent birth. Some administrators consider that the higher than
average fecundity of users could be due mainly to the lower incidence of
primary sterility among users.

67. A crude correction for primary sterility may be made by increasing
the fertility of the non-user population by a small percentage based on
the proportion of women childless at the end of their child-raising period,
obtained from the census or surveys. A more acceptable way to derive poten-
tial fertility (using survey technique) would be simply to substitute the
age-specific marital fertility rate of a group of non-users with demographic
characteristics (such as duration of marriage and parity within age groups)
similar to the acceptors. A third technique that sometimes has been used
is to substitute the average age-specific fertility rates of first-time accep-
tors during the three-year period immediately preceding acceptance. This, of
course, will not work if the period of protection is more than two or three
years.

68. If no correction is made for the higher fecundity of users, the
number of births averted would be correspondingly under-estimated. If the
degree of under-estimation is not significant, some administrators might
decide to accept the error rather than run the risk of over-compensating,
preferring the pleasant surprise of finding that they have under-estimated to
the disappointment of finding that they have over-estimated the effectiveness
of the program.

69. One more adjustment is necessary before the fertility rates can
be applied to woman-years of protection for estimating births averted. Since
protection is derived from pregnancy, and since not all pregnancies end in
live births, a downward adjustment is necessary to take into consideration
normal pregnancy wastage. An estimate of pregnancy wastage can be obtained
from fertility surveys where data is gathered on pregnancy history from
follow-up surveys, or even from client records indicating the nature of the
termination of the last pregnancy. In the absence of, or at a constant rate
of induced abortions, this adjustment is likely to be stable. However, if a
high proportion of pregnancies is aborted outside the program, this adjust-
ment should be reflected in the estimate of potential fertility. Similarly,
if induced abortion is one of the program methods for reducing fertility
(note that other methods prevent pregnancy), the additional births averted by this method must be calculated separately and added to the total. 14/

70. The preceding discussion makes it obvious that, in order to estimate births averted, it is essential to have access to accurate fertility rates for women not using program contraception, and these can be obtained only from a fertility survey of the general population. It is desirable to combine such a survey with one of the knowledge of, attitude towards and practice of family planning (a KAP survey) just before the program is launched. An adequate vital registration system can provide age-specific marital fertility rates at the beginning of a program in some countries, although, of course, it will not distinguish potential users from others. The fertility rates for the first year of a program (or just before launching) are perhaps the most relevant for estimating potential fertility, but if fertility has already shown a tendency toward decline the substitution problem arises. For most countries about to begin a program or those which have only recently started one, however, it is fair to assume an insignificant amount of contraceptive practice and therefore a stable fertility pattern. In these cases, the age-specific marital fertility rates for the general population, obtained from a survey with a minor adjustment for primary sterility, can serve adequately to indicate the potential fertility of acceptors. Censuses can provide workable estimates of fertility although their reliability is often open to doubt. A baseline KAP-fertility survey can be recommended, therefore, as an essential component of program evaluation and management in any new program.

71. Computation of Reduction in Birth Rates: Estimates of annual births averted by program acceptance, while providing a measure of program effectiveness, do not by themselves measure reduction in the birth rate in the terms in which the demographic goal of the program is expressed. Dividing the births averted during a year by the estimated mid-year population will produce the reduction in the birth rate. If it is assumed that, in the absence of the program, the birth rate would have remained the same as the beginning of the program then the difference between the expected births without the program (population multiplied by the constant birth rate) and the number of births averted will provide an estimate of the actual births occurring during the year, which then can be converted into the current birth rate. 15/ The same procedure can be used to estimate current age-specific fertility rates and other standard measures of fertility, as well as declines in these measures,


15/ This calculation will give a "maximum" estimate of the current birth rate, whose accuracy will depend on the validity of the constant birth-rate assumption and the accuracy of the birth rate assigned for the first year of the program. It is a maximum estimate because it does not take into consideration contraceptive activities of the population outside the program, which may be considerable when the program has been under way for a few years.
subject to the same qualifications with regard to accuracy and non-program activity. The management implications of these calculations are that they may suggest at which point the focus of the program should be shifted from one age group to another.

The Indirect Estimation of Program Impact

72. The entire question of the impact of family planning programs on fertility is still controversial. Some administrators contend that countries with family planning programs where fertility has declined, might have experienced such a decline even without a program. Then there is the moderate view that a program can at least accelerate an otherwise slow decline in fertility; this statement is subsequently followed by the question of how much of the decline was due to the program. The issue is further complicated by considerations of the direct and indirect effects of the program and non-program effects. Another view is that, if the program is accompanied by a decline in fertility, there is no need to look further. This means that in countries where reliable age-specific fertility data are available annually (for example, in Singapore), it is sufficient to verify that the fertility rates are decreasing consistently. Irrespective of these views, the program administrator still needs a yardstick, however imperfect, to produce answers to such apparently simple but crucial questions as, has the program improved this year compared to last year, or is one area doing as well as another? A number of approaches to the question of the impact of family planning programs have been listed and briefly discussed by Reynolds. 16/ The indirect-deductive approach described in this chapter is only one of these.

73. This approach provides the administrator with a convenient yardstick for assessing program effects, because it is acceptance-related. Another advantage is that it permits the revision of acceptance targets, which are often derived from demographic targets by reversing the prevalence. Finally, in many countries with family planning programs, this approach presents the only way, perhaps, to form some idea of the decline of fertility after the program has been launched.

74. This emphasis on acceptance is by no means meant to deny the importance of studying fertility trends in the general population independently. In fact, in those countries where vital registration is weak it is almost imperative to conduct national cross-sectional fertility surveys at regular intervals, say, five-year periods, in order to estimate contraception and fertility reduction outside of the program. Apart from other values, such estimates are particularly useful for revising program acceptance targets, determining method focus, identifying demographic and socio-economic groups requiring attention, and formulating policy changes.

ESSAY III

FAMILY PLANNING SERVICE STATISTICS SYSTEMS

A. NATURE OF A SERVICE STATISTICS SYSTEM

1. The service statistics system of a family planning program is composed of the processes of collection, compilation, analysis and interpretation of data generated routinely during the implementation of a program. As thus defined, the system comprises only those data-generating processes that are built into the program, and excludes certain data sources important for program evaluation and management, such as vital statistics, knowledge, attitude and practice (KAP) fertility surveys and follow-up surveys. However, a carefully developed service statistics system can provide most of the data essential for efficient operation and monitoring. It can supply a continuous flow of information on direct program inputs such as finance, personnel, supplies and equipment, activities generated through these inputs, and the outcome of the activities in terms of acceptors, users, etc.

2. An adequate service statistics system includes interlinked sub-systems of records, reports, data analysis, interpretation and feedback as its principal components. The detailed design of a service statistics system will depend on the nature of the program (e.g., types of contraceptives used, or implementation strategy), the number of implementing agencies, the levels of data aggregation, the facilities for data processing and management needs. It is, therefore, impossible, to design a single system to suit every family planning program. Although some experimentation is unavoidable at the beginning of a family planning program, perhaps, guidelines based on past experience may help to reduce the need for trial and error.

3. There is an extensive body of literature on the subject of family planning service statistics systems, including complete manuals suggesting models for evaluation frameworks 1/, 2/, 3/. Some of the earliest published


works, referring to the coupon system used in Taiwan and Korea, offer guidelines for the day-to-day collection of statistics 4/, 5/. A valuable review by Reynolds 6/ emphasizes the need to develop clear concepts, define key terms, improve data collection, and analyze, refine and validate measurements. The reports of two United Nations meetings on family planning program evaluation offer suggestions for the classification of terms and the use of service statistics 7/, 8/. Another United Nations report is concerned with the cost-effectiveness of family planning programs, as estimated from data that can be obtained through a carefully planned and operated service statistics system. 9/ Another United Nations report 10/ presents a comparative study of service statistics systems in Asia.

4. This essay makes no attempt to select any system as the most efficient. Instead, it describes some of the types of records, reports and analyses found useful through experience, and points out some common pitfalls.

B. TYPES OF DATA REQUIRED

5. The main types of data required for the system may be classified as follows:

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(a) **Resource statistics**

(i) Available manpower: The number and types of personnel, qualifications and background, types of positions available, positions vacant, and training of personnel.

(ii) Available facilities: The number of clinics, hospitals, laboratories, or other service installations by location and type.

(iii) Available equipment and supplies: Medical instruments for insertion of IUDs, for sterilizations and abortions, for prenatal and postnatal examinations, and contraceptive supplies.

(iv) Financing: This is a relatively neglected area of research. Improved unit cost data through operations research are essential for an increase in program efficiency.

(b) **Service statistics**

(i) Staff activity reports: These document the efforts and performance of personnel in the various program units, e.g., the monthly reports of field workers, supervisors and clinic staff.

(ii) Client records and reports: Client management requires knowledge of client characteristics, the circumstances of individual initial acceptance and follow-up visits. The coupons for first acceptance of IUDs and oral pills in Taiwan, client cards in Pakistan and Morocco, and clinic records in Kenya provide such information.

(iii) Follow-up reports: Adequate follow-up is essential for good client management in order to assess client satisfaction or dissatisfaction with a program. These attitudes may become apparent only over a period of time and involve various sectors of the population. Appropriate action can be based on these findings.

(c) **Health, vital and demographic statistics**

Although the collection of health, vital and demographic statistics is not part of the routine of the family
planning organization, it is essential for program planning and for an evaluation of the program's impact on health and demography. Special attention should be paid to the accuracy of these statistics, since health and vital statistics, demographic registration data and family planning data all reflect each other. Health and vital statistics are usually obtained from the Ministry of Health, and demographic statistics from the central statistics or census office.

(d) Special surveys and studies

(i) KAP survey: This type of survey has become routine in many large-scale family planning programs. Its purpose is to assess changes in the population's awareness of, knowledge of, and attitude toward family planning, and to assess the practice of family planning methods among the target population, thereby determining the need and demand for services. This survey is similar to marketing surveys in business and industry.

(ii) Ad hoc surveys: Specific information of managerial importance may not be available from routine data collection systems or from KAP surveys, in which case ad hoc surveys are needed. A typical example is a survey to assess the production, importation and sale of contraceptive devices and supplies in a country as part of an effort to evaluate a national family planning program. A survey of community leaders and medical professionals in Taiwan, to assess their attitudes toward induced abortion and reform of abortion laws and knowledge of abortion laws in other countries, provided much valuable information for administrative decision-making.

(iii) Special studies: Small experiments or pilot study projects need to be undertaken to answer specific questions, particularly to help determine program strategies. The data required can only be obtained by this means, for example, when managerial decisions are to be made regarding such matters as: Should home visits be made to each target woman or only to a proportion of the target population? What is the optimum price for a cycle of oral pills? Will mailing be effective in recruiting family planning acceptors?
C. SERVICE STATISTICS RECORDS

6. Every input into a family planning program is recorded in some form or another, as are most of the activities. Inputs, whether of personnel, money, equipment, facilities or supplies, are recorded for the purpose of control or accounting. Activities (motivational, services, etc.) are also recorded and provide the usual direct output data (number of women contacted, number of acceptors, number of revisits, etc.). Sometimes certain records are kept simply to facilitate program operations or to help in the control process at the clinic level, and are not intended for reporting to higher levels. The following records are normally kept at clinic or higher levels:

(a) Records of potential or actual acceptors;
(b) Records of services rendered (including motivational) at the clinic or from external sources;
(c) Records of clinic facilities, personnel available and equipment (including transportation);
(d) Records of consumables (contraceptives, drugs, etc.);
(e) Information, education and communication activities undertaken by staff other than those at the clinics (radio spots, posters, wall paintings, etc.);
(f) Records of training activities;
(g) Records of staff recruitment and turnover; and
(h) Budget and expenditure records.

7. The first three categories of records are invariably kept at the lowest level, i.e., the clinic. Records of consumables are kept at all supply and demand points, while the remaining records are usually kept at higher levels. In the following section each of these eight types of records are discussed.

Records of Potential or Actual Acceptors

8. An individual undergoes four stages before becoming a confirmed "method user": (a) identification as a potential acceptor, (b) motivation, (c) acceptance, and (d) continuation of use. Records can be kept at each of these stages. At the present time several countries are using this system (e.g., Indonesia and India).

9. Identification: In a family planning program where extension workers are expected to visit households for motivation or to follow-up
acceptors, it is possible to build up a current household register for the community through an initial survey and periodic updating. This register identifies all potential acceptors, so that priority rosters can be built up for face-to-face motivation. Such a register can be used for preparing work assignments of field workers at the clinic level. It can also provide such data for program evaluation as the number of married couples, the number of acceptors of individual methods, the number of women currently non-pregnant, and the number of current users of family planning methods from program (or even non-program) sources.

10. The proper maintenance of a current household register requires a fairly high field worker/population ratio. Using an incomplete or out-of-date register will handicap the program and its evaluation. In areas where there is significant population movement the register may not be very accurate. In a combined family planning/MCH program, however, the pooling of field workers can make the register a more effective instrument for both purposes, facilitating work at the clinic level as well as evaluation of the combined program.

11. **Motivation:** After a potential acceptor has been identified, several further contacts may be necessary before the individual accepts a method. The records made at this stage often consist of referral or appointment slips issued to potential acceptors. While these records are primarily to facilitate clinic service, they also can be used to provide several management indices (e.g., ratio of acceptors to slips issued, and average time lag before a referral slip is presented at the clinic). However, records on every single contact during the motivation stage probably will be too cumbersome to maintain, as well as too bulky for the evaluation system to process.

12. **Acceptance:** The third stage is the actual acceptance of a method. At this stage, the chief record is the individual client record card. Since this is a more-or-less permanent record, a variety of designs have been tried out in various countries. The data recorded, in addition to identifying the client and the clinic, include selected socio-economic and demographic particulars of the client, medical history and examination findings, past contraceptive experience, and method accepted during the visit. Space is also reserved on the card for information obtained during follow-up visits. While much of this information is primarily meant for use at the clinic level, some of it, especially that relating to socio-economic and demographic characteristics, can be reported to the central evaluation unit of the program, and used as a sampling base for follow-up surveys. The follow-up history will provide useful data for calculating estimates of continuation rates of contraceptive use.

13. Two types of client record systems can be identified: (a) method-specific and (b) client-specific. In the former, a separate card is completed for initial acceptance and each time thereafter that a change in type of contraceptive method is made (as in India). In the client-specific system, which is perhaps preferable, a single card is completed for each accepting
couple irrespective of the method accepted, with space for recording subsequent method changes. This system potentially avoids the possibility of duplication in the counting of acceptors when a user changes from one method to another during the same year. Furthermore, when a contracepting couple changes from a female method to a male method (e.g., from oral pill to vasectomy), a client-specific record system can identify such changes easily for the purpose of reporting.

14. The exact design of client record cards depends on such factors as the extent of information requested, and the facilities available for storage and retrieval. Some programs have found it convenient to use a folded card to record general information (both medical and non-medical) about the couple and method-specific cards (to be inserted in the client's folder) for the more permanent contraceptive methods, such as sterilization and the IUD, in order to avoid making the folder cumbersome.

15. Other data recorded at the acceptance stage, such as the client ID card and clinic index card, are meant specifically to facilitate identification of the client and the retrieval of her record card during future visits to the clinic. Many such forms are in use and they have little relevance to the program evaluation system.

16. Continuation: The fourth stage is that of continuing use. This can only be determined by follow-up studies, perhaps involving home visits to learn the status of those who have disappeared from clinic records. Space sufficient to register information on several clinic visits can be provided on the client record card, and additional cards can be used for further contacts.

17. The records mentioned above, which deal with individual, potential or actual acceptors, are primarily for use at the clinic level, for assigning tasks to field staff, setting up priorities in acceptor recruitment activities, estimating future workload, and facilitating services to the acceptor. Data from the two permanent records mentioned—the household or eligible couple register and the client record card—also can be of use in program evaluation at higher levels. Eligible couple registers can provide data for estimating trends and levels of contraceptive use, protection from pregnancy and even fertility, depending upon their completeness, coverage and reliability. The "non-medical" information on the client record card provides data for socio-demographic profiles of acceptors, which are valuable for program evaluation.

18. The potential value of a household or eligible couple register for the purpose of evaluation depends on its accuracy and completeness which, in turn, is related to the time spent in maintaining it. The available personnel often simply cannot cope with the work required. The same workers who recruit and provide services to acceptors also keep their records, and it is never advisable to favor data collection at the cost of neglecting services. On the other hand, if the sole purpose of maintaining eligible couple registers is to help in the control of field operations, the registers need contain only a few items of information, and it is less important to keep them up-to-date.
Records and Services Rendered

19. These records refer to all client processing completed at the clinic at the time of first acceptance or during revisits, and include contraceptive supply and resupply, initial medical examination and attention to complaints, IUD insertion and sterilization operations. Most programs use a single register or log book in which data on each clinic visitor is recorded on a single line, although some programs use additional registers for each type of acceptor. The main register is often known as the "clinic activity register," although a variety of other names is also used. This register provides the data on the total activities in a clinic, which are generally collected monthly and reported to higher levels. It provides the bulk of the information that is reported by the clinic, including the total number of new acceptors by each method, the total number of revisits, the number of oral pill cycles and condoms distributed, the number of IUD re-insertions, and the number of complaints treated.

20. If contraceptive resupply is provided outside the clinic (e.g., at mobile clinics, as in Malaysia or at subcenters, as in India) separate registers can be kept for these activities. Since one of the principal purposes of clinic activity registers is to provide information for higher levels, an important consideration in designing them should be to facilitate totaling the number of activities. Usually, the daily total of individual activities is transferred to another sheet on a single line, and this sheet (or the monthly total derived from it) is forwarded to higher levels at the end of the month.

21. Generally, records of information, education, and communication (IEC) activities, such as film shows and group meetings (whether within or outside the clinic) are maintained for control purposes, since the activities reflect the deployment of certain inputs. If these records are maintained in a suitable form, it is then easy to prepare monthly or quarterly reports that could be of value to management at the clinic or higher levels.

Records of Clinic Facilities, Personnel and Equipment

22. The facilities, personnel and equipment of a clinic are constant at least over the short period and are often standardized. Naturally, records of these items are kept at the clinic for reasons of accounting (e.g., furniture, storage facilities, examination tables, transport facilities, surgical equipment and other non-consumable items) or of control (e.g., attendance register, staff records, vehicle log books, etc.). These records provide valuable management data on the basic inputs into a program, such as the number of clinic hours available to the clientele, the number of staff days or hours worked, and the utilization of vehicles. Regrettably, most family planning programs do not keep these records in a form that readily lends itself to reporting.

23. It is often presumed that, if a clinic has been set up, it is open to the public during the prescribed hours; that, since staff have been authorized, they are in position and are working the scheduled number of hours; and
that, since a motor vehicle has been supplied, it is in use. It is possible, however, that a key staff position may be vacant or a vehicle out of commission for an appreciable time. While these problems are usually reported to the appropriate administrative authorities as soon as they occur, very rarely are they reported to the evaluation office of a program, and thus, consequent deviations from the planned level of inputs cannot be identified, measured and related to variations in output. This is one area where a little additional effort at the clinic level could provide invaluable information for management.

Records of Consumables

24. The records so far discussed relate mainly to program operations at the service point. Reports to higher levels of administration based on these records primarily serve monitoring and evaluation purposes. Requisitions for and the supply of consumables, such as contraceptives, drugs, record and report forms, on the other hand, affect more than one level simultaneously; the corresponding records and reports are therefore considered together.

25. While most consumables are used only at the clinic or other service points, the clinics have no facilities for bulk storage. Moreover, the storage at one service point of, say, a year's supply will unnecessarily delay the use of articles which could have been better used to meet a sudden demand elsewhere. Often, it is not even possible to provide each service point with long-term supplies, since the original sources of supply (production within the country or import) are geared to a continuous flow throughout the year. These considerations underline the importance of a quick and efficient supply system for continuous program operation.

26. In most programs the establishment of central, and sometimes regional, facilities for the storage and supply of consumables has been found necessary. Timely information on needs at service points and the prompt dispatch of supplies from the stores are essential for ensuring that there is no disruption in service. Records and reports of the depletion, demand for and supply of consumable stock, form the bulk of this information.

27. The recording of consumption and supply is essential, not only for efficient operation, but also for control and audit. Invariably, therefore, stock registers must be maintained at each level which is concerned with consumables. These registers record the initial stock, depletion and replenishment as they occur. Monthly or quarterly reports to central or regional supply units help to determine the level of stock and the flow of supplies for each storage point, so that no undue pile-up of supplies or disruption to the delivery system occurs at any point.

28. Two kinds of supply systems are now in use in national programs. The first, used in most programs, is based on requests which usually originate at the clinic and are aggregated at intermediate levels before being passed on to the central depot. It is then the responsibility of the central depot
to ensure that the intermediate warehouses are adequately stocked. The supervisory responsibility at the intermediate level includes checking to verify that supplies are used legitimately and that reporting is accurate, in addition to reporting promptly to demands from clinics.

29. The second supply system operates on a non-request basis (e.g., as in Indonesia and the Philippines). Here the logistics unit at the center depot determines the quantities, particularly of contraceptives, to be supplied to intermediate storage points as well as to clinics. Information from clinics on receipts, distributions and balances usually submitted monthly, give the central logistics unit an idea of the flows from and demands upon central as well as regional warehouse stocks. By maintaining this surveillance on program needs the logistics unit can determine the quantities to be supplied as well as distribute them, thus relieving the clinic staff of the need to submit requisitions.

30. The avoidance of undesirable stock-piling while ensuring a smooth flow of supplies free from disruption in service is the mark of an efficient order-supply system. The records and reports required should be based on the needs of such a system. Parenthetically, such a system, with its data on the consumption of contraceptive supplies, can also provide a gauge of the extent of contraceptive use, and can be used to cross-check independent reports on clinic performance.

Other Records

31. Supporting activities, such as those related to the IEC, through mass media, staff training and recruitment, are invariably undertaken at intermediate or higher levels, and are often controlled centrally. While these activities do generate records (for administrative control purposes) the resulting reports often bypass the central evaluation unit because their sources are located nearby the central administrative headquarters (except for training, which may be undertaken regionally). The channeling of data on these activities through the central evaluation unit permits systematic evaluation, which is of great value to management.

32. Budget and expenditure records usually follow the pattern of normal governmental accounting and auditing, for obvious reasons. Reports based on these records are rarely channeled through evaluation units, even when the national family planning organization is an independent body. Quite often, available financial data are not in a form suitable for the cost-effectiveness analysis of programs or their components. This is another area where valuable management insights can be gained if expenditure data are recorded and reported in an appropriate manner, and generally the necessary procedures can be easily incorporated without disturbing the normal government system of financial reporting.
D. SERVICE STATISTICS REPORTS

Content of Reports

33. Service statistics records and reports are so closely linked that it is impossible to discuss one without the other. This section deals mainly with reports submitted by peripheral service points. These reports fall into three broad categories:

(a) Reports on inputs at the service point (including those on activities generated by means of the basic inputs);

(b) Reports on outputs (in terms of numbers of acceptors, users, etc.); and

(c) Reports on the characteristics of acceptors.

34. Reports on Program Inputs: Because the patterns of personnel and equipment required at service points in most programs have been standardized, frequently, administrators do not insist upon reports on inputs from the periphery. This omission is a mistake, since (as already pointed out), authorized inputs may not be available (e.g., posts unfilled, vehicles out of commission or supplies unobtainable). As also noted above, situations of this nature are usually known to the central administrative authorities responsible for providing the necessary inputs. The information, however, is generally conveyed to the central authorities in a form and through channels unsuitable for monitoring the outputs in relation to inputs—although adequate for administrative purposes. It is essential, therefore, to devise an appropriate system for the regular reporting of the deployment of significant inputs to the evaluation unit.

35. The types of useful input data which can be reported by the clinics or other service points include actual man-days, clinic sessions held, etc., compared with the prescribed level. Activities which the available inputs generate, such as numbers of group meetings, primary contacts with potential acceptors, reference slips issued, and clinical examinations or PAP smear tests, also can be reported easily each month in a standard form.

36. In addition, a status report on inputs such as staff and their training, number of operational vehicles, and the condition of equipment and other facilities, should be prepared at regular intervals. This report differs from the report on basic inputs, which is stated in purely numerical terms (e.g., man-days for each type of personnel) without reference to the actual persons or vehicles, etc., assigned to the clinic. The status report is an administrative report which provides a "feel" of conditions at the clinic level.

37. Reports on Program Outputs: Program outputs here refer to the numbers of new acceptors by type of method chosen, revisits at the clinic or
elsewhere, the number of continuing users (if available), etc. Although the data on new acceptors are often of doubtful reliability, they still serve as the most important indicator of clinic output. As the service statistics system develops, such output indicators can and should be refined.

38. Data on output are easily extracted from the clinic activity register and can be reported in conjunction with figures on the distribution of contraceptives. A carefully designed system of output reporting can also indicate the level of use of the individual types of contraceptives supplied from program sources. For example, in Malaysia, where almost 90 percent of acceptors are oral pill acceptors, the number of active users is estimated from the number of women who keep their appointments for return visits. In the Philippines, follow-up findings on a fixed 10 percent of all acceptors are reported regularly.

39. Wherever the clinic maintains a register of community population data, certain extracts from it can be of immense value. These include the numbers of (a) total population, (b) married couples of childbearing age, (c) those who have not yet accepted any method, and (d) those who for various reasons are ineligible to accept. It is sufficient if these statistics are recorded only once or twice a year, since such registers are difficult to keep up to date.

40. Reports on Characteristics of Acceptors: Generally, such data are available for new acceptors only. The source of these data is the client record card, where certain socio-demographic characteristics, past user status, the purpose of accepting family planning methods, etc., are normally recorded. The uses of such information were discussed in para. 12 of this essay.

Form, Flow and Frequency of Reports

41. Form: The design of reports will depend upon their contents. However, when designing them it is useful to ensure that their contents can be key-punched directly without first transferring the data to coding sheets. As far as possible, the data should be reported on a single sheet, and uniform reporting sheets should be used throughout the service statistics system.

42. The client record card can be designed so that the client characteristics to be reported are located close together on the card, with a "flimsy" (thin paper with a carbon backing). The flimsies can be torn off the record cards and sent to the central evaluation unit together with other reports at regular intervals. This system, with minor variations, is now in use in many countries and has been found satisfactory. Sending the face sheets of client cards together with the reports on output has the additional advantage that the numbers of acceptors can be cross-checked from both sources. The alternative to this system is to tabulate client characteristics at the clinic for aggregation at intermediate levels as well as at the central level. Obvious
drawbacks to this alternative are that the tabulations are error-prone and time-consuming. Furthermore, only a few cross-tabulations of characteristics can be attempted, since the entire work has to be done manually.

43. **Flow:** Two reporting systems are used in national family planning programs. In the first, reports originating at the service points are aggregated at intermediate levels of administration before being forwarded to the central evaluation unit. In the second (which has been adopted by most of the newer programs), the reports from the primary reporting unit are sent directly to the center. Sometimes copies are sent simultaneously to intermediate levels. In the first system, the intermediate administrator learns at first hand how the individual clinics under his jurisdiction are faring.

44. The second system, to be effective, requires a strong evaluation unit at the center and minimum electronic data processing (EDP) facilities. If these are available, the second system is clearly superior to the first for the following reasons:

(a) Information on the efforts and performance of individual clinics which would be otherwise lost through aggregation at intermediate points will be available at the center.

(b) The intermediate administrator can be kept informed of the performance of clinics under his supervision by prompt feedback from the center which will also inform him of the performance of his own region compared with other regions.

(c) Centralized data handling relieves the usually skeletal supervisory staff at intermediate levels from statistical work. In any case, it is impossible to undertake any sophisticated analysis at these levels because of the absence of qualified staff. Even if staff were available, the volume of work would not generally keep them fully occupied; thus it would be more economical to centralize data analysis.

45. **Frequency of Reports:** Frequency of reporting depends, among other things, upon the capability of the central evaluation unit for data handling. A monthly interval for reporting on output as well as on client characteristics is standardized almost universally. Reports on basic inputs, such as personnel and vehicle usage, should also be made with the same frequency as far as practicable. Activity reports, particularly on motivational aspects, can be sent quarterly if monthly reporting is not convenient. No great harm will be done, since acceptance during a month generally cannot be directly attributed to the motivational activities of the same month. The status report on outputs also can be sent quarterly.
Recording and reporting forms are invariably filled out by staff whose primary duty is to provide services. Therefore, care must be taken not to require more information than is strictly needed for efficient control and evaluation. By the same token, it would be a waste of effort to provide more information than can be analyzed. Several programs have been started with ambitious recording and reporting systems which requested more information than was necessary, in the hope that the data might be useful sometime in the future. It is better to work out a flexible system whereby recording and reporting forms can be modified from time to time according to the changing needs of the program and the growing capacity to make good use of available information.

E. TABULATION, ANALYSIS, FEEDBACK AND PRESENTATION

Tabulation and Analysis

Four areas may be identified for the tabulation and analysis of service statistics: (a) characteristics of acceptors, (b) trends in acceptance and, if possible, use of services, (c) program effectiveness, and (d) efficiency of program implementation. Only brief references will be made to each, since the uses of service statistics tabulations have already been discussed.

Characteristics of Acceptors: The distribution of acceptors according to: (a) one or more demographic, socio-economic or racial/religious characteristic, and (b) comparison with the corresponding distribution, indicates how far acceptors are representative of the general population. Trends in the distribution of acceptors show whether acceptance trends follow a desired direction. In addition, certain demographic characteristics of acceptors are essential for the calculation of births averted through the use of program methods.

Although the basic data on acceptor characteristics can be made available on a monthly basis, their frequent tabulation is unnecessary because acceptor profiles change little over a short period. Half-yearly tabulations in new programs and yearly in older programs appear to be adequate. More frequent tabulation may be made whenever big changes in implementation strategy occur. Secondly, the tabulations can be based on a sample of the "face sheets." As the number of new acceptors continues to increase each year, the sampling fraction can appropriately be made smaller, maintaining a more or less fixed sample size for acceptor characteristic tabulations. Since this work is to be performed by the central evaluation unit, which has multifarious duties, these tabulations should be kept to the minimum.

Trends in Acceptance: Tabulations depicting trends in acceptance are among the most significant tabulations of output data. These data, by themselves as well as in combination with figures on general population and/or
Input data, can be analyzed in various ways, all of which provide valuable administrative guidance. The basic items in these tabulations are included in the monthly reports, such as the monthly and cumulative numbers of new acceptors by method, and administrative area, shown against targets where applicable. Figures derived from these tables, such as the percentage of annual target achieved by the end of the month, and the number of new acceptors per 1,000 population, also can be shown in the same tables.

51. **Program Effectiveness**: Data for measuring program effectiveness need not be analyzed frequently; once a year should be sufficient. The general purpose of such an analysis is to estimate the reduction in numbers of births and in the birth rate due to the family planning program, as well as to set or revise targets. The data for such estimates include not only family planning service statistics, but also information from such sources as the census, surveys and registrations. Methodologies, ranging from simple to sophisticated, are available which can utilize data of most qualities and varieties.

52. Some information on program effectiveness can, however, be included in the monthly tabulations of program performance, such as "percentage of women protected" or "couple-years protected," derived by applying simple conversion formulas to acceptance figures. Perhaps these indices are not accurate measures of protection, but they can serve important administrative purposes in evaluating comparative performance over area or time.

53. **Efficiency of Implementation**: In this area also, tabulations can be made at two levels: annually for a more sophisticated cost-effectiveness or an input-output analysis, as well as monthly, for the monitoring of program effectiveness. Reported input data, as described earlier, can be tabulated every month or quarter against both output data and expected or planned input, providing useful comparisons. Data on inputs of effort outside the clinic (such as training, mass media, etc.) also should be reported and tabulated against the planned capacity in order to provide a regular index of the level of utilization of facilities.

54. Program efficiency, however, is an area where few guidelines are available from past experience in countries with family planning programs. Moreover, inputs differ from country to country according to the organization and strategies of family planning programs. Sometimes it is difficult to apportion inputs for family planning in terms of personnel, facilities and transportation, etc., in combined health/family planning programs, and even in separate family planning programs, where workers could have more than one function. Each program, therefore, should make a special effort to identify crucial inputs as well as to devise ways of reporting and tabulating them. Efforts in this direction already are being made in several countries.

11/ A comparative study of input-output relationships in family planning programs is now being undertaken by four countries--India, Malaysia, the Philippines and the Republic of Korea--in collaboration with the UN Economic and Social Commission for Asia and the Pacific. It is expected that the study will eventually be published by ESCAP.
Feedback and Presentation

55. The term feedback is used here in a broad sense covering the transmission of information from the central evaluation unit down to the primary reporting units (clinics, etc.), as well as upwards to senior administrators and policy-making authorities. Feedback also includes information for the press, other government organizations, international agencies, and the public. The content, and frequency of feedback in such cases, will differ according to the need and absorptive capacity of the recipients.

56. Content: The most important recipients for feedback are within the family planning organization, especially the clinics (or other service units) and the intermediate-level supervisory units. At these levels the feedback should be confined to information of the highest interest and use. Ordinarily it should include information on comparative efforts and performance as well as ranking among clinics within the same region, and among regions within the country. This type of feedback encourages healthy competition and keeps every peripheral unit informed about the progress of the program. Occasional reports of general interest (including those on acceptor characteristics) should also be provided to the peripheral units. These reports should be sufficiently explicit to help create the overall feeling that the units are essential parts of the organization but, on the other hand, the reports should not be overburdened with statistical details. Some marginal comments accompanying the statistical feedback can serve to boost the morale of the more efficient clinics and gently chide the less efficient.

57. The feedback to policy-making levels should be precise; it should refer to national and regional (or implementing agency) performance, indicate administrative or management achievement, but not include more statistical tables than are absolutely necessary. This type of feedback will naturally be based on the careful analysis of data, and not on a simple aggregation of efforts and performance statistics. While transmission of information need not be undertaken with any regularity, it should be sufficiently frequent to ensure timely corrective action as needed. Top management also needs to have up-to-date information on the general progress of the program; preferably, data should be given to them through graphs and charts rather than numerical tables.

58. Extreme care should be taken in determining the content of family planning information to be released to the public either directly or through the press. Instances of misinterpretation, misquotation, and out-of-context quotation may cause serious harm to the program. If the released data are accompanied by appropriate explanations, these dangers can be minimized. Generally, in a national family planning organization, information releases are made by an official spokesman; the first step towards providing explanations, however, should be taken by the evaluation unit, which is usually the original source of information.

59. Form and Flow: The flow of regular feedbacks, both upward to the executive level and downward to the clinic level, should be made in a standard
form to facilitate interpretation and to maintain continuity among the series of reports. As far as possible, tables should be accompanied by a brief interpretation on the same page or the facing page of a report. Charts, diagrams and graphs are preferable to numerical tables wherever practicable. The flow of regular feedback, particularly to the lower level, is to a great extent dependent upon the number of intermediate levels, the total number of peripheral units, and the capability of the central evaluation unit to keep the lowest level units informed through direct means. If there is a large number of peripheral units, the work of sending individual feedback to each unit may be too much to handle from the central level. In such cases, the next higher level (usually supervisory) would be responsible for disseminating the relevant information to the clinic. It is, however, possible to devise computer-printed data sheets for each clinic, indicating its performance and relative ranking, which can be mailed directly to the appropriate destinations (as in the Philippines).

60. **Frequency and Timeliness:** If the feedback, both upward and downward, is not available when needed, its purpose could be defeated. In an ideal situation, rapid feedback would heighten motivation by demonstrating positive results as well as identifying problems before they become unmanageable. In many countries a monthly interval has been found suitable for the regular feedback of progress reports, with a supplementary quarterly feedback covering additional areas of interest to the respective audience. Brief and substantive special reports covering such matters as important changes, new strategies, and outstanding achievements in specific regions, could also supplement the routine feedback, providing the peripheral units with a sense of identification with the total program.

**F. IMPROVEMENT OF THE SERVICE STATISTICS SYSTEM**

61. There is virtually unlimited scope for improvement in any service statistics system, although there will certainly be financial, personnel and system constraints. This section will examine two issues only: (a) the reliability and validity of reported data, and (b) computerization of the system.

**Reliability and Validity**

62. The quality of service statistics is subject to three main deficiencies: incompleteness in recording and reporting, inaccuracies in content, and misreporting—both deliberate and accidental. Usually, the training of staff and close supervision can reduce these shortcomings, but there are various difficulties to be overcome. The following paragraphs discuss these difficulties and some of the ways in which they can be treated.

63. **Incompleteness of Records and Reports:** Forms are sometimes not fully filled out. The staff can be encouraged to take more care, and given instructions pertaining to not only how the forms should be completed, but
also why the required information is essential. Written instructions alone may not be sufficient, since staff at the periphery, who are mainly service-oriented and often lack basic education, find it difficult to appreciate the need for accurate and complete records and reports. Training in maintaining the statistical system should necessarily be part of the curriculum prescribed for the peripheral staff.

64. Failure to report, or delay in reporting, on the part of reporting units is another source of incompleteness. While most programs specify deadlines by which monthly reports must be sent, a certain percentage invariably fail to turn up on time. To discourage delinquency, some programs have made the monthly disbursement of salaries contingent upon the receipt of the prescribed monthly reports. Supplying the clinics with pre-addressed and pre-stamped envelopes has also been found to increase the reporting rate substantially.

65. Inaccuracies in Records and Reports: Inaccuracies in records can be caused by failure on the part of the persons making the record as well as by lack of knowledge on the part of the informants (such as the clients). For example, often the client cannot correctly state her age, family income, length of open birth interval, or total number of pregnancies. Although techniques are available to improve the accuracy of the information given in interviews, they are too time-consuming to justify their use in the usual clinic-service situation. In addition, the clinic staffs lack the requisite specialized training. It is therefore advisable to eliminate from the record forms items which are found by experience to elicit grossly inaccurate responses.

66. A particularly vexing type of inaccuracy occurs when the grand total of items in a report differs from the sum of the sub-totals. Another type of error occurs when the definitions are not properly understood, e.g., when number of condoms distributed is entered under a column headed "number of condom acceptors." Such errors are difficult to detect unless the figures are obviously incredible. Many errors can be detected through editing at the central evaluation unit at the stage of machine processing. Internal consistency checks, such as matching the reported number of new acceptors with the number of face sheets received, and the number of clinic visits with the number of oral pill cycles issued (where a fixed number of cycles are issued at a time), can detect many other types of errors. However, since the correction of such errors involves the cumbersome process of referral to the source, and consequent delay in preparing the progress report, attempts should be made to eliminate errors at the source through proper training and supervision.

67. Misreporting: Deliberate misreporting is occasionally encountered, particularly in programs where achievement targets for workers or clinics are very demanding or where an incentive is provided by the offer of bonuses for achievement. Such instances are rare since they require the connivance of several persons. More common are instances where the over-achievement of one month is reported as the achievement of a subsequent month in a program
in which workers are required to meet strict monthly performance quotas. Cross-checking, such as of reported acceptance against the consumption or stock of contraceptives, gauzes and bandages, can sometimes detect misreporting.

68. The extent of over-or under-reporting of acceptance can generally be gauged by independent follow-up surveys, although they may not always be reliable, because acceptors are sometimes reluctant to admit to an interviewer that they are acceptors. The systematic field checking of samples of reported acceptors is perhaps the best way of discouraging misreporting, and is already in practice in several countries. It requires, however, a strong supervisory unit at the level immediately above the clinic.

69. An error much more difficult to detect is that of duplication in reporting acceptance. Although in almost all programs a new acceptor at a clinic is asked whether she has previously accepted a method from a program source, her reply may be inaccurate. As a result, it is possible that some clients may be reported as acceptors more than once during the same year. A precautionary measure which could help reduce the number of duplications recorded would be to check with the clinic nearest to the home of a prospective acceptor, although this may impose an undesirable additional burden on the clinic staff. In countries where every citizen has a national identification number, the identification numbers of acceptors can be cross-matched by computer to detect duplications.

Computerization of Service Statistics System

70. The computerization of a service statistics system has many obvious advantages, one of the chief being the quick transformation of input data into output. Its capacity for multi-operation activities (such as determining logistics support requirements, printing feedback reports for individual clinics and performing complicated analyses from routine data) make it highly attractive. Lastly, since the capital costs of computers and related services have been decreasing, computerization can sometimes prove to be the most economical means, even in developing countries where salaries are low.

71. Unit record machines such as keypunches, verifiers, sorters and tabulators can be recommended for any program evaluation unit, as they can be operated easily and maintained at very low costs. They can easily satisfy most normal data processing needs in small programs. Local computer facilities may be used to meet an occasional need for a more complicated analysis.

72. It is inadvisable to shift to a fully computerized system until the following conditions have been met:

(a) The forms and procedures for recording and reporting service statistics must be well established and past the experimental stage.
(b) The data produced must be of reasonable quality. A sophisticated and expensive tool is of little help if the material to be processed is poor.

(c) Supporting services, such as trained personnel to operate the computer, a stable power supply, physical facilities and supplies (e.g., cards, stationery, tapes, discs), maintenance and repair services, etc., must be readily available.

(d) The workload must be sufficient to justify the initial monetary outlay as well as the running costs. This problem can be overcome by time-sharing with other government agencies or by entering into a contract with a private data processing firm.

73. A computerized central acceptor file, which requires maintenance of all acceptor records needed for evaluation or follow-up purposes at the central level, has the advantage of making it possible to provide a cross-section of a program and to identify "delinquent" acceptors at any given moment. Although such a file can be of practical use in small programs, its utility in developing countries with poor communications and a shortage of staff for follow-up work is questionable.

74. In many countries innovations in family planning services and methods are often tested in limited areas before they are introduced on a nation-wide scale. Examples of such pilot projects are the intensive district program (in India), the Kampung Bidan Project (in Malaysia), the use of para-medical personnel for IUD insertion, and field trials of new contraceptives such as the injectable, Depo Provera, or the Copper-T type IUD. The recording and reporting forms for such projects are often different from and contain more information than those used in the national program. Usually such data are also analyzed separately. The separate recording, reporting and analysis of data from such projects is feasible as long as they are on a small scale. When innovations are adopted on a national scale, however, the integration of additional data into the national system can present serious problems, since the situation often calls for changes in content, form and flow of reports. These problems can be avoided only by bearing in mind from the early stages of such special projects the need for the eventual integration of the data, and planning accordingly.
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