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MEASLES IMMUNIZATION AND ORAL REHYDRATION THERAPY
IN MAHARASHTRA, GUJURAT, AND HIMACHAL PRADESH, INDIA

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I. EXECUTIVE SUMMARY AND RECOMMENDATIONS

A. INTRODUCTION

A nine member team from PRITECH ^{1/} visited the Integrated Rural Health and Population (IRHP) project in Maharashtra, Gujarat, and Himachal Pradesh in April/May 1985, and held discussions with state officials. The team's purpose was to make recommendations for new or intensified programs in oral rehydration therapy, measles immunization, and family planning spacing.

B. BACKGROUND

The IRHP project started in 1980 in 14 districts in the states of Punjab, Haryana, Himachal Pradesh, Gujarat, and Maharashtra. The goal of the project was to achieve within the selected districts "significant" declines in the crude birth rate and declines of 15 percent and 20 percent respectively in infant and child death rates.

To achieve these goals, the project had two purposes. The first was to extend the reach of the public health system in the selected districts by constructing additional public health centers and subcenters (some 2,000 buildings in all) and supplying them with additional staff in accordance with the Indian Government's model health plan for rural areas. The second purpose was to improve qualitative performance of the health system by concentrating on 12 problems ^{2/} and strengthening training of health personnel, management procedures, communications programs, data gathering, and evaluation in order to better deal with these problems.

Initially, implementation proceeded slowly so that the project has been extended one year to August 30, 1986 in order to complete the original program. Due partly to the increase in the value of the dollar, USAID's \$40 million contribution will be more than enough to finance all project inputs. In addition, while maintaining its child mortality reduction goal, the mission recently redefined its health and nutrition strategy to focus more selectively on interventions addressing three of the 12 key problems in the original project. These three interventions are: the control of diarrhea through oral rehydration therapy, measles immunizations and the promotion of spacing in the family planning programs. In this context, USAID requested the PRITECH team to (a) assess current activities in ORT and immunizations (the mission would cover the third area, family planning) and (b) make recommendations for both intensified long-term programs and short-term activities which could be initiated during the extension of the project. At the request of USAID, the team focussed on Maharashtra, Gujarat, and Himachal Pradesh. The team's major findings follow.

^{1/} PRITECH is located in Rosslyn, Virginia, USA, and provides assistance in primary health care. The team members are listed in Chapter II.

^{2/} The twelve problems were: early age at first pregnancy, short birth intervals, large family size, low birth weight, birth injury/asphyxia, neonatal tetanus, septicemia, malnutrition, diarrhea, respiratory infections, immunizable diseases, malaria.

C. RECOMMENDATIONS

The team made individual sets of recommendations for ORT, measles, and family planning spacing. However, it is realized that many of the recommendations, for instance for improving record keeping, overlap one another and that the three initiatives--to the extent they are taken up by the states have to be melded into an overall program. This is particularly true since at the field level all three programs come together as the responsibility of PHC Center and subcenter personnel who already have multiple duties.

The team's recommendations raise several policy issues which would need to be decided by the states before beginning statewide programs (for instance, the relative roles of home solutions and ORS packets in an overall ORT program). In each case, also, the team assumes that the key to successful programs is software, not hardware. There are equipment and supplies required for each area, but the major task is to change the behavior of both providers and recipients through communication, training, strengthened management, and more informed planning.

For each state and each activity, there is a strong emphasis on generating better information to serve as a basis for planning, implementation, and evaluation. There are numerous recommendations for gathering baseline data on target groups, epidemiological information, knowledge-attitude-practice studies of providers and recipients, operations research, and evaluations. A key assumption behind many of these recommendations is that operational targets for programs should be set in relation to specific client groups not just as gross targets. Many of the recommendations will strike local readers as idealized--admirable if you could carry them out, but difficult to achieve given current budget and bureaucratic constraints and rural conditions. However, the state supervisors and managers of the proposed ORT, immunization, and spacing programs are "information workers," no less than other administrators. Their actions are governed by the information they possess about their programs. In this context, the evaluation and information gathering recommendations of the reports need to be scrutinized very carefully to decide what is critical and feasible in the Indian context.

Finally, each of the three program areas implies different relative roles for the public and private health care systems. For ORT, the recommendations assume that the public health system will lead statewide efforts and will be an extremely important promotional and treatment agent. However, the team also notes that the public health system can never directly treat each incidence of diarrhea. Hence, there is an emphasis in the ORT report both on home treatment using sugar and salt solutions, and on energizing the private health system to provide ORS packets. On the other hand, the team's recommendations on measles programs assume that--because the target group is smaller and because of the absolute necessity of maintaining a cold chain--the public health system will carry out the measles program as part of the EPI. For family planning spacing, the team's recommendations assume, particularly for the copper-T intrauterine device, that the principal responsibility rests with the public health system. Condom and oral pill distribution will be promoted in the public and private system.

A summary of the team's principal recommendations in ORT, measles, and family planning spacing follows.

1. Oral Rehydration Program Goals and Program Design

The goals of the ORT program recommended by the team are:

- To ensure that all families with children under five will understand the uses of ORT in mitigating the effects of diarrhea;
- That they will take steps to treat or have their children treated with ORT from the onset of diarrhea, and will continue feeding their children during diarrhea; and
- They will have access to cheap and appropriate ORT supplies.

The team recommends that the target group for ORT be families with children under five. The program should emphasize home mixed salt/sugar solutions as the first line of response to diarrhea. In order to help ensure proper mixing of home solutions, state governments might consider the use of standardized one liter containers and double-headed spoons. One end of this spoon would hold the correct amount of salt, and the other end the correct amount of sugar. This recommendation stems from the team's observations during their field trip that many rural families (and even many health workers) are not able to measure volumes of water correctly and that measuring salt and sugar with a finger pinch and hand scoop produces unacceptably high variations in the proportions of ingredients used. The effectiveness of ORT is greatly dependent on proper formulation of the solution.

In addition, because salt/sugar solutions do not provide certain critical elements lost through diarrhea, the program should teach families to obtain ORS packets if diarrhea continues after one day. The team recommends that the public health system be provided with ORS packets at all levels and, importantly, that the government and aid donors be willing to subsidize private sector production and distribution of ORS packets so that low-cost packets will be available to private practitioners and target families. The commercially produced ORS packets should be standardized by state regulatory bodies. Government subsidies for commercial production would be set so that the prices would be cheap enough for low income families to afford packets, yet high enough to provide an incentive for retailers and distributors.

Finally, the team recommends that the public health system actively discourage use of antibiotics for diarrhea. Antibiotics should be used only for patients with blood in their stools (dysentery) or with other specific indications.

a. Management

The team recommends that each state:

- Promulgate a state policy for control of diarrheal disease (CDD) and appoint both state and district CDD directors;
- Develop a budget and program guidelines for CDD;

- Establish a separate line item in its budget for ORS packets so packets do not have to compete with drugs when medical officers are ordering supplies; and
- Establish a uniform volume of water for mixing home-based solutions and ORS packets.

b. Training

Once program policies and guidelines are worked out, the team recommends intensified and standardized training incorporating competency based (learning-by-doing) methodologies as follows:

- Emphasize training of physicians who are critical to acceptance of ORT and who, because of the nature of their training, tend to downgrade ORT in favor of drugs.
- Establish one or more rehydration centers in each state where physicians and multipurpose workers can be trained and obtain hands-on experience administering ORT to patients. Practical experience obtained at the centers in rehydrating patients with ORT will give physicians and other health workers confidence in using ORT in managing diarrhea.
- Amend the ten week orientation training received by doctors posted to primary health care centers to include instructions on conducting basic epidemiological surveys and on supervising health workers in gathering epidemiological data.
- Provide male and female health supervisors and male and female multipurpose workers with specific training in
 1. accurate registration of births and deaths;
 2. prevention of diarrhea;
 3. recognition of diarrhea and dysentery;
 4. treatment of diarrhea and dysentery, in particular the need for continued feeding, the major role of ORT, and the supplementary role of the antibiotics which health centers have in their stores, referral for serious cases;
 5. accurate recording of diarrheal illness;
 6. accurate mixing of ORS (packets and salt/sugar);
 7. communication techniques for transfer of knowledge to the public;
 8. maintenance of an age-specific diarrhea information data base.

Although many of the above subjects are already included in the existing curriculum, the information needs to be standardized given various levels of workers.

- Train community health volunteers, anganwadi workers, and dais in the following areas:
 - recognition and reporting of diarrhea;
 - mixing of ORS (packets and salt/sugar) and stressing of continued feeding;
 - appropriate management of diarrhea and dysentery;
 - prevention of diarrhea; and
 - appropriate methods for teaching ORT to families.

This training can be provided in the short-term using training teams. Over the long term medical officers and other public health care center staff can train community health workers.

The team recommends that VCRs and video cassettes be used in training centers and by training teams to facilitate standardized training of various levels of health personnel. Appropriate steps need to be developed and implemented to expand the capacity of state training centers to carry out the above training programs.

c. Marketing

The team recommends that a comprehensive marketing program be prepared by a commercial advertising firm to promote ORT. The marketing program would reflect the relative emphasis given in the respective state programs to the use of home-mixed solutions and ORS packets.

The target audience for the marketing program can be:

Married women with infants up to five years

Adult males in the households, particularly husbands

Siblings in the household

Mahila Mandal organizers

Private practitioners (traditional and modern)

School teachers

Other village leaders like the Sarpanch

The messages developed for these audiences can stress:

Recognizing the symptoms of diarrhea

Knowing the danger of diarrhea

Advice on eating, drinking, breastfeeding, and hygiene

When to use home solutions, when to use ORS packets

Advice on mixing both home solutions and packets properly

Guidance on nutrition during and after diarrhea

The use of antibiotics should be used only when indicated (for diarrhea when associated with blood in the stool)

Promotion should be done through four different but overlapping categories of media:

Paid advertising, including use of broadcast media;

Point of purchase media (posters/handouts);

Personal face-to-face communication (between health worker and clients); and

Special events which improve public relations or attract free media coverage and consumer attention.

Further comments on these media, each of which has an important place in a communication strategy, are:

Urban and semi-rural cinemas, plus mobile cinemas, provide a good fit with target audiences.

Radio, including commercial and primary channels.

Audio cassettes/PA Systems used in vans and in hospital wards.

Print media, contrary to popular belief, do reach village influentials and can be used to reach these non-official change agents.

Outdoor media such as wall signs in mandi towns and panels on mofussil buses to be used for saturation effects as reminder media.

Doordarshan (TV) with the new low powered transmitters can be used as coverage of community and other receivers spreads.

Traditional/folk media have considerable possibilities for reaching areas uncovered by modern media.

Communications aids, such as illustrated flipcharts, can be developed for health workers when they meet with target groups. At present health workers rely on speech alone; marketing research clearly shows, however, that a communicator's effectiveness in getting a message across markedly increases when she uses a combination of "telling" and "showing."

Maximum effectiveness in securing correct use of ORT will be achieved if there is strong coordination among personal and impersonal communicators. For instance, messages broadcast over radio should be timed so that they can shortly be followed up by activities of health workers at various levels.

The responses sought from the target audiences will be in accordance with the following hierarchy:

Awareness of dangers of diarrhea if not immediately tackled.

Awareness of ORS.

Desire to learn more from subcenter or private practitioner and resolve doubts; personal dialogues

Confidence in efficacy

Intention/decision to use ORT when necessary

In addition to the commercial marketing program described above, a complete marketing effort can involve work with the state departments of education to introduce instruction on diarrhea and ORT into the school curriculum.

d. Information

In order to obtain adequate information on the extent of diarrhea and the progress of programs to combat it, the team recommends that the states invest substantially in obtaining information. Specific recommendations are:

- Establish a data base by using cluster sampling techniques to survey one block per district in order to collect baseline demographic and baseline diarrheal mortality and morbidity rates.
- Establish a surveillance system for collecting on-going diarrhea morbidity and mortality information to be used in planning adjustments in the CDD program.
- Establish a routine information system for age-specific diarrheal diseases using subcenter patient registries, family folders, field health provider reports (amended to include diarrhea information) to the medical officer who in turn reports to the district health officer.
- Strengthen the existing primary health care center sentinel information system by such steps as: using simple standardized forms, setting regular deadlines for reporting; requiring submission of

reports even when no cases have been seen; and establishing a system of sentinel villages, selecting one village for each sentinel PHC.

- In addition to regularizing reporting procedures, each state can establish independent evaluation teams for a district or group of districts. The team will annually evaluate the success of the CDD using specific pre-established criteria.
- Finally, the team recommends that the states establish operational research programs to conduct studies:
 - To determine mothers' abilities to prepare ORS packets and home solutions.
 - To examine the etiology of diarrhea disease.
 - To evaluate village attitudes towards village health guides and multipurpose workers, and to determine when and why they use the various services available to them whether they be private or traditional.
 - To address specialized questions about diarrhea in children under five such as the level of chronic diarrhea, dysentery, and dehydration among them as well as referral percentiles.

e. Summary

The program recommended by the PRITECH team implies that a budget is needed within the ORT program for ORS packets for all levels of the public health system plus funds to subsidize commercial distribution of ORS packets, for films, cinema vans and equipment, wall posters and print media, air time for commercial messages, audio-cassettes, and improved transport of local workers.

2. Measles Program Policy, Design, and Management

The goal of the measles program recommended by the team is to reduce measles morbidity and measles related mortality.

a. Policies/Program Design

The team recommends that in any given district or block the target group should initially be all children 9 through 35 months of age. During the initial phase, children 36 to 59 months who do not have a history of measles can also be immunized. Once the initial target groups in an area is completely vaccinated, the target group would be children 9-11 months.

Previous consultants and various documents recommend that the initial campaign year focus on children through 24 months of age. The age specific

measles attack rate data from serilogic surveys, morbidity reports and the impressions of medical personnel, indicate that the median age of measles cases is higher in India than in some other countries. Thus, the number of susceptibles over the age of 23 months, particularly in the rural areas, is significant, in this case between 25 and 50 percent of all such children. Because it is the desire of the GOI to demonstrate a reduction of measles morbidity and mortality, these children should be protected in the initial rounds of immunization.

In terms of program procedures, the team recommends that potent measles vaccine should be made available at the subcenters every three months. Vaccination days can be preceded by education/motivational campaigns and advance work by the local workers to assemble eligible children.

The team concurs in current plans that the program begin in the districts supported by the IRHP project. It is recommended that the states expand their capabilities to give vaccinations at convenient points for clients within villages as well as in the subcenters.

b. Program Management

The team's report stresses the necessity of maintaining the cold chain during vaccination efforts. Frequent breakdowns in the cold chain are now due primarily to lapses in procedure and lack of training rather than inadequate equipment.

It is recommended that:

- States develop written guidelines and operating procedures for cold chain personnel and vaccinators. The guidelines would spell out supervisory responsibilities. Training teams can be formed to provide instruction in proper procedures. Particularly important are guidelines and procedures for health workers to return unused vaccines to headquarters for disposal rather than returning them to active stock.
- States can establish a cold chain quality control unit at the state and/or district level to assess the effectiveness of the immunization delivery system. A quality control unit would search for breaks in the cold chain and would have the resources to assess the potency of vaccines at randomly chosen points in the distribution system. The unit can use temperature monitor cards provided by WHO or some other temperature monitoring device. Although not without problems, monitor cards are relatively cost-effective. (The monitor indicates only if the cold chain has been broken, not if the vaccine is still potent.) Such monitors have been in use since 1979. Several chemical indicators for monitoring are available and detailed discussions of their uses can be found in WHO document EPI/CCIS/83.8. In addition, vaccine potency assays, seroconversion results, and morbidity/mortality data can be valuable tools to detect cold chain failure and immunization delivery system success.

c. Training

The team recommends that training and continuing education programs in all aspects of immunization delivery, including vaccine handling, storage, and administration, be developed and conducted to ensure effective health personnel involvement in EPI activities. Training can be conducted one to two months before actual implementation of a vaccination effort in a given area. This training would include temperature control awareness and vaccine stability limits.

d. Marketing

The initial job is to educate the public that measles is an infectious disease and not a curse of a goddess. The message should communicate that whenever measles occurs, there is a possibility of complications which may prove fatal. Consequently, there is a possibility of "fear appeal" is necessary, but this would immediately be balanced with the reassurances that measles can be prevented by timely vaccinations. One important goal of the marketing campaign would be to help parents to recognize the symptoms of measles.

The team recommends a two step flow of communication to the target group through village leaders, private health practitioners, Mahila Mandals, and school teachers.

The main thrust of the marketing program would be interpersonal communication through health providers and "influentials" who will be mobilized. The team recommends experimentation with the use of video cassettes for improving communications between health providers and client groups. Communication aids such as flipcharts can also markedly improve the effectiveness of communicators.

The team recommends the use of mobile van promotion services timed to the actual dates of the campaigns every three months. Creating a festive or mela atmosphere can present a relaxed setting for serious clinical activity. Promotional material (posters, handouts, banners) can be developed to announce the program and displayed at health centers, market places, and other public gathering places. Because of the small size of the target group and because vaccines will be available only every three months, mass media would play a relatively minor supplementary role in the measles program.

e. Information

As with ORT, the team recommends that independent evaluation teams be formed (the same team can be used for both programs) to monitor program success. These teams can:

- Collect and analyze measles mortality and morbidity data

- Carry out measles vaccination coverage assessments using the EPI cluster method

- Participate in operations research efforts

In terms of surveillance, the team recommends that one and five year measles morbidity and mortality data be collected from all PHC's and subcenters participating in the measles program (using the same procedures as for ORT). In addition at least one PHC per district would be designated as a sentinel PHC and would carry out active surveillance in selected blocks participating in the measles immunization program. (Because of the under-reporting of measles cases, active surveillance is needed to obtain a picture of measles morbidity/mortality.)

In addition the team recommends that the states undertake operational research to improve the effectiveness of the measles immunization program. Suggested topics include:

Whether it is more effective to offer measles vaccine at subcenters for one day or one week.

Whether the administration of one dose of vaccine is as effective as two.

Whether the administration of DPT vaccine simultaneously with measles vaccine will increase coverage rates for any of the vaccines.

Whether providing measles vaccine at the village level will increase measles vaccine coverage and decrease measles incidence.

Finally, the team recommends that immunized children be provided with proof of their immunization by giving them an immunization card and marking the date and type of vaccination on the card. "Road to Life" or some other type card consistent with government policy can be used. Such a card, kept by the family, is essential to effective follow-up and evaluation.

f. Equipment/Supplies

In addition to measles vaccine, the recommendations of the team would require a budget for additional refrigerators and cold chain equipment as needed, back-up generators for units in case of power failure, promotional materials, and additional transport.

3. Family Planning Spacing

The goal of the spacing program would be to maximize the use of reversible family planning methods by eligible couples and extend the length of time between children to three years.

a. Policies/Program Design

The target group would be married couples 18-30 years of age with fewer than three children. In terms of relative emphasis on methods for family spacing, all states visited by the team offer the Copper-T IUD, oral pills, and condoms as spacing methods, but for a variety of reasons only the Copper-T

is strongly emphasized through the public delivery system. The Copper-T is an effective one-time method, requiring little follow-up, and many non-physicians, auxiliary nurse midwives (ANM) and female health assistants have been taught to insert it. On the other hand, although quantities of condoms are distributed to PHCs and subcenters, there appears to be minimal interest in this method among the rural population. There were good supplies of oral pills at many PHCs and subcenters that the team visited; but especially in Himachal Pradesh, supplies were not good. However, in each state at every provider level, there is skepticism about rural women's ability to remember to take the pill regularly and some incorrect perceptions of the side effects and dangers of the pill.

Hence, the states are basically pursuing a Copper-T spacing program for couples with one or two children. Given GOI preferences, and the attitudes of health providers, the Copper-T may offer the most potential for increased coverage with non-terminal methods, it does not satisfy the need of substantial numbers of eligible couples and cannot be used by women with no children. In addition, interviews and examination of records by team members on longer term Copper-T acceptors indicated dropout rates ranging from 25 percent to 50 percent in the first year. These figures correspond to results of acceptor continuation studies done worldwide and within India. Because of these dropout rates, up to half of all Copper-T users will no longer be protected after one year. Moreover, after two years only 30-40 percent of acceptors will still be protected.

In this context, the team supports emphasis on Copper-T as the main element of spacing programs, but recommends that the states also give increased emphasis to oral pills and condoms as supplementary family spacing methods.

In this context, the team recommends that a chief feature of the spacing program should be retraining of medical officers and particularly female health supervisors and ANMs in the importance of longer term systematic follow-up for new Copper-T acceptors beyond the current one month requirement. A revised government protocol can be issued requiring 3, 6, 12, and 18 month follow-up visits and training can be keyed to this schedule. Training would emphasize (a) recording of acceptors' status, (b) reassuring the acceptor about transient side effects, and (c) promotion of other methods if the IUD is removed.

b. Marketing

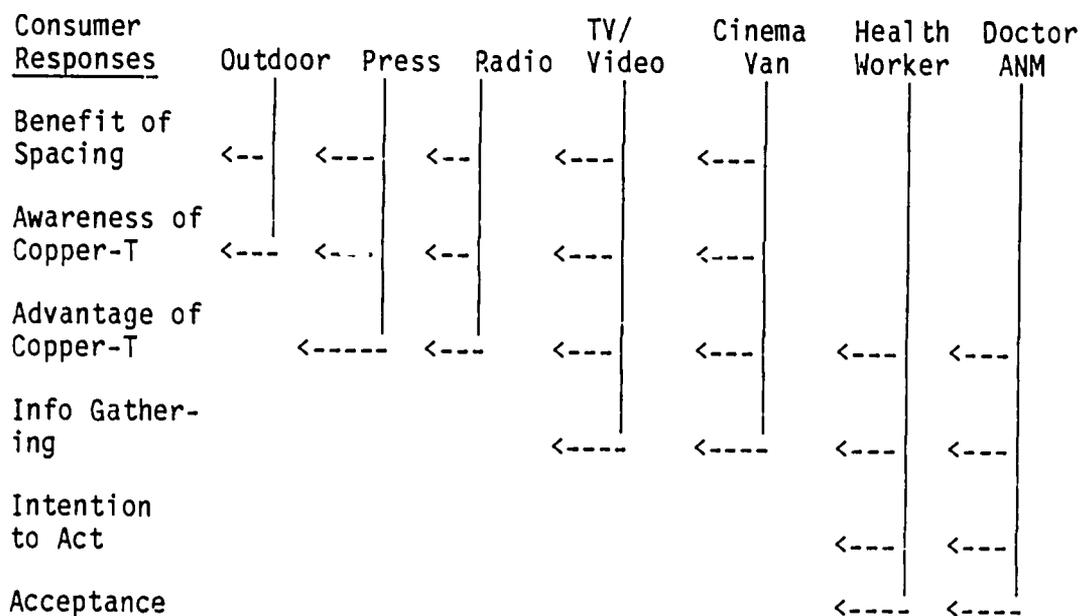
Baseline and CNA surveys have shown that although most villages know about male and female sterilization, only a modest proportion know about the Copper-T and even fewer about the oral pill. Therefore, a marketing program must focus on the advantages of spacing and the awareness of methods as well as on selling acceptance. The team strongly recommends the use of a commercial advertising firm to develop a complete marketing program. Chief elements of such a program would be:

- The Product: The benefits of spacing children every three years; The predominant method to be sold is the Copper-T IUD. Oral pills and condoms would be supplementary products.

- Target Groups: Married women 18-30 years with fewer than three children, their husbands, and influential people with particular emphasis on Mahila Mandal activists.
- Messages: A combination of appeals to reason and emotion to sell the concept of spacing children is essential. For example, "Give your love and care to the child who has already been born before you have the next. When this child is older, you will be free to give enough care and love to your next child." The product message will communicate the unique advantages of Copper-T: easily inserted; easily removed as needed; very reliable; ideal for spacing; a one-time method.
- Desired Consumer Response: First interest, then motivation to seek more information from health providers or influentials, then acceptance.
- Role of Media and Personal Communicators: The market program calls for combined efforts by mass media and personal communicators. The role of mass media is to create motivation for spacing, awareness of methods available, particularly the Copper-T, and a desire for more information. Personal communicators supply detailed information and urge acceptance. These respective roles are diagrammed below.

Figure 1

MEDIA MIX



- Communication methods: As with ORT, a range of methods would be used as follows:

Urban and semi-rural cinemas, plus mobile cinemas provide a good fit with target audiences.

Radio, including commercial and primary channels.

Audio cassettes/PA systems used in vans and in hospital wards.

Print media, contrary to popular belief, do reach village influentials and can be used to reach these non-official change agents.

Outdoor media such as wall signs in mandi towns and panels on mofussil buses to be used for saturation effects as reminder media.

Doordarshan (TV) with the new low powered transmitters can be used as coverage of community.

Experiments with use of VCRs in subcenters can be carried out.

Traditional folk media to reach areas uncovered by modern media.

- Promotion of Other Methods

While the Copper-T would be the focus of the spacing program, emphasis also needs to be given to other methods. The team recommends:

- Intensive orientation of specialist MDs and medical officers at state, district, and PHC levels concerning most recent findings in the use of the oral pill, its side effects, and dangers. This orientation can be done through workshops and publications using top Indian gynecological professionals and data from Indian studies on the ability of rural women to use the pill regularly.
- Similar orientation of female health supervisors and ANMs concerning the use of the pill and the proven capability of rural women to use it regularly. This training would also emphasize the need for regular follow-up of pill acceptors to reassure them if minor, but transient, side effects appear and to assure that pills are regularly supplied.

In terms of marketing, the team notes that as and when the commercial marketing organization is set up, the program of commercial distribution of condoms and pills will fall within its jurisdiction.

- Information

The team recommends that an improved current family planning acceptor information system be developed to provide up-to-date status reports on spacing method acceptors; to identify couples who have dropped out from one method and are motivated, but unprotected; and to provide a basis for evaluating continuation rates. As spacing

methods become more predominant, an improved system of evaluation should be established, including periodic acceptor follow-up surveys using cluster sample techniques.

- Equipment/Supplies

In addition to budgets for IUDs, pills, and condoms, the program outlined above would require promotional equipment and materials (posters, films, cinema vans, etc.) similar to that proposed for the ORT program. A combined equipment budget for the two programs can be developed.

II. BACKGROUND

A. PURPOSE

Technical assistance was requested by USAID/India to analyze and recommend ways to improve the planning for ORT and measles immunization programs under the currently funded Integrated Rural Health Project (IRHP) for the states of Gujarat, Maharashtra, and Himachal Pradesh. To achieve these objectives, PRITECH fielded an eight member team to assess the capabilities of introducing measles immunization into the current Expanded Program of Immunization (EPI) activities, to review the current implementation of the ORT programs, and to assess the status of the mass media campaign. The team members were:

1. Mathuram Santosham, M.D., M.P.H., Assistant Professor, Johns Hopkins University School of Medicine, Departments of Pediatrics and Medicine. Specialist in Infectious Diseases.
2. Diana Silimperi, M.D., Pediatrician, Medical Director Yukon Kuskokwim Health Corporation, Bethel, Alaska, Consultant on Diarrheal Disease for WHO Diarrheal Disease Program, formerly Medical Officer with CDC, Epidemiological Intelligence Service.
3. Terry Louis, Marketing Specialist, Director, International Programs, Population Services International.
4. Patricia Foreman, Pharmacist and Logistics Consultant, technical experience in several countries in drug delivery systems, cold chain, inventory analysis and distribution systems, and schedules.
5. John Modlin, M.D., Immunization Specialist, and Pediatrician Johns Hopkins University, School of Medicine, formerly Medical Officer with CDC Epidemiological Intelligence Service.
6. A. Marshall McBean, M.D., M.Sc., Measles Consultant, Pediatrician, Associate Professor, Johns Hopkins University, School of Hygiene and Public Health.
7. Subroto Sengupta, Marketing Consultant, New Delhi.
8. Jane Brown, M.B.A., Chief Operations Officer, PRITECH Project.

Because of time constraints, the team split into two groups. One went north to tour Himachal Pradesh, and the other travelled south to the states of Gujarat and Maharashtra. In all three states team members interviewed, key technical and service support officers for oral rehydration therapy, Expanded Program of Immunization (EPI), and family planning program within the respective state ministries of health. The teams also made field visits to the AID-assisted districts and interviewed program staff at regional offices, area hospitals, primary health centers (PHCs), and subcenters. The team also interviewed village health workers, traditional birth attendants (dais), women's groups (Mahila Mandals), private practitioners and local individuals.

At each site visited, facilities and equipment were inspected and program documents and records reviewed.

Meetings were also held with representatives of WHO and UNICEF, which are the major donors providing support to the national primary health care activities.

B. GENERAL INDICATORS OF DEVELOPMENT

India, with a population now exceeding 730 million is the second most populous country in the world. Since India gained Independence in 1947, its population has almost doubled. Currently, it is growing at a rate of about 1.91 percent per year, which is moderate compared to other countries of the region: Bangladesh, 2.4 percent; Iran, 2.6 percent; Nepal, 2.6 percent; Pakistan, 3.0 percent; Sri Lanka, 2.0 percent; Thailand, 2.4 percent (all 1977 figures). However, it is the magnitude of absolute growth, at present, about 13 million a year, together with a significant proportion of people below the poverty line and pressure on resources which add to the problems of economic development in India. At its current growth rate, the population will reach one billion by the year 2000.

About 80 percent of the population is rural and lives in over 575,000 villages. The rate of urbanization is low, less than two percent per decade. Forty-one percent of the population is below the age of 15.

C. HEALTH INDICATORS

The USAID/India 1984 Health Sector Strategy Analysis has reinforced the recognition of the importance and more clearly articulated the nature of the interlinked problems of high fertility and continuing high rates of infant and child mortality in India as shown below.

1. Crude Birth Rates

The crude birth rate, now about 30/1000 population, has been slowly declining. About 21 million children are born each year and there are over 100 million children under age five.

2. Crude Death Rate

The crude death rate is about 12 per 1,000 population. Although children under age five comprise 14 percent of the population, almost half of all deaths are in this age group. One third of all deaths are in the under one year age group, and, of these, 60 percent occur in the first month of life. Infant mortality declined from 200 deaths per 1,000 live births in 1911 to 129 in 1970, but the decline has been slow since then.

India not only has much higher death rates, but also a very different distribution of deaths from a developed country. Fifty-five percent of all deaths are in children under five; 30 percent in children under age one year,

and about 17 percent in children under one month of life. (In the USA, about 2.7 percent of all deaths occur in the 0-4 age group.) Most deaths in the first month of life in India are due to tetanus, respiratory infections, septicemias, or to birth injuries. Most of the babies who die are low birth weight. Later on, diarrhea, measles, respiratory infections, diphtheria, and whooping cough cause most of the deaths. Many of these dying children are also malnourished.

Although national data on mortality and morbidity of the rural poor are not readily available, indirect measures support the assumption that they suffer excessive amounts of death and disease. The rural crude death rate (CDR) exceeds the urban CDR by 65 percent and the rural infant mortality rate (IMR) exceeds the urban IMR by 74 percent.

3. Diarrheal Diseases and Diseases Preventable by Immunization

Diarrheal disease of several categories and the dehydration it produces account for 10 to 20 percent of child mortality.

Immunizable diseases include whooping cough, diphtheria, tetanus, polio, and measles. Of these, deaths from complications of measles are a major portion of all deaths from diarrheal and respiratory diseases.

4. Malnutrition

Malnutrition, although not in itself a direct cause of death, is an underlying, interrelated condition in a major proportion of infant and child deaths. Malnutrition in mothers is a common factor related to low birth weight babies. Malnourished children are also more vulnerable to the major diseases and at greater risk of dying from them.

National rates of malnutrition among Indian children as reported by the National Nutrition Monitoring Bureau have not declined over the past decade, and 74 percent of all children under five years are affected by moderate and severe malnutrition. However, substantial declines in malnutrition have been documented in areas with intensive nutrition programs for mothers and children such as the intensive nutrition programs for mothers and children in the Integrated Child Development Services (ICDS) Scheme.

Although there have been major increases in wheat and rice production, per capita food grain availability has not improved since 1961 because of a concomitant increase in population and decline in availability of other major food grains, especially pulses. Per capita food grain availability meets only 85 percent of nutritional requirements. Per capita availability of edible oils is drastically short of the nutritional requirements of India's population.

D. HISTORY AND CURRENT STATUS OF THE PUBLIC HEALTH SYSTEM

1. History of Family Planning and Health Programs in India

India has one of the oldest officially sponsored family planning programs in the world. Introduced in 1952 as an integral part of the country's economic and social development plan, the family planning program has made substantial progress. Over 31 million sterilizations and 8 million IUD insertions have been performed, besides enrolling over three million conventional contraceptive (chiefly condom) users.

2. Major Public Subsectors and Their Coordination

Providing basic health care to all its citizens has been a major objective of the Indian Government ever since the country's Independence in 1947. Since then, the Government has established an impressive number of 5,400 primary health centers (one in each development block covering a population of 80 to 100,000) and some 40,000 subcenters (one for every 10-12,000 population) throughout the country. In addition, a vast array of hospitals, dispensaries, clinics and other medical facilities, including 106 modern medical colleges, have been set up during the same period.

3. National Policies, Priorities, and Strategies

a. Family Planning Policy

Since 1977 the family planning program in India has been guided by a comprehensive population policy. Besides ruling out all forms of compulsion or coercion in the field of family planning, the following approaches have been emphasized:

- i. promotion of all methods of contraception with equal emphasis so that each family may choose the method most appropriate to it;
- ii. integration of family planning with basic health services, particularly for mothers and children, into a "family welfare" program;
- iii. direction of the program towards those underserved, mainly in the rural areas;
- iv. expansion and redirection of the program's motivational activities from heavy reliance on mass media to an interpersonal and extension approach;
- v. encouragement of participation by the community and by voluntary bodies;

- vi. establishment of village level, voluntary health workers and intensification of the dai (traditional birth attendant) training program; and
- vii. involvement of all departments of Government in the program.

A new Five Year Plan for 1986-90, now under preparation, is expected to continue to place the same high priority on family planning.

b. Health Policy

The GOI has formulated a draft National Health Policy keeping in view the Alma Alta goal of "Health Care for All by the Year 2000," to which India is a signatory. The draft policy lays considerable emphasis on preventative and promotive aspects of health care; greater decentralization of services; self-reliance through greater transfer of skills to and participation by the community and the development of an effective primary health care system which would ensure:

- i. a greater awareness among the community and population of the health problems and ways to tackle them at their own levels;
- ii. intervention at the lowest practicable levels by a worker more suitably trained;
- iii. optimal utilization of knowledge and expertise by higher level technical experts, by the health workers, and by physicians or specialists; and
- iv. increasingly less dependence on hospitals and thus optimal utilization of such facilities for cases where they are actually needed.

c. The Model Plan for Rural Family Planning and Health Services

Following the precepts of the population policy and draft health policy, the GOI has developed its "model plan" for rural family planning and health services. This model plan has become part of a multisector National Minimum Needs Program. The model plan has been developed to implement the policy directives on a nationwide basis over a ten year period. In selected backward and underprivileged areas of the country, the model plan is to be implemented in five years using external donor assistance. The plan is based on the model shown below for organization of services in rural areas.

MODEL FOR INTEGRATED SERVICES IN RURAL AREAS

<u>Level of Care</u>	<u>Providers</u>	<u>Population Served</u>
Village	CHV, trained dai	1,000 people
Several villages (3-8) via sub-center	Female Multipurpose Worker (FMW) and male multipurpose worker (MMW)	5,000 people (3,000 people in tribal and hilly areas)
Community development via Primary Health Center (PHC)	Doctors, Lady Health Visitors (LHVs), FMWs, Health Assistants (HAs)	100,000 people
Upgraded PHCs/sub-district hospitals	Specialist doctors, general doctors, nurses	Variable but about 300,000-400,000 people
District Hospitals	Specialists doctors, general doctors, nurses	Million people plus

The basic structure of the model plan has been carefully developed by the GOI over the past several years. The main objectives of the plan are:

- i. accelerate and complete infrastructure facilities in selected backward and deprived districts within the next five years or so;
- ii. improve and expand the availability of basic health and family planning services in these districts so as to provide such services as close to the doors of the people as possible;
- iii. ensure quality services by improving and strengthening the skills of various categories of workers, and
- iv. encourage community participation so as to ensure optimal utilization of the facilities and services.

The ultimate goal, of course, is to reduce fertility and mortality--particularly infant, young child, and maternal mortality.

E. OTHER DONOR ASSISTANCE

The GOI has completed or is in the process of concluding negotiations with the World Bank, the United Nations Fund for Population Assistance (UNFPA), the Danish International Development Agency (DANIDA), and the British Overseas Development Agency (ODA) for implementation of the model plan in 33 districts in seven states. UNFPA will assist in nine districts in Bihar and Rajasthan; DANIDA in ten districts in Madhya Pradesh and Tamil Nadu (\$40 million) and ODA in five districts in Orissa (\$23 million). These projects are expected to begin in the mid-1980s.

In addition, WHO and UNICEF are supporting specific national level programs, and the Norwegian Government (NORAD) is financing a further expansion of the Postpartum Family Planning Program to cover subdistrict hospitals and institutions.

III. THE MEASLES VACCINATION PROJECT AND IMMUNIZATION DELIVERY SYSTEM IN GUJARAT, MAHARASHTRA, AND HIMACHAL PRADESH

A. INTRODUCTION

The PRITECH team separated into groups, one to visit Himachal Pradesh and one to visit Gujarat and Maharashtra. This report represents the consolidated findings of the consultants regarding a measles program and immunization delivery system, and has taken into consideration the findings and recommendations of Mr. Gary West, Public Health Advisor, Centers for Disease Control. Mr. West toured selected districts in Gujarat and Maharashtra in December 1984. The basic data on immunization coverage were provided by state health officials.

B. HISTORY AND CURRENT STATUS OF IMMUNIZATION ACTIVITIES

1. Expanded Program of Immunization in the Public Sector

The Expanded Program of Immunization was introduced in India in 1978 as an extension of the National Smallpox Eradication program. The objectives of the program were:

a. To reduce the morbidity and mortality due to diphtheria, pertussis, tetanus, poliomyelitis, childhood tuberculosis, and typhoid fever. Other diseases were to be included when epidemiologically and logistically indicated.

b. To achieve self-sufficiency in the production of the EPI vaccines. Initially emphasis was laid on the coverage of children below one year who were to be immunized on a priority basis. However, immunization has not been denied to any child between one and two years old. Current estimates for the national immunization coverage rates and projected goals for 1985, 1990 and 2000 are shown in the table below:

TABLE 1
 IMMUNIZATION COVERAGE RATE ESTIMATES FOR INDIA IN 1983 AND
 PROJECTED GOALS TO THE YEAR 2000*

IMMUNIZATION	YEAR			
	1983	1985	1990	2000
<u>Immunization status (% coverage)</u>				
Tetanus Toxoid (TT) for pregnant women	20	60	100	100
Tetanus Toxoid (TT) for school children at 10 years of age		40	100	100
Tetanus Toxoid (TT) at 16 years of age	20	60	100	100
DPT for children below 3 years of age	25	70	85	85
Polio for infants	5	50	70	85
BCG for infants	65	70	80	85
Diphtheria and Tetanus (DT) for new school entrants 5-6 years of age	20	80	85	85
Typhoid for new school entrants 5-6 years of age	2	70	85	85

* From Bargarh, 1984 EPI Global Advisory Group Meeting.

2. National Immunization Recommendations

The details of the recommended immunization schedule are shown outlined in the table below:

TABLE 2
NATIONAL IMMUNIZATION RECOMMENDATIONS

Beneficiaries	Age	Vaccine	No. of Doses
Infants	3-9 Months	DPT	3
		Polio	3***
		BCG	1
	9-12 Months	Measles *	1
	18-24 Months	DPT	1 (booster)
		Polio	1 (booster)
Children	5-6 Years	DT	1** (booster)
		Typhoid	2
	10 Years	TT	1** (booster)
		Typhoid	1** (booster)
	16 Years	TT	1** (booster)
		Typhoid	1** (booster)
Pregnant Women	16-36 Weeks	TT	1** (booster)

* As of the present time, measles vaccine is available only at selected centers.

** Give two doses if not vaccinated previously.

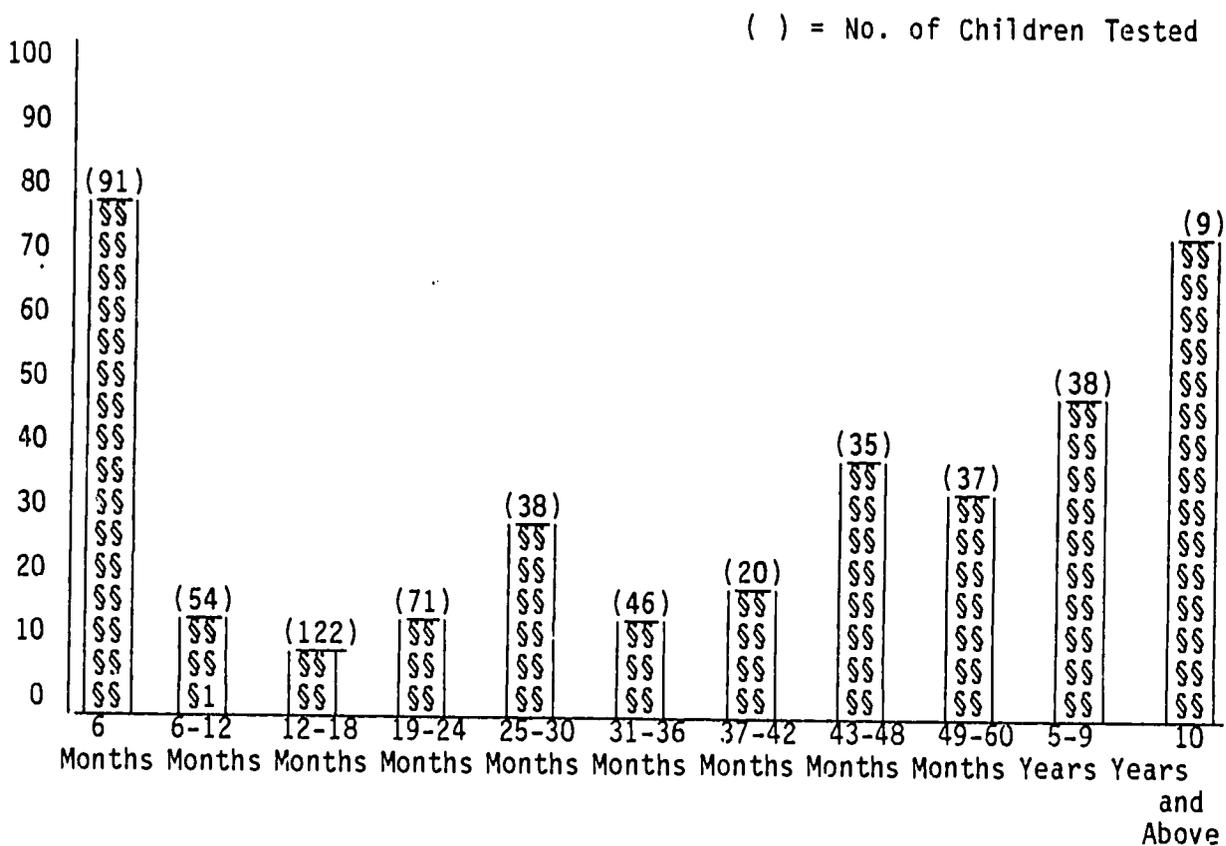
*** Indian Pediatric Society recommends 5 doses.

The Government of India sets target figures annually for immunizations. These targets are specified for each state and then distributed down through the system to district, block, and PHC. "Achievement" is measured in doses of vaccine given. All of the routinely reported immunization data are expressed in terms of percentage of target levels achieved, which makes it difficult to determine true immunization coverage of the eligible population. Team estimates of immunization coverage for DPT and OPV in Panchmahals District have been made by dividing the number of doses given by the number of children in the age group 0 to 1 year of age based on estimated census information. Because immunizations are given to children up to 24 months of age, these calculations overestimate the true immunization levels (see Figures 2 and 3 and Table 4). They are, however, useful to see the immunization coverage rates and how they relate to targets.

For Panchmahals District the estimates of immunization coverage are low. For 1984, using the estimate of the target population of 3.0 percent of the total population, only 27,341 doses of DPT were provided to a population of 65,040 children. An equally low number of 28,863 doses of OPV were given. Using the rough breakdown from Himachal Pradesh of 40 percent of DPT being used for the first dose, 30 percent for the second, 20 percent for the third, and 10 percent for the booster, as few as 15 to 20 percent of the children may begin their DPT series, and less than 10 percent receive their third dose. For polio vaccine the estimated coverage rates are very similar (18 percent for OPV-1 and 9 percent for OPV-3).

FIGURE 2

PERCENTAGE OF A SELECTED POPULATION OF NON-IMMUNIZED CHILDREN IN BOMBAY, INDIA BY AGE GROUP, WHO POSSESSED MEASLES ANTIBODY



Source: K.H. Dave, Measles in India, Review of Infectious Diseases, Vol. 5, No. 3, May-June, 1983.

FIGURE 3

ESTIMATED IMMUNIZATION COVERAGE IN PANCHMAHALS DISTRICT,
GUJARAT FOR OPV IN 1982 THROUGH 1984

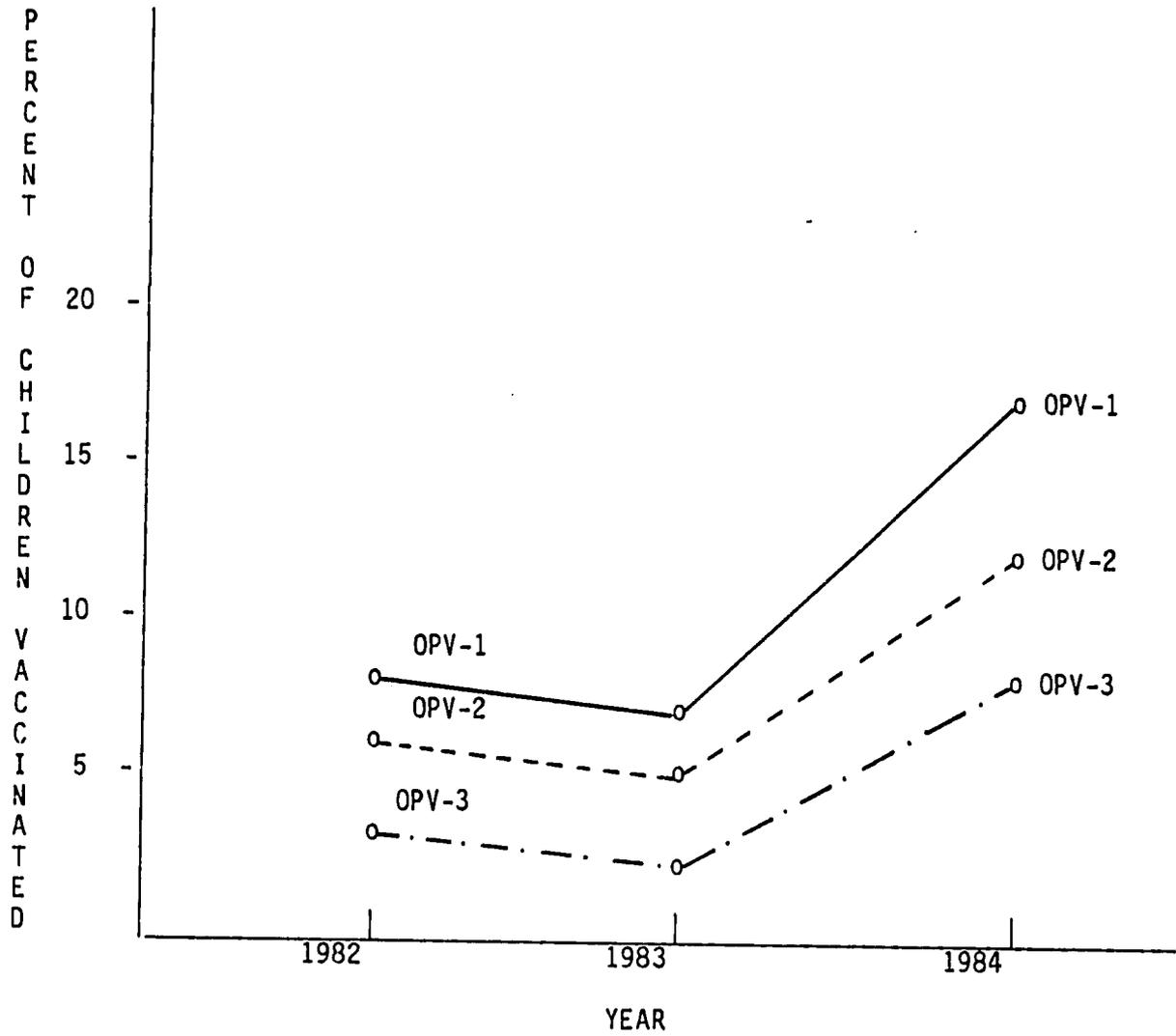
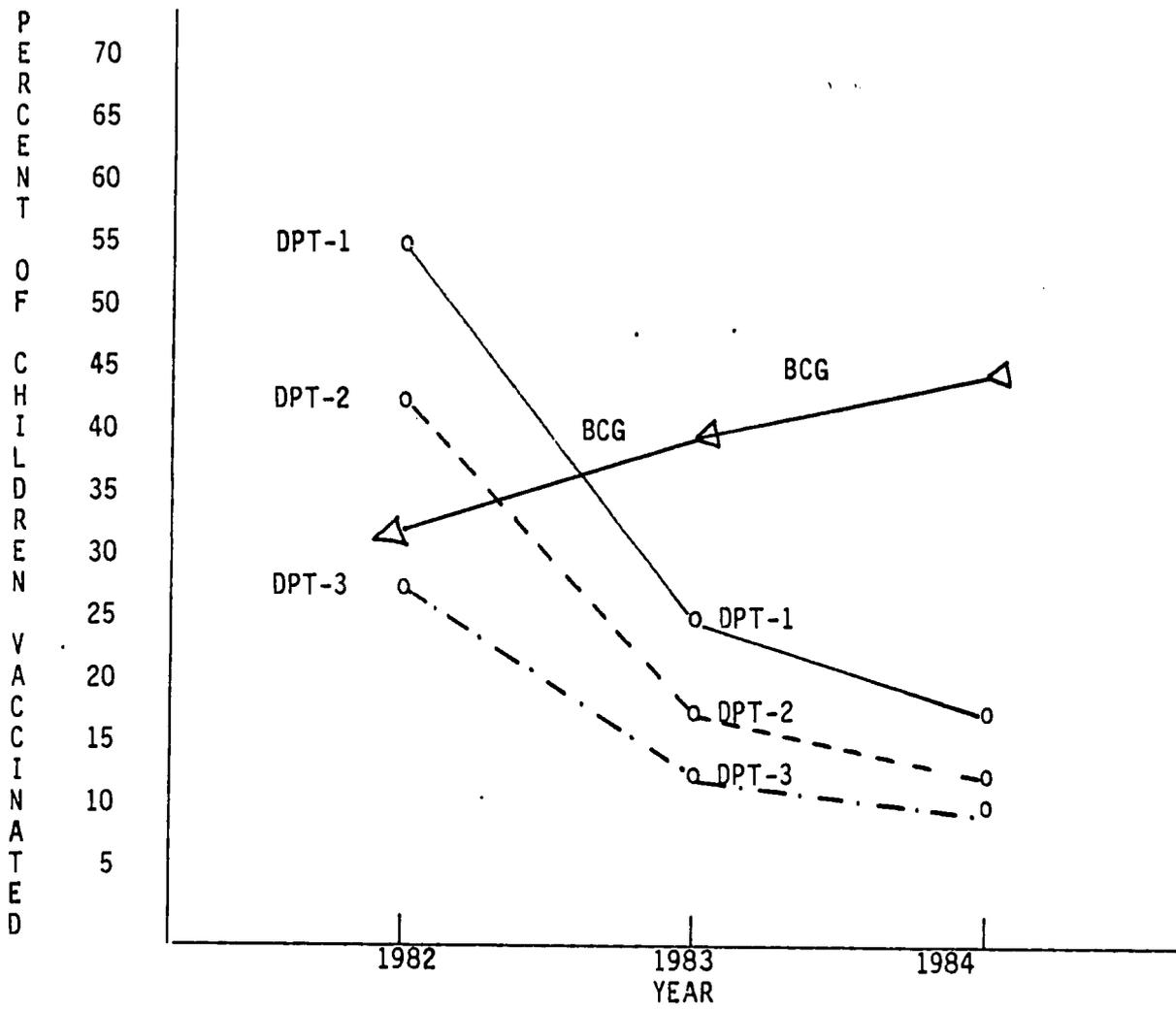


FIGURE 4

ESTIMATES OF IMMUNIZATION COVERAGE IN PANCHMAHALS DISTRICT,
GUJARAT FOR BCG, AND DTP IN 1982 THROUGH 1984



Data show the proportion of children receiving their first, second, third and booster doses of DPT and OPV in Himachal Pradesh based on the use of the 0-1 year age as the denominator for each of the three project districts for the year 1984-85 (April 1 to March 31). The program has been successful in delivering the first dose of DPT and OPV, but there is a significant drop out for second and third doses of the primary series, and a sharp decline in children appearing for the booster dose. DPT and OPV coverage was comparable for Sirmour District this past year, while OPV delivery was considerably less than DPT delivery in Hamirpur and Kangra districts due to occasional shortages of vaccine. These surveys are carried out according to the WHO cluster survey technique in 30 villages within the block selected at random. Visits by trained lady health visitors from outside the block are made to randomly selected households where a history of past immunization is obtained from the mother for all the children in the target age group in the household. The data from three surveys in Kangra district showed that immunization coverage for the urban area of Dharmsala is considerably better than the rural area covered by the PHC at Gopalpur.

In Gujarat, data from cluster surveys using the EPI methodology in Kheda District (in 1982) and Junagadh District (in 1981) give much more reliable, though older, estimates of DPT and OPV coverage than the routinely reported data discussed earlier. The utility of the data currently abstracted from the immunization registers for estimating immunization coverage is low, and the cluster survey method is much preferred. In Junagadh, 41 percent of the children had received DPT-1, 27 percent DPT-2 and 15 percent DPT-3. In Kheda, the results were better: 58 percent of coverage for DPT-1, 49 percent for DPT-2 and 46 percent of DPT-3. Polio immunization rates were 27 percent, 23 percent, and 22 percent for OPV-1, 2, and 3 respectively. Only 19 percent were "fully immunized." No similar data were collected from Maharashtra State.

In summary, reported immunization coverage rates for DPT and OPV vary greatly throughout the three states, although some of this variability is due to the difficulty in obtaining accurate denominators. The cluster survey method eliminates some of this problem, but still there are significant differences between the states surveyed.

A concern derived from the DPT and OPV data for a proposed measles immunization program is that women may not be as inclined to bring a child for immunization at or after nine months of age. It is not clear whether women do not understand the need for a second and third dose of OPV and DPT or if they have a decreased motivation to bring the child to the health facilities as the child gets older. Measles immunization rates that are only slightly better than twice for OPV-3 and DPT-3 in many districts would not be acceptable.

3. Current Measles Immunization Activities

Immunization against measles has been available in India on a limited basis for several years. In urban areas, many pediatricians and other physicians routinely give measles vaccine (sometimes twice) at 6 months and at 15 months. Measles vaccine was also available in chemist shops in several towns the team visited in all three states at a cost of 15 to 25 rupees. Measles

vaccine was briefly used in the Maternal and Child Welfare clinics at Dharm-sala three years ago. Recently a large measles immunization study to validate the effectiveness of measles vaccine in Indian children was carried out in 30 medical colleges in India. The results of this study are still not available.

Knowledge of measles and measles immunization appears high among the multipurpose workers and supervisors. These topics are currently included in the curriculum of the FHW training center. However, retraining of some workers, particularly the VHGs, about measles will be a necessary part of beginning a measles immunization program.

4. Measles Epidemiology

It is generally believed in the medical community that all children have measles, and virtually all have measles by six years of age. Because they are so infrequently taken to health facilities, few cases are reported and there are few epidemiologic data on which to base an immunization strategy. However, from the many discussions with state and district health officials, medical officers, multipurpose workers, and pediatricians at the district hospitals and from limited data collected from certain parts of India, a gross estimate of the impact of measles can be constructed.

A study in rural communities of West Bengal showed that there was a sharp increase in incidence in February, March, and April. Health personnel in Himachal Pradesh concurred that the seasonal incidence there is similar, although cases are seen during every month of the year. In Gujarat, the peak season was reported to be in March, April and May, and in Maharashtra in January and February.

Maternal antibody appears to protect children from measles up to eight or nine months of age. Although cases occur in children younger than this, they do not appear exceptional in terms of either number or severity. After nine months, the age specific incidence of measles rises sharply.

Serological surveys carried out in Delhi and in several locations in the south of India demonstrate acquisition of measles antibody in 40 to 60 percent by age three years, and over 90 percent by age five years (2-4). Because the population of all three states is largely rural, particularly in Himachal Pradesh, and is less dense than most other Indian states, it is possible that the age incidence of measles may be shifted slightly upwards. However, the pediatricians at the district hospitals and other health personnel report that most cases that come to hospitals are between one and three years of age.

Although there are few data relating to measles mortality in India, it has been estimated that there are 200,000 childhood deaths from measles in India each year. This is approximately one death per 100 measles cases although other estimates of the case fatality rate are as high as three percent.

Two of the three district hospitals visited in Himachal Pradesh reported that 200-300 cases of measles were admitted annually with complications, and

two or three deaths directly attributed to measles occurred. However, these hospitals principally serve the urban populations in the town and nearby villages, and cases from distant rural areas are not likely to reach the district hospital. The experience at the PHCs was generally the same, although most indicated that fewer cases were seen.

At the Ripon district hospital in Simla, 596 measles cases were seen in 1984-85 in the outpatient department. Seventy-two were admitted and seven deaths occurred. The urban area served by this hospital is considerably larger than the town served by the district hospitals in the three project districts.

Complications of measles are well known, including pneumonia (bacterial and viral), gastroenteritis, encephalitis, keratitis, hemorrhagic measles, and exacerbation of pre-existing malnutrition. However, the risk, age-incidence, and factors related to these complications have not been quantified in malnourished children. In developing countries, those with protein-calorie malnutrition are especially at high risk of serious complications when they are infected. Measles, pneumonia, encephalitis, and hemorrhagic measles all carry a high mortality. Measles may also contribute to childhood mortality in less direct ways by exacerbating underlying tuberculosis or severe malnutrition.

5. Public Perception of Measles

It is a common public belief in many parts of India that measles is not a disease, but the curse of a displeased deity. In Gujarat State measles is known as Ori, and the Goddess of measles is Orimata. In Maharashtra State, measles and the Goddess have different names. However, in Maharashtra the local perception of measles as a disease seems to prevail and an analogy was often made to smallpox. Acceptance of immunization in the rural areas of Maharashtra appears to be high. In Himachal Pradesh measles is known as "Kahsra" or "Dhrasal" among the rural villagers. The FHWs and VHGs we spoke with informed us that measles is well recognized by the villagers and is usually distinguished from other rash-producing illness. But even so, the symptoms are perceived to be a visitation by a goddess named "Choti-mata."

In all three states in order to please the goddess the sick child is kept indoors and may be deprived of food and water. (Figure 5 shows the various levels of beliefs about withholding food from a child with measles.) Shame is a factor in this behavior, and sick children are hidden or shunned as sometimes occurs with tuberculosis or leprosy. Children with measles are rarely seen by a health worker unless a significant complication occurs and many times not even then.

6. Organization, Planning, and Administration of EPI Activities

Administratively, each state is divided into districts and each district into blocks. The state ministries of health and family welfare have responsibility for immunization activities through the directorates of health and medical services and medical education (health). These activities are centralized in the EPI section of the directorate. For proper coordination and

planning for the USAID project, special offices have been established at the state and district levels.

Each of the three states is responsible for the implementation of the measles program in their respective districts. The District Health Officer is in overall charge of the EPI program and is responsible for both technical and administrative supervision and guidance. The state EPI officer provides guidance and supervision to the District Health Officer. The actual delivery of EPI services is done through a network of Government run primary health centers (PHC), subcenters, hospitals and dispensaries.

At the beginning of each year, the state EPI officer issues the necessary guidelines for planning, implementing, and monitoring to the districts. Similarly, the district and medical officers issue guidelines and directives to all PHCs and urban centers in their jurisdiction.

7. EPI Management Information System

In order to monitor the program, a management information system has been developed for various levels in the health care system. All workers are provided with registers to record work and village registers for maintaining EPI records. This information is compiled each month, usually by the multi-purpose health worker (MPW), and sent to the medical officer at the PHC. At the PHC a register is kept showing the immunization performance expressed as a percentage of target achievement. This information is then forwarded up to the District Health Officer, then the state, and ultimately compiled as a state whole and sent to the Central Government.

8. Vaccine Manufacture and Supply

The bacterial and viral vaccine products used in all three states, including DPT, BCG, DT, TT, and polio vaccine are produced or packaged in the country by national and private manufacturers.

The vaccine production capability of India's domestic manufacturers is shown below.

TABLE 3

MANUFACTURER	<u>DPT</u>	<u>BCG</u>	<u>PT</u>	<u>TT</u>	<u>*POLIO</u>
	In Million Doses				
Central Research Institute, Kasauli	--	14	26	22	--
Haffkine Bio Pharmaceuticals, Bombay	5	--	4	6	24
Pasteur Institute, Coonoor	5	--	5	5	--
Other State Institute	--	--	2	4	--
BCG Vaccine Laboratory	--	60	--	--	--
Private Sector	<u>31</u>	--	<u>27.4</u>	<u>130</u>	<u>--</u>
Total	41	74	64.4	167	24

Source: Plan of Operations 1985-89. Country Program of Cooperation, Government of India and UNICEF - 1984.

The vaccine is purchased in bulk from the Soviet Union and packaged in India.

Key Problem: Immunizable Diseases

MEASLES

35
% - Not right to feed during Measles

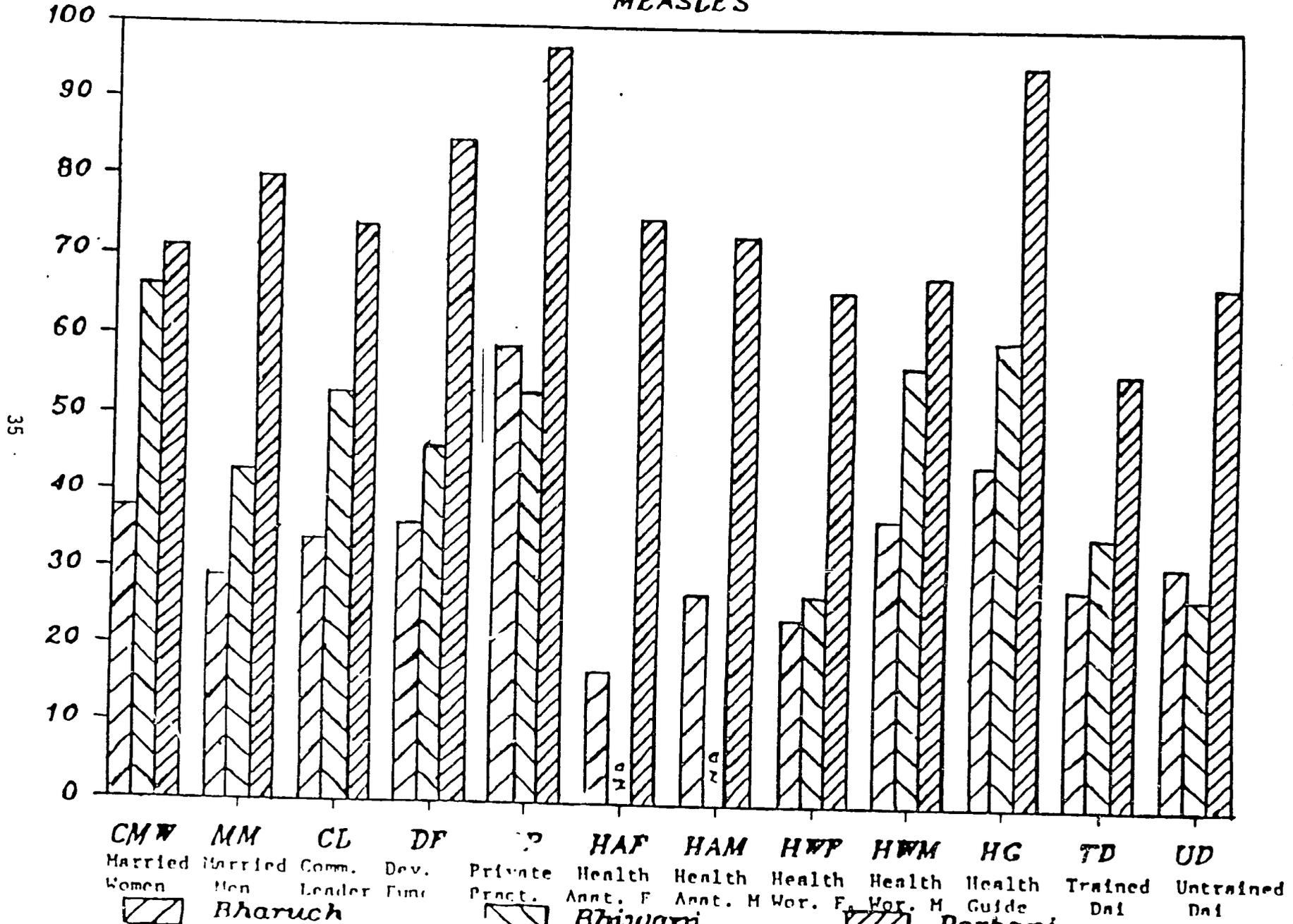


FIGURE 5

SOURCE: AID/INDIA Comm... ons... assessment done in 14 USAID assisted area project districts

Currently measles vaccine is not produced in India. For the pilot districts, AID has agreed to purchase 51,000 doses from the Institute Merieux in France. The Serum Institute of India, Pune has agreed to receive the vaccine from the manufacturer and deliver it wherever designated at a concessional cost. This vaccine will be second generation mcyker vaccube (Schwartz strain). It, therefore, will have a guaranteed stability at 37 degrees Centigrade for one week. (The ICID level should not fall below 10 degrees Centigrade.) The availability of this more stable vaccine will greatly enhance the ability of the immunization program to deliver potent vaccine to children.

The National projected requirements for measles vaccine are:

National

1985 - 8 million doses

1986 - 10

1987 - 13

1988 - 16

1989 - 20

Estimated measles vaccine requirements for the USAID Supported Districts are outlined in Table 4 below.

Another possibility being discussed by USAID and the GOI, as well as other possible private and public sector participants, is the eventual production of measles vaccine in India. If this were to be agreed to, the Indian organization chosen would most likely go through an initial phase of the purchase of measles vaccines in bulk form a European or North American manufacturer followed by the packaging of the vaccine in India. Subsequently, perhaps in three years vaccine production would begin in India.

Until national production is self-sufficient in measles vaccine UNICEF has stated that it is prepared to help fund quantities of measles vaccine so that the national campaign can begin.

Both teams found that periodic shortages lasting one to three months for OPV and DPT vaccines have occurred in the IRHP districts. Shortages appear more frequent for BCG and OPV. In Himachal Pradesh, when some PHCs experienced low supplies of OPV, they would withhold distribution to subcenters, requiring recipients to travel to the PCH for OPV administration. In some locations in Himachal Pradesh, this practice continued even after an adequate supply of OPV resumed. In Gujarat and Maharashtra it was said that the current supply of vaccines as well as pharmaceuticals was adequate.

TABLE 4

MEASLES VACCINE REQUIREMENTS IN USAID SUPPORTED DISTRICTS
1986-1990

State	District	Estimated Population 1985 in 1000s	Number of Doses of Vaccine Required (in 1000s)			1989 Maintenance	1990 Maintenance
			1986 For 1/3 of Blocks New Campaign	1987 For 1/3 of Blocks New Campaign For 1/3 of Blocks Maintenance	1988 For 1/3 of Blocks New Campaign For 2/3 of Blocks Maintenance		
Gujarat	Bharuch	1,363	50.9	64.9	80.1	45.0	45.0
	Panchmahals	2,491	91.3	118.7	147.2	82.2	82.2
H.P.	Hamirpur	350	12.9	16.7	20.6	11.6	11.6
	Kangra	1,100	40.5	52.7	64.9	36.3	36.3
	Sirmour	340	12.4	16.2	19.9	11.2	11.2
Maha- rashtra	Osmanabad	2,332	85.5	111.1	136.7	77.0	77.0
	Parbhani	1,854	68.0	77.3	108.7	61.2	61.2
	Latur	1,100					
TOTAL			361.5	457.6	578.0	324.5	324.5

9. Cold Chain Pathways

The transport routes from manufacture to immunization site are outlined for each state below:

a. Himachal Pradesh Cold Chain Pathway

The bacterial vaccine products used in Himachal Pradesh, including DPT, DT and TT and typhoid vaccine, are produced in the district of Kasauli by a government manufacturer and supplied to the State Health Department under contract. These vaccines are shipped directly from Kasauli to the District Health offices as needed, generally every three to four months. BCG and OPV are supplied from out of state. OPV is obtained in bulk from the Soviet Union and packaged in 10-dose vials at Haffkine Institute in Bombay. Monthly shipments of OPV are flown from Bombay to Chandigarh where the plane is met by a state vehicle that distributes vaccine to district health offices and to the state supply facility at Simla.

All vaccines are stored at district medical offices and supplied to PHCs on a regular basis, generally when the PHC medical officers hold their monthly meetings at the district office. Both the PHCs and subcenters hold immunization clinics usually one day per week. Unused doses, whether full or partial vials, are usually returned to the PHC the same day for re-use. These vials are marked and kept for use until the next clinic.

b. Gujarat Cold Chain Pathway

Gujarat has a cold chain system to store and transport vaccines for the entire state. The Vaccine Institute, located in Baroda, is about 100 km from the state headquarters. The state routinely receives from two sources: the Central Research Institute (a government manufacturer) located in Kasauli, Himachal Pradesh, and from the Haffkine Institute in Bombay.

Kasauli is about 1400 km from Baroda. The vaccine is transported from Kasauli to the Chandigarh airport in Haryana State (about 100 km). The vaccine is then flown (two to three hours) to Bombay and from Bombay flown (two to three hours) to Baroda. In Baroda, the vaccine is picked up at the airport by district officials and transported to the Vaccine Institute for storage. The vaccines from the Haffkine Institute, Bombay, are also sent to Baroda by air. The total time for shipment from Kasauli to Baroda is two to three days.

Vaccines from the Vaccine Institute are supplied to the various districts and corporations on a quarterly basis. However, health facilities may also request vaccines on an as-needed basis. There are 19 districts and four corporations in Gujarat. The furthest district headquarters, Bhuj and Kutch, is about 500 km from Baroda. The district health officers send vehicles and cold boxes to Baroda to collect vaccines, usually monthly when the medical officers have their monthly meetings. The vaccines are stored at the district department. The medical officers usually collect vaccines for the PHCs when they meet for their monthly district meetings. For the outreach programs, the multipurpose supervisors or an assigned staff member will

transport the vaccines from the PHC, usually in a thermocol box with cold dogs or ice packs. This weekly, sometimes biweekly, transport is usually accomplished by public carrier, but transportation is also done by motorcycle, moped, bicycle, and on foot. Immunization days are held weekly and immunizations are often administered on "maternal/child health" day which is also held weekly.

c. Maharashtra Cold Chain Pathway

In Maharashtra, vaccines are transported by car or air to the district depot in Aurangabad where there is a walk-in cold room with a temperature activated alarm system. From the district depot the vaccines are distributed to the PHCs on a monthly basis and on a weekly basis to subcenters in a manner similar to Himachal Pradesh and Gujarat. Two of the Auxiliary Nurse Midwives (ANMs) in Maharashtra suggested that their job would be much easier if they had access to a moped or bicycle. In view of the rough terrain and relatively long distances from the PHC to the subcenter, their suggestion merits serious consideration by state/GOI authorities.

Comments should be made regarding observations in all three states regarding the last leg of the cold chain pathway: post immunization session procedures. As described above, the vaccines at the subcenter level are kept by vaccine carriers and cold boxes. Very few subcenters are equipped with refrigerators. In Himachal Pradesh, it appeared to be standard policy to return unused doses (whether full or partially full vials) to the PHC for re-use. At the PHC vials are marked and generally used during the next clinic. It is only when a vial accumulates three marks that it is discarded. In Gujarat and Maharashtra the team was routinely informed that unused vials are returned to the PHC and open vials were observed in some of the PHC refrigerators.

In accordance with WHO guidelines, training courses on how to conduct vaccination sessions must stress that opened and unused vaccines must be destroyed if not used during the vaccine day. The vials should be broken and the disposed number of doses recorded in the stock register so that vaccine need estimates can be determined accurately. None of the vaccine stock registers reviewed indicated that unused doses were destroyed if not used during the vaccine sessions.

WHO recommends such vaccine information be recorded after each immunization session in the following manner:

TABLE 5
ACCOUNTING INFORMATION OF UNUSED DOSES

Doses per Bottle	Number of Bottles	Total Doses Supplied	Doses Administered	Doses Not Administered
10	4	40	32	8
10	2	20	8	12

The team recommends that this type of information be kept whenever immunizations are given at the PHCs and subcenters and sent back through the system to be consolidated at the state level so that accurate vial and dose consumption needs can be recorded and future needs more accurately determined.

10. Cold Chain Infrastructure

a. Equipment

From team observations, the cold chain facilities and equipment in all three states are capable of maintaining vaccine potency, including measles, for at least short periods of time. In Gujarat at the Vaccine Institute of Baroda and in Maharashtra at the district offices in Aurangabad, there are walk-in cold rooms with ample space to store measles vaccine for the entire state. In Himachal Pradesh there is a refrigerator and an upright freezer for storing vaccines. All refrigerators and freezers observed had dial recording thermometers in place for monitoring temperature. All three state level facilities have emergency back-up power systems in case of electrical failure. The walk-in facility at Aurangabad has a temperature activated alarm system.

Equipment at the district level varied considerably. Usually there were one or more refrigerators and at least one freezer. Storage space appears to be adequate to meet the district needs. In Himachal Pradesh and Gujarat, temperature registers were kept. One district office in Maharashtra was not monitoring or recording cold storage temperatures. All of the refrigerators seen throughout the public health system by the teams had voltage regulators either as supplementary equipment or built into the refrigerators. Almost all the refrigerators the teams saw had locks and were secure. In only two of the refrigerators in PHCs were there items that did not belong there.

The PHCs visited had small (eight to nine cubic foot) refrigerators. Most were two to three years old and had voltage regulators and freezing compartments. The quality of maintenance of the vaccine supply and temperature records varied widely from center to center.

All of the district offices and most of the PHCs had insulated vaccine carriers (usually provided by UNICEF), cold dogs or some type of styrofoam carrier. Cold dogs were available in ample supply at the district level and usually four or more were seen at the PHC in the refrigerator, although not always in the freezer.

We were told that an alternate storage scheme and backup equipment had been designed for maintaining the cold chain in case of power or equipment failure. At the district level the closest hospital was usually cited, at the PHC levels we were told the vaccines could be transferred to the nearest PHC, or temporarily left with the private practitioners or pharmacies or in homes with refrigerators. In none of the facilities did we see written operations procedures or guidelines for when and where to transfer vaccine should it be necessary. In one PHC where the refrigerator was not functioning, the vaccine had been transferred but we could not ascertain exactly where. In another PHC the refrigerator had been out-of-service for over two weeks, yet the vaccines remained inside.

b. Repair and Maintenance

Repair of electrical equipment was available locally at the district level, and in Gujarat there is a maintenance and repair contract funded by UNICEF for district refrigerators/freezers. However, at the PHC level sometimes local repair and parts were not available and the refrigerator would be sent to the district for repair, which would usually take a month or more. In the event a PHC refrigerator in Gujarat malfunctions the district depot has seven small portable refrigerators to provide coverage until repair is completed.

c. Other Vaccine Equipment

We were told and observed that sterilizers, needles, and syringes, cotton, alcohol, reconstitution solutions (sodium chloride and sterile water for injections) were in adequate supply at all sites visited. Generally the needles and syringes at the PHCs and subcenters were clean, and the needles not bent or barbed. The needles and syringes, however, being used by village health workers were observed to be dirty and substandard.

d. Power Supply

Electricity now extends to all but the most remote areas of the three states. Each health facility funded by AID has electricity including the subcenters. Brief interruptions of power ranging from a few minutes to several days can occur. Outages of up to two or three hours seem to occur every two to three weeks. More prolonged outages were said to be unusual. All the refrigeration equipment we encountered was electrical. No kerosene or solar units were seen.

As a comment on solar refrigerators, considering the relatively reliable and extended power supply, it is not recommended that AID purchase solar equipment at this time except perhaps on a pilot basis for remote regions

where electricity is not available. The cost, weight, initial set-up, repair, maintenance, and relatively short-life of the batteries on solar refrigerators precludes their practical and cost effective use on a wide scale. The use of solar cold chain equipment should be reconsidered as the solar technology becomes more practical and cost-effective. Recommendations on this subject can be further sought from the WHO Regional Office for Southeast Asia which has data obtained from the India solar refrigerator country studies and universal spare parts study.

To summarize, in general the cold chain equipment in Himachal Pradesh and Gujarat was found to be adequate to support vaccine maintenance. In Maharashtra new refrigerators had been recently supplied. However, vaccine carriers and other auxiliary equipment need upgrading. New equipment may already have been ordered.

To some extent, failures were encountered in equipment, power, and human error in all of the districts visited. However, by far, the latter predominated and is discussed below.

11. EPI Training

Most of the training specifically for EPI activities appears to have been conducted by WHO/UNICEF. WHO conducted one workshop on the orientation of non-medical supervisors at the district level on EPI in Ahmedabad (Gujarat) for 32 participants in 1984. In 1983 WHO held one midlevel management courses in Himachal Pradesh for 20 participants and one course for paramedical EPI supervisors in Gujarat. For a list of all training courses conducted by WHO, see the following tables.

Training of all health personnel involved in the immunization delivery system must be strengthened if the cold chain is to be effective. The team's observations indicate conclusively that the success of an immunization program will not depend so much on the existing or supplemental equipment in the target districts but rather upon the personnel.

Clearly the staff of some district centers and PHCs are better trained for measles campaigns than are others. However, at all levels there is a dire need to train, retrain, and supervise cold chain personnel so that the awareness of the limits and constraints of vaccine storage is absolutely clear. To illustrate the severity of this constraint to a viable immunization delivery system, some of the team's observations are described below.

At one PHC the refrigerator temperature had been dutifully recorded twice daily, but had varied from 10 degrees to 16 degrees over the last six days. Nothing had been done about the vaccine supply, nor was there an awareness that anything could be wrong. A second refrigerator in the same room contained cold drinks. The vaccines were warm; the Campa colas were cold.

TABLE 6
WORLD HEALTH ORGANIZATION
EPI TRAINING ACTIVITIES IMPLEMENTED IN 1983

COUNTRY AREA/LOCALITY	TYPE OF TRAINING	DATES	LANGUAGE	NUMBER OF SEAR COUNTRIES REPRESENTED	NUMBER OF SEAR COUNTRY PARTICIPANTS
<u>India</u>					
Mizoram/Aizwal	MLM	6-13 June 1983	English		20
Arunchad Pradesh	MLM	27 Apr-6 May '83	English		26
W.B./Calcutta	MLM	14-23 Mar 1983	English		25
Him Pd/Palampur	MLM	20-30 April 1983	English		20
M.P./Indore	MLM	6-15 June 1983	English		18
New Itanagar	MLM	25 May-3 Jun '83	English		10
U.P./Lucknow	MLM	27 Apr-6 May '83	English		
U.P./Agra	MLM	13-22 Sept 1983	English		
N.J.H.F.W.	MLM	5-14 Dec 1983	English		35
Pune	Cold Chain & Logistics (T)	4-16 Apr 1983	English		16
Calcutta	Cold Chain & Logistics (T)	19-22 Dec 1983	English		21
Goa	Paramed. Sup. EPI Training	16-19 Nov 1983	English		13
Panaji	Paramed. Sup. EPI Training	14-17 Dec 1983	English		30
Panaji	Paramed. Sup. EPI Training	29 Nov-2 Dec '83	English		16
Simla	Paramed. Sup. EPI Training				
Gujarat	Paramed. Sup. EPI Training				
Pb./Chandigarh	Paramed. Sup. EPI Training				
Bubaneswar	Paramed. Sup. EPI Training				
Itanagar	Paramed. Sup. EPI Training				
Port Blair	Paramed. Sup. EPI Training	14-17 Nov 1983	English		
Delhi (NJHFW)	Paramed. Sup. EPI Training	August 1983	English		36
Delhi (NJHFW)	Paramed. Sup. EPI Training	September 1983	English		41
Delhi (NJHFW)	Paramed. Sup. EPI Training	December 1983	English		83
Bangalore	Paramed. Sup. EPI Training	6-9 Dec 1983	English		22
Har/Chandigarh	Paramed. Sup. EPI Training	28-30 Nov 1983	English		18
W.B./Nadia	Paramed. Sup. EPI Training	4 October 1983	English		160

TABLE 7

WORLD HEALTH ORGANIZATION

NATIONAL, STATE, OR LOCAL EPI TRAINING ACTIVITIES IMPLEMENTED IN 1982
 (or 12 month period ending in 1984) State period under consideration: From JAN '84 to DEC '84

TYPE OF TRAINING	LOCATION	DATES	LANGUAGE	NUMBER OF PARTICIPANTS	NUMBER OF FACILITATORS			REMARKS
					NATIONAL	WHO	OTHER	
Workshop on Orientation of Non-Medical Supervisors at District Level on EPI	Ahmedabad (Gujarat)	14-16 21-24 February '84	English	9 23				
Same as Above	Bangalore (Karnataka)	21-24 March 26-29 April 1984	English	38 28				
Same as Above	Bhubaneswar (Orissa)	2-5) 7-9) May 10-11) '84	English	31 28 15				
Same as Above	Jaipur (Rajasthan)	30-1-84 to 2-2-84 1-4/8/84	English	37 26				
Same as Above	Delhi Admin. (Delhi)	3-5-84 to 7-5-84	English	17				
Same as Above	Howrah (West Bengal)	19-9-84 to 22-9-84	English	28				

Comments:

At several PHCs the temperatures was recorded daily as being exactly 4 degrees Centigrade in the morning and 6 degrees Centigrade at night. However, the actual temperature at the time of the team's visit was 25 degrees Centigrade. At another PHC the temperature log indicated a drop in refrigerator temperature by two degrees even though the electricity had been out for six hours.

At approximately half the PHCs the OPV, which should be kept frozen, was thawed. In two cases OPV was kept in a tray beneath the freezer rather than in the freezer. Teams in all districts frequently found frozen OPV vials stuck together in ice, suggesting prior thawing and re-freezing. (Measles vaccine, like the polio vaccine, should be kept frozen until the last link in the cold chain.)

By far, the most serious case of neglect and indifference was seen at a district depot. Although the three refrigerators were running, each had inside temperatures ranging from 25 to 28 degrees Centigrade. Because even the freezer compartments were also warm, we had reason to believe that the units had been turned on in honor of our visit. Contained in the refrigerators were over 3,000 vials of vaccines. Even the casual observer could reasonably ascertain that vaccines distributed from that district depot would probably not provide immunity.

The above examples are cited to stress the point that the backbone of an immunization delivery system is temperature control. In the opinion of the consultants, the basic refrigeration and transport equipment are present in all three states. The success or failure of effectively immunizing children and mothers is clearly up to the health care personnel who at any point handle vaccines. These personnel must have additional training. Negligence, indifference, or ignorance of temperature status will guarantee impotent vaccines and a useless immunization program.

To maximize the learning curve, the timing of health personnel training should be as close to the actual initiation of the measles campaign as possible. EPI training materials to date have not been specially designed for India. WHO has produced a set of nine modules for training mid-level managers which could be used as basic educational materials.

UNICEF in its Plan of Operations 1985-89 has acknowledged that there is an insufficient availability of training materials for paramedical workers who actually implement the EPI program in the field. In view of this, UNICEF has pledged to support the development and production of India-specific training materials. In addition, UNICEF has stated it will assist with training courses for all levels, as well as with support for the in-service EPI training of village health guides and traditional birth attendants (dais). Specifically, UNICEF has proposed to provide the cost of training materials and courses in the following areas:

- Refrigerator repair - 25 courses
- Refrigerator maintenance by users - 100 courses
- Logistics & Cold Chain Management:
 - 80 courses at the national/state/regional levels
 - 400 courses at the district/PHC level
- Cold Chain Monitoring - 25 courses

Encouragement should also be given to medical colleges and nursing schools to place a stronger emphasis on EPI training in the curricula.

C. PRIVATE SECTOR ACTIVITIES

1. Organizations Providing Measles Vaccine

As with the public sector, measles immunization has generally not been provided by the PVOs or private sector medical community. In Gujarat, however, a physician husband and wife team were carrying out a baseline survey of measles morbidity prior to the initiation of measles immunizations in September 1985.

2. Education Program for the Medical Community

Education of the medical community is mainly through training programs provided by international organizations such as UNICEF or WHO. The Indian Pediatric Society also issues recommendations regarding immunization schedules, but to our knowledge, does not provide training specifically for immunization programs in India.

D. ROLE OF KEY DONORS

1. UNICEF

UNICEF is assisting the program by supplying relatively small quantities of pertussis and measles vaccines, chemicals and equipment for the production of DPT vaccine, refrigerators for strengthening the cold chain and immunization kits for primary health centers. During 1982, \$1.4 million was spent by UNICEF for new equipment for expansion of DPT vaccine production and refrigerators for strengthening the cold chain. The draft 1984 Country Program of Cooperation between UNICEF and the Government of India proposed an ambitious national EPI with operational thrusts for "universal immunization of children and pregnant women throughout the country." This will involve greatly expanded importation of measles vaccine and improvement and expansion of the immunization delivery system.

2. WHO

WHO is assisting the program by providing short-term consultants, supplying equipment (mainly vaccine carriers) and meeting local cost subsidies for training, survey, and group educational activities. During 1982 and 1983 the budget was US \$258,000.

E. CONSTRAINTS SPECIFIC TO THE MEASLES PROGRAM

1. Until the recent (1985) change in policy, measles immunization has not been a part of the national EPI program.

2. The public perceives measles as the result of an angry goddess and a curse on the child. Therefore, measles cases are often neglected and not brought to health centers.

3. There is a traditional lack of public and private physician concern over measles.

4. Traditional program goals or targets are based on the number of immunizations given rather than based on outcome measures linked to the actual number of children at risk.

5. There is a lack of accurate coverage data from service units and a lack of community based data necessary for program monitoring.

6. There is an absence of comprehensive measles morbidity and mortality data partly due to the public and professional perceptions of measles as noted above.

7. There is inadequate cold chain equipment in some areas of the target districts.

8. There is a need for a better understanding of all health personnel handling vaccines regarding temperature control and vaccine storage requirements.

9. Vaccine delivery does not usually extend beyond the subcenter level.

10. There are no clear guidelines for cold chain monitoring and personnel supervision and no authority or incentive to withdraw vaccines from the distribution system once the cold chain has been broken.

11. The temperatures of Maharashtra and Gujarat during the dry season are extremely high and distances to be covered by the cold chain, especially in the outreach areas and the Himachal Pradesh mountain terrain are great.

IV. DIARRHEAL DISEASE CONTROL ACTIVITIES IN GUJARAT, MAHARASHTRA, AND HIMACHAL PRADESH

A. ORAL REHYDRATION THERAPY IN GUJARAT, MAHARASHTRA AND HIMACHAL PRADESH

1. Administrative Organization

The Administrative Unit within each state in India is a district. Districts are further subdivided into panchayats. Each district has a hospital for patients requiring care during acute illness. The district hospital is staffed with specialists in various disciplines. It serves as a referral center for the primary health care centers. In addition, patients are seen in the outpatient clinic of the district hospital for acute illnesses both from the urban and rural areas.

Taluka dispensaries are health clinics in urban areas of each district. They are staffed with one to three medical officers. The taluka dispensary is responsible for curative and preventative care such as immunizations, family planning, and health education.

In Gujarat, there is one primary health center (PHC) for every 80 to 100,000 population. Formerly the number of PHCs per 100,000 population in Maharashtra was similar to Gujarat. However, this year the government of Maharashtra plans to have at least one PHC per 20,000 to 35,000 population. Each PHC may have one to three medical officers depending on the size of the population. The medical officers are responsible for the supervision and in-service training of all staff at each PHC. In Himachal Pradesh MOs at PHC level supervise LHV's (Lady Health Visitors) who are the mid-level supervisors at PHC and subcenter levels, as well as the MPWs at subcenter levels. The skeletal mid-level supervisory network exists at PHC level to provide field supervision of MPWs at subcenter level.

The medical officers at the PHC level are also ultimately responsible for all the reports generated at that level such as family planning and immunization targets and birth and death registers, etc.

Ideally, there is one subcenter for every 3,000 people for tribal areas and one for each 5,000 population in non-tribal areas. Each subcenter is staffed with one female multipurpose worker and one male multipurpose worker. In addition, each subcenter has a community health volunteer (CHV) and a trained dai living in the village for each 1,000 population.

2. Policies and Strategies

The Government of India (GOI) is in the process of developing an official policy and strategy for ORT at the present time. A meeting of the Indian officials and technical specialists was planned for May 11, 1985 at Agra to discuss the proposed national policies and strategies. From preliminary discussions with the GOI, it is apparent that they plan to promote the homemade salt/sugar solution rather than WHO recommended formula ORS packets in their national ORT program.

The state governments also do not have an official policy and strategy for their ORT program. However, the State of Maharashtra has decided to base its ORT program on the use of salt/sugar solutions rather than ORS packets.

Therefore, they have decided to withdraw the WHO recommended ORS packet from all PHC and subcenters. The only exception will be the CHVs. They will continue to receive the WHO recommended formula ORS Packets as part of their medical kit.

At the present time, there is no budget allocated for a diarrheal disease control program at the national or state level.

3. Planning and Organization

In previous years the national programs on diarrheal diseases concentrated on control of cholera epidemics. The proposed seventh five-year health plan has an optimistic goal of reducing the mortality due to diarrheal diseases by 50 percent over a five year period beginning from the year 1986. This plan proposes to reduce diarrheal diseases mortality through the following means:

- Training of medical and paramedical personnel.
- Increased production and distribution of ORS (both through the existing health structure and the private sector).
- Education of mothers and other community members in the use of ORT through mass media campaigns.
- Operational health services research for identification of the suitable strategy for implementation.

They also plan to reduce diarrheal morbidity (no specific target has been set) by:

- The provision of safe drinking water supplies.
- Improvement of sewage disposal systems.
- Improvement of general environmental sanitation.
- Health and nutrition education of the people

The main thrust of the ORT Program in the proposed plan will be to use home remedies such as kanji, dal water, etc. and to promote the use of salt/sugar solutions. The WHO recommended ORS packets will be reserved for cases of diarrhea that do not respond to the salt/sugar solution.

They also plan to promote a number of research activities which would help to:

- Establish the epidemiology and etiology of diarrheal diseases in India.
- To institute effective preventative and curative measures.

4. Management of the Service Delivery System

The trained dais and CHVs live in the villages. The dai is usually contacted for matters related to ante-natal, delivery, and post-natal care. The CHV is meant to be available to the village population at all times to advise appropriate treatment for all other medical problems. Both the dai and the CHV report to the female multipurpose worker (FMPW). There does not appear to be any set schedule for the meetings between the FMPW and the dais and the CHVs. The dais and CHVs help the FMPW to recruit people for family planning (FP) programs, immunization programs, etc. The CHV also refers cases to the FMPW when appropriate and obtains additional supplies from her when needed. The CHV is also expected to report to the PHC once a month. At this time he makes his monthly report to the medical officer, replenishes his medical kit, and collects his monthly wages (50 rupees).

The FMPW is responsible for most of the activities at the subcenter. Her responsibilities include:

- Direct patient care.
- Referral to PHC.
- Recording births and deaths.
- Maintaining immunization records.
- Giving immunizations and achieving targets for immunization.
- Promoting family planning and achieving targets.
- Health education of public on various issues such as ORT, hygiene, etc.
- Supervision of Mahila Mandals.
- Maintenance of various registers for family planning and other activities.

Male multipurpose workers (MMPW) are supposed to help the FMPW in all of the above functions. However, the primary responsibility for conducting the above functions rest on the FMPW. The MMPW are also responsible for making blood smears on slides for malaria and sputum collection when appropriate for tuberculosis control programs.

Both the FMPWs and MMPWS are supervised by the health visitor. She visits the subcenter frequently. During her visit she reviews the records kept by the FMPW. She also brings the necessary immunizations for that day. The FMPW, MMPW, and health visitor conduct an immunization session at the subcenter. The Medical Officer from the PHC also visits the subcenter once a week. At this time he reviews the records of the FMPW. During this visit he is also supposed to participate in health education activities.

The medical officer also has monthly or bi-monthly meetings with all the PHC and subcenter staff. At this meeting the various targets and health programs are discussed. This meeting is also meant to be used for in-service, training of the staff.

There are also training teams from the District Health Office that visit the PHCs once in three months to conduct in-service training on various topics such as immunization, ORT, etc.

5. ORS Supply System

The ORS packets (for one liter of solution) for the district hospital, Taluka dispensaries, and PHCs are provided from a district storage facility. There is no special budget for ORS packets. The ORS packets are purchased with the budget allotted for medicines.

The total budget for the district pharmacy is 12 lakhs. Seventy-five percent of this budget is used at the discretion of the Government. The rest can be used at the discretion of the District Health Officer. Each PHC is given medicines worth 12,000 rupees/year. Each subcenter is given medicines worth 2,000 rupees per year and each CHV is given medicines worth 50 rupees per month. The PHCS request ORT packets and medicines once a year. The supplies are sent to the PHC every three months. If the PHC requires ORS packets or medicines in excess of that allotted to them, a special request is made by the medical officer to the District Health Officer. The District Health Officer can at his discretion use 25 percent of the total pharmacy budget to obtain these additional supplies. The ORS packets purchased through the state government procurement system costs 1.25 rupees. The Government of Maharashtra produces these packets in collaboration with Haffkine Biopharmaceutical Limited. ORS packets purchased directly from a private commercial company cost 2.16 rupees per packet. In 1984 Baruch district (in Gujarat) purchased 20,000 packets at a total cost of 25,000 rupees. This figure represents two percent of the total district pharmacy budget.

Some districts in Maharashtra are also buying ORS salts in bottles. The total contents of these bottles should be used with three liters of water.

The Government has decided to withdraw these bottles from all their facilities. However, they are still being used at hospitals, PHCs, and subcenters.

6. Local Production

Several government institutions, especially Indian Drugs and Pharmaceutical Ltd., produce ORS packets on a large scale. However, a number of private commercial companies produce ORS (see Table 8). The composition of the ORS packets available in the packet varies widely in composition, cost, and the recommended volume of water for reconstitution. Some of the variations are listed below:

TABLE 8

ORAL REHYDRATION PACKAGES IN URBAN AND SEMIURBAN

PHARMACIES IN MAHARASHTRA*

SR. NO.	BRAND NAME	MANUFACTURER	COMPOSITION	DIRECTION FOR USE	ELECTROLYTE MEQ/LITRE	PACKING	PRICE
1.	EMTRAL	EMCURE PHARMACEUTICALS PVT. LTD. BOMBAY	Calcium Lactate I.P. 0.545% Potassium Chloride I.P. 2.337% Magnesium Sulphate I.P. 0.736% Sodium Chloride I.P. 0.975% Sodium Citrate I.P. 0.839% Permitted) Tartrazine) Colour 0.004% Dextrose I.P. QS	80 gm of EMTRAL in one litre of solution-280 Cal. Use Measure (provided) and dissolve one level measure (app. 4g.) in 50 m. (app. 2 fl. oz. of water)	Sodium 25 Calcium 4 Sulphate 4 Biphosphate 5 Citrate 15 Potassium 25 Magnesium 4 Chloride 30 Lactate 4	Waxed Paper For 1 Lt. mix	5.66
2.	ELECTRAL	THE FAIRDEAL CORP. (PVT) LTD. BOMBAY	Calcium Lactate 0.545% Potassium Chloride 2.337% Magnesium Sulphate 0.365% Sodium Chloride 0.365% Sodium Citrate 1.839% Sodium Acid Phosphate 0.975% Permitted Tartrazine Colour - 0.004% Dextrose- Q.S.	80 gm. of Elec- tral Supplies 280 Cal. <u>Children</u> Approx. 150 ml. per Kg body wt. per day for Maintetance	Sodium 25 Potassium 25 Calcium 4 Magnesium 4 Sulphate 4 Chloride 30 Biphosphate 5 Lactate 4 Citrate 15	Foil for 1 Lt. Mix.	5.96

SR. NO.	BRAND NAME	MANUFACTURER	COMPOSITION	DIRECTION FOR USE	ELECTROLYTE MEQ/LITRE	PACKING	PRICE
3.	ELECTRAL FORTE	THE FAIRDEAL CORPORATION (PVT.) LTD. BOMBAY	Sodium Chloride 11.7% Potassium Chloride 4.967% Sodium Bicarbonate 8.5% Dextrose Q.S. Permitted Colours: Sunset Yellow FCF Fast Red E.	75 gm. of Electral Forte in 2.5 Lt. of solution supplies 215 calories	Sodium 90 Potassium 20 Chloride 80 Bicarbonate 30	Foil for 2.5 Lt. mix	6.12
4.	ELECTRAL - M	THE FAIRDEAL CORPORATION (PVT) LTD. BOMBAY	Sodium Chloride 0.78% Potassium Chloride 4.96% Sodium Bicarbonate 3.13% Dried Sodium Phosphate 0.76% Sodium Citrate 6.65% Magnesium Sulphate 1.036% Calcium Lactate 1.64% Permitted Colour: Tartrazine 0.004% Dextrose Q.S.	75 gm. in 2 Lt. solution supplies 240 calories	Sodium 52 Potassium 25 Magnesium 4 Chloride 30 Bicarbonate 14 Lactate 4 Phosphate 4 Suphate 4 Citrate 29	Foil for 2 Lt. of mix	6.52
5.	EMLYTE-S	M.M. LABS BOMBAY	Sodium Chloride 3.5 gm Sodium Bicarbonate 2.5 gm Potassium Chloride 1.5 gm. Sporlac (spores of Lactobacillus sporogenes) 250x10 ⁶ Glucose 20 gm Excipients Q.S. Colour Used: Sunset Yellow FCF	35 gm. Emylte - S for 1 Lt.	Sodium 90 Potassium 20 Chloride 80 Bicarbonate 30	Waxed Paper & Foil for 1 Lt. mix	6.60

SR. NO.	BRAND NAME	MANUFACTURER	COMPOSITION	DIRECTION FOR USE	ELECTROLYTE MEQ/LITRE	PACKING	PRICE
6.	PROLYTE (LEMON FLAVOR)	CIPLA BOMBAY	Sodium Chloride 27.5 gm Sodium Bicarbonate 2.5 gm Potassium Chloride 1.5 gm Permitted Color Sunset Yellow 0.002 gm Dextrose 27.5 gm	27.5 gm of Prolyte in 1 litre of solution	Sodium 90 Potassium 20 Chlorida 80 Bicarbonate 30 Dextrose 111	Foil for 1 Liter	4.05
7.	PROLYTE (LEMON FLAVOR)	CIPLA BOMBAY	Sodium Chloride 7.00 gm Sodium Bicarbonate 5.00 gm Potassium Chloride 3.00 gm Permitted Color Sunset Yellow 0.004 gm Dextrose 55 gm	55g of Prolyte in 2 liters of solution	Sodium 90 Potassium 20 Chloride 80 Bicarbonate 30 Dextrose 111	Foil for 2 liters	6.45
8.	PROLYTE (ORANGE FLAVOR)	CIPLA BOMBAY	Sodium Chloride 3.5 gm Sodium Bicarbonate 2.5 gm Potassium Chloride 1.5 gm Permitted Color Sunset Yellow 0.002 gm Dextrose 27.5 gm.	27.5 g of Prolyte in 1 liter solu- tion	Sodium 90 Potassium 20 Chloride 80 Bicarbonate 30 Dextrose 111		
9.	PEDITRAL	SEARLE (INDIA) LTD. BOMBAY	Sodium Chloride 4.3875% Potassium Chloride 3.7300% Sodium Bicarbonate 4.2000% Dextrose Anhydrous 86.0825%	40 g in 1000 ml of solution	Sodium 50 Potassium 20 Chloride 50 Bicarbonate 20 Dextrose 188	Foil Orange Flavored for 1000 ml	6.58

SR. NO.	BRAND NAME	MANUFACTURER	COMPOSITION	DIRECTION FOR USE	ELECTROLYTE MEQ/LITRE	PACKING	PRICE
10.	MEDILYTE	MEDICARE PHARMACEUTICALS PVT. LTD. BOMBAY	Sodium Chloride 6.656% Potassium Chloride 1.3969% Magnesium Sulphate 0.9625% Sodium Citrate 3.6763% Sodium Acid Phosphate 1.950% Dextrose 20 gm Permitted Color: Tartrazine	80 gms Medilyte in 1 liter of solu- tion provides 282 calories	Sodium 90 Potassium 15 Calcium 5 Magnesium 3 Chloride 65 Lactate 5	Waxed Paper for 1 Liter	6.84
11.	EMTRAL FORTE	EMCURE PHARMACEUTICALS BOMBAY	Sodium Chloride 3.5 gm Sodium Bicarbonate 2.5 gm Potassium Chloride 1.5 gm Dextrose 20 gm Permitted Color: Tartrazine	27.5 gm Emtral Forte in 1 liter of solution	Sodium 90 Potassium 20 Chloride 80 Bicarbonate 30 Dextrose 111	Waxed Paper for 1 liter	3.90
12.	BOOSTRAL (ORANGE FLAVORED)	CHELSEA PHARMACEUTICALS BOMBAY	Each 22 gm Con- tains: Sodium Chloride 0.50 gm Dextrose Monohydrate 20 gm Potassium Chloride 0.35 gm Sodium Bicarbonate 0.75 gm	44 gm of BOOSTRAL in 1 Litre of Solution	Na+ 35 MMO K+ 20 MMO Cl- 37 MMO HCO ₃ - 18 MMO Dextrose 200 MMO	Waxed Paper for 1 liter	5.20

SR. NO.	BRAND NAME	MANUFACTURER	COMPOSITION	DIRECTION FOR USE	ELECTROLYTE MEQ/LITRE	PACKING	PRICE
13.	ORHYDRATE	ALKEM LABORATORIES PVT. LTD.	28 gms. Contains Sodium Chloride 3.5 gm Potassium Chloride 1.5 gm Sodium Bicarbonate 2.5 gm Glucose 20.0 gm Permitted Color: Erythrosine	28 gms of Orhydrate in 1 liter of solution	Sodium 90 Potassium 20 Chloride 80 Bicarbonate 30	Waxed Paper for 1 Liter	3.55
14.	GLUCOLYTE	TUTON PHARMACEUTICALS AHMEDABAD	27.5 gm contains Sodium Chloride 3.5 gm Sodium Bicarbonate 2.5 gm Potassium Chloride 1.5 gm Glucose 20 gm	27.5 gm of Glucolyte in 1 liter of solution	Sodium 90 Potassium 20 Chloride 80 Bicarbonate 30	Waxed Paper for 1 liter	4.25
15.	EMLYTE	MM LABS BOMBAY	Each 35 g contains Sodium Chloride 3.5 gm Sodium Bicarbonate 2.5 gm Potassium Chloride 1.5 gm Glucose 20 gm Excipients Q.S. Color Used: Sunset Yellow FCF	35 gms for 1 liter mix	Sodium 90 Potassium 20 Chloride 80 Bicarbonate 30	Foil for 1 liter mix	4.52

SR. NO.	BRAND NAME	MANUFACTURER	COMPOSITION	DIRECTION FOR USE	ELECTROLYTE MEQ/LITRE	PACKING	PRICE
16.	REGOLYTE	RAPTAKOS BRETT & CO. BOMBAY	Per 100 gm Sodium Chloride 3.88 gm Sodium Citrate 0.84 gm Potassium Chloride 1.40 gm Monobasic Potassium Phosphate 0.85 gm Calcium Lactate 0.78 gm Magnesium Sulphate 0.62 gm Citric Acid 0.63 gm Dextrose Q.S. Permitted Color: Tartrazine	80 gm To obtain 8% Solution Mix 16 gm in 2-0 M/of water	Not Provided	Bottle	9.95
17.	UNBRANDED ORAL REHYDRATION MIXTURE	BASED ON WHO FORMULA FOR ORAL FLUIDS	28 gm contains Sodium Chloride 3.5 gm Sodium Bicarbonate 2.5 gm Potassium Chloride 1.5 gm Dextrose Q.S. Color Used: Sunset Yellow FCF	28 gms for 1 liter of water	Sodium 90 Potassium 20 Chloride 80 Bicarbonate 30	In paper and pack and sealed in Polythene	FOR GOVERN- MENT USE AND NOT FOR SALE

- Volume of water for reconstitution: 250 m. to three liters.
- Range of sodium concentration: 25 m.mol/liter to 90 m.mol/liter.
- Range of alkali in ORS: 25 to 35 m.mol/liter.
- Range of consumer cost per liter of ORS: 3.32 to 6.84 rupees.

7. Training

a. Dais.

These are female traditional birth attendants living in villages. They are trained for three months. The main thrust of their training is related to pregnancy and family planning. Very little training is given on diarrheal diseases.

b. Female Multipurpose Worker (FMPW)

These are women with 10th grade educations. Ideally they are to be selected from the village to which they will be assigned after their training. Often the women that are selected are not from the appropriate villages for the following reasons:

- The Panchyat (the political body) has a strong say in the selection of the candidates;
- The selection of candidates is often political rather than based on place of residence.
- Their total training period is for 18 months.

The training of the FMPWs for the first three months consists of six hours of lecture per day in the classroom. The topics include hygiene, nutrition, physiology, microbiology, and anatomy. For the second eight months they are given four to five hours of lectures a day. The topics covered are vital statistics, leprosy, tuberculosis, malaria, and family planning.

During these eight months they also go to the district hospital for two to three hours a day for training in acute care.

For the last seven months the training is conducted in a village PHC under a trained FMPW and supervisor. During this period, they are expected to obtain practical experience in conducting deliveries, immunizations, and management of acute illnesses including diarrhea.

In 1982 a training needs assessment was conducted of 20 percent of workers in AID districts. The results of this survey revealed that many workers had poor knowledge of ORT. For example, many believed that feeding should be stopped during diarrheal illness, and many did not know the rationale for using ORS. Based on these findings, modules were developed for specific training in diarrheal diseases and ORT.

B. DIARRHEAL DISEASE CONTROL ACTIVITIES IN HIMACHAL PRADESH

The majority of the villages in Himachal Pradesh Project districts are served by piped water systems, community wells, community taps or hand pumps. During the dry season, water shortage becomes a problem in some villages. An increase in diarrheal disease and epidemic outbreaks then occurs.

Any diarrheal disease program in Himachal Pradesh will depend upon the infrastructure of primary health centers (PHCs) and subcenters with attendant staffs. Because of the hilly terrain and relatively sparse population the state uses an ideal figures of one subcenter per 3,000 population and one PHC per 80,000 population. Currently there are 12,000 subcenters not far from the 15,000 ideally planned. The 101 PHCs (90 rural) already fulfill the idealized ratio noted above. Within the three Project districts, 78 to 89 percent of the ideal number of the subcenters have been built and are functioning. The shortage is most severe in Kangra District where it appears some 24 field staff do not have state subcenters (they may be renting a room in which to work). The majority of the subcenters observed by the team included living quarters for the MPW, for the FMPW, and/or for the LHV.

The training and hiring of staff for these facilities, multipurpose workers (MPW) and health supervisors, have been included in the IRHP. To date some 800 MPWs have been trained across the state, and 420 will be "graduating" within the next 18 months. Of the three Project districts, Kangra had trained 85 percent of the projected ideal number of MPWs, and Sirmour about 40 percent. Overall figures were not obtained for Hamirpur.

Village Health Guides do not have separate facilities, but instead work out of their homes or in the patient's homes. Based on an ideal of one VHG per 700 people (the GOI uses one per 1,000), Kangra District has already trained and hired 77 percent of the total ideal, and Hamirpur 70 percent. Data were not obtained for Sirmour.

One of the difficulties with the staff:population ratio system is that in more sparsely populated states such as Himachal Pradesh ideal population: staff ratios for the purpose of service may be significantly different from ideal supervisor ratios. The supervisory ratios should be examined closely after planning the CDD program. The figures obtained for Kangra and Sirmour Districts revealed no significant shortage in LHVs. This report concentrates on female MPWs and lady health visitors because, at this time, the male workers are not significantly contributing to diarrheal disease treatment. (Clearly in the future, the male workers and supervisors might be better utilized in a focussed CDD program.)

1. Diarrheal Disease Statistics Surveillance and Reporting

In 1984 a system of sentinel PHCs was formed for the purpose of gathering information about diarrheal disease in children under the age of five and about ORS usage. This information should be available at the State Department of Health as well as the District Hospitals. Only information relating to diarrhea and dysentery is collected; gastroenteritis is not included. In Kangra District, the Chief Medical Officer requested that all of his PHCs and subcenters collect this information. Unfortunately, the monthly or annual

information is not reliable for district determination because of inconsistent denominators. (Number and type of reporting facilities varied every month.) In addition, the District Hospital's Chief Medical Officers do collect information from the PHCs about the total number of diarrheal and dysentery cases seen in all ages per month. It was not clear to the consultants how the PHC case numbers related to subcenter diarrheal disease cases. It is possible that the same denominator inconsistency is obtained. However, generally, the PHC-specific information is probably the most accurate data available.

An estimate of the percent of total cases of diarrhea and dysentery attributed to the under five years age group was obtained utilizing the monthly data collected consistently from each of three PHCs in Kangra visited by the team. The calculation revealed 25 percent of the total reported diarrheal and dysentery cases were in children under five. This figure is derived from Kangra statistics, but it is not unreasonable to assume that a similar percentage would be found in the other districts as well. Estimates of case fatality rates and annual episodes of diarrhea and dysentery per child under five can also be determined from the Kangra District data. The fatality rates and morbidity figures obtained, however, are so radically different from those expected that underreporting is strongly suspected.

District Hospitals also collect diarrhea and dysentery statistics specific for their individual institutions and maintain some records of district ORS packet supplies and orders.

In addition to the lack of consistent denominators noted above, limitations on the present data at PHCs and District Hospitals include the "lumping" of diarrheal disease and dysentery into one general category, the omission of gastroenteritis figures when considering total diarrheal disease and ORS projections, misclassification or classification inconsistencies especially when multiple symptoms or etiologies are involved (and one is diarrhea), and lack of age-specific data. District Hospital institutional statistics for ORS utilization should be clearly demarcated as such, distinct from district-wide statistics based on PHC records. Clarification of whether PHC statistics are inclusive of subcenter data or in addition to them must be made. Efforts to assure consistent denominators should be encouraged.

A significant amount of diarrheal disease information currently rests in the MPW and LHV outpatient encounter registries kept at the subcenters, but it is not collated or organized. Other potential information sources are the monthly reports by VHGs, MPWs and LHVs. Although information pertaining to diarrheal diseases or ORS utilization is not currently requested, if such were added in these reports, these reports would constitute a valuable diarrheal disease data base.

The information regarding diarrheal diseases incidence and ORS utilization obtained from interviews with field workers during the consultants' visit was not consistent either with the statistics from sentinel reporting centers or district level collations. Some of the discrepancies may stem from the fact that workers generally responded in terms of their personal experience and did not extrapolate to total facility experience. Hence the facility data had to be "guesstimated" from individual field interviews. District and PHC reporting was more likely to include full-facility calculations.

As already noted, field and hospital records do not differentiate between diarrhea and dysentery. However, when questioned, field and hospital workers spontaneously and consistently estimated 20 percent of the reported diarrheas to be dysenteric (i.e. blood and mucus in stools). Similarly, field responses concerning chronic diarrhea were consistent in their chronic nature (most of which were related to malnutrition). This type of diarrheal differentiation is important in order to establish anticipated mortality reduction through ORT.

Diarrheal deaths secondary to dehydration can be reduced significantly through an effective ORT program. Deaths in dysenteric patients usually stem from severe and systematic complications which are not significantly affected by the administration of ORS. Likewise, chronic diarrhea deaths are most often the result of malnutrition rather than dehydration.

Field workers claimed that 20 to 25 percent of the diarrhea and dysentery cases they treated had significant dehydration (moderate to severe). However, very few (less than 10 per year) referrals from the subcenters to the PHC or from the PHC to district hospitals were recalled. It would be useful to delineate referral problems and percentiles per diarrheal disease prior to the initiation of a CDD program, since one outcome of an effective ORT program might be a decrease in referrals and/or hospital admissions.

It should be noted that all of the above percentiles are estimates based purely on "off-the-cuff" answers from field workers and, hence, are subject to the limitations of this type of retrospective recall.

Generally, the district hospitals only collect total disease or admission information, not age-specific or even pediatric disease information. However, because epidemics are usually investigated by the district hospital staff, these figures may also be available. Field interviews regarding ORT packet utilization during peak diarrheal months indicated figures well below those determined from sentinel or district reporting systems. More legitimacy can probably be placed on their general response to ORS packet sufficiency during "peak" diarrheal months. The majority of MPWs and VHGs noted insufficient ORS supplies during the peak diarrheal season.

2. Diarrheal Disease and ORT Knowledge and Awareness Among Health Personnel

The definition of "diarrhea" as three or more loose, watery stools (without blood or mucus) per day was consistently used by all provider staff interviewed (from the village to the district hospital) with one exception "where greater than four or five" was the response standard at Diltogntal. Passage of stools with blood or mucus immediately moved a case into the "dysentery" category. As noted previously, both categories of diarrhea were recorded under the single heading of "diarrhea and dysentery" at all levels of the system. "Gastroenteritis" was reserved for any episode of diarrhea which was accompanied by vomiting. Hence, if one only gathered statistical information from the diarrhea and dysentery categories, one would be underestimating diarrheal disease, since a substantial portion is included in the gastroenteritis category. Most information was gathered without regard to age (with the exception of the sentinel system). The foregoing categories of recording diarrheas were regularly identified and utilized by all levels of staff interviewed.

In general, all levels of provider staff interviewed believed that breastfeeding should be continued during diarrheal episodes. Few of the staff seemed to stress the concept of small amounts of fluid given frequently. No staff member maintained superstitious ideas concerning diarrheal home remedies or feeding practices.

All levels of providers easily identified at least three appropriate signs and symptoms of dehydration. The limited number of VHGs interviewed usually responded with some version of "no tears, dry mouth, decreased hunger; etc." The FMPW and LHV, as well as the medical officers could identify more symptoms. Awareness of weight loss and decreased urine output was only discovered at the medical officer level.

Treatment modalities for diarrhea obviously varied with the level of the health provider interviewed. VHGs utilized the ORS packets in their kits until they ran out and then resorted to home mixed salt and sugar solutions. Some noted they used home mix if the child were not dehydrated and ORS packets once dehydration was present. The few interviewed clearly maintained a high level of awareness concerning ORS use (both packet and home mix). They could correctly recite how to mix the packet themselves, how to teach the mothers using boiled water and an appropriate home container of one liter size. (A common household milk container was the standard home container recommended by VHGs and MPWs). There was less consistency and accuracy in the instructions for making home mixed salt and sugar solutions. No standard measuring utensil was identified for the salt and sugar. Because sugar was of limited availability in some households, the VHGs would tend to be less specific about the amount, saying only "add what you can." VHGs generally gave out only one packet of ORS at a time, instructing the mother to bring the child back in 24 hours if he or she did not improve. Referral to the subcenter or, more frequently, the PHC, was made if the child did not respond or developed new signs or symptoms, especially of vomiting or dehydration. ORS was not utilized in the treatment of gastroenteritis.

Female MPWs and LHBS also displayed a high awareness of ORS usage for the treatment of diarrheal diseases. They utilized ORS packets when available, preferring to pre-mix the packet contents in the subcenter or PHC whenever possible (using the milk container brought by the mother). If the family had not brought available containers, mixing instructions were given to the parent along with a packet of ORS. Some attempt was made to have VHGs follow-up, but this has not been regularly done. When possible, follow-up in 24 hours was requested. All workers interviewed were able to correctly recite instructions for ORS packets and home mix solution mixing. Quantities of each ingredient were correctly identified, though no consistent or accurate measuring device for home mix (salt and sugar) was described. The prescription of one ORS packet per episode was standard among the workers interviewed. Referral to the PHC was made if signs of dehydration appeared despite ORS treatment, if the child did not respond after one or two days of ORT, or if the child developed additional symptoms, especially vomiting. Again, little awareness was displayed of the use of ORT in gastroenteritis. Most commonly, ORS packets were used by female MPWs and LHVs as therapy for all diarrheal cases, whether or not dehydration was present and regardless of age.

Medical officers at the PHC level and in the district hospitals treated children first with anti-motility medication and antibiotics. If signs of mild dehydration were present, ORS packets were prescribed. Often the hospitals themselves had low supplies of ORS packets, so outpatients were referred to local chemists to buy the packets. If ORT packets were available, outpatients received them (pre-mixed, if they had a container) from the hospital pharmacy where mixing instructions were also supplied. Minimal instructions appeared to be given to the parents by the medical officers. A few of the PHC-based medical officers stated that if the patient was not dehydrated, they would advise home oral fluids (home mixed ORS or other clear liquids) the first day and only prescribe antibiotics, anti-motility agents, and ORS packets if the patient returned the next day or soon after with unremitting symptoms.

Some of the ungraded PHCs had the capabilities for intravenous treatment. When available, it was utilized. In-patient therapy at district hospitals still largely depends on intravenous therapies, antibiotics, and anti-motility medications. Only seriously dehydrated patients or those with complications are admitted. It appeared that parents were not given as complete instructions as they were at the village or subcenter levels. Moreover, they were utilized as "assistants" to feed the child ORS in the controlled, supervised hospital setting.

With the exception of the medical officers, field staff were not attuned to physical signs of dehydration such as weight loss or reduced urine output, nor was the increased risk of dehydration in infants and young children widely understood. Use of ORT for gastroenteritis was not regularly stressed. ORS packets, more often than not, were utilized for all patients with diarrhea and dysentery, regardless of age. Of concern was the pattern of "saving" ORT for those cases with signs of dehydration. This attitude was not uncommon among MPWs or MOs. ORS can and should be used for the treatment of children with diarrheal disease and dehydration, but it is also very important in children in order to prevent dehydration.

Due to time constraints, the consultant team did not get to actually view staff at any level either mixing ORS packets themselves or teaching a parent/patient how to mix the ORS packets or homemade solution. Thus, the aforementioned observations were based entirely on verbal exchanges. Obviously, the opportunity to watch the process would have been preferable.

No dehydration centers or outpatient "holding centers" existed. No ORT/ORS demonstrations were set up in any of the PHCs or subcenters seen by the team.

3. ORT in the Private Sector

The team did not have the opportunity to personally evaluate the types of ORS packets available at the private chemists or practitioners. It was informed of one private pharmaceutical company in Dharamsala (Raman Co.) that produced WHO-standard ORS packets for Kangra District through a special contract arrangement with Himachal Pradesh state health officials. In general, the team was concerned that systems be instituted to assure standardization of content and packaging for local, privately-produced ORS packets. Private

market prices (the price of the packet at chemist, etc.) quoted by health providers in urban and rural areas were significantly higher than state provided supplies (four to six rupees a packet vs. two rupees a packet).

4. Role of Key Donors and Donor Coordination

Exploration of private and donor sources of ORS packets should be explored, especially during the initial phases of the CDD program when state production capacities are limited. Ultimately, local public and private production may be feasible. The CDD program director should take advantage of ORT training materials already available from the international health organizations. These organizations may be willing to sponsor workshops on ORS. They can also provide technical assistance regarding in-country assessments for ORS production capabilities and will assist in the production start-up phase. Furthermore, international organizations may be willing to finance particular laboratory investigations or operational research which does not fall under the jurisdiction of the IRHP. Finally, coordination between national or state CDD programs financed or assisted by different donor organizations is essential to ensure maximum utilization of services and to avoid duplication. A CDD program director would be instrumental in this regard.

To date, the key donor for Himachal Pradesh has been USAID, through its IRHP, but it is only with the proposed extension that this program will be focused on diarrheal diseases. As noted above, other donors (WHO, UNICEF) might be considered to fund or assist with specific portions of a statewide and national CDD program.

5. Achievements to Date: Public Awareness and ORT Usage

No statistics are available for Himachal Pradesh to assess general public knowledge about diarrheal disease and awareness of ORT or use of ORS with the exception of a recent KAP survey. Most of the survey concentrated on family planning issues, but several questions about diarrheal disease yielded the following results: 10 percent of the currently married women and 35 percent of the married men said that it is not proper to feed a child with diarrhea. Thirty-six percent of the community leaders also believed this to be true as did 15 percent of the MPWs and Health Supervisors (male and female), and 32 percent of the VHGs. Furthermore, 26 percent of private practitioners, 35 percent of untrained dais, and 30 percent of trained dais held the same view. Hence, the field health workers interviewed during the team's visit appeared to be much better informed than the above survey would indicate, since literally every worker questioned responded that breastfeeding in particular but feeding in general should be continued in the face of diarrheal disease. (Details about the survey format were not available.)

During field interviews, the consultant team did discover that some people still believe diarrheal disease is the cause of an "evil eye" syndrome, though most people today were able to relate it to poor sanitation. In some villages, the belief that children over one year of age should not be given water coupled with the belief that breastfeeding should be stopped when diarrhea starts resulted in literally total fluid restriction for children over one year of age with diarrheal diseases.

The KAP survey discussed above also revealed that more than 90 percent of the currently married women and more than 85 percent of the married men had not heard about ORS, compared to 65 percent of the community leaders. Of those who had heard about ORS, more than 90 percent did not know how to make it.

The field observations of the team also indicated a significant lack among medical officers of acceptance of ORT and only limited knowledge about ORS. Since these physicians are the critical people in the education and supervision of all field paraprofessional staff, especially regarding diarrheal disease and ORT/ORS, there is a likelihood that this lack of knowledge and acceptance pervades the entire medical system.

6. The ORS Supply System

VHGs are provided a fixed number of 60 packets of ORS per year in their VHG kits (each kit contains 15 packets). The kits are replenished on a quarterly basis when they visit the PHC. The production source of these packets has varied depending upon which company was awarded the annual contract tendered by the state ministry of health. As of April, 1985, the GOI has promised to assume the responsibilities for the supply of ORS. Field interviews revealed the current fixed supply to be inadequate, especially during the peak diarrheal season (April-September). Some VHGs obtain additional ORS packets from subcenters or PHCs when this occurs.

The ORS packets utilized by the MPWs, LHVs and MOs in the subcenters and PHCs are supplied through the district hospital. Under the state health system each district hospital is allotted a particular sum in its operating budget for "medicines." Expenditures for ORS packets are subsumed under this line item. The district hospital chief medical officer is, therefore, faced with the trade-off of purchasing ORS packets instead of general medications. (For this reason, most CDD programs have found that a separate ORS linelisting distinct from medication is necessary within the CDD program budget.)

It is of interest that in Himachal Pradesh one private local pharmaceutical company is already employed in supplying one district's ORS needs. Hence, the feasibility of local private sector production should be explored. One district hospital was very interested in investigating costs for its own production of the packet. At this writing, none of the project hospitals was buying ingredients to package its own ORS home solution. However, one district hospital outside of the project was buying in bulk to create envelopes of "home solution" given out by its pharmacy.

The medical officers report ORS needs for their PHC when they attend the monthly meeting at the hospital. PHC requests for ORS packets are filled according to the population and number of subcenters served by the PHC as well as its stock "balance" of ORS packets. PHC supply decisions are made independently at each district hospital. The chief medical officer must also decide what proportion of total district ORS stock should be retained for district hospital use.

No consistent minimum stocks are maintained across the health service system, nor are consistent records tabulated upon which future ORS packet

needs could be based per facility or district. Records from Kangra District PHCs revealed that ORS deliveries varied considerably from month to month. Field interviews indicated that ORS insufficiencies were common at all levels of the delivery system during the peak diarrhea months. Only PHCs and subcenters are regularly supplied with ORS packets. Other health facilities are not routinely included in ORS distribution. The system of planning and distribution is standard in both project and non-project districts of Himachal Pradesh.

Despite the common source of ORS packets per district, a variety of ORS packets was viewed in field facilities. However, the 27.5 gram WHO formula packets were most common. Citrate packets are not yet readily available at all facilities. Only a few UNICEF packets were seen.

Storage facilities for ORS supplies appeared adequate at the district hospitals toured. PHC and subcenter supplies were usually kept in plastic bags within metal cabinets. Field supplies were utilized rapidly so shelf-life posed no serious problem. Figures were not readily available to assess the potential magnitude of this problem at the district hospitals. (Field staff interviewed were not aware of "shelf-life" concerns or the meaning of "color changes" in packet contents.)

C. ANALYSIS OF CONSTRAINTS

Following are general and specific constraints affecting diarrheal disease control efforts in India.

1. General Constraints

- a. The vast geographical size and variation in terrain of India places significant logistic constraints on any delivery system and makes communication and transportation more difficult.
- b. The large number of ethnically diverse sub-populations with distinctive customs, languages, and cultures challenges any system which attempts to communicate and provide services across all groups.
- c. The overwhelming numbers of India's populace severely complicate and magnify the difficulty inherent in any large scale service venture.
- d. The relatively high proportion of the population in the economically deprived sector of society constrains private sector initiatives which require adequate broad-based purchasing power.
- e. Lingering caste bias makes it difficult to train individuals to serve the most needy members of the society.

2. Health Constraints

- a. The lack of a reliable data base regarding general demographic and health indicators limits the development of targeted health programs and hinders objective evaluation of program impact.
- b. The lack of general village acceptance of VHGs and MPWs in their role as primary health providers minimizes their effectiveness.
- c. Minimal water supplies for any purpose, especially during the dry season, lower standards of sanitation and hygiene.
- d. Minimal available clean water during the dry season increases the risk of drinking contaminated water and subsequent infection.
- e. Limited fuel supplies to boil water for purification increases the likelihood of exposure to contaminated water.
- f. Long distances between villages and subcenters or primary health centers and limited numbers of such facilities, as well as restricted means of transportation decrease accessibility and probably adversely affect utilization of available public health services.
- g. Limited supervision of field health workers (MPWs and VHGs) minimizes their effectiveness as health providers and hinders quality assurance in the provision of health care.
- h. Limited numbers of VHGs and MPWs decreases the availability of community-based primary health care services.
- i. Limited numbers of facilities or living quarters for the MPWs and LHV's decrease the availability of primary health care services.
- j. The lack of clinical laboratory facilities and services decreases the ability of health providers to make secure diagnoses and, hence, to provide more specific therapies.
- k. The lack of a system for on-going monitoring and evaluation of health programs decreases quality assurance of programs and hinders the recognition of program changes necessary to improve effectiveness and impact.
- l. The role of partisan politics in the selection process for VHGs and MPWs decreases the likelihood of selection based on qualifications which would maximize job effectiveness.

m. The continuing evolution of the primary health care system in India means that organizational and supervisory structures, community interfaces, and community investment in the primary health care system are still in the process of development.

n. Limited communication and coordination between the public sector, the private sector, and the donor health sector minimize the impact which each system has on improving health care.

3. Constraints Specific to Diarrheal Disease Control in the Public Sector

a. There is no reliable data base for national or regional diarrheal disease morbidity and mortality (age-specific total cases) to provide baseline information for CDD Program Planning.

b. There is no surveillance system to collect on-going data regarding the epidemiology of diarrheal diseases which is useful in the establishment of an effective CDD campaign.

c. There is no national CDD program policy, plan, or budget.

d. There are no state CDD program directors or district ORT coordinators to develop overall regional CDD programs and budgets.

e. There is no consistent, reliable system of data collection to ascertain annual ORS requirements per state or district.

f. The present inclusion of ORS under "medication" in the district hospitals' budgets forces a trade off between the purchase of antibiotics, general medications, and ORS packets.

g. There is no line item specifically for ORS supplies or CDD program needs in the state MOH budget or district hospital budgets.

h. The ORS packet supply for VHGs is set at a predetermined level which apparently is insufficient.

i. The GOI's current ORS production capacities are limited.

j. Local public sector ORS production capabilities have not been adequately explored.

k. The current system of supervision and training of field staff delivering diarrheal disease control services depends largely on the medical officers

(at PHCs) who may have limited CDD/ORT training, limited teaching or supervisory time, and limited inclination to perform these functions.

- l. There is less-than-optimal use of the male health workers (MMPS or Supervisors) to deliver CDD Control/ORT services.
- m. Currently, ORS is supplied to villages through the infrastructures of the public health system, yet in many instances, public health providers are not the first-line responders to diarrheal disease. The lack of communication with and utilization of private and traditional practitioners in the provision of ORT services lessens the effective outreach of diarrheal disease control efforts.
- n. The present system of ORS packet distribution omits key public health facilities with local outreach capacities such as the civil dispensaries.
- o. Superstitions concerning the cessation of feeding with the onset of diarrheal disease continue to influence the actions of some parents.
- p. Inconsistent messages about ORT and ORS from different levels of health providers increase confusion among parents and patients about the optimal treatment for diarrheal diseases.
- q. There is a limited knowledge about the acceptance of ORT (ORS) among staff at all levels of the public health provider system: MOs, MPWs, Supervisors, and VHGs.
- r. There is a basic lack of knowledge about diarrheal disease, dehydration, and ORT among lay village people.
- s. There is a lack of knowledge about accurate mixing of ORS packets and home salt-sugar solutions by some field staff members.
- t. There is a lack of knowledge about accurate mixing of ORS packets or home salt-sugar solutions by most villagers.
- u. There are no readily available, standard measuring utensils in the home or in many field facilities for the preparation of ORS (packets of home solutions).
- v. There is no incentive system for public health providers to utilize ORS packets in the treatment of diarrheal diseases.

w. Some of the essential ingredients (especially sugar) for the creation of home made salt-sugar solutions are not readily available to villagers. There is inadequate information regarding alternative home solutions.

x. The current GOI's perspective on the role of international donor organizations supplying ORS packets during the development period of local production facilities has not been clarified.

4. Constraints Specific to Diarrheal Diseases Control in the Private Sector

a. Laws and/or regulations for a standard, medically acceptable formulation for ORS have not been enacted, nor have standards for packaging. ORS packets of varying quality are, therefore, available at chemists and private pharmacies.

b. There is a lack of knowledge about and acceptance of ORT (ORS) among private and traditional practitioners.

c. There is consumer pressure on private practitioners to prescribe medications or intravenous therapy for diarrheal diseases rather than "second class" salt-and-sugar solutions.

d. There is a lack of economic incentives for private practitioners to utilize ORS.

e. There is a lack of economic incentive for private production of ORS.

f. There has been limited exploration of costs necessary to establish private local production capabilities.

V. THE SOCIAL MARKETING OF FAMILY PLANNING SPACING, ORAL REHYDRATION THERAPY, AND MEASLES IMMUNIZATION IN INDIA

The marketing consultants visited the states of Gujarat and Maharashtra to explore approaches to marketing techniques to promote measles immunization, oral rehydration therapy, and spacing methods of family planning.

A. FAMILY PLANNING SPACING PROGRAMS IN THE STATES OF MAHARASHTRA, GUJARAT, AND HIMACHAL PRADESH

1. Introduction

The Government of India has placed special emphasis in all their development plans on family planning and family welfare and over the years this has created a positive attitude to family planning acceptance. Programs have been directed both at terminal and spacing methods, but more emphasis has been on terminal methods to achieve a substantial decrease in the growth rate. The results have been measured by achievements against the targets set and the Government believes they have been encouraging. The acceptance of terminal methods has grown quite steadily in some states, like Maharashtra and Gujarat where they believe they are reaching near saturation point with the terminal methods.

Recognizing the need to supplement sterilization programs with spacing programs, the Government of India and state governments have begun to emphasize spacing methods, particularly the IUD (Copper-T). The program in the States of Maharashtra, Gujarat, and Himachal Pradesh have set targets to achieve high rates of contraception during the next year. To meet the targets, the governments believe that the clinical delivery service system needs to be supported with a strong marketing and communication program.

2. The Product Choice

Currently, the product "portfolio" in India consists of the IUD (Copper-T), the condom (Nirodh), and the oral contraceptive.

The critical consideration in determining priorities in a product mix strategy is to emphasize the method which is likely to meet the least consumer resistance and is likely to create a greater degree of consumer response within the next year.

From this point of view the product/method which requires only a one-time decision on the consumer's part is far preferable to a method that calls for repeated decision making or reinforcement of an earlier decision. Similarly, once a decision has been made to space births it is by far more preferable to emphasize a method that calls for a one-time action by the consumer than to emphasize a method that requires repeated actions.

a. The IUD

In spite of drawbacks, the Copper-T seems to be the preferred choice by the GOI in terms of selecting which product in the spacing portfolio should be given maximum promotion.

However, this marketing plan clearly recognizes that the Copper-T will not suit nor be preferred by every target consumer. Hence, other products also have to be promoted in a suitable manner.

In the survey areas of the Communications Needs Assessment (CNA) study, it was found that the percentage of acceptors varied from one to three percent.

Dropouts among IUD users vary widely. They are likely to be removed after they have been inserted for six weeks in 20 percent of cases of removal. This rejection increases to about 50 percent during menstruation or immediately after delivery. Reasons usually are:

- excessive bleeding
- white discharge
- back ache
- infection

It appears that follow-up of Copper-T acceptors is irregular leading to unreliable information regarding dropouts. More important is the evident lack of post-insertion care.

The above experience based upon the program so far underlines the need for a closely monitored system of follow-up by properly trained health workers. It also stresses the need to prepare and educate the potential acceptor before the actual insertion. It is necessary to prepare her mentally so that she can cope with some of the problems that may arise without immediately losing confidence in the method and dropping out.

In the CNA survey areas it was found that among married women and married men only 50 percent have heard of the IUD. Surprisingly, even among development functionaries there appears to be a fair degree of unawareness (see Figure 6).

On the positive side it was found that quite a large proportion of married women and married men favored spacing (from 50 to 60 percent). A still higher proportion of community leaders favor spacing.

But opinion is divided about the correct interval between births--whether it should be less than three years or more than three years. Those who favor an interval of more than three years believe that children coming too closely together weaken the mother and she cannot take care of them.

Unaware of IUD

(73)

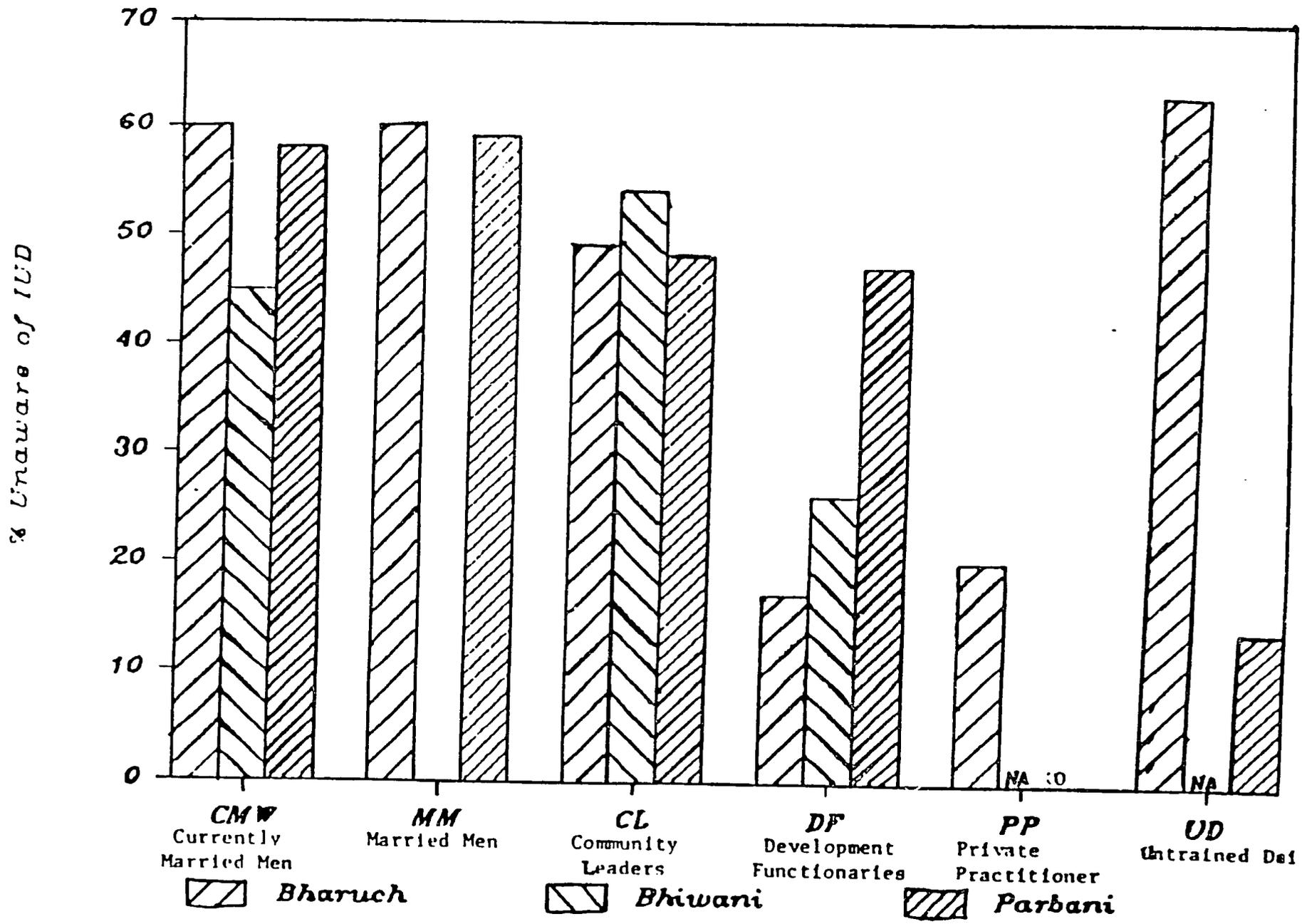


FIGURE 6

Those who wish children at closer than three-year intervals want to complete their family sooner. They feel that they would be sure to have enough children, and these children can share clothes, books, etc.

b. Conventional Contraceptives

While considerable thrust needs to be given to the Copper-T, promotion of commercial contraceptives (condoms and oral contraceptives) should also be undertaken.

The figures for free distribution of condoms probably do not give a reliable picture of couple protection.

Free distribution of oral pills through the health worker probably gives a somewhat better measurement of actual usage, but this, too, is not reliable because there is no means of knowing what percentage of acceptors follow the regimen.

We, therefore, believe that the major thrust behind the condom should be through the contraceptive marketing program, at present confined to Nirodh. We have noticed a lull in the promotional activity behind Nirodh and we would recommend reactivation of the distribution activities of the private and public sector firms involved in this program.

As and when the CMO (Commercial Marketing Organization) is set up, the program of commercial distribution of condoms will presumably fall within its jurisdiction.

With regard to oral contraceptive pills, a similar activity could be undertaken by the proposed CMO.

Pending its formation, it is recommended that pharmaceutical companies engaged in the marketing and distribution of over-the-counter drugs (e.g. analgesics, cough drops, etc.) should be induced to promote and distribute oral contraceptives, initially through their chemist outlets, and to promote them ethically.

The spacing method program planned by the state governments to support the overall family planning program can benefit greatly if the promotion of oral contraceptives is carefully addressed. Oral contraceptives will meet the need of the already motivated acceptor of spacing who, for one reason or another, may be a dropout from the IUD program. For a successful pill program, it is essential that providers fully understand that the pill is an effective and acceptable method of contraception and that acceptors, if properly screened, can find the pill a very effective and convenient contraception method. Experience in Asian countries indicates that remembering to take a pill every day is not necessarily a problem.

Communication can be developed to educate and motivate pill users to accept and continue using it. The clinical system which the state governments will utilize for the promotion of spacing is a very effective vehicle for the promotion of the pill. The team believes that reorientation and training at the provider level and proper supervision by the medical profes-

sion will enable the development of an effective oral contraceptive program and that it should be pursued systematically. This belief is based on the recent oral contraceptive technology and research findings which point to the oral contraceptive as an acceptable contraceptive method in developing countries.

3. A Marketing Plan for the IUD

Successful marketing of the IUD will require reorientation and training of health providers at two levels, such as health visitors and those who undertake the actual insertions, removal, and counseling.

The follow-up activities are an absolutely vital element in the Copper-T marketing program. They represent in marketing terms "after-sales service," as mentioned earlier.

Such training and reorientation are directed towards the provision of correct advice and information to the consumer, ensuring a dependable delivery system, and providing a strongly monitored follow-up system. This is necessary to give maximum satisfaction to consumers in terms of correct contraceptive usage, and referrals as needed, in order to reduce negative experiences and bad mouthing contraception.

It is of paramount importance that when a clinical program is supported by marketing and communications, the products offered in the system be readily available and that no acceptor is turned away or asked to call a second time for the method he or she seeks.

a. Target Groups

In order of priority, the target groups would be:

- Married women in the age group of approximately 18-30 years, with fewer than three children.
- Their husbands.
- Influencers, with particular emphasis on Mahila Mandal activists.

Available data and field visits showed that awareness of spacing is only moderate to low.

While awareness can be created with relatively little difficulty, the real problem of persuasion will lie in convincing the target audience (the couple) that an interval of three years is of direct benefit to them from the point of view of the mother's health and the care and healthy growth of the new child.

In such persuasion, whether through the health workers or mass media, it must be remembered that a combination of appeals to reason and to emotion is essential.

"Give your love and care to the child which has already been born before you have the next. When this child is a little older you will be free to devote enough care and the love needed by your next child."

b. The Message

The message should communicate the unique advantages of the Copper-T. It is:

- Easily inserted
- Easily removable when needed
- Very reliable
- Ideal for spacing
- A one-time method

c. The Media

The principal role of mass media will be:

- To create motivation for spacing
- To create awareness of the methods available, especially the Copper-T
- To advertise the advantages of the Copper-T
- To urge target consumers to get more information

If mass media are properly used to accomplish the above goals, the task of the personal communicator (health worker) becomes easier and the health worker can devote his/her limited time to the tasks of evaluation, reassurance, and nudging the consumer to a final decision.

Keeping in mind the synergistic effect of mass media and the health worker acting together, the following table suggests what the media mix for the Copper-T should be when addressing the consumer and the influencer:

TABLE 9
MEDIA MIX

<u>Consumer Responses</u>	<u>Outdoor</u>	<u>Press</u>	<u>Radio</u>	<u>TV/ Video</u>	<u>Cinema Van</u>	<u>Health Worker</u>	<u>Doctor/ ANM</u>
Benefit of Spacing	<--	<--	<--	<--	<--		
Awareness of Copper-T	<--	<--	<--	<--	<--		
Advantage of Copper-T		<--	<--	<--	<--	<--	<--
Info. Gathering and Evaluation				<--	<--	<--	<--
Intention to Act							
Actual Practice						<--	<--

Despite some over-simplification, the above media strategy suggests how the most productive use can be made of different types of media and especially how the scarce and valuable time of health workers, doctors, and auxiliary nurse midwives (ANMs) should be used.

Outdoor advertising will focus primarily on the value of birth spacing.

The press (i.e., newspapers and magazines with proven readership) will be used to reach the influentials.

Radio (the primary channel) will reach both influentials and consumers and it will reinforce the effect of other media to communicate spacing benefits and awareness of the Copper-T.

TV (based on the reach of low powered transmitters) can very effectively perform the various tasks shown. TV (Doordarshan) can effectively achieve its potential role only if there are enough community receivers in working order.

It is within the capacity of the Family Welfare Department to ensure that such telecasts are viewed by their target groups by installing video sets at least at the PHC level and preferably at the subcenter level as well.

The additional advantage of such hardware would be that the same equipment could be used to show several cassettes that can be commissioned by state governments on different aspects of spacing and such viewing will be over and above the transmission time of the LPT system. Moreover, the availability of such equipment will stimulate discussion and interaction between the audience which has gathered at the subcenter and the health worker present at the time.

There is one important proviso. There can be misuse of the system through the screening of non-relevant or undesirable cassettes which can be rented from video libraries that have mushroomed all over the country. Therefore, this proposal should be pilot tested before final adoption.

The cinema van, a medium which has much potential and is now in use, will accomplish tasks very similar to TV. It is taken for granted that posters, folders, etc. will continue to be produced and distributed in the usual way.

B. MARKETING ORAL REHYDRATION

1. ORT and the Marketing Perspective

Marketing is built around what marketers refer to as the four "Ps": product, price, place and promotion. In the existing clinical environment of promoting oral rehydration therapy, the product will mainly be the homemade solution consisting of a pinch of salt and a scoop of sugar or gur. Price is the time and effort required to mix it plus the cost of the ingredients. Place is the home, primary health centers, subcenters, and divisional hospitals where the therapy can be taught and administered, and promotion is all the supporting activity that can and should be provided the target group (household) to accept oral rehydration therapy as a simple, but effective and life saving therapy.

a. Product

The product offered through the clinical system will be the "three finger pinch" of salt and a scoop of sugar or gur mixed in a liter of water.

As simple as it may seem, the critical issue is producing the right product in the correct mix. The success of the program and the reduction of morbidity and mortality due to diarrheal diseases hinges on the correct and effective sugar/salt solution. That, above all, is of primary importance.

Promoting a home mix solution and teaching oral rehydration therapy to the households should be based on:

1. Recognizing the symptoms of diarrhea.
2. Knowing the danger of diarrhea.
3. Eating, drinking, and breastfeeding and hygiene.

4. Understanding the ingredients and advantages of a home-made oral rehydration solution.
5. Administering it properly and in right quantities and at right intervals.
6. Guidance regarding nutrition during and after an episode of diarrhea.

In terms of product development for the future, there are options to be considered. One is to interest some pharmaceutical companies in manufacturing a low-cost powder in standardized packets such as the correct ingredients in the right amount to make one liter of solution.

Another option is to obtain ORS packets from international agencies such as AID, and a third would be to set up indigenous units for the manufacture and packing at district levels but under strict quality control supervision. The third has been tried and is being used in the national ORT program in Bangladesh.

b. Price

Every element of the marketing mix is interrelated and here in the 'social marketing' sense, where the activity is to produce a social benefit, the time, effort, and proficiency of the providers is the price of the marketing program. It is believed that the salt and sugar required to make an effective solution can be found or obtained in almost all homes.

The success of the program depends greatly on the clinical provider system. The medical practitioners and supporting staff should believe that the therapy is effective in treating diarrheal dehydration. They should in marketing terms "seek the excitement in the product." They should also know the effects of correctly and incorrectly prepared solutions and why. The providers, beyond a doubt should be able to demonstrate the correct mixing of the solution.

The team observed uncertainty vis-a-vis the therapy itself at all levels--hospitals, primary health centers, and subcenters, and among auxiliary nurse midwives (ANMs), compounders, and village health workers.

This has to be addressed very carefully and the team is of the opinion that technical assistance should be provided for training at all levels from the medical profession to the dai. This is essential because the program is largely built on interpersonal communication. Any variation in the messages of providers will confuse the target audience and minimize the effect of the program.

c. Place

The home becomes the primary point of message delivery, and the mother and, in the extended family situation, the elders and older siblings should be targeted. There is a secondary audience that has to be clearly consid-

ered, and that is the village leaders and the male population who, by virtue of being decision makers in the community, play a significant role in decision making in the home. Their approval will greatly enhance the acceptance and use of oral rehydration therapy.

The target audiences therefore will be:

- Married women with children up to five years.
- Adult males in the household, particularly husbands.
- Siblings in households, primarily in the vulnerable socio-economic groups.
- Mahila Mandal organizers.
- Private practitioners (traditional and modern).
- School teachers.
- Other village leaders like the Sarpanch.

The primary health centers, subcenters, and divisional hospitals are the other points or 'place' for message delivery. The constraints here are the availability of salt and sugar. If the homemade solution is the only therapy promoted then the system should be provided with salt and sugar both for treatment and message delivery. The ORS packets, as we understand in Maharashtra, will be quietly withdrawn. The team strongly recommends that ORS packets should be available at least at primary health centers and subcenters for use at least for advanced dehydration patients.

It is also appropriate to note that the private sector pharmacies, even in semi-urban towns which often serve rural villages, carry a variety of ORS packets. The team visited around 15 pharmacies in Maharashtra and found 17 different brands with varying compositions and price. Having studied the packages the team feel that while private sector ORS promotion should be encouraged, standardization of the products in terms of composition and volume should be enforced. The team was not able to observe the private sector market in Gujarat due to disturbances in that state during their visit. However, it is believed that ORS packets are available in pharmacies in that state.

d. Promotion

Promotion can be divided into four different but overlapping categories: paid advertising, including the use of broadcast media, point-of-purchase posters or handouts, face-to-face consultations, and special events or techniques which improve public relations or attract free media coverage and consumer attention. Each has an important place in a communication strategy.

Development of a strategy to create user demand for ORS is a complex problem. The complexity increases substantially when promoting a home mix solution and products in the commercial market are not standardized.

In this case, it is probably a better educational strategy to leave the teaching of specific new skills primarily to face-to-face educational sessions. These sessions can be structured for parents as class instructions at PHCs, subcenters, divisional hospitals, or homes. The supporting mass media would promote the concept of ORT, point out to the consumer the value of the

therapy, generally educate the consumer about the causes and prevention of diarrhea, and alert the consumer to seek professional assistance at the point where ORT fails. In addition, the media can influence secondary targets and audiences by increasing public awareness and acceptability of ORT as the preferred treatment for diarrhea.

The team's observation and the Communication Needs Assessment Report for Maharashtra point to a considerable number of wrong notions and beliefs and only a moderate level of awareness of ORT among various target groups and, unhappily, among health workers themselves. Such data will be used to develop message content and creative media presentations.

The present emphasis is on the homemade solution and the key problem is in regard to the actual quantities of water, salt, and sugar being mixed by the consumers. One answer might be to provide all target households with a low-cost plastic one liter measure and a measuring spoon for salt and sugar.

e. Training

There can never be too much emphasis on this element of the marketing plan. While mass media can do a big part of the task, the critical medium for behavior change is the "personal salesman," the health worker.

Printed training manuals that have been prepared should be reviewed to ensure that correct training is given. If the recommendation for the introduction of the measuring spoon is accepted then the training manuals should be revised to include them and show them graphically.

Most importantly, to improve and standardize training, video cassettes should be prepared and shown to all levels of personnel. The cassettes will act as powerful visual aids in the hands of the teacher and should be designed for classroom use, allowing for questions, role playing, discussion, "doing" by trainees, and teaching by the instructor. Above all, ORT requires demonstration, and nothing does this better than live demonstration reinforced by video tape shown repetitively.

The above applies equally to training the trainers, e.g. the Training Institute at Aurangabad. They have other equipment but no video.

In brief, a "standard specifications" concept should be adopted towards the preparation and use of training material; video provides a fail-safe software system which is also very flexible, quick to produce, and relatively inexpensive.

2. A Media Mix Strategy

The success of social marketing programs depends on combining the efforts of personal communicators and mass media. Maximum emphasis must be placed on audio-visual, visual, and audio media, especially electronic media.

In a media mix strategy existing hardware and media infrastructure should be used along with new hardware channels of message delivery.

Urban and semi-rural cinemas plus mobile cinemas of which there are about 20 in Parbhani District alone offer a good fit with target audiences.

Some commercial van promotion services are also available and can supplement government vans. Successful OTC marketing companies in India use their distributor's vans to visit rural and semi-rural centers on bazaar days where they both sell and promote.

Doordarshan (TV) with the new low powered transmitters (like the one the team visited in Parbhani) has the potential to go right into the heart of Maharashtra and other states. Despite the seeming wastage in using LPTs (since the program is identical for the national hook-up and is broadcast at present in English or Hindi alone), the program created at present for Maharashtra, Gujarat, and Himachal Pradesh may well stimulate awareness and demand in the less progressive states and add to their momentum. Very profitable would be the hour-long school program.

Other governmental agencies are responsible for installing village "community receivers." The project extension should make available color video receivers in all subcenters in the three extension states reached by LPT telecasts.

The transistor radio (including commercial and primary channels) played a role in bringing about the Green Revolution, and it can contribute to the "health revolution."

Audio Cassettes/PA Systems are at present used by vans. In addition, PA systems could be installed in the maternity as well as general wards of government hospitals, and cassettes (including suitable entertainment and information) can be played, thus creating an audio medium for a "captive" target group in a highly receptive mood.

Print Media, contrary to popular belief, do reach village influentials and should be used selectively to reach these non-official change agents.

Outdoor media such as wall signs should be continued as well as sites in mandi towns and panels on mofussil buses for a saturation effect as reminder media.

These have considerable possibilities for the use of traditional/folk media in areas uncovered by modern media. (A striking example is a "Jatra" program produced by a professional troupe with a brief from the Advertising Agencies Association as part of its contract with the Union Government Family Welfare Department in 1975.)

Health workers have virtually no communication aids when they meet target mothers and other "consumers." They rely on speech alone. Measurements from the industrial product and pharmaceutical fields clearly prove that maximum impact on and retention of the message by the audience is achieved when the salesman uses a combination of "telling" and "showing."

Handy, well designed, and durable flipcharts are regularly and effectively used by detailing salesmen of successful pharmaceutical firms and engineering companies. (See also the Union Health Ministry's flipcharts produced with the help of UNICEF.)

Flipcharts on ORT should be immediately produced and used by health workers. Surprise visits by Department officials would stimulate and enforce their utilization.

Technology has already made available highly compact and portable video equipment. Every subcenter should be so equipped and appropriate video cassettes played on special days observed by the subcenter:

ORT Day
Measles Vaccine Day
Immunization Day
Copper-T Day, etc.

The great advantage of video over a cinema van is that the former is ideal for small group discussions with interaction between the message on the video screen and the audience through the medium of the health worker. This leads us to the strategies outlined below.

3. Coordination Between Personal and Impersonal Communicators

The strongest pull towards social and health behavior change comes from well-planned coordination between, say, the telecast over an LPT or radio station and the follow-up discussion between such an exposed audience and that critical change agent, the health worker, at various levels. This element of strategy should be reflected in the operational plan for the USAID extension.

4. Communications and Training Hardware

Hardware planning and placement will be indispensable in achieving targets for the extension plan.

Existing hardware must be maintained and operational (set a standard of, say, 80 percent of the units being serviceable on any day). This will apply mainly to cinema vans and PA systems.

The target for new hardware placement--VCRs and color monitors--can be set at 100 percent in training institutions and at 60 percent for subcenters within three months of commencing the extension project, and 100 percent within six months.

5. Support from the Private Sector

An operation involving marketing companies--similar to the Nirোধ program--can be considered for ORS. When manufactured or AID financed imported powders are available, they can be distributed to every worthwhile outlet in the country (500,000 or more).

In the near term, companies selling fertilizers, OTC remedies, laundry soaps, etc., could be persuaded to help in ORS promotion (merchandising, posters, exhibition of ORS promotional material) using their existing infrastructure.

6. Target Consumer Response

The purpose of this social marketing program is to evoke desired responses from the target "consumer."

The Response Hierarchy:

- Awareness of the dangers of diarrhea if not immediately tackled.
- Awareness of "ORS."
- Desire to learn more from ANM/subcenters and resolve doubts; interpersonal dialogues.
- Correct knowledge of making the sugar/salt solution.
- Confidence in efficacy.
- Intention/decision to use it when needed.

7. Monitoring and Evaluation

- Using baseline information from the CNA, fill in the gaps in data.
- Conduct a mid-term check six months after the launch of the extension program followed by evaluation and course correction.
- End-of-year check and evaluation for long-term strategy.

C. MARKETING MEASLES IMMUNIZATION

1. Introduction

Measles immunization programs in India have been few in number and limited in scope. All such programs, however, have indicated that the vaccine is highly efficacious with minimal side effects.

Experience in the Expanded Program of Immunization (EPI) indicates modest acceptance of immunization by the public. It has also been observed that the degree of success of the current immunization program is largely dependent upon the interest and enthusiasm of the physicians and health workers in each district and primary health center.

Much of the public in India perceives measles not as an infectious disease but as the curse of a goddess. This perception of measles has several significant implications.

A measles immunization program will be offered through a number of pilot projects in the states of Gujarat, Maharashtra, and Himachal Pradesh and then, once successful, expanded throughout the states and eventually throughout the entire country. The marketing approach has been based on the following assumptions:

1. The measles immunization program will initially focus primarily on children, age 9-35 months.
2. The program would be selective in specified target areas during the one year extended period.
3. Vaccines will be supplied to the subcenter level four times each year.
4. There will be a promotional thrust to the program.
5. There will be an evaluation component to assess coverage of vaccine.
6. Adequate care will be taken to maintain the cold chain at all levels with a contingency plan to meet power failure.
7. Field research will be done to investigate alternate immunization delivery strategies (e.g. pulse vs. regular).
8. The cold chain will be monitored and evaluated for effectiveness.

2. The Marketing Perspective

The marketing approach will be to educate the public that measles is an infectious disease and not a curse of a goddess and that it can be prevented.

The message should communicate that whenever measles occurs there is a possibility of complications which may prove fatal. Consequently, an element of "fear appeal" is necessary, immediately balanced with the reassurance that measles itself can be prevented by the timely use of a vaccine that is highly effective and reliable.

The activities of registering prior to immunization will be explained and the importance of listing children will be highlighted.

The two-step flow of communication to the target group through village leaders, private health practitioners, Mahila Mandals and school teachers has great potential, particularly since the program is planned in a pilot project setting.

3. Communication Strategy

The promotion and communication strategy would be to present the dangers of contracting measles and the probable complications so injurious to the child. One of the initial messages must be to help the parent to recognize the symptoms of measles. At this time, the symptoms are not well understood. The marketing program would attempt to present the value of vaccination which will prevent the child from contracting measles, which in turn will ensure continued good health of the child they love and cherish.

The simplicity of the program being offered conveniently in the community will be used to advantage, and the positive attitudes of the community to other immunization programs should be built on.

4. Media Mix

The main thrust of the program will be interpersonal communication through health provider and influencer who will be mobilized.

This project calls for the intensive use of video cassettes produced for the communication tasks involved. Video usage will also enable a combination of messages on the video screen followed by interpersonal communication.

Promotional material (posters, hand-outs and banners) should be developed to announce the program and displayed prominently at health centers, market places, and other public gathering places.

Influencing opinion leaders, village practitioners and school teachers is critical to the success of the measles immunization program since the activity is directed to selected blocks and not to the state or district.

The team recommends the use of mobile van promotion services which are available in the states and timed to actual "pulse" dates. Creating a festive or mela atmosphere can present a relaxed setting for serious clinical activity. This should also be used to reinforce the already promoted message and could well recruit additional acceptors to the program. The timing of such activity is important and should be carefully planned.

Follow-up is an essential ingredient to any new intervention, particularly to low-literate groups in village settings. It will greatly assist if clinical attention is provided at the community level as reassurance to the small percentage of those immunized who will be exposed to the possible reactions of fever and rash.

VI. RECOMMENDATIONS

A. MEASLES PROGRAM AND IMMUNIZATION DELIVERY SYSTEM RECOMMENDATIONS

Recommendation No. 1: Establish a Cold Chain Quality Control Unit at the State and/or District Level to Assess the Effectiveness of the Immunization Delivery System

One of the major problems in all three states is that there is not a single authority responsible for quality control of the cold chain. The weakest link in the current cold chain system is that once it is broken, there is no incentive to withdraw the vaccines from distribution. In fact, just the opposite exists. To withdraw the vaccine from distribution might result in a shortage, thereby causing someone not to meet his/her immunization targets. The current operational output is determined by the number of shots given rather than actual decline in the disease incidence (morbidity and mortality) because of the immunization program.

Establishment of a cold chain quality control unit could help to address this problem. The quantifiable measures of success of this unit could be to set detection targets for the number of breaks in the cold chain and/or the number of impotent vials (doses) withdrawn from distribution. For example, the quality control unit could have the resources to assess the potency of vaccines at X points in the distribution system. According to their best judgment, they could pinpoint a distribution site and request that an independent laboratory test the vaccine potency and/or seroconversion.

Targets for this unit could be set annually to carry out X number of cold chain spot checks to determine if the cold chain had been broken. The counterbalance to the regulatory group could be the incentive of the health personnel to keep the cold chain intact and vaccines potent. However, some sort of reward should also be given to health workers who identify breaks in the cold chain.

Another tool the quality control unit could use to determine weak spots in the distribution system are monitor cards or some temperature monitoring device. Although not without problems, they are relatively cost-effective. It should be kept in mind that any monitor cannot tell the potency of the vaccine it accompanies, but rather will indicate whether the cold chain has been broken.

Cold chain monitors and indicators have been in use since 1979. Several chemical indicators for monitoring are available and detailed discussions of their uses can be found in the WHO document EPI/CCIS/83.8.

A WHO cold chain monitor trial was begun in Gujarat and Tamil Nadu in 1983 using the 3M time-temperature indicators attached to packets of oral polio vaccine manufactured by Haffkine Bio Pharmaceutical Corporation. Whereas the final report on the trial is not available, preliminary results show that the cold chain was better than expected at the lower levels of the systems, while improvement is needed at the higher levels, the reverse of what was expected.

Temperature monitors, vaccine potency assays, seroconversion results and morbidity/mortality data on diseases preventable by immunizations can be valuable tools to detect cold chain failure and immunization delivery system success. PRITECH could provide technical assistance to develop a cold chain research protocol, monitor its implementation, evaluate the results, and recommend changes in the system to make immunization delivery and vaccine handling more effective.

Recommendation No. 2: Training and Continuing Education Programs in All Aspects of Immunization Delivery Should Be Developed and Conducted to Ensure Active and Competent Health Personnel Involvement in EPI Activities

All too often breakdowns in the cold chain occur not because of inadequate equipment, but because staff have not properly used equipment or did not have the appropriate knowledge. For example, staff may not have been taught how many icepacks should be put in a cold box during the summer season or how to keep the vaccine properly chilled during an immunization session. Training in cold chain and logistics is clearly one of the most urgent needs.

Concurrent with the need for training is the need for courses and training materials adapted to local conditions and translated into local languages. This is especially important as the emphasis shifts from management levels to technicians and peripheral level health workers.

Another major factor in an effective immunization delivery system lies in the interest and enthusiasm of the staff providing immunization services. The motivation of health personnel, especially medical officers, at the PHCs appeared to be a critical determinant of success of the overall EPI program. The effectiveness of the multipurpose health workers and village health guides in promoting immunization was difficult to assess, but appeared to be higher in areas where immunization was a priority of the medical officer. Continuing education programs can play a large role in maintaining awareness and enthusiasm for EPI activities.

In addition, efforts should be made to include EPI in the academic curriculum of medical and paramedical institutions. Technical assistance could be provided by PRITECH to develop country, state, and district specific EPI training materials and course evaluation.

Recommendation No. 3: Assess What Supplemental Cold Chain Equipment Will Be Needed in the Target Blocks Where the Measles Programs Are to Be Initiated

USAID and UNICEF have both provided cold chain equipment and support to Maharashtra, Gujarat, and Himachal Pradesh. With few exceptions, most of the equipment seen by the team was newer than three years old. Additional equipment needs, especially for the PHC and subcenters should be determined and the equipment supplied before the measles program is begun. The Maharashtra health units were the least equipped for a measles program. However, new refrigerators in some health units had just been put into place prior to the team's visit. Additional new equipment for this state may have already been ordered.

Recommendation No. 4: Provide Technical Assistance for Comprehensive Anticipatory Cold Chain Equipment, Maintenance and Replacement

Despite the relative newness of the equipment the team observed, problems can be expected in the future, and advance preparation for these anticipated problems should be made now. Included in such plans could be provisions for adequate spare parts and refrigeration maintenance and repair training courses. It was said that UNICEF is funding refrigeration service contracts in Gujarat and has proposed to support 100 refrigerator preventative maintenance courses in 1985-89. Consideration should be given by USAID and PRITECH to fund cold chain equipment and repair courses and supplemental equipment and/or spare parts or service contracts.

Recommendation No. 5: Provide Training and Orientation to All Health Personnel Who Will Be Involved With the Measles Program as to the Requirements of Vaccine Handling, Storing and Administration

It will be essential to provide training courses and briefing sessions in the target blocks just prior to the initiation of the measles program. It is recommended that the training be conducted one or two weeks ahead of the actual program implementation. This training should stress temperature control awareness and vaccine stability limits. Time will probably not allow for the development of India-specific training materials before the measles program is to begin in 1980. Consideration should be given to using the WHO EPI training modules for mid-level managers.

Recommendation No. 6: Develop Clear Guidelines and Operating Procedures for Cold Chain Personnel and Vaccinations

At all levels of the health system the team observed procedures by health personnel which could innocently sabotage the cold chain. Cold chain policies and operational procedures should be put in writing and the appropriate sections made available at various levels in the health care pyramid. Included in these guidelines should be a clear delineation of supervision of immunization activities. For example, the return of unused doses to active stock should not be a standard operating procedure, and the responsibility to assure that unused doses are not returned should be assigned probably to the medical officer in charge at the health facility. In addition, the responsibility for and oversight of temperature control personnel should be specified. The WHO EPI guidelines could be referred to for short-term guidance until state or block specific materials are developed.

Recommendation No. 7: Implement an Effective Measles Immunization Program in Two Blocks in Each of the Districts Supported by the USAID IRHP Program

The blocks will be chosen by the responsible state or district person based on the following criteria:

- Proximity to the District office
- Interest and capability of the PHC staff in measles immunization
- Current availability of functioning cold chain equipment
- Climate and terrain considerations
- Success in the current immunization activities (BCG, DTP, and OPV).

In each of these blocks the following strategy should be followed:

1. Potent measles vaccine should be made available at the subcenters every three months during the non-peak measles seasons.
2. During this one year period all children nine through 35 months of age should be offered vaccine. Children 36 through 59 months of age who do not have a history of measles should be immunized. Emphasis should be given to immunizing children 9 through 14 months.
3. Lists of children eligible for vaccination should be prepared by the VHGs and the male or female health workers prior to the arrival of the vaccine at the subcenter. This list should be drawn up from current birth registers and home visits by the VHGs and/or female health workers.
4. Education campaigns to motivate parents to bring children to the subcenter should be instituted prior to the arrival of the vaccine.
5. Children (parents) should be given vaccination cards at the time of immunization.

The program above may be modified as follows:

1. Only those children nine through 11 months of age should be given measles vaccine in the original two blocks.
2. The program should become more village based. After the operations re-research recommended above is carried out, the decision will probably be made to carry out immunizations in most villages. If that decision is taken, then the health worker can be met at the village by a person from the PHC who will bring measles vaccine on the immunization day.
3. Additional blocks should be added so that after three years (September 1989) the entire district will be covered. This means that one third of the blocks will be added each year.

The choice of the districts and block within them will have to be negotiated between USAID and the state governments. Vaccine should be made available every three months at each site because of the short length (three months) of the preferred age at which to give measles vaccine. A frequency of every three months will keep the time during which any child is susceptible to measles to an acceptable length. At present, no recommendation is made to increase the number or frequency of vaccination sessions prior to the

peak annual period of disease. Measles cases occur throughout the year with seasonal peaks, and the emphasis should be on high coverage rates when children are nine to 11 months of age. In spite of the planned information and marketing efforts, all children will not be able to attend the immunization session when they are nine to 11 months of age. If coverage rates are found to be low (60 to 70 percent), then a further intensified program prior to the annual peak disease period would be justified.

Previous consultants and various documents recommend that the initial campaign year focus on children through 24 months of age. The initial purchase of 51,000 doses of measles vaccine reflects this recommendation. The age specific measles attack rate data from serilogic surveys, morbidity reports, and the impressions of medical personnel indicate that the median age of measles cases is higher in India than in many developing countries. Thus, the number of susceptibles over the age of 23 months, particularly in the rural areas, is significant. "Significant" in this case means between 25 and 50 percent. Because it is the desire of the GOI and USAID to demonstrate a reduction in measles morbidity and mortality, these children should be protected in the initial round of immunization.

The success of the measles immunization effort should not be constrained by a relatively minor line item in the budget, the cost of measles vaccine, given the overall costs of the project extension. At approximately \$.10 per dose of measles vaccine, the amount purchased could be doubled without causing a major financial burden on the total budget.

VHGs and/or male and female health workers can prepare the lists of eligible children. At the All India Institute for Medical Sciences (AIIMS) Department of Community Medicine Project area in Ballabgarh, male health workers based at the subcenter working in the absence of VHGs prepare such lists. The preparation of such lists is, therefore, occurring in India and should be carried out in all blocks which begin measles immunization programs.

Recommendation No. 8: There Should Be One Evaluation Team Per District

This two person team should have the following responsibilities:

1. To collect and analyze measles mortality and morbidity data as well as immunization data.
2. To carry out measles vaccination coverage assessments using the EPI cluster method.
3. To participate in operations research projects described below.
4. To monitor the cold chain and assist in the assessment of and supply of functioning cold chain equipment to health facilities.

Planning and support of the evaluation of the measles immunization activities is one of the major contributions which can be made by USAID. This should be done through close collaboration between the PRITECH technical advisors and the state governments. Two individuals per district will have to be identified for intensive training in epidemiology, information manage-

ment, and cold chain. The IRHP Project should pay for their support salary and required operating expenses throughout the project extension. The details of how this can be arranged is left to USAID staff. Although these workers will report to their state level supervisor (the Deputy Directors of Health Services for EPI through the District Health Officer), clearance should be negotiated which will allow the PRITECH advisors to work directly with them as needed.

The success of EPI coverage surveys in the past in Himachal Pradesh and Gujarat bodes well for expanding this activity in the IHRP extension.

The activities of the measles immunization evaluation team should be integrated with those of the diarrheal disease control program to the extent possible. This will help demonstrate to health workers the integration of these two activities under the banner of primary health care and reduce the operating costs of field activities.

In the short term individuals should be recruited and trained for this team in each district and necessary vehicles purchased and space arranged, etc.

In the long term the evaluation activities listed about should be carried out throughout the districts and a quality control unit at the state and/or district level should be established to assess the effectiveness of the immunization delivery system.

Recommendation No. 9: One Year and Five Year Measles Morbidity and Mortality Data Should be Collected From All PHCs and Subcenters Participating in the Measles Immunization Program. In Addition at Least One Hospital Per District Should Be Designated as a Sentinel Hospital for Measles

The following data should be collected for each reported case:

- Age (in months of those under one year, 1-4, etc.)
- Sex
- Village and block
- Immunization status and the age at which immunization was given

This data should be reported initially to the Evaluation Team Members, as well as to the medical officer of the PHC. A tabulation of reporting frequency for each reporting site should also be maintained.

A major constraint presented earlier on measles surveillance is the public perception of measles and the few cases which are brought to the health facilities. Because of the small number of cases coming to the public health system, the sentinel system may have to cover broad geographic areas. An alternative is to carry out active surveillance in selected blocks which participate in the measles immunization program. Currently, the AIIMS is carrying out active surveillance for measles cases in Ballabgarh. In the AIIMS area there are no VHGs. However, each household is visited every two weeks by either a female or the male health worker to identify possible measles cases. Unfortunately, data from this activity are not yet available

to assess the merit of this approach. This may be the most appropriate surveillance system for measles in the blocks in which measles vaccine is given. Active surveillance which takes advantage of the VHGs and male and female health worker whose job descriptions currently include home visiting would not require new personnel and would only incur few new costs for supplies and the training of the worker diagnosing and reporting cases. The active surveillance would be introduced after the initial year of immunization in each block. At that time, there should be very few cases of measles which would have to be verified. (In fact, only those cases in the age group immunized would have to be investigated.) Also, after one year of immunization, it would be important to identify and investigate each case. The decision whether or not to do active surveillance should be made by the state authorities in discussion with PRITECH and AID. However, without it little will be documented about the impact of the immunization program on measles morbidity.

Recommendation No. 10: An Operations Research Component Should Be Built into the Program

The long term effectiveness of the measles immunization program will depend on the ability to identify problems and offer solutions to the problems which reduce immunization coverage and increase morbidity and mortality. An operations research (OR) component should be built into the program.

Operations research issues should be agreed upon, the most appropriate block chosen, and the necessary protocols written, reviewed, and funded. At least one issue will be addressed in each block. The other blocks involved in measles immunization will serve as controls. The following are proposed topics:

TOPIC ONE: The lengths of time measles vaccine is made available at the subcenter level

Null Hypothesis: Having vaccine available at the subcenter for one week will not increase vaccination coverage compared to having the vaccine available for only one day.

Discussion: The proposed measles immunization strategy will make vaccine available at each subcenter for one day every three months. Assessment of current cold chain capabilities indicate that this is the maximum time vaccine can be guaranteed to be potent at the subcenter level. The constraint which this places on the parents is that they must bring the child to the subcenter on that day or the child will be susceptible to measles for three more months. In the UNICEF evaluation of Delhi's Intensive Immunization Program (IIP) carried out in 1983-84, 20 to 47 percent of the children did not attend because they were out of town (21-25 percent) there was no one to bring the child (7 percent), or the child was sick (11-21 percent). Most of these children would have been able to attend if immunizations were available five consecutive days.

Isothermic boxes are available in which second generation measles vaccine can be preserved by replacing the cold dogs. Replenishment of the cold dogs after three days or the delivery of new vaccine would allow vaccine to be available for the entire week.

Measure of success: Vaccination coverage rates determined by EPI cluster survey.

TOPIC TWO: The administration of two doses of measles vaccine rather than one.

Null Hypothesis: The administration of a dose of measles vaccine at nine through 11 and at 15 through 18 months of age will not cause a greater reduction in measles morbidity than the currently recommended single dose at nine through 11 months of age. (If intensified surveillance in Year One shows that 10 percent or more of the children contract measles before 11 months of age, then the first dose of vaccine should be given between six and eight months of age.)

Discussion: Although nine through 11 months of age is the best three month age period at which to immunize Indian children against measles, certain of them (10 percent) will have maternal antibodies which will prevent successful immunization. There have been few efforts in other countries to provide a second dose of vaccine three or six months after the first. Anecdotal information indicates that only 30 to 40 percent of the children return for the second dose of measles vaccine. Further the administration of a second dose of vaccine will increase program costs.

Measures of Success

Outcome: Measles morbidity

Process: Immunization coverage rates for M-I (first dose) and M-II (second dose) of measles vaccine

TOPIC THREE: The Administration of the DPT Vaccine Simultaneously with Measles Vaccine

Null Hypothesis: The administration of DPT vaccine and OPV at the immunization sessions for measles vaccine will not increase the coverage rates for any of the vaccines.

Discussion: Adoption of a three month immunization cycle for measles vaccine would allow the following immunization schedule for all of the EPI vaccines to take place:

<u>Age of Child</u>	<u>Vaccine</u>
3-5 Months	BCG (if not given at birth) DPT-I, OPV-I
6-8 Months	DPT-II, OPV-II
9-11 Months	DPT-III, OPV-III Measles .

Although the Indian Pediatric Association is currently recommending five doses of OPV, that is not the policy of the Government of India and so only three doses of OPV are urged in the project area.

Measure of Success: Improved DPT, OPV, and measles immunization coverage rates in areas where multiple antigens are given simultaneously as measured by EPI coverage surveys.

TOPIC FOUR: The Development of a Village Based Immunization System

Null Hypothesis: Providing measles vaccine at the village level will not increase measles vaccine coverage nor decrease the incidence of measles.

Discussion: Access to measles vaccine is a major barrier to high immunization coverage rates. The existence of camps for family planning activities is an example of health services being taken out beyond the subcenter. Also, in Maharashtra, the number of villages per subcenter is as often as few as two. Finally, the thrust of a primary health care program is to bring health services to the village.

Data are available from an EPI immunization cluster survey carried out in Kheda district (Gujarat) which reinforces the idea of providing a more villages based immunization program. This survey concerned DPT, OPV, and BCG coverage. In all of the categories shown in the table below, BCG, DPT-III, OPV-III, and fully immunized children living in the subcenter villages were much better immunized than those who lived in non-subcenter villages.

TABLE 8

VACCINATION STATUS OF CHILDREN LIVING IN THE SUBCENTER AND NON-SUBCENTER VILLAGES IN KHEDA DISTRICT, GUJARAT (1982)

VACCINATION	SUBCENTER VILLAGES	NON SUBCENTER VILLAGES
BCG	54	45
DPT-III	55	35
OPV-III	34	6
Fully Immunized	31	6

Apparently, no special efforts have been made to address the different levels of immunization coverage between the subcenter and non-subcenter villages. The differences probably still exist and hence the need for operations research to test a more village-oriented approach.

Measure of Success:

Process: Measles Immunization Coverage in Subcenter Versus Non-Subcenter Villages as Measured by EPI Cluster Survey Method

Outcome: Measles morbidity rate measured by active surveillance.

Recommendation No. 11: Give "Road to Life" or Some Other Type of Immunization Cards to the Parents of Children as They are Immunized

It is essential that the measles immunization program be able to assess immunization coverage rates (this is as true for DPT and OPV as it is for measles). The validity of cluster sample surveys is greatly enhanced by providing immunized children with proof of their immunization by giving them an immunization card and marking the date and type of vaccination. It is strongly recommended that in the blocks and districts in which measles immunization are given either "Road to Live" or some other type of card be used consistent with current GOP policy which encourages the use of such cards.

A rapid decision should be made regarding the type of card and the information to be contained on it. The model established in Ballabgarh, Haryana, by the All India Institute of Medical Sciences, Department of Community Medicine, is recommended. They have prepared "Road to Life Cards" which include in turn space for recording of pertinent demographic information concerning the child, space for including the immunization and other interventions to be given to the child, and the typical weight for age "road to life." The card should also explain via pictures the ORT strategy of the project. In order that the mothers assign a value to the card, it is suggested that they pay 50 paise for the card and its plastic cover.

Immunization card use should be continued. It may be desirable to carry out an operations research project to see if a particular card design or information content is more useful in getting mothers to retain the card or encouraging them to come for the immunizations. This decision will be made during the project extension.

B. RECOMMENDATIONS FOR DIARRHEAL DISEASE CONTROL ACTIVITIES IN GUJARAT, MAHARASHTRA, AND HIMACHAL PRADESH

1. Recommendations for Government of India and State Governments

a. Establish a Demographic Data Base

(ST)* Using the cluster sampling technique have VHGs (supervised by LHV's) perform a survey of one block per Project district in order to collect baseline population data: age, sex, rural-urban, number per household, number of children, CBR, CDR, CIMR, water and sanitation standards, shelter standards.

(LT)* Expand the survey to include (a) additional Project blocks, (b) blocks in non-Project districts, and (c) blocks in non-Project states.

b. Determine Baseline Diarrheal Mortality and Morbidity Rates

(ST) Using the cluster sampling technique noted above, have VHGs (supervised by LHV's) perform a household survey in one block of each Project district.

(LT) Expand the survey to include one block in all non-Project districts and then include one block in each district in all non-Project states.

c. Establish a Surveillance System for Collecting On-going Diarrheal Disease Information (Morbidity and Mortality) to be Used in the Planning and Later Evaluation of a CDD Program

(ST) Determine what data are needed to evaluate objectives, targets, and subtargets.

- Clarify the definition of diarrheal disease.
- Include gastroenteritis in the reporting.
- Include age-specific data.

(LT) Establish a routine information system for diarrheal diseases utilizing subcenter patient registries; family folders and family diarrheal-immunization cards (if instituted); field health provider (VHG, MPW, LHV) report forms (amended to include diarrheal disease information) to the MOS, and MO reports to the CMO at the district hospital (annual summaries of the information should be sent from the district hospitals to the state MOH, Director of Health Services). Institute this system in one block of each Project district. Whatever source of data is used:

* (ST): Short-Term = 1 year project/program
(LT): Long-Term = 2-5 year project/program

- ensure the reporting of both diarrhea cases and deaths;
- use standardized forms;
- use simple, self-explanatory forms;
- set deadlines for reporting;
- require reports to be submitted even when no cases have been seen; and
- provide regular feedback to reporters.

(LT) Expand the system to include one block in each non-Project district and then to include one block in each district in all non-Project states. Ultimately, the system would be expanded to include all blocks in all states.

(ST) Improve the existing PHC sentinel information system by:

- using simple, standardized forms;
- making forms self-explanatory;
- setting a regular deadline for reporting;
- requiring the submission of reports even when no cases have been seen;
- stressing that sentinel information should be collected from the same sources each reporting period (denominator consistency), e.g., if PHC data are collected from their own registers plus its SC's registries, information from all the SCs and the PHC must be included in every report each reporting period; and
- provide feedback to personnel involved in the reporting system.

(LT) Establish a system of sentinel villages, selecting one village relating to each sentinel PHC. Utilize the same principles noted above.

- d. **Develop a National CDD Program Policy and Budget and Encourage the Development of Tandem State CDD Programs.** (Refer to "A Manual for the Planning and Evaluation of National Diarrhoeal Local Disease Control Programs," Available from WHO).

(ST) Appoint an individual in the MOH to be responsible for the national CDD program.

(ST) Appoint a state CDD program director who would be responsible to the Director of Health Services, state MOH.

(ST) Initiate planning and development of the state program in all IRHP states.

- The program should focus on children under five years old.
- A decision should be made as to whether the program will focus on rural areas or include rural and urban areas and facilities.
- ORT/ORS is recommended as the prime program strategy in order to reduce mortality, but secondary strategies (epidemic control, MCH, environmental/sanitation, measles immunization) should be identified that reduce morbidity by preventing disease. ORT prevents death secondary to dehydration but it does not prevent disease.
- The recommended focus of ORT will be homemade salt-sugar solutions used by parents or household child caretakers as soon as diarrhea is noted, before seeing a VHG or other health provider. Ideally, ORS packets would be utilized by every level of health provider from the MO to the VHG to treat children under five years of age with diarrheal disease or gastroenteritis.
- A program goal: All levels of public health facilities should be provided with staff trained in ORT/ORS (packet and homemade).
- A program goal: All facilities in the public health infrastructure should be provided with a supply of ORS packets.

(ST) Initiate the program in one block of each Project district in the Project states.

(LT) Initially expand the CDD program to full Project district and then to non-Project districts in project states. Finally, expand to include non-Project states.

- e. Utilizing the Current Health Care Field Supervisors, Develop a Format of Supervision of Diarrheal Disease Control Activities Performed by the MPWs and VHGs. Institute the System in One Block of Each Project District of Each Project State.

(ST) Report forms on all levels of the system should be amended to include key questions regarding diarrheal disease and ORS use.

(ST) Supervisors will be responsible for reviewing and tabulating DD information from MPW and VHGs on a monthly basis.

(ST) Supervisors should perform follow-up visits to homes of a random number of cases to evaluate KAP of ORT following MPW or VHG instruction. This should be done on a regular basis every three to four months.

(ST) Supervisors should accompany every new MPW or VHG on a home or clinic visit and observe the new worker doing ORS teaching and mixing. At a regular time interval, "review" visits should be performed to assure that workers maintain a high level of expertise.

(ST) Supervisors should submit reports to the MOs on a quarterly basis regarding their supervisory functions, ORT training, and diarrheal disease summary tabulation (from MPW/VHG reports).

(ST) MOs should have the responsibility for maintaining and overseeing the PHC sentinel reporting systems. MOs should send monthly sentinel data to the CMO of the district hospital and the state MOH, Director of Health Services.

(ST) MOs should review LHV diarrheal disease reports and summaries on a quarterly basis.

(ST) LHVs are to be responsible for maintaining PHC, subcenters and village CDD program supplies of ORS packets, home measuring containers or utensils, diarrheal disease public relations materials, etc. They should perform monthly inventory checks of all CDD supplies.

(ST) It is recommended that the LHV select one day each week to be CDD "Program Day" and devote all her activities of that day to the supervision of the CDD program tasks performed by the MPW and VHGs.

(ST) The ideal supervisor:supervisee ratio to aim for is 15 (which may be more difficult in sparsely populated areas such as Himachal Pradesh).

Expand the supervisory system to all blocks of the Project districts and then to one block from each non-Project district. Ultimately, all blocks in all districts would be included from the Project and non-Project states.

f. Create An Impartial Evaluation Team for Each Project District, Headed by the District ORT Coordinator.

The team will annually evaluate the success of the CDD program using specific pre-established criteria. Other team members might include one national ORT specialist and one faculty member of a community medicine department from an Indian medical school. The state CDD program director will conduct an annual evaluation meeting to analyze the results of the district teams. Invited to the meeting will be the PRITECH-USAID CDD staff, an international ORT specialist, two Indian ORT specialists, and two faculty members from department of community medicine.

(ST) The first teams would be established in the Project districts. Suggestions for types of criteria to be used in the evaluations are as follows:

Compare the numbers of reported cases of diarrhea and dysentery in children under five years with the "expected" number based on either earlier national estimates (two episodes per child per year) or, if available, with baseline morbidity data collected as in Recommendation 2.

Total number of ORS packets distributed annually to children under five years with diarrhea and dysentery treated with ORS packets compared with total children under five with diarrhea and dysentery.

Total number of children under five years with diarrhea and dysentery treated with ORS packets compared with total children under five years with diarrhea and dysentery by percent.

Total number of children under five years with diarrhea and dysentery treated with homemade salt-sugar solution compared with total children under five years with diarrhea and dysentery.

Total number of field workers (at each level) who were observed to correctly mix ORS packets and homemade salt-sugar solutions. Total number who can correctly answer diarrhea and dysentery questions based on training modules.

Percentage of workers who can correctly prepare above mixtures out of total number observed.

Percentage of workers who can answer diarrhea and dysentery questions correctly out of total number observed.

Examine supervisor:supervisee staff ratios.

Review a random number of monthly reports by health providers at each level of the delivery system for completeness (review of the information system).

Evaluate distribution, storage, and record-keeping for ORS packets.

Review sentinel and village surveillance system.

- Describe procedures for collecting and providing data to the district level.
- Review overall reports and cases reported. Note the number of reports expected, the number of reports submitted, cases and deaths reported by facility, workers and totals.
- Note how and by whom data were evaluated and used.
- Note if the reporting facilities have received any feedback.
- Problems.

Evaluate the patient referral and follow-up system. Compare the number of patients referred to PHCs (from subcenters) and to the district hospital (from the PHCs) at the beginning of the CDD program and at the end of first year of the program.

Note all training efforts during the last year.

Calculate results of treatment: case fatality rates (percent) assessing ORS homemade salt-sugar solution and ORS packets.

Calculate case fatality rates at beginning of the ORT program; compare with rates after one year of the program. Do the same for infant mortality rates.

(LT) Expand to non-Project districts in Project states and then to all districts in non-Project states in a step-phase pattern.

- g. Conduct a Series of "Special Studies" to Obtain Useful Information to Improve the On-going CDD Program (For Details Relating to Study Design See the WHO Guide "Notes for Investigators Planning to Undertake Epidemiologic Research in CDD")

(LT) A special study to determine access to ORT.

(LT) A special study to determine coverage with ORT (utilize survey format similar to that for Recommendation "1.b" above).

(LT) A special study to determine whether health facilities are receiving sufficient supplies of ORT packets.

(LT) A special study to estimate the number of ORS packets utilized per case of diarrhea.

(LT) A special study to determine mothers' abilities to prepare ORS packets and home solutions.

(LT) A special study to examine the etiologies of diarrheal disease in India. This is a more complicated study and would require the establishment of collaboration laboratories.

(ST) A study to examine the usefulness of a "family folder" system.

(LT) A study to examine the value of family "diarrheal disease cards" kept with the immunization cards.

(LT) A study to determine the usefulness of child growth charts.

(ST) A study to evaluate village attitudes towards VHGs and MPWs.

(ST) A study to evaluate utilization of health services--public, private, traditional.

(LT) A study to evaluate more specialized information about diarrheal disease in children under five years of age such as the amount of chronic diarrhea, dysentery, and dehydration as well as referral percentiles and patterns.

(LT) A study to evaluate the effectiveness of different types of mass media campaigns to improve public knowledge and acceptability of ORT.

(ST) A study to compare diarrheal disease morbidity and mortality rates in children treated with home salt-and-sugar solution versus those treated with ORS packets.

- h. Institute a Series of Mass Marketing Techniques to Increase Public Knowledge About Diarrheal Diseases and ORT

- Posters
- School lessons

- Women's Meetings
- "Camp" Meetings combined with immunizations, family planning, etc.
- Contests (see Mass Marketing Section)

i. Training

Physicians

A major emphasis should be placed on training physicians since they are responsible for supervision of all the workers at the PHC level. They are also ultimately responsible for reporting the data collected in the field. At the present time physicians are not trained for these functions. They should obtain specific training in the following areas:

- Obtain practical training in the management of diarrhea. This training can be given at specific centers where trained personnel, equipment, supplies and technical advisors are made available for providing appropriate training in the management of acute diarrheal illness. These centers will be termed "rehydration centers" and are described below. These centers can also be used for training supervisors and MPWs. Hopefully the practical experience obtained at these centers in rehydrating patients with ORT will give the physicians and other health workers enough confidence in using ORT for the management of diarrhea.
- Obtain training in conducting basic epidemiological surveys and the process of supervising health workers and evaluating epidemiological data gathered by them. During the first year of the IRHP extension period this can be achieved by holding a series of workshops in different areas to cover topics that include the following topics: basic epidemiology training, supervision and management skills and training in evaluating epidemiological data gathered in the field. In the long term this training should be done during their orientation period. At the present time all PHC doctors are supposed to have a ten week orientation period. A lot of this training period is spent on learning the logistics of the PHC system and acute care medicine. A curriculum could be developed for training in the above areas during this period. This may require additional staffing for training physicians and the provision of material to the trainers.

Female Multipurpose Workers

Provide specific training in the following areas:

- Accurate registration of births and deaths.
- Recognition of diarrhea and dysentery.

- Treatment of diarrhea and dysentery, especially the appropriate use of antibiotics.
- Accurate recording of diarrheal illness.
- Accurate mixing of ORS (packets and salt-sugar).
- Communication techniques for transfer of knowledge to the public.
- Maintenance of a diarrhea register.

Many of the above topics are included in the existing curriculum. However, the information given to various level workers should be standardized. This can be achieved in the short term by establishing training teams that could visit each block for training the FMPWs. Some districts already have training teams. For the long term a curriculum should be developed in conjunction with the training schools for training individuals in the above topics. All existing FMPWs should also spend time in rehydration centers. In addition trainees should be taken to rehydration centers for practical training during the time they are taught about ORT in the classroom.

Male Multipurpose Workers

Many of these workers have little or no training in ORT. They should be given the same training as FMPWs in the topics mentioned above. This training can be given in the manner described for female MPWs.

Community Health Volunteers

They need to be retrained in the following areas:

- Recognition and reporting of diarrhea.
- Mixing of ORS (packets and salt/sugar).
- Appropriate management of diarrhea and dysentery. This training can be provided in the short-term using the training teams. In the long term the medical officers and other PHC staff can do it.

Standardization of Training in ORT

Consistent information should be given to all levels of workers on this topic. This would require a review of the curriculum of the various training schools for MPWs and physicians orientation curriculum.

The contents of the information given at various workshops will also have to be standardized and coordinated with the various training schools. One method for standardizing the training for ORT would be to develop a series of video tapes and slides for teaching various aspects of ORT therapy. This would also necessitate the purchasing of video equipment and TV monitors. Sets of slides with accompanying text which describe various aspects of ORT can also be developed. The above function could be completed within the first year of the IRHP extension period.

Continuing Education for Workers at All Levels

Periodic in-service training should be done of all levels of workers. This can be achieved by using one or more of the following methods:

- Periodic in-service training by training teams.
- Provide retraining at MPW schools for one week every six months.
- Provide educational material periodically to the health workers.
- Retraining at rehydration centers once a year.

Establishment of Rehydration Centers

The purpose of establishing these centers would be to demonstrate the safety and efficacy of ORT in treating diarrhea to health workers at various levels especially the physicians.

The following criteria should be used in selecting rehydration centers.

- In hospitals capable of handling in-patient pediatric admissions.
- There should be at least 15 admissions for diarrhea during the peak diarrhea season.
- There should be adequate space in the hospital for establishing a center.
- There should be one or more full time pediatricians at the hospital. If available medical school hospitals should be used. The advantages of establishing the center at a medical school would be a) the medical officers in training are more likely to have respect for that environment, b) some medical schools already have people skilled in ORT, c) additional peo-

ple such as medical students and post graduates can also be trained at the center, and d) a pool of trainers can be trained at the medical school for training other groups, PHC physicians, and health workers.

Initially there should be a rehydration center for each state. If the program is successful, the number of centers should be increased to provide adequate training for all the districts in the state. A center will probably be required for every three districts.

The following equipment will be required:

- Chairs with wide armrests on one side for placing a cup with ORS. The number of chairs used should be 10 percent more than the number of hospital admissions per day for diarrhea expected during the peak season.
- Reusable cups for ORS.
- Teaspoons for feeding ORS to infants.
- ORS packets.
- Two large containers (5 to 10 liter capacity) for mixing ORS.
- One liter containers for demonstrating mixing of ORS packets and salt-sugar solutions.
- Bibs.

Staff should consist of two nurses for each nursing shift, one nurse aid for each nursing shift, one physician in charge of the center, and one pharmacist for maintaining an inventory of ORS and other supplies.

During the establishment of the initial rehydration centers one national and one international expert should be available during the training period.

In the rehydration center, training groups should not consist of more than 10 to 15 people. Initially only physicians should be trained. Later other categories of workers should be trained. The training should take one week and its main thrust will be to demonstrate the use of ORT in a hospital setting. During the training period each trainee will be expected to assess and treat a number of cases of diarrhea. At the end of each day discussions will be held on individual patient management. Certain standard information will also be provided by the technical specialists regarding the etiology, pathophysiology, and treatment of various forms of diarrheal illnesses. The curriculum for such training centers have already been developed in other countries. The curricula from those country programs can be obtained and altered appropriately for use under Indian conditions.

During the training sessions the physician trainees will observe and supervise the nurses who will explain ORT to mothers and demonstrate the proper mixing of ORS.

A pre- and post-training test will be given to all participants.

These rehydration centers should be established within the first six months of the extension period of the IRHP. During this period national and international technical experts should be used for training. For the long term a number of local physicians should be trained as trainers.

j. Use of ORS Packets, Salt-Sugar Solutions and Home Mixed Solutions

Families should be educated to use appropriate solutions available at home and salt-sugar solutions as soon as diarrhea starts. They should be instructed to seek advice from the community health worker if diarrhea does not resolve after one day. These patients seen by the community health workers or other workers for diarrhea should be given ORS packets with appropriate instructions on mixing and feeding.

Each PHC should establish a desk at the clinic for demonstrating proper mixing of ORS packets and salt-sugar solutions. Demonstrations should be conducted at least once a day at the PHC during the peak clinic hours. In addition all patients seeking advice for diarrhea at the PHC subcenter or at the village level should have a demonstration session on mixing ORS packets and salt-sugar solutions.

In order to help ensure proper mixing of home solutions, state governments might consider the use of standardized one-liter containers and double-headed spoons.

Salt-sugar solutions and some other home solutions can be promoted immediately. However, at the present time there are not enough ORS packets for all the patients that will seek medical advice for diarrhea. The production of adequate numbers of ORS packets and the obtaining of containers and spoons may take six months to one year.

k. Use of Antibiotics

Standard criteria should be given to all health workers for using antibiotics for diarrhea and dysentery. Antibiotics should be used only for patients with blood in their stools (dysentery). The use of unnecessary and harmful drugs should be strongly discouraged. This intervention can be started immediately.

l. Provision of ORS Packets

Certain states, e.g. Maharashtra, have decided to withdraw ORS packets at all levels and base their program entirely on salt-sugar solutions. These states should be encouraged to reconsider their decision. Oral rehydration solution packets should be supplied for all levels of the health system.

An inventory system should be developed for monitoring the use of ORS packets. Each worker should report the number of cases of diarrhea treated per month and the number of ORS packets used. This process can start as soon as additional funds are available to the states to purchase packets from the private sector.

Many PHCs and subcenters still have ORS powders in bottles which are meant for mixing with three liters of water. An intensive effort should be made to remove these bottles from all the health facilities.

m. Production of ORS Packets

At the present time there are no government facilities producing ORS in large scale. The government can investigate one of the following ways of increasing the production of low cost ORS packets:

- Produce its own packets
- Subsidize one of the commercial companies for producing low cost ORS packets

n. Provision of Salt-Sugar Containers and Spoons for PHCs and Subcenters

Each PHC and subcenter should be provided with adequate amounts of salt, sugar, containers, and spoons for demonstrating the mixing of salt-sugar ORS.

o. Incentives

An incentive scheme should be developed for workers who are successful in teaching mothers the proper use of ORT and maintain accurate records of diarrheal illnesses. An attempt should be made to identify the individuals in each area who provide health care. These individuals should be contacted and provided with specific information on ORT in the form of simple handouts. Training sessions at rehydration centers can also be offered. An appropriate monetary incentive can be given to those who complete the training course. A certification also can be given for those who successfully complete the course. Subsidized ORS packets should be provided to these practitioners. Periodic in-services training should also be offered to them with appropriate monetary incentives for participating in these activities.

2. Recommendations for USAID/India

(For the time frame, see Recommendations for the Government of India.)

a. Provide funds for short-term consultants to conduct workshops on survey techniques, surveillance systems for diarrheal disease, and the planning and evaluation of CDD programs. Provide funds for the material/space needed to conduct the workshops.

b. Provide salaries for Project state CDD directors and district ORT coordinators for one year.

c. Provide funds for short-term consultants to establish the materials and standardized forms to be used in the demographic data base, diarrheal disease morbidity/mortality data base, surveillance system (information system and sentinel system) and the supervisory system.

d. Provide funds for short-term consultants to create the evaluation team methodology and associated forms.

e. Provide funds for short-term consultants to help local officials decide upon, implement, and evaluate special studies (see priority order and long- and short-term designations under GOI recommendations).

f. With regard to training at the rehydration centers, provide salary support for the staff at each center. Purchase additional equipment and supplies for the rehydration center. Provide necessary funding for educational material for conducting the training. Provide funding for transportation costs and stipends for trainees.

With regard to physician orientation training, provide additional support for developing and providing training materials and provide salary support if necessary for adequate staffing of trainees.

With regard to FMPW, MMPW and supervisor training centers, provide support for developing and providing training material at these schools. Provide funding for additional staffing so that periodic in-service can be done. Provide transportation costs and stipends for trainees.

With regard to training teams, provide funding for adequate staffing and transportation costs for staff. Provide funding for developing and providing educational material.

With regard to community health volunteers and dais, provide funding for developing materials for retraining in ORT and training in accurate recording of diarrheal diseases.

In order to coordinate the curriculum, provide funding for developing standardized teaching material in ORT for various levels of workers. This could include developing standard slides with text, video tapes, flipcharts and other printed and illustrative material.

Provide funding for conducting workshops (outlined in Section VI.A. above).

g. Provide funding for obtaining adequate number of ORS packets for all health facilities and workers, assuming two episodes of diarrhea per child under five years of age.

h. Provide funding for subsidizing the production and distribution of ORS packets.

i. Provide funding for developing teaching materials that could be used by health workers for teaching mothers ORT.

j. Containers and Spoons. Provide funding for manufacturing appropriate containers and spoons. Initially provide one container and spoon for each household. Provide funding for developing training materials for proper use of these containers. Provide funding for replacing the containers and spoons each year with new ones. Provide funding for incentives to mothers who return original containers and spoons and are able to demonstrate their skill in mixing ORS.

Provide funding to create incentives for health workers who are able to successfully educate mothers about ORT and provide support for obtaining a desk and a chair and additional teaching materials for demonstrating the mixing of ORS at each PHC and subcenter.

Provide funding for recruiting and training health providers in the private sector.

3. Recommendations for Technical Assistance

a. For a series of workshops to teach field supervisors about survey techniques.

b. In the development of a demographic data base in Project districts.

c. In the development of baseline diarrheal morbidity and mortality rates in Project districts.

d. In the development of a surveillance system, including the establishment of a routine information system and improving the existing PHC sentinel system.

- e. To state CDD program directors and district ORT coordinators in Project states to assist in the planning and development of CDD programs.
- f. To the Project districts regarding the establishment and monitoring of a supervisory system for CDD activities.
- g. For the development of the evaluation teams' methodology, as well as for the first state-wide annual evaluation meeting in each project state. Serve as a member of at least one district evaluation team and as a regular attendant at the annual statewide evaluation meetings in Project states.
- h. For the design and evaluation of special studies conducted by CDD programs in Project districts or states.
- i. For establishing rehydration centers. This would include the following:
- Provide an international consultant who could work with certain national experts for developing a curriculum for the training at rehydration centers. The consultant should also visit several of the institutions in the states and serve as an advisor to local officials in selecting the appropriate hospitals for setting up rehydration centers. The consultant should help to develop a pre- and post-test for the trainees.
 - A consultant should be made available for developing curriculum and planning for rehydration centers as soon as clearance is obtained from the GOI and the states for establishing rehydration centers. Additional consultants should also be made available during the summer months (peak diarrhea season) of 1986 for conducting the training sessions.
 - Provide technical assistance for developing educational material for training at rehydration centers.
 - Provide one international consultant and one national consultant for the initial training groups. The initial groups of trainees should consist of potential trainers for future groups.
- j. For conducting workshops for the following areas:
- Epidemiology.
 - Supervision and management skills.
 - Gathering of field data and evaluating the data obtained.

One or more international and national consultants will be required for this purpose.

k. For developing curricula for training various individuals in ORT. This would include:

- Curriculum for training physicians during their orientation period.
- Review existing curriculum for male and female multipurpose workers and supervisors. Develop additional materials where indicated and suggest appropriate changes.
- Curriculum for training teams which would conduct on-going training and retraining of individuals at the PHCs.

The technical advisors should pay particular attention to standardizing the information contained on or in the curriculum of various workers.

l. Technical assistance should also be provided for developing educational material for communicating various messages to families (see Marketing Strategy Section above).

m. Technical assistance should be provided for developing and recommending the appropriate form of containers and spoons that should be given to families. This should include the development of appropriate slogans or messages on containers.

n. Technical advice to central and state governments on increasing ORS production capabilities.

C. RECOMMENDATIONS REGARDING MARKETING OF HEALTH AND POPULATION SERVICES

To get the best returns on the large investments of time and money, it is essential to engage the services of professionally skilled and experienced advertising agencies and marketing research organizations.

Each state involved in the extension project (Maharashtra, Gujarat and Himachal Pradesh) should appoint three advertising agencies, each to handle one of the campaigns:

- Spacing
- ORT
- Measles Immunization

It is desirable that there should be some coordination between the three participating states so that the advertising agency selected to handle, say, ORT, is responsible for that promotional program in all three states. This will prevent "reinventing the wheel" and allow that particular agency to acquire in-depth knowledge and experience in respect of the given marketing

program. This "learning curve" effect will be of advantage to all three participating states.

Monitoring and evaluation should also be done with the help of professional market research agencies so that the client can be sure of the most effective research methodology being used, the validity of the data, and consequently their value in taking decisions on long-term strategies.

An illustration of the nature of specialized services from an advertising agency is given below:

In view of the size of each campaign, it is expected that the best available creative, production, and media talents and skills in India will be available to the client.

Necessary and actionable information should be generated by a professional market research set-up.

The client will decide on marketing and communications strategy with considerable expert assistance from the agency. The agency will pre-test important communications software--press advertisements, outdoor signs, film and video storyboards or rough tapes--before formal presentation to the client.

The agencies should present complete campaign plans including communications content and execution, media strategies, and below-the-line promotional, task-based budgets. After approval, media plans and operational details will follow.

The market research agency will undertake the gathering of baseline data and interim, and final measures of campaign results.

Messages on both the Copper-T and ORS originating from the Government of India or state governments will be broadcast free over radio/TV, both of which are wholly government owned. This very important component of the media mix, therefore, will not require cost outlays by the sponsoring governments.

There will, however, be production costs related to the use of such electronic media, and advertising space for these programs is used in relevant newspapers and magazines, these will have to be paid for.

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