Health Needs

Report of a Seminar held at Pokhara, Nepal, in October 1977

Laura P. Shrestha, and Marilyn Campbell

(IDRC publication). Report on health service/s and needs in rural area/s of Nepal, including information on the Nepal Health Manpower Development Research Project — (1) examines survey/ methodology/ and data collecting/ procedures; application of research result/s and role of applied social research in health planning/ (2) presents country papers from selected countries of South Asia/ and South East Asia/, examining basic needs/, personnel/ training/, maternal child health/, etc. (3) includes annotated bibliography/, sample questionnaire/s.

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Cover: An interviewer with the Nepal Health Manpower Development Research Project questions an elderly woman about her health in a small village in the Pokhara Valley of Nepal.

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Rural Health Needs
Report of a Seminar held at Pokhara, Nepal,
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The Nepal Health Manpower Development Research Project was initiated in 1973 by the Institute of Medicine of Tribhuvan University in Nepal to collect information useful for health planning and the development and modification of training programs.

The specific objectives of the project were to:

1. develop an inventory of the present supply of health manpower by numbers, level of training, geographic and functional distribution, their career pattern, and the origin and magnitude of attrition;

2. study the existing felt health and family planning needs of Nepalese communities, health care utilization patterns, unmet demands of health care, community satisfaction with existing health services, and the health care expenditures of the community;

3. identify the health problems and needs of Nepal as felt by health personnel in rural districts and to identify the actual roles and functions performed by health institutions and health personnel; and

4. utilize the outcome of such studies in planning or modifying the curricula and training programs of the Institute of Medicine.
Three districts in Nepal were investigated during the course of the project: Tanahu and Dhankuta, which are both hilly districts, and Bara, a district in the terai (plains and foothills) bordering India. In both Tanahu and Dhankuta districts a household survey and health services studies were carried out to obtain estimates of rural health needs, health services utilization, health care expenditures, and the activities of government health personnel. In Bara district, only the household survey was undertaken.

The following report provides details on the procedures followed in Tanahu and summarizes the results of the studies undertaken in that district.

**Design and Organization of Tanahu District Studies**

**Household Survey**

**Design**

Two groups of villages were identified, one around the district hospital in Bandipur and the other around a health post in Sabhung. Villages with better access to other health posts or hospitals (in another district) were eliminated. From each group, two subgroups were identified: strata I was within 1 hour's walk of the district hospital; strata II was 1-3 hours from the district hospital; strata III was 1 hour from the health post; and strata IV was 1-3 hours from the health post. Four villages with 25-35 households were chosen randomly for each strata for the health survey. Thus, in total, eight villages were sampled around the hospital and eight around Sabhung Health Post. All the households in the sample villages were surveyed, except those unoccupied or with only minors present or unable or unwilling to respond at the time of interview. The household survey thus includes 453 households comprising a total of 2775 individuals.

The survey was conducted in the form of an interview of the responsible and eligible respondents of each household with the help of a standardized questionnaire. The questionnaire was in two parts. First, a household part (Appendix 1) provided general information about the household including age, sex, marital status, occupation, education, immunization status, long-term disability of household members, health personnel visits during the last month, water supply and storage, latrines and drainage, births including antenatal, natal, and postnatal care, problems and cost of such care during the last year, 1-year mortality and problems leading to death, family planning acceptance and practice, and illness in the household for the 2 weeks prior to the interview. The second part (Appendix 2) was filled in for each member of the household listed as ill in the household questionnaire. It contained a detailed chronological history of any problems, the total duration of sickness including duration within the last 2 weeks, disability within the last 2 weeks, any consultation and visits per consultation, type of consultation or practitioner and name and address of the consulted person, fees for each visit, the cost of medicine, travel, and other health-related expenditures. Questions were also asked about the result of treatment, satisfaction or cause of dissatisfaction with the treatment received, any self- or home treatment, reason for not consulting if there was no treatment, and expenditures for self- or home treatment. Because of problems of recall, we concentrated only on information from the 2 weeks prior to the interview.
Organization

Two main teams were formed, each headed by two supervisors. One team surveyed the villages around Bandipur Hospital and the other those around Sabhung. The project program officer took overall command of field operations for both teams. After an initial visit to all six health posts and Bandipur Hospital to collect data for the health facilities study, the household survey was conducted village by village. After completion of the household survey, the second institutional visits were done to repeat certain parts of the studies. Hand sorting and tabulation were mainly done at Kathmandu by the research project staff after initial field tabulations had been done.

Quality Control

The quality of any interview depends on the adequacy of the training of the interviewers. After developing a training manual for the questionnaires and forms, we trained the interviewers with repeated cycles of theory and practice, using role playing and pretests in rural villages and health posts. Even in the field the initial surveys were closely watched and intensive interpersonal discussions were conducted right in the field. We also conducted a meeting in Bandipur where all interviewers, supervisors, and most of the district health personnel were present to discuss the possibility of underreporting and other field and research problems. The recommendations of the meeting were very constructive and included suggestions like using the help of village school teachers, social workers, and panchayat leaders, informal chats before the interview, repetition of the questions in simpler terms, and sleeping in the same village the previous night. At times the interviews were conducted in groups that would include other family members, namely children and elderly relatives and even neighbours. On these occasions, each member was asked to complete or correct the information given by the household head during the interview. A few households were interviewed twice taking different respondents and using different interviewers. This, along with a close watch by the supervisors and at times by the program officer, constituted the main method of ensuring the reliability of data collected.

Health Facility Study

Design and Methods

For this study, six health posts, currently functioning for at least 1 year prior to the study, one district hospital at Bandipur, four Family Planning/Maternal Child Health (FP/MCH) clinics, four ayurvedic dispensaries, and three National Malaria Eradication Organization units were sampled. Over 100 health technical personnel were identified as working in these facilities. Of these, 40 were selected for interviews. The following methods were used to study the health facilities and their personnel.

(a) Interview

A standardized questionnaire (Appendix 3) with three parts was devised for the interview of health personnel. Modifications were made after pretests in the health posts near Kathmandu. The first part collected background information about the health personnel. The second part assessed their perception of the health problem in their district, including the main causes of mortality and morbidity and the utilization pattern of health services. Information was also asked about adequacy of supplies, equipment, and buildings. The
third part of the questionnaire dealt with the responsibilities and activities of health personnel and the health institution, as well as their training experience and ability to perform these functions. Most of these interviews were carried out during a first visit to the health facilities, prior to the start of any of the other data collection.

(b) **Work Sampling**

This method was devised to identify the actual function and activities of health personnel in a quantitative fashion providing a time dimension. Intermittent instantaneous observations of each person studied were made every 2 minutes through 1 or 2 working days. Details of the precise activity at the moment of observation were recorded. In addition to this observation a continuous count of persons served by age-sex groups was done, as well as a summary of activities performed outside of working hours. The latter was determined on a recall basis for the previous day.

The work sampling was done at least 1 full day on each of 28 health personnel. In addition, 13 were observed a 2nd complete day. These days of observation were done on two separate visits to the facilities.

(c) **Task Analysis**

This observational study supplemented the data obtained from work sampling. It consisted of two parts — one for the analysis of personnel activities in the health facility, and the other for their activities in the community. It recorded the time taken for each patient consultation or home visit. In addition, details of consultation or visits were recorded on a checklist.

As with the case of work sampling, task analysis was repeated on each of two visits to a facility.

(d) **Service Record Forms**

Four different service record forms were devised to record data from the health facilities' own statistics:

**Form W** — This collected general descriptive information about the facility. It included the actual expenditure and the staffing pattern for the previous year.

**Form X** — This form was used to collect information on the type of health problems presenting at the facility by age-sex groups. For the Outpatient Department of the hospital, health posts, and ayurvedic dispensaries, the form was filled for 24 randomly selected days during the previous year covering 2 days each month and each of the 6 different working days of the week for each of the seasons. This form was also used for 28 consecutive days during the time of our study. In the case of the hospital, all inpatient admissions during 1 full year were also recorded.

**Form Y** — This form was used to record the total attendance by age-sex groups for each month of the previous year. All the health posts, ayurvedic dispensaries, the district hospital, and two FP/MCH clinics were included.

**Form Z** — This form was used to tabulate the number of Outpatient Department attendances from different villages around the facilities made during 28 days of the study. This permitted calculation of the volume of visits to the health facility by time distance zones.

**Individual Health Worker's Service Information Form** — Two forms (A and B) were devised to count the activities for each health worker for the 28-day study. Form A was for personnel engaged in medical care and FP/MCH, and form B was for personnel engaged in malaria eradication, smallpox eradication,
TB control, leprosy control, health education, environmental sanitation, and supervision. Each of the 28 rows of the form described 1 full day's activity giving counts of service contacts for various functions. Thirty-two health workers were able to maintain these records during the 28 days.

(e) Control Form

This form recorded the name and designation of each of the technical personnel assigned to the health facility, the amount of leave of absence during the last year and also during the 28 days of the study, and their housing facilities. The form also indicated how many of the various studies the individual had been involved in, such as interviews, work sampling, task analysis, and service records.

Organization of Field Work

For the health facilities study, the two field teams were each divided into two subteams with three members each, including one supervisor. Each subteam studied one health post and one ayurvedic dispensary, one FP/MCH clinic, and one National Malaria Eradication Organization unit wherever applicable. Two subteams were grouped together to conduct the health service study at Bandipur Hospital. Similarly, the other two subteams conducted the study at the larger units of Damauli and Khaireni. The health service studies were done on two separate visits for all health posts and the hospital with a gap of 28 days between visits. The second visit provided the opportunity to repeat work sampling, task analysis, complete any unfinished interviews, and collect all service records filled out by staff during the 28 days. Control forms were filled after all the forms and interviews were completed.

Quality Control

There are few ways of checking the reliability of observational studies and service record data. The following measures, however, were taken in this study to overcome this problem.

(a) Training of the observers was intensive with repeated practice and pretests in different health posts near Kathmandu both under supervision and independently. Each observer participated in translating to Nepali and retranslating to English all the forms and training manuals developed for the purpose.

(b) The work of the observers was carefully supervised by the head of each subteam. Sometimes supervisors conducted observations while the observers watched. Any shortcoming was promptly pointed out and corrected. Sometimes simultaneous observations by two observers were synchronized.

(c) Each of the forms was checked in the field shortly after completion, at which point any incomplete information or inadequate or unclear information or any discrepancy was pointed out and corrected. Final verification or check was done by the Program Officer.

(d) Some of the forms were rechecked or verified by supervisors and the Program Officer with the respective health personnel or office register.

(e) Any new experience or information leading to more appropriate or correct probing or interpretations were added in subsequent observations of the other health personnel.
Findings

Interpreting the many findings of this study and drawing reasonable conclusions from them are activities requiring the participation of a wide variety of individuals familiar with the health system in Nepal. However, to provide a preliminary stimulus for discussion, some general conclusions can be summarized from the viewpoint of the research team:

- There is a very high level of untreatable morbidity and disability in rural areas of Nepal. Utilization patterns suggest a definite preference for government services at the district hospital level. Utilization of traditional sources of care assume prominence only in isolated areas at a distance from health posts or the hospital.
- The overriding factor determining use of services is distance. So constant is this effect that the findings can be used to estimate the number and location of facilities that would be required to provide specific levels of coverage.
- Costs are not a barrier to the use of health services, as most people willingly spend money in the market for medicines unavailable at the government health services. Currently patients spend on the average over Rs. 5* for medicines as a result of a visit to a government facility. If even a part of the money currently being spent outside the government health system could be utilized for government health services, these services could be expanded considerably. However, there may be those who cannot afford even these levels of expenditure, for whom some provision for adequate care would have to be made.
- As high as 70% of the need for care might be preventable. Serious attempts should be made to weigh the value and effectiveness of preventive programs in contrast to the gigantic task of satisfying the unmet curative needs.
- Health services in the homes are minimal except for malaria control programs. In spite of the difficulties of travel, the efficiency of selected home contacts needs to be carefully weighed against the dominance now of fixed curative services. This becomes especially valid when the large amount of time spent by health workers waiting for patients is considered. However, ways must be worked out to reduce the excessive travel time related to field work.
- Maternity care is predominantly a function of the family. Government facilities, traditional healers, or midwives play a minor role. Any program designed to improve this care in Tanahu or similar areas must recognize this fact. Home contacts and education on using available facilities may have to go hand in hand.
- There appears to be a significant reservoir of couples expecting to use family planning for whom services should be made available. This is in spite of the finding that most of the population has to learn that there are methods for spacing or controlling the number of children they have.
- Although health personnel are trained to provide services involving multiple functions, there is almost complete preoccupation with curative services. If this is to be changed, careful consideration must be given to the appropriateness of training programs and the organization,

*Rs. 1 = ca. U.S. $0.08.
supervision, and delivery of services. This certainly should include attempts to increase productivity above the current level of 30% in direct service time to the clients. Increases in the current low levels of supervision are undoubtedly part of the answer.

- There appears to be a need for a concerted effort to improve the community’s knowledge and understanding of health. Recognition of this by health personnel was almost universal with some expressing the desire to be better prepared to provide health education.
- A corollary finding is the need for health personnel to have a better understanding of the community. Incorporation of a number of the findings of this study into orientation and training programs for health personnel should be useful in meeting this need.

Making Research Count: Identifying Practical Implications in Research Findings

In the final analysis, applied research can only be justified if it is “applied.” The very definition of applied research connotes practical use of its findings. Unfortunately many of the findings of applied research never get tried out in the real world of large-scale health care delivery systems. In this workshop we have already reviewed some of the major reasons for this lack of application: inadequate definition of the problems to be studied, selection of areas that are not of real concern to health planners and administrators, inappropriate or inadequate design and implementation of research studies, and collection of information that does not reflect the true conditions of a population or its health services.

Another important reason for nonimplementable findings is the very nature of research itself. In this modern age we tend to expect quick and valid answers to all our questions if we just rigorously apply the scientific method to our investigations. Unfortunately, research, especially in areas of social concern, is not that well developed. Even in the physical sciences, research is always a gamble. Negative or nonmeaningful results are a fact of life confronting all who do research. This does not mean that we have to be overly pessimistic about the usefulness of research; good research is still much better than a trial-and-error approach to solving problems. But in spite of our best efforts in design and implementation we must guard against excessive expectations that can bias our interpretations of results. All too often findings and suggestions from field studies have been touted as the answer to specific problems only to have them fall flat when tried out in “real life” situations. Healthy skepticism is a useful approach to all research findings. But it must be directed toward identifying and separating out the useful products of research and not waste time dwelling on findings it identifies as useless.

This then leads to a third major obstacle to implementing research findings and the main concern of this paper. Many well-conceived and productive research projects have failed to be applied because their findings have not been translated into practical actions that could be understood by individuals
responsible for their implementation. Too often administrators or planners are heard to complain, "These are very interesting findings, but what do they mean in practical terms? How can I use these findings to improve health services?" It is in this area of interpretation and generation of meaningful applications of findings that a careful and systematic approach is needed as much as when designing and carrying out the research itself. Usually much of our interpretation of findings is intuitive and based on our own experiences. This probably is one of the most important ingredients in the process of interpretation, especially when individuals with extensive and appropriate backgrounds are involved. However, a number of important steps can be useful in assisting and making the empirical aspects of interpretation more effective.

(1) When interpreting research findings, be sure those involved know what questions the research was trying to answer. This may seem obvious, but many findings have been ignored or wrongly interpreted because they were used to answer questions they were not intended to answer. It is always better if those responsible for interpretation and implementation of findings are involved or aware of all aspects of the research right from the start.

(2) After each of the research questions has been identified and well delineated, all pertinent sources of data in the study that may provide answers to each question should be identified and reviewed in terms of actual implementation during the study and probable validity of the data collected.

(3) The findings from each of the sources of data that are related to a specific question should then be summarized as simply as possible, using a minimum of statistics. More complex analysis or data presentation should be used only when questions cannot be answered by the summarized findings.

(4) Using the findings, list all reasonable interpretations and answers to the research question and identify the most probable of these. If additional analysis or even new studies are required before the research question can be reasonably answered, these should be spelled out in detail.

(5) Based on the most probable interpretations of the findings, develop a list of changes in the system being studied that might be implemented throughout the system or in part of the system on a trial or demonstration basis.

The success of the above steps depends heavily on the skill of those summarizing the findings, the involvement of a good cross-section of experienced persons in the interpretation process, the effective use of group consensus techniques, and the widest possible dissemination of the findings so that reactions from individuals and groups not directly involved in the interpretation process can also be taken into account.

**Data Collection Methods and Their Uses in Health Services Research**

Applied research in the health field usually involves four major types of data collection. These are community (population-based) surveys, surveys of health personnel, observational studies of health service activities, and use of existing or special records and reports. The types of questions that each of these methods tries to provide answers for are summarized in Table 1. In this table, data provided by each method are categorized into five basic types: (1) health needs of the community; (2) use of resources, both manpower and material; (3) the activities of the health service system; (4) health services provided; and (5) the impact of these services on the health of the community.
<table>
<thead>
<tr>
<th>Data collection methods</th>
<th>Health needs</th>
<th>Health resources</th>
<th>Activities</th>
<th>Services</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community surveys</td>
<td><em>What are the morbidity, mortality, disability, and attitude patterns in the community? Who are the persons requiring preventive or other types of services? What are the environmental, social, economic, and demographic characteristics of the community?</em></td>
<td><em>Who provides health services in a community and at what cost to the individuals involved? Where are the services provided? Why are they used or not used?</em></td>
<td>What is involved when services are received? What is the content of any interaction?</td>
<td>How many and what types of services have been received and why are these services chosen or provided?</td>
<td><em>What are the changes in health indicators (morbidity, mortality, etc.) that are a result of the services? Is the community satisfied?</em></td>
</tr>
<tr>
<td>Observational studies and health personnel surveys</td>
<td>What are the numbers and types of problems presenting at a facility? What are the types of problems seen or recognized by health personnel?</td>
<td><em>Who provides care, how much time is provided, what are the resources utilized, and where are the services provided?</em></td>
<td><em>What activities are involved in providing services and how are these activities divided by time and category of health worker; in what sequence do they occur; what is the nonproductive or waiting time involved?</em></td>
<td><em>How many and what type of service and service contacts are provided and to whom?</em></td>
<td>What are the results of the services as perceived by health personnel?</td>
</tr>
<tr>
<td>Records and reports</td>
<td>What are the numbers and types of problems seeking care from a facility? Who are the individuals requiring care?</td>
<td><em>Who provides care, how much time have they been available, what are the resources utilized, including financial, and where are the services provided?</em></td>
<td>What was involved in the delivery of care, what was done, what advice given?</td>
<td><em>How many and what types of services were provided and to whom?</em></td>
<td>What are the changes noted on revisit?</td>
</tr>
</tbody>
</table>
The data in the table marked with asterisks (*) indicate the most useful types of data generated by a particular method. As can be seen there is a good deal of overlap between the methods in their ability to provide different types of information. Where there is this overlap a decision about the method to be used will often hinge on much more specific details of the variables to be examined as well as questions of cost and feasibility of application. In general, however, community surveys are best utilized for determining health needs, impacts of services, and the broad availability and use of health resources. Observational and health personnel studies provide the best data on manpower inputs and details of health service activities. Records and reports are usually the most efficient sources of information about resources used and services provided in health systems maintaining such records.

Pitfalls in Applied Research — Lessons from the Nepal Experience

When any research program is implemented in a developing country, it consumes some of the country’s scarce resources. Thus it is the responsibility of the research workers to design research programs to provide immediately usable solutions to existing problems. Besides the need for careful and systematic planning and programming for a research study, careful execution is necessary to meet the research objectives more precisely and more completely. Research studies involve team work with the team sharing collective responsibility. Each member of a research team should be well motivated and practical. He should not only understand clearly the nature and purpose of the research study he is involved with but should also be able to take appropriate decisions when faced with difficulties or problems especially during the operational phase.

Improperly designed research, poor preparation, incompetency of field staff, underreporting or misreporting, concealed information, incomplete or inconsistent data or information, and difficult working situations all produce biases that may jeopardize a research study. These problems should be prevented or minimized. How they are coped with will depend on the situation. However, the following general approaches to these problems should be carefully considered.

Research Design

The test instruments and research methodology should be prepared according to the research objectives but adjusted to the conditions of the study area. They should be field-tested or pretested before conducting the actual research study. In addition, there should be provision for constant improvement and modification of the instrument and methodology to make the research design more effective and more consistent. Modification itself, however, should only be done to better attain the research objectives. The data thus obtained should be the same if repeated in the same area and time and should be comparable to previous similar studies in other places. In addition the
research should be acceptable to the population being studied. In those areas of information where sensitivity may arise, solutions should be found and tested with repeated field trials that do not encroach on the feelings of the sample population.

**Manpower for Research Studies**

As already stated, a research study involves team work. Each member of the research team, especially the data collectors or interviewers, should have a clear-cut understanding of all aspects of the research study, especially how to collect valid information. To develop competent data collectors, interviewers, or observers, they should participate whenever possible in some way in the development of the research instruments from the initial stages, like translating, drafting, and participating in problem-solving discussions. Field staff, especially supervisors, data collectors, interviewers, or observers, should be properly motivated. They should be persistent, patient, and willing to do the job to the best of their ability. They should always try to identify themselves as part of the community or study population. For example, when they have to work in a rural community they should eat and live much the same way as the members of the community and try to copy their way of life. The development of this type of attitude is easier said than done. But this attitudinal development is necessary for them to be acceptable to the community and to gain the community's confidence. They should be able to establish good rapport with the community using local customs of politeness and conversation. They should respect the tradition and way of life of the study population. In addition they should always try to get (and should be able to get) the cooperation of primary or other school teachers, social workers, village leaders and elders, and other related individuals and agencies. The insights and experience of these leaders developed after a long span of time with the people and locality should be beneficial. Though there is often a tendency by a field team to ignore such community leaders this type of cooperation whenever utilized has always been very valuable for our field study.

Other skills to be developed for field staff are the ability to take initiative, to explain the purpose of the study well so that the study questions are properly understood, to observe or to probe into certain casual relationships, to verify peculiar or abnormal findings, and to modify the ways and means to complete the information in difficult or different cases. All these show the need to prepare different levels of field staff very carefully and thoroughly. We have always found this to be a challenge.

**Sampling and Timing**

Site selection and sample generations of the study area should be based on the research objectives and feasibility. Timing too should be consistent with the study design as well as field conditions. Major festival days should be avoided. During busy seasons interviewers should be prepared to work during morning or night hours. At the same time scheduling should be such that continuity is maintained and the research team's time is properly utilized.

**Logistic Problems**

In Nepal this problem is intimately related to the difficult geographic terrain. An interviewer or observer almost always has to make difficult treks through the mountains, streams, rivers, muddy fields, boulder beds, and jungles. After a day's hard walk he often finds that the village he has just reached cannot accommodate him. In the villages of Nepal the pattern of accepting or
accommodating visitors differs widely. Normally a village cannot accommodate more than four or five visitors a day. Even then food is scarce and villagers have usually nothing to sell. In most of the villages in hilly and mountainous regions visitors are welcomed and most houses have a corridor built, often open, to accommodate or to receive visitors (in such corridors household members also meet, rest, work, and discuss their affairs). However, the villages in the terai area normally do not entertain outside visitors and their houses often do not have such extra space. Visitors in this case need to find odd places like panchayat buildings, schools, or a community hall for accommodation. All the supplies usually have to be carried in on human back. Sometimes porters are not available. Interviewers and supervisors have to carry their own personal belongings such as sleeping bags, clothes, etc. even if porters are available because of the cost of such transportation.

All these indicate the need for proper planning and scheduling, staff movement, and organization. The team should be properly equipped with required forms, light-weight sleeping bags and other personal effects, flash-lights, candles, utensils, etc. They should also carry some food even though they will be ready to eat what the villagers eat. A sufficient number of forms should be brought and they should be simple, light, and functional. Investigators and their papers should also be adequately protected from rain. But certain things like tents and “luxury” appliances should not be brought, for these things may isolate the interviewers from the community. Logistic considerations should be studied to keep the team and supervisors highly mobile. It would be helpful if the team members took some lessons from nomads!

Community-Related Problems

This is one of the most important problem areas about which field staff should be thoroughly acquainted. Community-related problems that were not anticipated should be tackled in the field itself after joint discussions among the interviewers and supervisors and other agencies involved in the community’s affairs. The community might have been exposed to several similar studies by other agencies and its members might not see any need for the study in question and may not like to be bothered. There may be a tendency in the community to conceal certain information. This tendency may be unintended or unconscious. For example, a child’s diarrhea and pot-bellied appearance, an old man’s cough, a woman’s back pain may appear to a respondent in the community too natural and too trifling to bother mentioning or they may be forgotten because of recall problems or nervousness. It may be intentional because of shyness, fear, and false beliefs or superstition that any condition occurring in the family, especially among the women and children, should not be discussed. There may be certain legal implications or social taboos attached to certain problems like birth control, abortions, miscarriages, separation, and injuries as a result of a family squabble (usually wife beating).

One might find it quite difficult to adapt to attitudinal diversities in communities and their varied culture and customs. There may be the problem of overreporting or misreporting if the community expects some local benefits from the research study such as a new health post. Sociopolitical rivalry in a community may affect the study. For example, an interviewer staying in a household might have to face certain disbeliefs from rival households. The problems mentioned above may not always be avoidable but should be solved to the best of the team’s ability, which depends very much on their willingness to be innovative and creative in handling such situations.
Supervision

Multitier supervision is necessary for an accurate study. Supervisory responsibility is not a simple concept. Problems like what to supervise and how to supervise need always be rethought and reformulated. Supervision should not be taken as routine work but should be seen as an important procedure to improve the quality of the study and ensure that the study achieves its objectives. Supervision should help improve techniques, monitor and assure progress, provide learning opportunities, reenforce appropriate attitudes and morale, and provide regular logistic support.

In addition supervision itself should be measurable. A supervisor of a research study should know in detail all aspects of the field operation, have done the field work himself, be exceptionally competent, mobile, careful, and trustworthy. In Nepal, we have developed a comprehensive supervisory pattern for our research study but still we realize that supervision is one of our weaknesses.

Repeatability or Validity Testing

This is another area we have had problems with. Generally a community does not want to be bothered twice for the same purpose. In addition, supervisors and interviewers are invariably tired after completion of interviews and they are in a hurry to go to other areas or to go back home. In our case, a system of checking was developed for the study but was utilized only to check discrepancies or to ensure completion of the data. No measurable repeatability or validity tests were done. In view of the above constraints, we are planning to continue repeatability and validity testing with some sort of examination or observational survey. If one or two well-trained and well-oriented community physicians are sent to a certain proportion of the interviewed households to reinterview as well as to conduct physical examinations of the household members, this might solve some of the above problems as well as provide additional valuable information not available from interviews. But this kind of backup survey needs to be field-tested before we can determine how much help it will be.

On-the-Spot Monitoring

Preparation of initial field tabulations and continuous statistical monitoring of the entire study are necessary. If certain kinds of underreporting or misreporting are identified or suspected, field operations should be temporarily suspended and a solution to the problem should be found before restarting the field survey. Meeting with the district health personnel at Bandipur when problems were encountered in the survey of health needs in Tanahu District provided important insights that helped the team improve the interviewing. However, initial field checks or monitoring are not always done conscientiously. This can be avoided if the team understands the importance of such monitoring.

If, through monitoring, an instrument or methodology is identified as incompatible with the existing field conditions, there should be no hesitation in looking for the reason and changing or modifying the methodology if necessary, ensuring, however, that the major study objectives or design are not violated.

Finally, it is worth repeating that staff in applied health research must be physically and mentally prepared to go and live with the rural population and learn from their way of life. Only when this occurs will the results truly reflect the health needs and practices of the people who eventually must benefit from the research.
Appendix 1. Household census form.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>NAME</th>
<th>SEX</th>
<th>AGE (YRS)</th>
<th>MARITAL</th>
<th>SCHOOL</th>
<th>OCCUPATION</th>
<th>LOCATION OF WORK</th>
<th>IMMUNISATIONS</th>
<th>DISABILITY</th>
<th>DAYS AWAY</th>
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<tbody>
<tr>
<td>26</td>
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CODE IN FIELD
- MALE = 1
- FEMALE = 2
- AGE = CODE COMPLETED YEARS
- UNDER 1 = 00
- OVER 99 = 99
- MARRIED = 1
- WIDOWED = 3
- UNMARRIED = 2
- OTHER = 4

IMMUNISATIONS: 1-5 yrs. = 1, 1-3 yrs. = 2, 3+ yrs. = 3, UNCERTAIN = 4, NEVER = 0

DISABILITY: NONE = 0, PARTIAL = 1, TOTAL = 2

DAYS AWAY: CODE ACTUAL DAYS AWAY DURING 14 DAYS, OVER 14 DAYS = 99

RESIDENTIAL STATUS: NORMAL RESIDENT = 1, TEMPORARY AWAY = 2, TEMPORARY PRESENT = 3

(cont'd.)
I. HAS ANY HEALTH WORKER OR MEDICAL PRACTITIONER VISITED YOUR HOUSE IN THE LAST ONE MONTH FOR THE FOLLOWING -

<table>
<thead>
<tr>
<th>WHO VISITED</th>
<th>NO. OF VISIT</th>
<th>WHAT WAS DONE</th>
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<tbody>
<tr>
<td>a) FOR FEVER CHECKS ETC. (MALARIA F. WORKER)</td>
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<td>b) FOR VACCINATION (S.F. VACCINATOR)</td>
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<td>c) FOR COUGH CHECK ETC. (T.B. WORKER)</td>
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<td>d) FOR SKIN CHECK ETC. (LEPROSY WORKER)</td>
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<td>e) MOTHER &amp; CHILD CHECK (MCH VISIT)</td>
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<td>f) FAMILY PLANNING M/AIDS ETC.</td>
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<td>g) OTHERS (SPECIFY)</td>
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</table>

2. COMMENT THE FOLLOWING AFTER INQUIRY & OWN OBSERVATION:

2.1 SOURCE OF DRINKING WATER:

2.2 DRINKING WATER IS STORED:

2.3 PLACE WHERE THE HOUSEHOLD MEMBERS USUALLY MOVE THEIR BOWEL:

2.4 GARBAGE DISPOSAL:

3. DID ANY WOMAN IN YOUR HOUSEHOLD give birth in the last one year? (Mention each married woman in the census form. Include daughters-in-law who are temporarily absent but exclude married daughters of the HH. Specifically ask about still births, abortions and sex of baby. Ask for each: a) who provided any type of care before delivery, at delivery, and after delivery, b) how much money or presents were given, c) were there any problems with the pregnancy at any time. If more than one birth indicate the S.No. of mother for each birth.)

<table>
<thead>
<tr>
<th>S. NO. (SEE CENSUS)</th>
<th>NAME</th>
<th>LIVE BIRTH</th>
<th>STILL BIRTH</th>
<th>ABORTION</th>
<th>SEX</th>
<th>ANTENATAL CARE/WHO/WHERE</th>
<th>AT DELIVERY</th>
<th>POSTNATAL CARE/WHO/WHERE</th>
<th>MONEY OR PRESENTS</th>
<th>PROBLEM</th>
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(con't.)
4. HAS ANY MEMBER OF THIS HOUSEHOLD BEEN ILL, WET WITH AN ACCIDENT, NOT FELT NORMAL, NOT SEEN TO CARRY OUT USUAL ACTIVITIES, HAD ANY KIND OF TREATMENT OR HOME REMEDY OR SICK TO A PRACTITIONER OR HEALER IN THE PAST TWO WEEKS? (LIST ALL SUCH INDIVIDUALS BELOW. BEFORE LISTING FIRST ASK FOR EACH MEMBER ON THE CENSUS FORM WHETHER IN THE PAST TWO WEEKS THEY HAVE HAD ANY FEVER, COUGH, BREATHING PROBLEM, LOOSE MOTIONS OR PROBLEMS WITH HEAD, EYES, EARS, NOSE, MOUTH, THROAT, NECK, CHEST, SACK, ABDOMEN, GENITALS, ARMS, LEGS, SKIN OR MIND OR INJURY ANYWHERE. ADD ANY ADDITIONAL PROBLEM IDENTIFIED TO THE LIST. DO NOT LIST ANY ONE ABSENT ALL 14 DAYS.)

<table>
<thead>
<tr>
<th>S. No.</th>
<th>NAME</th>
<th>NO. OF PROBLEMS</th>
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</table>

5. HAVE ANY BABIES, CHILDREN, WOMEN DURING PREGNANCY OR DELIVERY OR ADULTS DIED IN YOUR HOUSEHOLD IN THE PAST ONE YEAR? (ASK SPECIALLY ABOUT INFANTS AND GIVE THEIR AGE IN MONTHS AT DEATH. ALL OTHERS SHOULD BE AGE IN YEARS. ASK ABOUT SYMPTOMS AND PROBLEMS LEADING TO DEATH.)

<table>
<thead>
<tr>
<th>NAME</th>
<th>SEX</th>
<th>AGE</th>
<th>CAUSE OF DEATH</th>
<th>CODE</th>
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</table>

6. DO YOU OR YOUR SPOUSE DO ANYTHING TO PREVENT PREGNANCY OR GIVING BIRTH, THESE DAYS?

<table>
<thead>
<tr>
<th>S. No.</th>
<th>NAME OF RESPONDENT</th>
<th>HUSB/WIFE</th>
<th>NO. OF PROBLEMS</th>
<th>CODE</th>
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FOR EACH PERSON LISTED ABOVE FILL OUT A SEPARATE INDIVIDUAL PROBLEM FORM.
Appendix 2. Individual health problems form.

1. Ask the Respondent (preferably the ill person) to describe his/her problem(s) chronologically, and then the number of days during the past 14 days his problem has been present. Record in respondent's own words.

2. UNDUPLICATED DAYS OF ILLNESS DURING TWO WEEKS:

3. TOTAL UNDUPLICATED DAYS OF ILLNESS:

4. UNDUPLICATED DAYS OF DISABILITY:

A. ENTER EACH GROUP OF PROBLEMS SEPARATELY, e.g., ILLNESS, INJURY, BIRTH RELATED DETAILS, PROBLEMS, ETC.

B. HOW MANY DAYS WERE YOU NOT COMPLETELY WELL DUE TO THE PROBLEM FOR THE LAST 2 WEEKS? (CIRCLE 1 IF IT IS NEW OR RECURRENT ORIGINATING THE LAST 14 DAYS.)

C. TOTAL DURATION OF THE PROBLEM. WRITE DAYS/MONTH/YEAR AS APPROPRIATE. CIRCLE 2 IF THE PROBLEM IS CONTINUATION OF MORE THAN 14 DAYS.

D. HOW MANY DAYS IN THE PAST TWO WEEKS YOU WERE IN BED OR DISABLED, OR NOT ABLE TO WORK? (FOR A CHILD ASK IF HE IS NOT PLAYING OR ACTIVE AS USUAL.)

E. DID YOU TAKE ANY SELF OR HOME TREATMENT FOR THE PROBLEM DURING THE LAST 14 DAYS? IF YES CIRCLE 1, IF NO CIRCLE 0. WRITE WHAT WAS DONE AND MONEY SPENT.

PROBLEM 1

PROBLEM 2

PROBLEM 3
5. DURING THE LAST TWO WEEKS DID YOU VISIT OR SEEK ANY HELP OR CONSULT A PRACTITIONER OR HOSPITAL, HEALTH POST, AYURVEDIC DISPENSARY OR FAITH HEALERS, DRUG SELLER OR ANY PERSON FOR THE RELIEF OF THE PROBLEM? CIRCLE: YES / NO. IF NO GO TO Q NO. 6

<table>
<thead>
<tr>
<th>FIRST CONSULTATION</th>
<th>SECOND CONSULTATION</th>
<th>THIRD CONSULTATION</th>
<th>TOTAL UNDuplicated EXP.</th>
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<tbody>
<tr>
<td>A. TYPE AND NAME OF SUCH PERSON OR HEALER.</td>
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<tr>
<td>B. FOR WHAT PROBLEM YOU CONSULTED?</td>
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<tr>
<td>C. HOW MANY DAYS AFTER THE START OF PROBLEM DID YOU SEEK FIRST HELP? (IF THE PROBLEM IS NEW OR RECURRING DURING TWO WEEKS)</td>
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<td>D. HOW MANY TIMES YOU VISITED HIM OR THE PLACE DURING THE LAST 14 DAYS.</td>
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<td>E. HOW MUCH FEES OR PRESENT YOU PAID HIM DURING THE LAST TWO WEEKS?</td>
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<tr>
<td>F. TWO WAY TRAVEL EXPENSE (FOR TWO WEEKS ONLY &amp; RELATED TO EACH CONSULTATION)</td>
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<tr>
<td>G. MEDICAL EXPENSE ON HIS PRESCRIPTION (FOR TWO WEEKS ONLY)</td>
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<tr>
<td>H. OTHER EXPENSE DURING TWO WEEKS LIKE DIET, SACRIFICE, WORSHIP ETC.</td>
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<tr>
<td>I. TOTAL EXPENSE DURING TWO WEEKS.</td>
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<tr>
<td>J. WHAT IS THE RESULT OF HIS TREATMENT? WRITE 1. IF CURED, 2. IF IMPROVED BUT NOT CURED, 3. IF NO CHANGE, 4. IF WORSE, 5. IF OTHER AND SPECIFY &quot;OTHER&quot;</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
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<tr>
<td>K. ARE YOU SATISFIED WITH HIS TREATMENT?</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
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<td>L. IF NOT SATISFIED, WHY?</td>
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6. IF THE AFFECTED PERSON RECEIVED NO TREATMENT FROM PRACTITIONER OR HEALTH SERVICE OR IF RECEIVED SELF OR HOME TREATMENT ONLY, ASK WHY NOT. RECORD IN RESPONDENT'S OWN WORD.
Appendix 3
Health personnel interview form.

HEALTH MANPOWER DEVELOPMENT RESEARCH PROJECT
HEALTH SERVICES STUDY
HEALTH PERSONNEL INTERVIEW FORM

Form No. S. No. District
Facility Interviewer Date

Date Month Year

PART A

Respondent's name Designation
Age Sex Marital status
Number of living children : Boy Girl
Ethnicity Home : Rural/Town/City
District Basic Education Level
Education in Health Field (Last certification)
Place of Health Training Year completed
How long have you been in the present post? Year Month
How long have you been in a similar post? Year Month
How long have you been in a different post? Year Month

PART B

Questions:
1. List the main causes of death in the following groups of individuals in this district:
   1.1 Infants under 1 year of age
   
   1.2 Children from 1 to 5 years
   
   1.3 Women during pregnancy and delivery
   
   1.4 All others (adults & children above 5 excluding pregnant, natal, and postnatal mothers)
   
2. List the main diseases in the following groups of individuals in this district:
   2.1 Infants under 1 year
   
   2.2 Children from 1 to 5 years
   
   2.3 Women during pregnancy and delivery
   
   2.4 All others

3. What are the main causes of poor health that you are aware of in this area?

4. What percentage of the people are malnourished or underweight in this area?

23
5. What are the main causes of malnutrition in these individuals? 

6. What other health facilities or practitioners are available to the people in this part of the district within 4 hours travel? (e.g. health posts, hospitals, doctor's house, ayurvedic dispensary, vaidya, sudeni, spiritual healers, and others) 

7. What percent of people in this area (within 4 hours travel) with any health problems seek care from your facility? from any other source of care? treat themselves at home? 

8. What are the reasons some people with problems do not seek care from any source? 

9.1 If people go to your facility or the other source of care, where would they go first for most of their health problems? 

9.2 Who conducts most of the deliveries in your area of this district? 

10. What percentage of patients who come to your facility have to walk more than 3 hours a. outpatients  b. inpatients 

11. When you go home visiting or working in the community, what is the farthest distance (in time) you have to travel away from your facility? Indicate by what means? 

12. In what ways does your community help you or participate in health work in this area? 

13. Is your facility located in an area that is convenient to the greatest number of people possible? If not, what would be a better place? 

14. Are the buildings and equipment adequate? If not, suggest how to improve them? (at reasonable cost): 

15. Do you have adequate medicines and other supplies? If not, how many months would they last if used properly? 

16.1 List the actual responsibilities (functions) of your facility at the present time: 

16.2 List your own responsibilities (functions) at present if different from those above: 

16.3 (First ask the Question 16.1 and 16.2 as they are, then list the following functions and have them indicate which are the facility's functions and which are their own functions.) For ranking, please see Question No. 18. 

<table>
<thead>
<tr>
<th>Function</th>
<th>Facility's</th>
<th>Your Own</th>
<th>Rank Q. 18</th>
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<tbody>
<tr>
<td>Illness care (curative)</td>
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<tr>
<td>Preventive</td>
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<td>MCH</td>
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<td>FP</td>
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<tr>
<td>Communicable disease control</td>
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<td>Environmental sanitation</td>
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<td>Health education</td>
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<td>Administrative</td>
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<tr>
<td>Other (sp.)</td>
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17. Are you confident that you are able to carry out all your responsibilities properly and to your satisfaction?
18. If you had a choice, what should be the functions of a worker like you to meet the main health needs of your area. Rank the three most important functions above (Q. 16.3), indicating the most important with "1," second most important with "2," and third most important with "3."

19. Did you have adequate theoretical and practical training in the following areas? Indicate under theory and practice separately, if training was quite adequate with (1), just adequate with (2), only partly adequate with (3), if not adequate at all with (4)

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<thead>
<tr>
<th>Function or Activity</th>
<th>Theory</th>
<th>Practice</th>
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<tbody>
<tr>
<td>a. Health education</td>
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<td>b. MCH</td>
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<tr>
<td>c. Family planning</td>
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<tr>
<td>d. Environmental sanitation</td>
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<td></td>
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<tr>
<td>e. Medical care (curative)</td>
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<tr>
<td>f. Communicable disease control</td>
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<td></td>
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<tr>
<td>g. Recording and reporting</td>
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<tr>
<td>h. Other administration</td>
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<tr>
<td>i. Supervision</td>
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<tr>
<td>j. Others (list)</td>
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</table>

20. Do you feel that you need further training in any of the above areas? If yes, circle the number against that area and check either theory or practice or both.

21. Are you able to use all your skills or knowledge you learned in your training?
   If not, which are the ones you are not using now?

22. List additional skills or knowledge you wish you had received in your training:

23. Approximately how much time do you use in an average working day (in hours) for the following: Be sure that time listed is only during working hours.

23.1 Travel time (to and from the place of work)
23.2 Writing or working with records and reports
23.3 Waiting for patients
23.4 Cleaning equipment, preparing drugs, etc.
23.5 Maintaining good relations with community people, such as friendly talk, etc.
23.6 Personal time, such as rest, tea breaks, etc.
23.7 Taking care of administrative matters other than records or reports
23.8 Supervising other personnel
23.9 Assisting other personnel
23.10 Time spent providing the actual services to people (e.g. treating patients, dispensing medicines, home visits etc.):
   a. In outpatient department
   b. In indoors
   c. In the fields or during home visits
23.11 Total time spent per day
   (Make sure that total equals the sum of 23.1 to 23.10. If not, have the respondent reestimate.)

24. What percent of your time, on the average, do you spend on the following functions?
   (Estimate from a day's or week's activity.)

<table>
<thead>
<tr>
<th>Function</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illness care (curative)</td>
<td></td>
</tr>
<tr>
<td>Preventive care</td>
<td></td>
</tr>
<tr>
<td>MCH</td>
<td></td>
</tr>
<tr>
<td>FP</td>
<td></td>
</tr>
<tr>
<td>CDC (malaria, small pox, TB, leprosy)</td>
<td></td>
</tr>
<tr>
<td>Environmental sanitation</td>
<td></td>
</tr>
<tr>
<td>Health education</td>
<td></td>
</tr>
<tr>
<td>Other (sp)</td>
<td></td>
</tr>
</tbody>
</table>

25. How many people do you serve on an average day for each of the following functions in the following places?
<table>
<thead>
<tr>
<th>Function</th>
<th>In facility</th>
<th>In person's home</th>
<th>In your home or private clinic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illness care</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preventive care</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MCH</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family planning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communicable disease control</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental sanitation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (specify)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

26. How many people do you have to refer to another facility or practitioner on an average day (specify to whom and why)?

27. Do you provide family planning advice to anyone? 
   If yes, what type of advice? 
   To how many people in an average week? 

28. Do you provide any type of contraceptives to anyone? 
   If yes, what type? 
   To how many people in an average week? 

29. If married with at least one child, ask: Have you or your spouse ever used any contraceptive method, and if so, what type?
   If yes, are you or your spouse currently using any contraceptive method, and if so, what type?

30. How often are you visited or supervised by a more senior worker? 
   Who is this person? 
   What does he/she do when supervising or visiting you?

31. How often do you visit a larger facility (indicate where)? 
   For administrative purposes:
   For training or receiving technical supervision or instructions:
   For other purposes (list):

32. What are the main obstacles that you feel prevent you from meeting the health needs of your community properly? 
   32.1 Related to your own ability: 
   32.2 Related to the characteristics of your community: 
   32.3 Related to the organization for which you work (include provision of facilities such as housing, pay, etc.)

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Appendix 4.
Applied Research — A Tool for Health Services Development

In countries with limited resources, an important question that must be asked in any discussion about research should be, "how much, if any, can we afford?" Inherent in such a question is the feeling that much research is nonproductive, or at best a luxury that will provide answers useful only in the distant future. Countering this impression about research are the arguments that only through sound experimentation and applications of research methods can appropriate decisions be made regarding the use of a country's scarce resources. As in most situations reality is somewhere in the middle of these two extremes. This background paper on applied health research is based on the assumption that well-conceived and properly planned research can make important contributions in situations where resources are limited. The key concepts that are conveyed in this position are careful selection of the research problem and careful planning and execution of the research study itself. A lack of these elements probably more than any other factor explains the all-too-frequent complaint that the practical returns from research are minimal. Improvement in research competence is therefore a major goal of the present workshop. The following sections of this paper are designed as an introduction to important topics related to understanding and developing the ability to plan and carry out good applied research projects.

Definition of Applied Research

Applied research is a general term encompassing a wide range of approaches concerned with the issues of applying current knowledge to the tasks of solving technical or organizational problems. In contrast, the goal of so-called basic research is the generation of new knowledge. Practical applications are secondary considerations in basic research. This difference explains the higher priority that is often placed on applied research in developing countries. Two examples of applied research providing solutions for practical problems follow.

The problem may be one of technology. For example, efficient hand pumps with a long life could be used to provide rural areas with a safe water supply, but no such hand pump currently exists. In this case, applied research could be directed toward developing a new hand pump to meet these criteria.

The problem may be organizational. For example, there may be little health care coverage in rural areas because services are concentrated in the urban centres. Applied research could be undertaken to determine whether using voluntary health workers to extend health care to rural areas has an effect on the health status of the people. Similarly, the research may be directed toward solving managerial, administrative, or pedagogical problems.

Regardless of the nature of the problem, the purpose of applied research is to suggest solutions that can be applied or implemented. This relationship between research and application is strengthened when the persons responsible for program implementation are involved in the research process. Their involvement is helpful in identifying problems needing research; and their cooperation is often necessary to carry out the research, for example, if the study is concerned with demonstrating alternative manpower patterns in delivering services. In addition, their assistance is essential for implementing any changes recommended by the research.

In carrying out applied research a number of methods or approaches can be used depending on the problem and the situation involved. Some of the most familiar methods
include controlled field experiments, epidemiologic studies or social surveys, pilot or demonstration projects, systems analysis, and operations research studies. Because these types of applied research are often confused or misunderstood, a brief description of each follows.

Controlled field experiments — In a classical sense these are closer to basic research in design and execution. They consist of experiments in which a new treatment or solution to a problem is applied to one population, while a second similar population not receiving the experimental inputs acts as a control. Controlled experiments are complex and expensive and it is difficult to assure absolute comparability between the two populations. However, answers obtained from well-designed studies often provide the most valid estimate of program effects.

Epidemiologic studies or social surveys — These types of studies generally involve collecting information that provides a description of a population. In many instances, by appropriate analysis, comparisons between different segments of the population or examination of time trends provide information useful in answering research questions.

Pilot or demonstration projects — These are often similar to experimental field studies in purpose but have no controls and may involve larger, more realistic applications to a population. Careful assessment of the results are required, but separation of program effects from the influence of other factors, such as socioeconomic change, is difficult.

Systems analysis and Operations research — These are probably the least understood types of applied research, yet their names are being used more and more frequently and often inappropriately. The confusion usually centres around their highly mathematical applications. In fact, the basic approach in either can be utilized in designing research studies that make use of simple quantitative descriptions and a minimum of statistical analyses. The main contribution of systems analysis or operations research in the health field is the use of systematic thinking to identify, analyze, and interrelate the components of the health problems and health service systems being studied. The basic steps of systems analysis and operations research can be summarized as follows:

**Systems Analysis**
- (a) Analyze the situation
- (b) Establish goals and constraints
- (c) List alternative approaches
- (d) Compare alternative approaches
- (e) Set objectives
- (f) Develop a plan of action
- (g) Implement
- (h) Evaluate and replan

**Operations Research**
- (a) Define the problem and its interrelated features in terms amenable to analysis
- (b) Identify possible solutions
- (c) Develop a model of the total system incorporating the identified interrelationships
- (d) Test alternative solutions by applying them to the model
- (e) Pinpoint feasible solutions that are likely to be implemented and yield maximum benefit from the resources utilized

Although these approaches are applied to a variety of problems, they are most commonly used for solving managerial problems within a service system. Improvements in efficiency and effectiveness of a service or program are usually their goal.

The Research Process

Recommendations contained in any research report are only as valid as the process and procedures used to reach those conclusions. For this reason a clear statement of the problem being studied, the purposes of the research, the design of the study, the variables being measured, the methods being utilized, the hypotheses or questions being tested or answered, the implications of the results, and the resources utilized are all important components in preparing for carrying out valid applied research. In the following discussion the steps involved in defining and selecting a research problem are presented, then the important components of a research project are outlined as they might appear in a research proposal.
Problem Definition and Feasibility of Research

Defining a problem that at the same time is amenable to research is a process consisting of two stages: (1) the concept stage, during which areas of concern or general problems are identified and priorities established between them; (2) the problem definition stage, during which an area of concern is narrowed down to a specific question or problem that needs to be solved.

The following questions can be helpful in this process as they outline the theoretical and practical factors that need to be considered when undertaking any research project:

**Significance of the Problem**
(a) Is the problem important for the area of concern (e.g., family planning, basic health services, communicable diseases, water supply and sanitation)?
(b) Is it an area of concern to the country or region?
(c) Would the results of research on the problem have a practical value in terms of application or implementation?
(d) When would the results have any impact? Immediately or in the future?

**Researchers**
(a) Are there researchers available who are interested in studying the problem?
(b) In terms of training, experience, and personal qualifications, are they suited to carrying out this type of research?
(c) Do they have the time available to conduct the research?

**Methodology**
(a) To what group of people or service system are the results of the research meant to apply?
(b) What is the population or system to be studied? Can a sample of this population or system be taken?
(c) What variables need to be considered in order to answer the research question? Which are not essential?
(d) How can valid and replicable data on these variables be collected at reasonable cost?
(e) How can the data be analyzed and the findings presented in the most effective form for implementation?

**Administrative Considerations**
(a) Are there preexisting political, legal, administrative, or ethical considerations that can hamper carrying out the research or implementing the results?
(b) What cooperation with other organizations is necessary?
(c) Are research facilities available?
(d) What steps are involved in conducting the research?
(e) How much time is needed to complete the research?
(f) What type of administrative mechanism is needed to coordinate activities during the research?
(g) Is appropriate managerial and administrative capability available to support the research effort?
(h) How much will it cost to undertake the research? What other resources will be required (e.g., field staff, clerical staff, space, equipment, supplies, etc.)?

**Preparing a Research Proposal**

A research proposal is basically a description of the problem on which research will be undertaken, the purpose of the research, and how it will be carried out. These basic components are broken down further in the following paragraphs:

**Title of Study**
This should be a short descriptive phrase reflecting the subject of the proposal.

**Institution Proposing the Research**
The name and address of the institution undertaking the research should be given. A brief description of the objectives of the institution, as well as any previous experience with research projects, is a useful inclusion.

**Outside Cooperating Agencies**
This should comprise the names and addresses of all other institutions that have been involved in planning the research or will be involved in carrying out the project. A short description of the nature of their involvement is also recommended.
Background of the Problem

(a) **Statement of problem** — This should be a clear, concise statement of the specific problem on which research is to be undertaken.

(b) **Definition of terms** — Definitions of the important terms used in the proposal should be provided. Because terms may have different meanings in different areas, this facilitates communication and understanding.

(c) **Background of situation** — A brief description of the national or regional setting that helps clarify the problem, as well as the circumstances surrounding the development of the research proposal, including the significance of the problem and the links between the proposed research and the socioeconomic plans of the government, should be given.

(d) **Regional implications** — Aspects of the research that could be useful for other countries in the region should be explained.

(e) **Review of literature** — This should provide a summary of the findings of other research. A review of the literature is helpful in pointing out problems that need research and in providing examples of different methodologies for collecting and analyzing data. If a review of the literature has not been done prior to the time of the proposal, it may be done as the first stage of the research project.

Objectives

(a) **Statement of purpose** — This is a clear statement of the overall aim of the project, i.e., for what purposes the project is being carried out.

(b) **Statement of objectives** — Specific objectives should be stated that must be clearly spelled out in quantifiable terms. Information that is to be collected can then be carefully selected to measure the achievement of these objectives.

(c) **Hypothesis (if any)** — This would be a statement of the relationship to be expected between the variables included in the study. A hypothesis may suggest an explanation or a solution to a particular problem; it can be formulated on the basis of past experience, a review of the literature, or theory. If the objective of the research is to test a hypothesis, data will be collected and analyzed in terms of the hypothesis. On the other hand, a research project may have as the first objective the formulation of hypotheses. The latter are usually exploratory or descriptive studies.

Research Procedures and Methodology

(a) **Research design** — Briefly outline the design. Research design, as it is used here, refers to the procedures and time frame for collecting data in such a manner that they answer the research questions. For example, data may need to be collected both before and after a new village health worker program is implemented to show the effect of the program on the health status of the people. The same data may be needed on a control group (a similar group where the new program is not implemented to show that the effect is due to the village health worker program and not to other factors. The choice of a design both influences and is influenced by the variables, sample, instruments, and methods of analysis.

(b) **Sample** — If a sample of a population is to be studied, a description of the procedures for selecting the sample should be included. In statistical terms, a sample is a subgroup of the individuals to be studied on whom data are collected. The characteristics of those included in the sample should be representative of the population or universe to which the findings of the study are to be generalized. The sample size will depend on the variability of the data to be collected and the precision required in predicting the measured characteristic for the entire population.

(c) **Variables** — The variables to be included in the study should be listed. A variable is a quantity that may assume any one of a set of values. Variables, such as age, weight, and height, may be measured directly. Other variables, e.g., attitudes and knowledge, cannot be so easily related to the concepts they represent and must be measured indirectly through indicators, from which inferences about the variables may then be made.

Variables can be classified as independent, dependent, and concomitant. It is normally the objective of the research to determine the effect on the dependent variable
of changes in the independent variable. For example, will an increase in the number of
trained midwives (independent variable) have an effect on the infant mortality rate
(dependent variable)?

(d) Instruments — Describe the instruments to be used to measure the different
variables, e.g., questionnaire, experimenter observations, water quality analysis, etc. It is
important to design or choose a cost-effective instrument and not attempt to obtain
more information than is needed or can be handled in the analysis and interpretation of
the data. Two important factors to be considered in selecting an instrument are: (1) Is it
accurate? Does it measure what it intends to measure? (Validity) (2) Is it consistent?
Does it give the same measurement if the measurement is repeated? (Reliability)

(e) Pretest — Outline the procedures for pretesting the instruments. A pretest or
trial provides the opportunity to see how an instrument works and whether changes are
necessary before the full-scale study begins. The pretest (and there may be several)
provides the means for finding errors, such as in the phrasing and order of items in a
questionnaire, and for determining the accuracy and consistency of the instrument. The
number of respondents or the size of the sample involved in the pretest may be small, but
they should have characteristics similar to those who will participate in the final
experiment.

(f) Data collection — Outline the details of the actual data collection and
introduction of experimental programs, if any. This should include staffing of field teams,
logistics of travel and lodging, timing, data flow, supervision, procedures for resolution of
technical as well as administrative problems, and quality control of the data. The latter
should involve routine and regular checks, such as review of filled-in questionnaires,
reinterviews and cross-checks with other sources of information.

(g) Data analysis — Describe the procedures for processing and analyzing the data.
This consists of coding the data (categorizing and giving a representative value, usually
numerical, to each item of data), tabulating the data (counting the number of items in
each category), and performing statistical computations. The statistical computations
are used to summarize the data and to establish the confidence that can be placed in the
inferences made from the data. Statistical analyses are appropriate only to certain types
of data and certain sampling procedures. To avoid collecting data that cannot be
analyzed, the analysis plan must be determined before the data are collected. For this
reason, it is important to involve the person who will be responsible for data analysis
when the research design, sample, variables, and instruments are being considered.
Consideration should also be given to whether the analysis will be done by hand or by
computer. As in data collection, a well-designed quality control system is required to
assure a minimum of errors in data processing.

(h) Project review — A description of the specific mechanism for reviewing project
activities should be outlined. Project implementation is considerably facilitated and
strengthened when review activities are built in from the outset of the project. The
mechanism, to be conceived as an educational as well as a managerial tool, should allow
the project team to review periodically the project activities, make necessary
readjustments, and plan future activities.

Project Administration Plan
This is a description of how the administrative aspects of the project will be handled.
From the outset, it is helpful to name one individual to assist the research team in the
administrative aspects of the project and to define that person's responsibilities in the
overall implementation as well as day-to-day operations of the project.

Duration and Phasing of the Project (Work Plan)
Define each phase of the project. Estimate the time needed to complete each phase
of the research and the total time required to complete the project. Each project can be
divided into natural and distinct phases. After discussion among all parties concerned, a
realistic and manageable schedule should be developed that allows ample time for each
phase, from problem definition to the submission of the final report. Careful scheduling
of the multiple stages of a project are required to identify the dependence of one
component on the completion of another. (See Appendix Fig. 1 for an example of a work
plan diagramed to show the sequence and interrelationship of project components. This
diagram could be expanded to include time, manpower, and other resources required to
progress from one stage to the next.)

Training Component
Identify those aspects of the project that would contribute to training staff so that in
the future they might participate more fully in solving development problems within the
country. It may be beneficial for certain staff to undergo specific training prior to or
during the project to enable them to perform at the level required.

Plans for Dissemination or Implementation of Results
Outline the plan for disseminating or implementing the findings of the study. Before
the results of a research project can be used they must first be reported and distributed
to the appropriate individuals or organizations. A means for distributing the results
should be built into the project with consideration given as to how results will be
disseminated (e.g., final report, series of papers, seminar, film, etc.), and to whom. In
instances where direct implementation of the findings can be carried out, a brief
description of this process should be included along with the expected impact.

Relationship with Funding and Cooperating Agencies
Details of the relationships and conditions of participation with any funding or
cooperating agencies (national or international) should be spelled out including project
visits, progress review, reports, publication agreements, schedule of payments, etc.

Personnel
List the personnel to be involved in carrying out the research project and their time
commitment. The curriculum vitae of the principal staff should be included.

Budget
Estimate the total costs of the research project, indicating the yearly contributions
to be made by each institution or agency involved. A sample budget work sheet follows.

Budget

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>...</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Staff (in man-months)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1.1 Research Staff</td>
<td>1.1</td>
<td></td>
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<td>1.1</td>
</tr>
<tr>
<td>1.2 Secretarial Staff</td>
<td>1.2</td>
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<td>1.2</td>
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<tr>
<td>1.3 Project Administrator</td>
<td>1.3</td>
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<tr>
<td>1.4 Outside Consultants</td>
<td>1.4</td>
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<td>1.4</td>
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<tr>
<td>2. Training</td>
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<tr>
<td>Do any of the personnel need training prior to, or during, the project?</td>
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<tr>
<td>3. Space</td>
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<tr>
<td>3.1 Office Space</td>
<td>3.1</td>
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<td>3.1</td>
</tr>
<tr>
<td>3.2 Research Facilities</td>
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<td>3.2</td>
</tr>
<tr>
<td>4. Equipment and Supplies</td>
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<tr>
<td>5. Surveys and Interviews</td>
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<tr>
<td>5.1 Manuals and Interview Schedules, etc.</td>
<td>5.1</td>
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<td>5.1</td>
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<tr>
<td>5.2 Training of Interviewers</td>
<td>5.2</td>
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<td></td>
<td>5.2</td>
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<tr>
<td>5.3 Field Costs</td>
<td>5.3</td>
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<td>5.3</td>
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<tr>
<td>5.4 Transportation to and from Field</td>
<td>5.4</td>
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<td>5.4</td>
</tr>
<tr>
<td>6. Data Processing</td>
<td></td>
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<tr>
<td>7. Dissemination of Results</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>7.1 Publications, journal articles, seminars</td>
<td>7.1</td>
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<td></td>
<td>7.1</td>
</tr>
</tbody>
</table>

32
Specify data needs to fulfill project objectives

Develop quality control and supervisory pattern

Plan data processing:
- methods
- flow of data
- coding format, code keys, manuals
- basic tabulations anticipated
- quality control of data

Select and train staff
- field investigators
- supervisors
- statistical assistants

Pretest program:
- preliminary pretest
- translate into local languages
- final pretests and standardization
- print schedules

Coordinate with other possible data collection:
- service statistics
- indigenous practitioners study
- interviews with health staff
- observation of health staff

Develop sample design

Develop instruction manuals and training procedures

Plan field logistics:
- office, accommodations, supplies
- transport
- finances
- local schedules
- official contacts, rapport, etc.

Plan overall schedule for survey:
time sequence, milestones, etc.

Appendix 4 Fig. 1. Flowchart of possible steps leading up to sample surveys.