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INDIA HEALTH SECTOR ANALYSIS

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## EXECUTIVE SUMMARY

The Indian health policy has consistently embraced the long range strategy of providing high coverage services that will eventually lead to health for all. The major emphasis has been on family planning provided in a context of maternal and child health services since 40 percent of all deaths occur among infants and children. The large investment in health infrastructure since Independence in 1947 has not yielded the expected results in terms of human welfare and improved life expectancy. The Primary Health Care (PHC) system, though well conceived and endowed with resources, is not functioning as expected.

The primary deficiencies in the system include:

1. lack of focus on key services for lowering infant and child mortality;
2. inadequate skills among the service providers at all levels;
3. lack of leadership and managerial skills and public health orientation among doctors;
4. deficiencies in the drug and vaccine supply system;
5. lack of utilization of the health services by high risk groups;
6. lack of supervision;
7. lack of adequate information systems;
8. lack of appropriate, cost-effective interventions for several important causes of mortality.

In order to improve infant and child mortality as rapidly as possible, the priority is improvement of the existing system focusing upon a small number of interventions, namely improving immunization acceptance (tetanus toxoid, DPT, and measles particularly), improving nutritional status of mothers and children, improving acceptance of child spacing methods, and usage of oral rehydration (homemade solutions primarily).

In-service education of all levels of staff, improvements in surveillance and monitoring through a good management information system, drug supply, multimedia, and popular health education efforts should all focus on this small number of interventions. In addition, the project should be initiated in one or two states in the areas in which USAID is already involved and gradually spread to encompass the whole state.

Other priorities should include information system development for malaria control, strengthening epidemiologic expertise through the National Institute of Communicable Diseases, and encouraging expansion of private sector involvement through vaccine manufacture and private voluntary organizations.

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## I. INTRODUCTION

The scope of work for this consultant visit included the following:

- ° A review of the background study papers written by consultants for USAID during the last three years concerning particular aspects of the Indian health sector. Other relevant documents from the Government of India (GOI), United States Agency for International Development (USAID), and other donors were also reviewed. The background papers are listed in the references.
- ° Preparation of a written health sector analysis on the basis of this review and interviews with USAID and GOI health officials. The list of individuals interviewed is included in Appendix B. This analysis includes comments on the availability of information to define the health problems and on the adequacy of resources and the appropriateness of present USAID activities and includes recommendations for future priorities to reduce infant and child mortality.

This report outlines the current status of infant and child health in India and health related factors affecting them. It reviews what is known concerning the historic changes in these variables and geographic differences that exist and discusses the causes of infant and child mortality, reviews the organization of health services, the Government of India goals for health, and the present status of government and private services. The report reviews USAID's involvement in the health sector, the stated goals, and the experience. Based on this review and interviews with USAID and Government of India health officials, problems have been identified and priorities for future involvement in the Indian health sector by USAID are discussed.

## II. BACKGROUND

### A. Economic and Vital Statistics of India

Every seventh person in the world is an Indian. The country contains nearly 15 percent of the world's population, but these 720 million (1983) inhabit only 2.4 percent of the world's land mass. (Table 1 presents the population over the last 80 years.) India has increased in size rapidly, particularly in the last 30 years when annual growth rates have averaged 2.2 to 2.5 percent. During this period the crude death rate has declined more rapidly than the crude birth rate. In the last decade the birth rate declined substantially from 36.9/1000 in 1971 to 33.3/1000 in 1981, and the growth rate has stabilized around 2.5 percent. But the growth rate will only begin to decrease when fertility declines faster than mortality.

In spite of enormous population growth, the net per capita national product has gradually increased from Rs 633 to Rs 712 (at constant 1970-71 prices). The distribution of income has remained markedly skewed in the last decade (Figure 1) with the top 30 percent of the population consuming more than half of the total expenditure but the bottom 30 percent sharing only 13-14 percent.

Land ownership is similarly skewed. Seventy percent of small land holders own less than two hectares each, and this group comprises only 24 percent of the cultivated land holdings while the large landowners (with more than ten hectares each), representing three percent of the total, own 26 percent of the cultivated land.

Food grain production grew about 2.6 percent annually during the 1970's, but per capita food grain availability has not improved since 1960. It falls short of requirements. Availability of specific cereals and pulses has declined. Only wheat availability has increased. Forty-eight percent of India's population, or 340 million people, existed below the poverty line. These individuals' monthly per capita expenditures were inadequate to provide 2,400 calories per person per day in the rural areas and 2,100 calories in the urban area.

Although 76 percent of the people live in rural areas, the urban population has grown 46 percent in the last ten years. Marked inequalities remain between rural and urban dwellers in income, education, literacy, health services, mortality, fertility and other areas. The rural inhabitants in general are much worse off which encourages urban migration.

Children under age five constitute 14 percent of the country's population (100 million) but contribute almost half of the deaths. About one-third of all deaths occur in the first year of life. Sixty percent of infant deaths occur in the first month of life, and more than half of all these deaths occur in the first week. Obviously, infants and children carry the heaviest burden of sickness and death in the population, and deaths in this age group must be prevented if health conditions are to improve.

Infant mortality declined from 200 in 1911 to 129 in 1970 (Table 2) and has continued to decline slowly since then (Figure 2).

The urban/rural differences have remained marked. Child mortality for the age group 0-4 years has changed very little in the past decade (Table 3), and urban mortality has been significantly less than the rural. Life expectancy has steadily increased (Figure 3) throughout this century.

India has an excess of 22.9 million males over females. Throughout this century the sex ratio has declined from 972 to 933 (Figure 4). From infancy through the reproductive age, females have a greater risk of death than males (Table 4). Since 1969 the proportion of children with malnutrition has remained constant. Malnutrition is a combination of factors relating both to availability of food, food habits, and the inability of the body to make efficient use of available food primarily because of frequent illness. As mentioned above, food production in India is inadequate, and 48 percent of the population are below the poverty line and unable to obtain adequate food. This group of destitute poor also suffer most in terms of frequency of illness and greater risk of death.

Access to sanitation has increased only slightly between 1970 and 1981 (Table 5), while access to safe water has improved dramatically (Tables 5 and 6). The Government of India has considered the provision of safe water and sanitation a priority and allocated four percent of the Sixth Year Plan budget (1980-85) to this effort.

Trenching and irrigation projects can increase disease by providing breeding niches for malaria and hookworm. The positive impact on health of safe water supply and sanitation is less clear cut. Water in adequate supply, properly used and maintained, and clean, well-maintained, properly used sanitation facilities can decrease diarrheal disease and helminth transmission to some extent, but intensive health education and maintenance efforts are required in order to realize this goal. Poorly maintained and used facilities may increase disease transmission. The expense and difficulty of providing easy access, health education, and long term maintenance may lower the priority of sanitation and water supply as a purely health promoting intervention.

Education, particularly of women, is clearly related to infant mortality (Figure 5). In the past 50 years the literacy rate has gradually increased (Figure 6) but only about 40 percent of the adult population was literate in 1981. Rural dwellers, women, and scheduled castes have the smallest proportion of literates. But in spite of rising literacy rates, the absolute number of illiterates has increased particularly among women and scheduled castes and tribes. Women's lack of education limits their awareness and utilization of the benefits of health services, of health promotive practices, and of learning for themselves and their children.

In conclusion, the population of India increased rapidly in the last three decades at the rate of 2.5 percent yearly. The birth rate has declined to 33 per 1000, but the decline in mortality has occurred more rapidly. Seventy-five percent of the population live in the rural areas which has the greatest concentration of illiterate poor and the highest birth and death rate. Those groups with the greatest risk of mortality in India are female

infants and children of illiterate mothers living in rural areas. This group must be accorded high priority in order to improve health conditions in this country.

## **B. Geographical Differences in Vital Statistics**

Marked geographical differences exist among the states and territories of India (Table 7 and 8). This section will concentrate on information from the five states in which the United States Agency for International Development and the Government of India collaborate on health projects: Gujarat, Maharashtra, Haryana, Himachal Pradesh and Punjab.

Data on Kerala and Uttar Pradesh are presented because the former has the lowest infant mortality rate and the latter the highest of any state within India. The other five states have growth rates slightly lower than the whole country and lower infant mortality rates. Kerala is also remarkable for its high female to male sex ratio and adult literacy.

Table 7 presents population data for the five states in which AID is involved; together they contain 19 percent of India's total population. Table 8 presents vital statistics for these states. The five states assigned to USAID are about average for birth rate, death rate, infant mortality, literacy, and female to male sex ratio. Table 9 presents information on access to safe water and sanitation. The proportion of the population of Maharashtra, Gujarat and Himachal Pradesh with access to safe water and sanitation is among the highest of any state, but access to sanitation is only ten to 14 percent and water 47 to 78 percent.

In conclusion, no striking differences occur in the five states in which USAID is involved.

## **C. Infant Mortality**

### **1. Levels of Infant Mortality**

Infant mortality has usually been separated into neonatal mortality (deaths occurring from birth up to 28 days of life) and postneonatal mortality (deaths occurring from 28 days through 11 months of age). In 1978 Indian infant mortality was 126, but Table 10 subdivides this further into rural-urban differences in neonatal and postneonatal mortality. Rural infant mortality is almost twice that of urban dwellers (136 vs. 71), and neonatal mortality is greater than postneonatal.

Table 11 provides data on the male/female differential in infant mortality. The adverse situation of rural female infants is evident, although in urban areas the rates are the same.

Table 12 presents information on the levels of infant mortality and mortality in neonatal and postneonatal periods from carefully performed studies in various parts of the country. Since the 1970's rural infant mortality rates ranged from about 96 in Kerala to a high of 124 in Rajasthan. In practically all these studies neonatal deaths contribute 50 percent or more of the rural infant deaths. The Kerala study demonstrates a remarkably low

postneonatal mortality between 1970 and 1980. Data for this study were collected from a random sample of 3,000 households from 150 villages selected at random from three selected districts. The women were questioned about prior pregnancies between 1950 and 1980, and information was obtained on 9,400 births.

At the present time it is unclear infant mortality in Kerala is so low. Zachariah and Patel found that socio-economic factors such as mother's education, caste, and household expenditures were significantly related to infant mortality but these together explained only three percent of the differentials. They were unable to examine cause-specific mortality but postulated that other unexamined factors such as health care utilization rates may be a more important determinant. Further study in this area would be needed to attempt to answer this question of the determinants of health.

## 2. Causes of Neonatal Mortality

In 1981 Ruth Puffer analyzed the causes of infant and child mortality in India. The chief causes of neonatal mortality were immaturity, diarrheal diseases, tetanus, and pneumonia (Table 13). In rural areas such as Uttar Pradesh tetanus may cause 40 to 60 percent of neonatal deaths. The Indian Infant and Child Mortality Survey also found a very high rate of tetanus (Tables 14). This disease is easily preventable by immunizing all pregnant women and/or by providing trained birth attendants with sterile delivery kits for every delivery. Tetanus immunization is one of the most cost-effective methods for decreasing rural infant mortality.

Low birth weight (below 2,501 grams) is a major contributor to neonatal mortality. Those infants dying of "immaturity" and "prematurity" mentioned in Table 14 are certainly low birth weight, and these contribute ten to 25 percent of neonatal deaths. According to the Indian Report of the Working Group on Health For All by 2000 A.D., 30 percent of live births in India had birth weights below 2501 grams. The causes of low birth weight are discussed in Appendix A.

Prematurity or immaturity is also the underlying cause of many neonatal deaths attributed to pneumonia, septicemia, diarrhea or other causes. In the North Arcot, Tamil Nadu project, 32 percent of the infants weighed 2500 grams or less, and these contributed 56 percent of the infant deaths. In Table 17, the risk of death for an infant less than 1500 grams at birth is more than seven times greater than an infant more than 2500 grams.

In summary, tetanus remains the major cause of 40 to 60 percent of deaths in the neonatal period which can be effectively and efficiently prevented. Prematurity is potentially preventable (see Appendix A) but requires more research into causes and cost-effective interventions.

## 3. Causes of Postneonatal Mortality

Among infants 28 days to 11 months of age, diarrheal diseases, respiratory diseases, measles, and "other perinatal causes" are the most important causes of death (Tables 14, 15, and 16). Again, premature or low birth weight infants are at greater risk of dying from all these causes than normal weight infants. One study of deaths in children weighing less than 2000 grams found that most of the deaths occur after one month of age and are at-

tributable to gastroenteritis. In the 2000 to 2500 gram birth weight range, respiratory infections emerge as an even more important factor than gastroenteritis. Most of the deaths attributed to diarrheal disease and measles are preventable through the use of oral rehydration, encouragement of feeding during illness, and immunization.

Although these deaths may be attributed to a specific cause, many result from multiple factors, e.g. an infant born with low birth weight who is no longer breast fed and sustains frequent infectious diseases resulting in malnutrition who finally succumbs to diarrhea. This death may be attributed to diarrhea, but many factors were involved. Even though all of the deaths attributed to diarrhea and immunization-preventable diseases may not be allayed with these interventions, use of oral rehydration, immunization, encouragement of feeding during illness, and appropriate weaning practices can prevent a substantial proportion of the malnutrition and infant deaths.

Deaths attributed to nutritional deficiency (that is low weight for age) noted in Tables 15 and 16 are also very likely to be due to prematurity because these infants have slow catch up growth and remain below the expected weight for age for many months.

Deaths from respiratory illness include pertussis and diphtheria which are preventable by immunization in addition to pneumonia.

In summary, in the post neonatal age group, diarrheal disease and immunizable diseases cause 30 to 60 percent of the deaths and can be largely prevented through the widespread use of immunization and oral rehydration and good nutritional practices. Prematurity and respiratory diseases also contribute to mortality but require more research efforts at this point to identify cost-effective interventions.

#### **4. Multiple factors contributing to mortality**

Infant and child deaths usually result from a combination of factors. Malnutrition is associated with many deaths and seems to be related to a lack of food due to inadequate purchasing power, unequal distribution within the family, poor child feeding practices, too many children with too little space between them, and recurrent disease. Social, economic, and cultural factors act together to increase the risk of death. Girls, rural inhabitants, children of illiterate mothers, children of high birth orders and very small birth spacing, those in destitution are more likely to be born premature, have poor food intake and higher disease incidence rates, and are less likely to utilize health services. This is the priority group for providing health services and actively seeking their participation.

#### **D. Mortality in Children**

From 1970 to 1978 the mortality rate for the age group one to four changed little. The age specific death rate ranges from 53 in 1970 to 50.1 in 1978. However, substantial rural and urban differences occurred; in the rural areas, the death rate in 1978 was 54.1 while in urban areas it was 30.7.

The ranges of child mortality in the states of interest to USAID are shown in Table 18. These rates are about average for the whole country. Table 19 lists the top ten causes of deaths among rural and urban children one and two years old. Before attempting to interpret or use this information, one must remember that the diagnosis of the cause of death was left entirely up to the individuals reporting the death. In addition more than 40 percent of rural deaths and more than 22 percent of urban deaths were attended by untrained medical practitioners or no one. Typhoid may be an important cause of death. But to make a diagnosis of typhoid requires sophisticated bacteriology for accurate diagnosis and differentiation from other causes of fever such as malaria, and, therefore, all the deaths mentioned under typhoid may not be due to typhoid. Respiratory diseases (pneumonia, influenza, bronchitis and "other disorders of the respiratory system") constitute 15 to 25 percent of deaths; and diarrheal disease (dysentery, diarrhea, and gastroenteritis) 12 to 20 percent. Malaria causes four to five percent and measles approximately three percent. Only recently has the importance of measles been recognized since many of the deaths resulting from this virus occur two to eight weeks after the initial illness as a result of pneumonia, diarrhea, and malnutrition. Many of the diarrheal and respiratory deaths have measles as an underlying cause. J. Johns, after reviewing measles in India, concluded that 200,000 deaths occur yearly and nearly ten percent of preschool mortality results from measles.

Table 20 presents information on causes of childhood deaths from two carefully followed groups in the north and south. Again diarrheal diseases and measles are common. Malaria is not mentioned specifically probably because of a lack of diagnostic facilities, but it occurs frequently.

Table 21 provides a clearer appreciation for the burden of illness from respiratory diseases and diarrhea in children. Compared with developed countries, Indian children experience a similar number of episodes of respiratory deaths resulting from pertussis and diphtheria. At least 50,000 deaths occur from diphtheria and more from pertussis. Tuberculosis probably causes 17,000 childhood deaths yearly; polio results in many fewer deaths but cripples between 50,000 and 60,000 annually.

Many childhood deaths result from multiple factors; frequent illnesses and malnutrition from living in destitution, illiteracy, being a rural inhabitant and being female. Table 22 illustrates these marked socio-economic and geographic differentials.

In summary, diarrhea, measles, and other immunizable disease together cause up to 30 percent of childhood deaths, with malnutrition as a major underlying cause, and the simple, cost effective interventions of oral rehydration, immunization, and proper infant and child feeding practices can prevent these deaths. In order for interventions to have the greatest impact, these must reach out to the illiterate rural poor who suffer under the heaviest burden of illness.

## E. Health Services of India

### 1. Infrastructure

"India is a party to the universal commitment to secure 'Health For All by 2000 A.D.'"

Kripa Narain (1981)  
Secretary to the Government of India  
Ministry of Health and Family Welfare and  
Chairman, Working Group on Health

India has been evolving a strategy for meeting this goal during the Sixth Five Year Plan 1980-1985 and drafts of the Seventh Five Year Plan 1985-1990. The targets of the Working Group on Health For All by 2000 A.D. are listed in Table 23.

The recommended goals of the Seventh Five Year Plan are quite similar and are listed in Table 24. Even though not specifically listed as a goal, measles immunization is included in the immunization program.

In order to reach these goals, the rural health infrastructure has been greatly enlarged through the Minimum Needs Programme in the Fifth and Sixth Plans. (Efforts have also been made to improve the provision of health services to the urban poor, but this report concentrates on rural health services since USAID has a primary interest in the rural area where health conditions are probably worse.) This program provides social services to the poorest segments of society as an investment in human resources development. It includes improvements in elementary education, rural health, rural water supply, rural roads, rural electrification, housing for landless, laborers, and environmental improvement of urban slums and nutrition.

Table 25 outlines the envisaged infrastructure for rural health. India has made enormous strides since the inception of the Minimum Needs Program in 1974 in fulfilling its targets. Table 26 reveals that on April 1, 1983, 65,643 subcenters and 5,955 primary health centers were in position. A slightly smaller number are functioning as seen in Table 28. If we estimate that 70 percent of India's 720 million people are in rural areas, then this planned rural health system will eventually provide for approximately 500 million people. Each subcenter provides for at least 5,000 people and each primary health center 30,000. Therefore, probably 165,000\* subcenters total will be required. As of April 1, 1983, 35 percent of the needed subcenters and 35 percent of primary health care centers were functioning. Certainly some states have a higher proportion in place than others.

India has done an enormous job in training manpower to staff the rural health system. Since the training program was initiated in 1974-75/ By

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\* GOI estimates that 122,000 subcenters will be required by mid-1984 to provide health services to 74 percent of the rural population. 122,000 divided by 0.74 is equal to 165,000 subcenters total requirement if the entire 1984 population is to be covered.

April 1, 1983, 24,074 Male Health Assistants, 11,186 Female Health Assistants, 76,220 Male Health Workers, and 51,148 Female Health Workers and 425,695 Dais had been trained. Since some states have slightly different community Health Volunteer or Health Guide schemes, it is unclear how many have been trained throughout the country, but at least 227,500 have undergone training. The total number of health providers trained certainly overestimates the number of health providers actually functioning since some drop out after training. No information came to hand on the number actually providing services at present. Based on numbers of those trained, the maximum possible coverage would be (based on 165,000 subcenters and one-sixth as many PHC's or 27,500): 87 percent Male Health Assistants, 40 percent Female Health Assistants, 46 percent Male Health Workers and 31 percent Female Health Workers (yearbook 1982-83 Family Welfare Programme in India). In addition to these facilities and manpower, throughout India there is one hospital bed per 1,500 population and one doctor per 3,600. This varies among states and between rural and urban environments. The rural population is always less well served.

In the five states where USAID jointly funds the Integrated Rural Health and Population Project with the GOI, 45 percent to 91 percent of the subcenters which are part of the effort for Health For All by 2000 A.D. now function in these states and 55 to 97 percent of ANM's are in position. Nevertheless, the infant mortality remains very high and hardly seems to be related to the rural services provided by the government. Throughout the country, infant mortality has changed very little--125 in 1974 to 113 in 1980 in spite of major improvements in health services. The proportion immunized (Table 28) ranges from nine to 39 percent. These infections cause 20 to 30 percent of child deaths. Concomitant with improvements in primary health care, malaria cases have declined to two million cases reported annually from a peak of six million in 1976-1977 (this figure certainly reflects some under-reporting), but continues to be a major problem particularly since vector resistance to insecticide increases and chloroquine-resistant malaria continues to spread. Access to safe water and sanitation has improved but remains limited as seen in Tables 5 and 6. The government has increased its expenditures on water and sanitation (discussed below) and hopes to provide these to all by the end of the century.

In summary, the health infrastructure is rapidly expanding in the rural areas. Approximately 40 to 50 percent of the rural population is covered today, but dramatic differences in coverage exist among states. In spite of this growing health service, the burden of illness on infants and children has minimally declined and immunization levels remain poor. Even though infrastructure development must continue, the content and utilization of services provided must be re-examined to make this scheme more effective. USAID has sponsored analyses from several consultants to discuss various aspects of these problems, and these will be discussed later.

## **F. Health Budget**

The budget for health related expenditures are divided between plan and non-plan funds, and State and Central Government contribution to each. Plan funds pay for "development" programs under the Five Year Plans, while non-plan funds provide for the maintenance of institutions, positions, structures, and programs initiated under the previous plans.

Table 29 gives the Family Welfare budget in the last six five year plans. The Family Welfare Programme of the Central Government largely funds family planning but supports the Primary Health Care system and the paramedical personnel who work in the Primary Health Centers and subcenters and communities. The primary purpose of the system is the provision of family planning services, integrated with health. This includes construction and maintenance of subcenters and rural family welfare centers (attached to the Primary Health Centers) and training and maintaining the female multipurpose workers, auxiliary nurse midwives, health guides, and trained birth attendants. These workers provide integrated health and family planning education and interventions. This rural health system expends approximately 70 to 75 percent of the family welfare budget. The central budget for Health (as opposed to Family Welfare) is spent on hospitals: medical, education, and communicable disease control programs. Nutritional programs such as the Integrated Child Development Service Scheme (ICDS) is administered by the Social Welfare Ministry. Nutritional and health education campaigns involve the Ministry of Education and Ministry of Food and Civil Supplies in addition to Health.

Table 30 provides some estimate of the relationship between plan and non-plan funds. Total non-plan funds are slightly larger than Five Year Plan funds. (The source of this table did not elaborate on the difference between capital and revenue provisions; therefore, this distinction cannot be explained.)

Within the Central Health budget, Table 31 provides an outline of priorities. In 1982-83, almost half went to medical education and training and 30 percent to institutions such as hospitals and dispensaries. Less than three percent went to rural health, but this primarily pays medical officers. The rural health centers and paramedical personnel (primary health centers and subcenters) are funded by Family Welfare. Of note, two thirds of the health sector outlay (not mentioned in Table 31) comes from the states and union territories.

In addition to Central Plan funds, the states spend even more money for social programs. For example, in the Sixth Five Year Plan for rural health, the central plan budgeted Rs 169 crores while the states provided Rs 408 crores. The maintenance of personnel, services, and structures initiated under the plan are transferred to non-plan funds after each five year plan is completed. An example of relative magnitude of plan and non-plan funds is given in Table 30. Non-plan funds are equal or greater than plan funds.

As one can see from the Table 32 and Figure 7, even though the amount of money for Family Welfare and Social Service Programmes in the last six five year plans has dramatically increased, from 19 million rupees to almost 975 million (at current prices) health, family planning, and education expenditures have declined from 21 percent to 14 percent of the public sector plan outlay. Only funds for water supply and sanitation have increased both in amount and as a percentage of the plan from one percent during 1961-1966 to four percent during 1980-1985.

It is difficult to obtain figures on how much the Central Government provides for each state for health, but Table 34 lists the total per capita expenditures on health and family welfare for the five states in which USAID

is involved in health. The Health budget ranges from Rs 21.6 to 62 per person and Family Welfare from 1.5 to 3.

Table 35 provides the budget for the state of Maharashtra and notes that 42 percent of the outlays are for civil hospitals and medical education.

Table 34 provides information about the budgetary priorities proposed for Family Welfare and Maternal Child Health (MCH) in the Seventh Plan. MCH, which gets only about three percent of the budget, includes: vaccines (DPT, DT, tetanus toxoid, polio, BCG and typhoid), Iron folic acid and Vitamin A solutions, provision of cold chain facilities, transportation (vehicles and drivers), syringes, immunization cards, district level MCH and medical termination of pregnancy (MTP) activities, creation of facilities for care of the newborn, care of infants and preschool children and creation of a National Institute of Maternal and Child Health.

The relative funding levels for vaccines also provide a picture of priorities. DPT, DT and tetanus toxoid are accorded Rs 37.50 crores, polio, BCG and typhoid Rs 26.7 crores, and measles Rs 15.50 crores. Measles is a more expensive vaccine than the others and targets for measles immunization are not even mentioned in the draft of the plan. Child deaths from immunizable diseases and diarrheal disease are more easily prevented than other deaths. Vaccination, particularly for measles, is given low priority in Family Welfare's proposed budget. Over half the proposed budget is payment for sterilization and IUD acceptance, although this sterilization payment (Rs 10,000 if a family has only two daughters) is a delayed payment 20 years after the procedure. This budget is only proposed and will be modified before the Seventh Five Year Plan is completed.

The Ministry of Health and Family Welfare (MOHFW) received 14.15 percent of budget from outside assistance such as USAID, DANIDA, World Bank, etc.

In summary, since 1951 the proportion of the plan budget for rural health development has decreased while water and sanitation efforts have increased in importance. The proportion of total funds for Rural Health Development is small. Institution and medical education maintenance receive one third to one half of the outlays. There is no question that the priority of the Ministry of Health and Family Welfare is increasing contraceptive acceptance and maintaining hospitals and medical education. The Rural health scheme appears to exist to reach family planning objectives and MCH activities accorded low priority essentially to make family planning more palatable in an integrated context. Family planning and MCH activities complement each other as birth rates decline following infant and child mortality declines (and vice versa) and older maternal age at first birth, longer birth intervals and smaller family size may avert infant and child deaths. Nevertheless, efforts to increase vaccine acceptance and use of oral rehydration will have more direct effect on preventing these deaths.

## **G. Nutrition Programs**

The major budgetary items for nutrition in the Sixth Five Year Plan are two schemes that are part of the Minimum Needs Programs: 1) The Special Nutrition Program (SNP) and 2) the Mid-Day Meals Program (MDM). The SNP

provides supplements for children aged birth to six years and pregnant and nursing mothers and will gradually be upgraded into ICDS in areas in which this scheme occurs. Point 15 of the 20 point program of the Prime Minister called for acceleration of nutrition programs for pregnant and nursing women and children and therefore the GOI has begun expansion of ICDS in a big way. One thousand out of the total 5,000 blocks in the country are ICDS blocks.

The Sixth Five Year Plan budget for nonfood costs of ICDS increased from \$46 million to \$82 million. In FY 83 the plan outlay will rise to \$60 million of which ICDS will be 37 percent. Maintenance of blocks started in the Sixth Five Year Plan will continue to be a high priority in the Seventh and future plans. Mid-Day Meals provide meals for school children. In the Sixth Five Year Plan, the plan will continue to feed 17.4 million children and MDM will be integrated with other services.

#### **H. Central Government Health Scheme**

In 1954 the Central Government Health Scheme (CGHS) was started to provide comprehensive medical care for Central Government employees. The scheme covers Delhi and several other cities involving about 640,000 persons until 1982-83. The Sixth Five Year Plan budgeted Rs 120 million for maintenance of the scheme and did not plan any further expansion.

#### **I. Other Providers of Health Care**

In addition to the rural health program detailed above, many other sources of health care exist. Private care consisting of traditional healers, ayurvedic and homeopathic practitioners, allopathic doctors, and private organizations provide anywhere from 20 percent to 80 percent of all health services depending on which study one reads. In addition, the Government of India legislated an Employee Insurance Scheme (EIS) for health care for employees of private concerns to be paid largely by employees. The date, the EIS has a reputation for providing inferior quality care for a small percentage of the workforce.

According to the USAID Private Voluntary Organization Project Paper:

Voluntary organizations and private practitioners represent a major asset in India for the promotion of health, nutrition and family planning awareness and services. In 1974, there were estimated to be over 400 non-government organizations engaged in health and family planning activities. Hospitals in the voluntary sector are by and large found in towns and cities and are mostly run by Christian missions. Although these are found all over the country, they are concentrated in the South where Christian missionary activity has been the strongest over the years. Most of these hospitals have some sort of rural extension outreach programs, primarily for curative services. There are also hospitals, dispensaries and clinics set up by philanthropic trusts and foundations, and these are also predominantly found in urban and semi-urban areas. They tend to be uni-purpose (e.g. maternity hospitals), are often limited in their geographical area of operation, and have few rural extension programs (except for occasional eye and immunization camps).

The voluntary organizations provide about 50% of small town and rural hospital beds.

Over 2,000 family planning centers are being operated by non-governmental organizations. Most of these clinics are located in large cities and towns and cater primarily to the urban population. At present, only a few have rural outreach programs of any kind or are engaged in family planning promotion or motivation.

Voluntary organizations are well respected for quality services, a caring attitude, and their commitment to the poor. They have often been leaders in innovative programming. Some of the voluntary organizations are quite large and have branches in various parts of the country. Some well known organizations are the Ramakrishna Mission, The Family Foundation of India, the Voluntary Health Association of India, Christian Medical Association of India, and Indian Hospital Association.

In addition to voluntary organizations, there are now about 120,000 practitioners of allopathic ("western scientific") medicine in the private sector (mostly in urban and semi-urban areas) and over 600,000 private practitioners following indigenous systems of medicine (ayurveda, unani, homeopaths, naturopaths, and siddha) who mostly practice in the rural areas. Indigenous practitioners are of two types: one is formally trained in an institution, registered by government, and usually practices full time. The others are trained informally by preceptors, not registered by government, practice part time and usually charge minimal fees. The GOI is supporting training in these systems of medicine in order to institutionalize such training and maintain minimum standards. Both types of these practitioners constitute a large reservoir of untapped potential for improving basic health, nutrition and family planning services. Some estimates are that, in small towns and rural areas, the government sponsored system provides about 20% of non-hospital services, the organized voluntary sector, 20% and private sector (allopathic plus traditional) about 60%.

Both allopathic and indigenous systems of medicine are represented at the national and state levels by professional associations such as the Indian Medical Association, the All-India Ayurvedic Congress, and the Unani Tibbia Conference.

### III. USAID HEALTH SECTOR PROJECTS

USAID major health projects include the Integrated Rural Health and Population (IRHP), Private Voluntary Organizations for Health (PVOH), and Integrated Child Development Services (ICDS). Each will be reviewed and some of the problems and constraints discussed. For fiscal years 1984-86 the planned funding level is about 23 percent of USAID/India's budget.

#### A. Integrated Rural Health and Population

The Government of India has provided official family planning programs since 1952, and since independence in 1947 basic health care for all citizens has been a major objective. To provide both family planning and health services in rural areas a Model Plan was developed for rural areas (Table 25). The Family Welfare section of the Ministry of Health and Family Welfare administers this program and its major objective is to increase contraceptive acceptance. The Model Plan provides family planning services that are integrated with maternal and child health services in order to increase access to women of childbearing age.

In this context the Integrated Rural Health and Population (IRHP) Project commenced in 1980 to assist the GOI in implementing its Model Plan for basic health and family planning services in 13 "Backward" districts in five states: Maharashtra, Gujarat, Punjab, Haryana, and Himachal Pradesh. Table 36 provides demographic indicators for districts involved. Project outputs include:

1. additional trained health workers;
2. additional services facilities and quarters constructed;
3. installation of additional trained health workers to levels recommended by the Model Plan;
4. improved and expanded services;
5. improved and expanded training support;
6. improved and expanded communications support;
7. improved and expanded existing services facilities; and
8. improved and expanded management support.

The project planned to continue for five years with project inputs that included technical and managerial skills of Indian institutions and Indian professionals and \$64.75 million in financial input of which USAID contributes \$40 million.

USAID identified 12 key problems which interfered with infant and child mortality and fertility reduction, and this project aimed to provide effective services to alleviate these:

1. early age of first pregnancy;
2. short inter-birth interval;
3. desire for three to four living children;
4. low birth weight;
5. high incidence of birth injuries and asphyxia;
6. neonatal tetanus;
7. Septicemia;
8. malnutrition;
9. diarrhea;
10. respiratory infection;
11. immunizable diseases (measles, whooping cough, etc.); and
12. malaria.

Table 37 shows the costs of the various activities. Fifty-three percent pays for construction and initial equipment costs and 23 percent for salary support. In total 135 million people will benefit from improved services from this project at a cost of \$4.80 per person.

The World Bank, the United Nations Fund for Population Activities (UNFPA), the Danish International Development Agency (DANIDA) and the British Overseas Development Agency (ODA) are financing similar projects in 33 districts in seven states. UNFPA assists in nine districts in Bihar and Rajasthan, DANIDA in 10 districts in Madhya Pradesh and Tamil Nadu (\$40 million) and ODA in five districts in Orissa (\$23 million). All these projects also began in 1980-1981. In addition, WHO and UNICEF support specific national level programs and the Norwegian Government (NORAD) finances a further expansion of the Postpartum Family Planning Program to cover sub-district hospitals and institutions.

In the fall of 1983, IRHP underwent a mid-term evaluation. The overall conclusion of the mid-term evaluation is that the IRHP, after a very slow start, has continued to make substantial progress at an accelerated pace. The project goals remain valid, although a longer period of time than initially scheduled may be necessary to achieve them. Some of the project inputs achieved their targets by the end of the third project year, but others have been delayed in completion. The project will not attain full operational status before the last year of the project period--two to three years behind schedule. The planned level of activities will not be in place long enough to permit adequate assessment of the impact of the project on the reduction in infant and child mortality and fertility. Up to now the project has involved primarily the construction of facilities and training and placement of staff. The baseline survey has just recently been completed and results have not yet been disseminated. The training needs assessment was delayed, but results have been available. The results of the Communication and Man-

agement Needs Assessment are not yet completed. Little of innovative projects and operations research have been initiated. Systems and indices to permit monitoring and assessment of the impact of the project have not been developed.

The causes of these delays have stemmed from bureaucratic delays in creating and filling posts for technical staff at the state and district level that the states must continue to fund after completion of the project, from the inexperience of many of the nationals in dealing with such a complex project, from the attempt to involve all levels of health and family welfare personnel in the planning process and from over-ambitious implementation. The communications needs assessments asked approximately 160 questions from 66,000 people throughout the community and all levels of health services in the state. Once completed, the information from these needs assessments will be invaluable in future planning and surely will not be repeated on such a scale. Because of the investment made in these districts, any future health project should continue work in at least some of these areas to build on the experience obtained.

In summary, the project goals remain valid, but the implementation has become bogged down in bureaucratic delays, dispersion into five states, and inexperience in dealing with the overly complex nature of the project. Impact on infant and child mortality probably will occur as a result but may take several years after the planned completion date to become evident. Future projects should consider limiting geographic involvement to a small number of states providing more experienced manpower to work with the state health officials. They should concentrate on strengthening utilization of the most effective interventions available among the groups at highest risk. These interventions are namely oral rehydration and immunizations, and this group should be encouraged to use appropriate infant and child weaning practices.

## **B. Private Voluntary Organizations for Health (PVOH)**

This project involves a \$20 million grant in rupees from USAID plus a GOI contribution of \$6.7 million. The project aims to assist the GOI in its efforts to encourage private and voluntary organizations to undertake greater responsibility for improving the health and family planning status of India's poor population. It began in 1981 with a planned six year disbursement period.

Other bilateral donor agencies are involved in the voluntary health sector in India including Canadian, Swedish, and Danish International Development Agencies (CIDA, SIDA, and DANIDA, respectively) and Swedish International Development Authority (SIDA). Although these governments operate mostly on a bilateral basis in the health field, they also channel assistance to their own respective non-governmental agencies which in turn operate health programs and projects in India. For example, CIDA works through Canadian PVOs and provides funding for hospital construction, public health programs, drug subsidies, transport, and salary support.

Many voluntary organizations receiving external funding have a religious affiliation mostly with United States and Western European churches. The American Council of Voluntary Agencies for Foreign Services lists 104 U.S.

organizations, representing almost all denominations, which provide developmental assistance and material aid in India. Out of the total, there are 73 with medical and public health, nutrition and/or population and family planning programs. These PVOs, with a few major exceptions, tend to work at just one or two sites in rural areas and have modest budgets. The three exceptions are Catholic Relief Services, Church World Service, and Lutheran World Relief. Each of these PVOs have a large number of developmental projects all over India. All three import U.S. medical equipment and supplies for Mission clinics and hospitals, provide food for Maternal and Child Health (MCH) programs, and support limited community health programs. Secular foreign PVOs active in this sector are less numerous, but include CARE (U.S.), Catholic Relief Services, Oxfam (U.K.), Novid (Netherlands), and Save the Children Fund.

In the past, USAID has contributed about Rs 250 million (US \$30 million) to assist the construction and equipping of eight leading private sector medical institutions in India. In addition, in the late 1960's and early 1970's, USAID provided about Rs 3.2 million (US \$260,000) to support family planning activities in the private sector.

Since its inception, the PVOH project has had difficulties in finding suitable organizations to accept the money. The project hopes to make grants around \$1 million but requires the grantee to provide an additional 25 percent. Most organizations are not able to use such large grants nor can they provide such a large amount of additional funds. Three grants have been made so far, and another is under negotiation. Certainly the goals of the project are congruent both with the expressed goals of the GOI and USAID. The GOI has had a Grant-in-Aid program under the MOHFW and had dispersed a total of \$4.7 million from 1974 to 1981. This PVOH project clearly fits the USAID strategy for improving rural infant and child mortality by improving health care and the strategy of encouraging private sector involvement. In the future, USAID will probably have to play a more active role in helping the GOI seek out organizations who could use this money.

### C. Malaria

In 1981, USAID completed the last year of a \$38 million commodity assistance loan to the GOI for the reduction in malaria. This assistance was not continued because USAID's strategy changed and discouraged the provision of commodities. At the present time USAID/India funds no malaria control projects. Further investigation, not possible within the short duration of this consultancy, would be required to clarify the involvement of other donors in this area.

The emphasis for future malaria projects of USAID in Asia as of July 1984 is as follows:

A.I.D. malaria assistance will concentrate on the development of cost-effective control programs which make feasible utilization of the Primary Health (PHC) system. A.I.D. will emphasize:

- The design process to prepare projects with clear, prioritized objectives.

- A choice of control tactics keyed to the epidemiological conditions faced and to technical and administrative capacity, within a framework of indigenous self-sufficiency.
- Increased support for biomedical and applied research and training, to enable development, adaptation and transfer of cost-effective malaria control technology.\*

USAID/India has discussed funding an improved computerized management information system for malaria with the GOI. With such a systems, recognition of problem areas would be faster and more accurate and response time for control measures would be shortened.

#### **D. Integrated Child Development Services (ICDS)**

The project proposes to test a comprehensive approach to alleviating young child malnutrition and mortality in Indian villages through delivery of supplementary feeding, nutrition education, and health services to those children and pregnant and nursing women most at risk. The project will expand and improve the Integrated Child Development Services Scheme of the GOI and make more effective use of Title II food commodities provided through CARE. It will establish approximately 4,000 improved village child care centers known as "anganwadis" through which an integrated package of services will be provided. These centers will be located in 19 blocks in Panch Mahals District, Gujarat, and Chandrapur District, Maharashtra. It should be noted that Panch Mahals is one of the districts in which health services are being upgraded through USAID's Integrated Rural Health and Population Project. Over the six year life of the project, \$16 million in Development Assistance (DA) Funds will be needed, and Title II food costing an estimated \$18 million plus \$7 million for ocean transport. The Government of India will contribute \$9.5 million or approximately 35 percent of the total cost of this project. Some inputs will be provided by UNICEF through its agreement with the GOI, e.g. weighing scales, jeeps and training stipends for some of the workers.

Improvements will be made through this project to get appropriate food rations to pregnant and nursing women and moderately and severely malnourished children under three years of age along with enhanced nutrition and health education and health services. Improvements will also be made in training, monitoring, and evaluation. To accomplish these improvements, supervisory and technical staff will be added at various levels of project management and given special training. Village level workers' training will be strengthened to impart the skills needed to reduce malnutrition and mortality. Substantial technical assistance from the U.S. and from within India will be provided to make these improvements and to adapt systems and techniques that have been found effective elsewhere.

A key element of the project is support for an improved management information system within ICDS to monitor the implementation of new techniques and skills for growth monitoring, supplementary feeding, nutrition education, and selected health services. This system will be coupled with

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\* Source: Revised Agency Guidance on Malaria Control, Feb., 1984, Page 27.

continuous impact evaluation surveys in a sample of villages to analyze the effects of the project on the nutritional status of the target group. Data generated from the monitoring and evaluation systems will be used as a basis for assessing potential policy and procedural changes throughout ICDS. The extent to which the project's management staff respond to data from the monitoring and evaluation systems to make necessary adjustments during implementation will be an indicator of the effectiveness of these improved systems.

Another important element of the project is research conducted by Indian scientists in collaboration with experts from the United States in the critical area of low birth weight. Studies will evaluate the causes of low birth weight and interventions to improve it. Although this research will not be finished in time to influence the design or operation of anganwadis during the life of this project, it does promise valuable guidance in the planning of future health and nutrition programs to reduce infant mortality. The details of this research will be finalized by the Indian Council of Medical Research (ICMR) subject to the approval of the Ministry of Health and Family Welfare.

Table 38 outlines the contents of the budget for the ICDS project. Forty percent of the entire budget (AID plus GOI) will pay staff costs, 20 percent is for research and innovative activities and ten percent is for training and nutrition/health education. The remaining 30 percent is for operations, furniture, equipment, technical assistance, etc.

This project began only one year ago so that little evaluation can be made. The major problems have been difficulty in assuring a supply of high quality food supplements to the anganwadis and the slow provision of staff in some areas. In 1984 only 27 percent of the anganwadis in Maharashtra were regularly distributed food. In addition, some of the health service envisioned in ICDS have not occurred as scheduled because of a shortage of health staff, particularly female health workers and medical officers, and because doctors in primary health centers are frequently reluctant to take on responsibility of village visits. The low birth weight research activity has stalled in the process of obtaining clearances from the MOHFW and will not begin for probably another year.

#### **E. Biomedical Support**

USAID/Washington has identified biomedical research as a priority area for technical assistance and collaboration and has earmarked in its plans from FY 1984 to 1989 a total of 9.8 million dollars about equally divided between grants and loans. At the present time the GOI has demonstrated little interest in these funds and in the projects USAID has suggested for its use. Even though the GOI, through the Indian Council for Medical Research, places some importance on research, AID has yet to negotiate mutually acceptable projects. To some extent, the biomedical research community here feels that sufficient funds are available locally.

Some funds could be used to provide India the production capacity for measles vaccine and improve production capacity of other vaccines. This endeavor would include transfer of technology and technical assistance plus some possible private sector involvement from the U.S. and India.

Some other areas for possible involvement of USAID in biomedical support that may lead to rapid introduction of effective mortality-reducing interventions may be:

1. **Facilitation of local manufacture and use of the new, more effective, oral typhoid vaccine.** In the draft of the Seventh Five Year Plan, the target for typhoid vaccinations for school entrants is 85 percent. The presently available vaccine is intramuscular, requires at least two doses, and is only about 60 percent effective in disease prevention. Since this disease is recognized as a priority, the new vaccine would be an improvement over present technology. The testing of the new vaccine might be a vehicle to use typhoid rapid diagnostic techniques (developed by Dr. J. Johns, Vellore), develop epidemiologic skills in the design, management, and analysis of the study, and to evaluate the importance of this disease in this country.
2. **Field trials of presently available vaccines for respiratory infections, namely pneumococcal vaccine, influenza, A and B vaccine, and Hemophilus influenza vaccine.** Pneumococcal vaccine resulted in approximately a 20 percent decline in mortality in Papua New Guinea. Even though this multivalent polysaccharide vaccine is ineffective in children under two, respiratory infections remain a major cause of death in the age group over two years of age. Controversy exists about the relative importance of viruses versus bacteria in death from respiratory illness, but probably viruses are the initial insult and cause the frequent episodes of acute upper respiratory disease while secondary invasion with bacteria such as pneumococci or Hemophilus cause extensive lower respiratory infection and death. Influenza virus is known to cause some disease in India, but a trial will clarify its importance as a cause of disease and death particularly in children. All of these vaccine trials would function as vehicles to improve rapid diagnostic and epidemiologic skills.
3. **Identification of areas for future malaria vaccine trials.** Within three to five years malaria vaccine will be ready for field efficacy trials. Before these can occur, background community census and evaluation of status of this protozoal infection should be performed.
4. **Field trial of Penicillin or other antibiotic treatment for presumptive lower respiratory tract disease.** The Narangwal study a decade ago first demonstrated the efficacy of intramuscular Penicillin treatment of presumptive lower respiratory tract disease in decreasing infant and child mortality, but before this treatment method is used widely, it should be repeated. For the Narangwal study, specific criteria were developed for the use of the IM Penicillin by the Female Health Workers such as fever, cough, and labored breathing so that the antibiotic was not used for all acute respiratory tract infections. The controls for the Narangwal trial were retrospective (when this treatment was unavailable). Important elements of the proposed study would be:

- a) **Development of criteria for diagnosis of lower respiratory infections and use of Penicillin.** Prior studies of the use of antibiotics for treatment of upper respiratory tract infections have demonstrated Penicillin's lack of efficacy in speeding recovery and in preventing lower respiratory tract infections. In fact, Penicillin prophylaxis of viral respiratory disease may increase the likelihood of acquiring pneumonia with antibiotic-resistant organisms and thereby increase mortality.
  - b) **Dose and delivery systems for Penicillin.** Oral Penicillin may not be as effective as intramuscular because of lower attainable blood levels.
  - c) **Efficacy of Trimethoprim and Sulfamethapazote versus Penicillin.** This drug has a wider spectrum of activity (against Hemophilus), is readily absorbed orally, is almost as inexpensive as oral Penicillin, but has higher rates of allergic side effects (rashes). Certainly, before Penicillin is widely distributed by ANMs, further studies are needed.
5. **Prevention of premature labor by education of mothers to identify signs early and seek health care.** In studies by Creasy and colleagues at the University of California San Francisco, the rate of premature delivery secondary to early labor was reduced by instructing high risk mothers in recognition of signs of early labor and developing a rapid referral system for intervention. This might be a reasonable method to study to attempt to decrease low birth weight.
  6. **Prevention of prematurity with chlorquine prophylaxis during malaria seasons in high transmission areas.**
  7. **Rapid diagnosis and treatment of nutritional anemias.**

#### IV. DEFICIENCIES IN THE SYSTEM

Indian health policy has consistently embraced the long range goal of high coverage of services leading to Health For All. Emphasis has been placed on Family Planning (FP), but FP is provided in a context of Maternal and Child Health services since the major mortality occurs among infants and children. The large investment in health infrastructure in the past 37 years of independence has not yielded the expected results in terms of human welfare and improved life expectancy. The Primary Health Care system, although well-conceived and endowed with resources, is not functioning. Even in areas with full facilities and adequate staffing, infant and child mortality remains high. From my review and analysis, the major weaknesses and constraints in the system are the following:

- A. Lack of leadership and managerial skills and public health orientation by the doctors;
- B. Inadequate skills among the peripheral service providers for the key duties they should perform;
- C. Lack of adequate information systems (surveillance, evaluation and feedback) for public health problems;
- D. Deficiencies in drugs and vaccine supply;
- E. Lack of appropriate, cost-effective interventions for several important causes of mortality;
- F. Lack of clear orientation toward providing key services to the highest risk groups;
- G. Lack of community commitment and lack of utilization of the system by high risk groups; and
- H. Lack of supervisory support at all levels.

These constraints are discussed in more detail below with suggestions for possible alleviation:

##### **A. Lack of Leadership and Managerial Skills and Public Health Orientation by Doctors.**

"Present training of M.B.B.S. doctors is examination oriented: didactic, clinical, and curative in emphasis. While social aspects of disease are recognized, students are not given experience in community interaction, nor a role of responsible leadership of a health team nor managerial competency. They are at best clinical curative doctors. The development of improved leadership in health at PHC level is a critical step for significant reductions in child mortality in India. As long as the infrastructure continues without motivated leadership to manage the system at block level, it will continue to fall far short of its potential." (Arole, R.S. and Rohde, J.E., 1983.)

Specific suggestions for USAID assistance include:

1. In the GOI-USAID assisted project areas, training modules should be developed and a system for regular in-service training in teaching, leadership, communication, and management skills for present PHC doctors and a short course for those newly appointed before posting to health centers should be designed and implemented. Initially these modules should emphasize a few key health problems for which cost-effective interventions are available namely, oral rehydration and immunizations (including measles, DPT, tetanus toxoid) and nutrition. As skills increase and oral rehydration and immunization usage rates increase, other areas may be stressed.
2. Suggestions made by Drs. Arole and Rohde in their evaluation of the "Organization of Health Services and Training of Physicians for Child Health Services" included:
  - a) Strengthening the Medical Council of India (MCI) in its role of implementing curriculum change, evaluation, continuing medical education and manpower planning;
  - b) Improve liaison between medical college and health services in the USAID-GOI integrated rural health and population project area;
  - c) Help develop field teaching program for undergraduates and interns;
  - d) Assist states to develop model PHCs including the training of service doctors and community health officers to better lead and manage the health team; and
  - e) Offer resources and technical cooperation to states wishing to try new approaches to implementation of key PHC interventions based on epidemiologically ascertained priorities.

It would be extraordinarily difficult for USAID to effect any change in MCI policies. USAID could attempt to develop model programs for medical school curriculum and training depending on the enthusiasm and constraints of GOI, state governments, and local medical colleges. Such a project requires a long term effort in planning, activating, evaluation, and, if successful, convincing others of its value and finally funding expansion of the system. At present, an approach with regard to preplacement and in-service training may demonstrate results in health faster and, if successful, the types of training given could be used as a model for future medical school curriculum changes.

#### **B. Inadequate Skills Among Peripheral Service Providers.**

The training needs assessment planned by Drs. S. Thomas, Michael O'Byrne, and J. LeSar and performed in the GOI-USAID IRHP area revealed an appalling lack of knowledge in key health problems for MCH and family planning. The ineffective and miserable level of care that results from this is evident from the lack of improvement of health statistics in spite of health infra-

structure development. In addition to the lack of health skills, nursing personnel, including Female Health Worker/Auxiliary Nurse Midwife, Female Health Assistants, Health Guides, and Trained Dais have inadequate abilities in supervising, educating, motivating, and supporting those beneath them in the PHC structure and the public. To teach others requires competence in recognition and management of many common disorders and nutritional needs.

As highlighted in the report of Dr. Ruth Harner, and Professor Betsy Lehman to USAID on "Nurse Education in India: Its Relevance in Provision of Primary Health Care," the Female Health Worker is assigned the "lion's share" of the health promoting activities. This report lists these problems which make the training of Female Health Workers inappropriate and inadequate:

1. lack of enough qualified teaching staff;
2. training sites inappropriately based in urban hospitals;
3. lack of rural field practice areas with adequate facilities;
4. lack of physical facilities and excess population;
5. content of curriculum too traditional and partially irrelevant;
6. teaching/learning methodology is not problem-oriented nor competency based; and
7. training time insufficient to implement curriculum and teach the knowledge and skills needed for job responsibilities.

In addition to the lack of competency of Female Health Workers, Harner and Lehman recognized other difficulties that FHWs encounter in accomplishing their tasks:

1. lengthy travel distances to reach the assigned population;
2. immense work scope, including maintenance of a voluminous record system;
3. sexual harassment faced by young single women assigned to work in villages.

In the GOI-USAID IRHP areas, in-service education for nursing personnel for 12 key areas for lowering infant and child mortality and fertility has occurred and an evaluation is scheduled.

Specific suggestions for USAID assistance in future includes:

1. If this system of in-service education improves competency, then one should consider expanding this system throughout the rest of the states where USAID is involved. If this system does not improve competency, then other methods should be considered for future in-service training efforts.
2. Continued emphasis on in-service education to improve the teaching, leadership health promoting, and supervisory skills of nurses, par-

ticularly regarding a smaller number of cost-effective mortality reduction interventions, namely ORT, growth monitoring and immunizations, should be established. This could include audiovisual mater material that could be brought to the blocks or villages and in centralized areas. This in-service training should be coordinated with an expanded effort to provide vaccines and mass advertising campaigns to educate the public.

3. The Harner and Lehman report suggested the establishment of an experimental FHW school to implement innovative ideas for nursing educations. This would help make the training of FHWs relevant and based on skills or competencies required for work at the subcenters. This project would not be valuable unless USAID made a long term commitment to planning, implementation, education, and, if this new school demonstrates improved FHW functioning, to convincing others of its value and then funding duplicate schools elsewhere.
4. To resolve the other difficulties of FHWs noted by Harner and Lehman, USAID should assure in their projects that FHW and supervisors have the facilities to make the needed visits, that women from the local areas are trained for these positions, and that the record keeping requirements are streamlined.

### C. Lack of Adequate Information Systems.

Female Health Workers spend a substantial proportion of their time in record keeping. These include an extensive baseline survey, household/family records which must be updated every three years, and a MCH register with nine sections, a child care register with three sections, and a monthly report with 12 major sections. But in addition, there are seven more registers with a total of 209 separate columns to be filled in. These records need to be assessed for their utility and value in relation to the time spent on keeping them. Certainly FHW time would be better spent in health promoting activities and most of the accumulated data are unused. In spite of the voluminous records, infant and child mortality rates, birth rates, malnutrition rates, contraceptive acceptance rates and immunization rates can only be roughly estimated because of a lack of knowledge of denominator size.

A streamlined system of surveillance, record keeping and data transmission would make the available information more valuable. An improvement in the system to evaluate this information and then respond or provide feedback would encourage more careful surveillance. Through this system, incipient epidemics and high risk population groups or areas could be identified and interventions targeted. The family folder system developed by the Christian Medical College, Ludhiana, may be one method to improve data collection and record keeping, but improvement is also needed in the evaluation and feedback segments.

The following recommendations are suggested to USAID:

1. Continue to encourage use of family folders in model projects and if successful, subsidize and facilitate expansion of use throughout the states in which USAID is involved.

2. Facilitate reorganization of the surveillance system for increased efficiency. This will be particularly important, for example, to monitor and evaluate the proposed introduction of measles vaccine in Maharashtra.
3. A model malaria information system has been developed for USAID by a local organization. Facilitation of use of this system by the GOI should aid in recognition of changes in malaria transmission patterns and rapid response to them.

#### **D. Deficiencies in Drug and Vaccine Supplies**

Even near cities, drug and vaccine supplies are erratic, adversely influencing the credibility and efficacy of the health system.

Specific suggestions for USAID:

1. Within the context of a coordinated health effort to improve vaccine and oral rehydration acceptance, improve the management of the drug supply and vaccine cold chain. The system should begin in a small area and eventually enlarge to include larger areas. Such a system, functioning well for a small number of items, may be slowly expanded to include others.

#### **E. Lack of Appropriate, Cost-Effective Interventions for Several Important Causes of Mortality.**

Measles vaccine is not locally produced and is essentially unavailable. USAID might aid the GOI with technical assistance to eventually manufacture locally all vaccine needed in the country. Acute respiratory infections, prematurity, and septicemia are three examples of important causes of infant and child mortality for which no safe, inexpensive treatment, or preventive methods are available for use by FHWs. USAID is already jointly funding research into prematurity with the Indian Council of Medical Research under the ICDS Project. In the proposed Biomedical Support Project, Section I mentioned several possible research projects that may lead to valuable interventions. These include: trial of the new typhoid vaccines, development of criteria for effective use of oral and/or intramuscular Penicillin and Sulfa/trimethoprim for treatment of respiratory infections, pneumococcal vaccine trials, influenza vaccine trial, establishment of an area for future malaria vaccine trials, chloroquine prophylaxis in pregnancy trials, trials of efficacy of teaching mothers early recognition of signs of premature labor, and rapid diagnosis and treatment of nutritional anemia. As new cost-effective interventions become available, USAID should encourage and facilitate their widespread use.

Up to now the GOI has not expressed much interest in collaboration with USAID for biomedical research support. Certainly any efforts by USAID will require GOI support and commitment. Because of these constraints, USAID may not be able to become involved in this area.

**F. Lack of Clear Orientation Toward Providing Key Services to the Highest Risk Groups.**

Throughout the Ministry of Health and Family Welfare and the PHC system, family planning is most important with health a distant second. But even within health, the proportion of workers' time actually spent doing effective health promoting activities is small, and outreach activities to high risk groups become limited. USAID should encourage concentration on a small number of effective interventions and their provision to the high risk groups.

**G. Lack of Utilization of Health Services by Highest Risk Groups.**

Lack of utilization of health services particularly by those groups with the poorest health (the rural poor with female children) may result from a number of factors such as lack of credibility of the health services (poorly trained staff, lack of communication, few drugs available), inaccessibility of centers and subcenters, and expense. Certainly more information in this area would be helpful.

The Indian health system as planned, attempts to reach out to provide Health For All. The Female Health Worker becomes the key person to assure outreach of services by home visits of all families in her area, providing health education and encouraging use of services. This is probably her most important function. Nevertheless, her scope of work is so large that this important part of her job may be given short shrift. She is usually provided no means of transport so that those areas farther than a short walk may be visited infrequently. The ANM should make use of the Anganwadi Worker (AWW) in areas where ICDS projects are functioning. The AWW can be of great help in reaching the larger groups.

Suggestions for USAID:

1. Mass health education campaign in one or two states in which USAID is involved, coordinated with increased efforts to improve measles and other vaccines and oral rehydration. Efforts must be made to reach inaccessible areas and poor, illiterate segments of the population through a variety of media. Health education can ensure the evolution of the community felt needs and then community commitment for these health promoting efforts.
2. Study reasons for lack of utilization of health services in targeted areas. This study should identify problems that can then be addressed.
3. Strive to take advantage of ICDS infrastructure in USAID assisted districts where it exists.

**H. Lack of Supervision at All Levels.**

Particularly the health personnel stationed in accessible rural areas suffer from lack of supervision. Supervision is important to ensure staff capability and functioning. The lack of teaching, communication and leader-

ship skills were discussed above, but lack of transport and housing facilities may also interfere.

Suggestions for USAID:

1. Make adequate provisions for scheduling and transport for supervisory visits at all levels.

## V. SUMMARY OF RECOMMENDATIONS

### A. Short Term One to Five Years

1. USAID should concentrate on one or two states (Maharashtra and Gujarat in which cooperation by state officials has been best) rather than diffused in five states as the IRHP has done and should begin in the areas in which the IRHP has established health facilities. An intensive oral rehydration and immunization program is suggested coordinated with mass media health education and development of a related information system, and in-service staff training to improve skills. The IRHP, baseline surveys and assessments of training, communication, and management needs identified areas for further training, and this information should be useful in developing training modules. Once acceptance levels are high in these initial areas, then the program should gradually be expanded to encompass the whole state. (N.B.: Population of Maharashtra and Gujarat combined is more than 100,000,000 people). Immunization campaigns may sound simple, but at least the following sets of factors must be considered in implementation:

- a) **Vaccines employed and methods of administration.** Different vaccines may be needed in different places and these have different temperature sensitivities. For example, measles and polio require cold chain; Japanese encephalitis, yellow fever and hepatitis B may only occur in localized areas. Different target groups in the population require different vaccines. Pregnant women or those of childbearing age need tetanus toxoid; measles must be given to those older than nine months; BCG can be given from birth; DPT and polio to infants older than three months. Vaccines have different methods of administration: Subcutaneous versus intradermal versus intramuscular. Vaccines may be packaged differently depending on the needs of the program. Multidose vials cost much less than single dose ones; therefore, the planners may want to design the program to vaccinate as many as possible in one day.
- b) **Method utilized for vaccine distribution.** House-to-house distribution may be required in areas of Muslim purdah and in areas where the socio-economically underprivileged stay. In other areas, outreach, school programs, or daily availability of vaccines at the health center may be most efficient.
- c) **Techniques used to motivate residents to reach out for at least accept vaccination.** Promotional-educational campaigns must be appropriate and carefully coordinated with scheduling of where and when vaccines will be available. Vaccination campaigns must be coordinated with other seasonal and weekly activities so that the largest number of the target group can be reached and health staff are available (for example, vaccine campaigns at the same time as family planning campaigns should probably be avoided).
- d) **Design of the assessment mechanisms and their use in management.** The program must assure that the vaccines remain potent

at the time of administration. The data that must be collected should include at least numbers vaccinated, proportion of target population actually immunized, number of cases and deaths occurring. Different antigens require different data.

e) **Organizational structure and management of the program.** The leadership should provide technical guidance and training to facilitate incorporation of practical experience into operation; to assure timely receipt and distribution of vaccines and equipment, to identify and resolve problems; to provide encouragement to field staff; and to develop and sustain mechanisms for measurement of progress.

2. Facilitation of the implementation of malaria information system.
3. Facilitate local manufacture of vaccines, e.g. measles, typhoid and rabies.
4. Make greater efforts to seek out and identify private voluntary organizations who could effectively expand services with USAID-GOI funding.

#### **B. Long Term, More Than Five Years**

1. Improve training and nursing school curricula. Nursing education eventually should be competency-based stressing skills required in the PHC system.
2. Encourage the development of curricula changes in medical colleges to include community involvement, training in management, and leadership skills needed in PHC. Initially this could be done by integration of a community health course by nearby medical schools in the GOI-USAID areas. In order for this to have any long term influence on the directions of medical education, workshops and seminars and other methods for popularizing this approach must be sponsored.
3. Strengthen the National Institute of Communicable Diseases through provision of laboratory equipment and reagents and funding training of epidemiologists initially at CDC or WHO or other such centers. Eventually an upgraded epidemicology training program should be developed here.

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## APPENDIX A

### PREMATURITY

Two studies in India have weighed infants at birth and followed them longitudinally. Premature infants (those with less than 2500 grams birth weight) have more than five times greater risk of death in infancy as those born of normal weight. In Tamil Nadu, up to 30 percent of infants are born premature, and the infants contribute almost 60 percent of the infant deaths. In addition, these premature infants slowly attain the normal weight-for-age so that they become malnourished during childhood.

Prematurity can result from either a preterm delivery or slow intrauterine fetal growth. Many factors affect the rate of prematurity (the following list does not purport to establish orders of magnitude nor account for the interdependence of factors):

- gestational age at birth;
- sex (male babies in developed countries are about 150 grams heavier at term than female babies);
- birth order (second babies are usually 100 grams heavier than first babies);
- birth spacing (a longer birth interval is associated with higher birth weights);
- maternal age (teenage mothers tend to produce babies of lower birth weight);
- infection during pregnancy (primarily a symptomatic maternal genital infection with Group B strep, mycoplasma, chlamydia, possibly other organisms in the mother initiating premature labor or interfering with intrauterine fetal growth);
- previous obstetric history (women with prior still births have second babies who are about 250 grams lighter);
- maternal illness (hypertension, heart disease, and other illnesses result in lighter babies);
- socio-economic status (in the UK studies, a 50 gram difference between highest and lowest);
- altitude (an increase of 1000 meters in altitude seems to result in a decrease of about 100 grams in birth weight);
- smoking (associated with a 50-100 gram lower birth weight);
- falciparum malaria in holoendemic areas (control or effective prophylaxis causes a 75 to 250 gram increase in birth weight);
- parental size and prepregnancy weight;

- ° weight gain during pregnancy and nutritional status of the mother (discussed below);
- ° hard physical labor during pregnancy when maternal diet is inadequate (discussed below).

Given the underlying role of maternal nutrition in so many of these factors, it is important to consider the potential effect of gestational food supplements on infant birth weight. Many studies have occurred, but most have been poorly controlled. Usually nutrition supplement acceptors are compared with refusers. Refusers are a poor control group because this group in general has much poorer health and birth weights. Six key studies using adequate controls are described here:

1. In the U.S., Rush provided either a high-protein or a balanced protein-calorie supplement to two groups of poor black urban women in their second and third trimesters. With the high-protein supplement, the results were detrimental: this group displayed significant growth retardation up to 37 weeks of gestation, as well as an excess of very early premature births and associated neonatal deaths, when compared with a control group. The balanced protein-calorie supplement resulted in no increase in birth weight compared with the control group (Rush, et al, 1980).
2. In Birmingham, England, Viegas and colleagues provided vitamins only, calories and vitamins, or protein-calorie-vitamin supplements to three groups of Asian women. Among inadequately-nourished women given the protein-calorie-vitamin supplement, mean birth weight was 310 grams higher than that of the group given vitamins only. The mean birth weight of babies born to adequately nourished women given the triple supplementation was actually 70 grams lower than the mean of the vitamin only group, a difference that did not quite reach statistical significance ( $p = 0.06$ ). It is noteworthy that infant's head circumference did not increase in the group with increased birth weights. Since the head is the usual presenting part for vaginal delivery, it can be inferred that an increase in birth weight as a result of nutritional supplementation will not increase the risk of cephalo-pelvic disproportion and related problems in labor (Viegas, et al, 1982).
3. Bacon Chow studied fourteen villages in Taiwan where women were provided either a high-calorie/protein supplement or a low-calorie supplement throughout pregnancy. The only result from the study was that female infants in the high-calorie/protein group displayed a non-significant increase in birth weight over males in the same group. In retrospect, the population was adequately nourished (McDonald, et al., 1981).
4. In rural Guatemala, a group receiving a high-calorie/protein supplement was compared with a control group receiving a supplement containing only carbohydrates and fewer calories. The group receiving the high-calorie/protein supplement delivered babies with a mean birth weight 110 grams higher than the mean of the control group; the incidence of low-birth-weight babies in this group was

eight percent, as compared to 17 percent in the control group (Lechtig, et al., 1975; Lechtig, et al., 1978). The supplement benefited primarily women of low socio-economic status and of small stature (less than 147 centimeters).

5. In the barrios of Bogota, Colombia, foodstuffs were provided to entire families in which women were in the third trimester of pregnancy and families in which at least 50 percent of the children were malnourished. The mean birth weight of the infants born in the group receiving supplementation was not significantly higher than in the control group, although male infants in the supplemented group were an average of 95 grams heavier (Mora, et al., 1979).
6. In The Gambia, a high-calorie dietary supplement was provided to all pregnant women in the second and third trimesters; results were compared to retrospective data collected among this well studied, stable population. Even though this study suffers from lack of simultaneous controls and comparison of food acceptors with non-acceptors, it is a worthwhile study as this community has been investigated by this group for many years, and community involvement and participation in studies is great. In the wet season, when the women were normally in marked negative energy balance because of food shortages and a high agricultural work load, the supplementation increased birth weight by a mean of 224 grams and reduced the incidence of low-birth-weight babies from 28.2 percent to 4.7 percent. In the dry season, when the women were normally in positive energy balance (despite an intake of only 60 percent of the recommended calories), the supplementation had no effect on birth weights. The wet-season fetal weight gain was associated with a mean increase in head circumference of seven millimeters; the authors specifically noted that there were no difficulties during labor attributed to cephalo-pelvic disproportion (Prentice, et al, 1983).

From these studies, it can be concluded that:

1. Among those women who are severely malnourished, nutritional supplementation in the second and third trimesters can increase the average birth weight of infants.
2. Nutritional supplements--particularly high-protein supplements--for women who are adequately nourished may have a detrimental effect of fetal development.
3. In areas of food shortage during periods requiring hard physical labor, nutritional supplementation during the second and third trimesters can increase the average birth weight.
4. The birth weight increases associated with nutritional supplementation do not seem to be associated with any increase in labor or delivery problems from cephalo-pelvic disproportion.

From the standpoint of policy, if nutritional supplementation is used as an intervention in hopes of decreasing the number of low-birth-weight babies, it must be carefully focussed on malnourished women who are in the lower socio-economic group, performing hard physical labor, poorly-nourished, and/or living in areas of chronic food shortages.

Other interventions now available to prevent low-birth-weight include encouragement of family planning to increase the age of first birth and lengthen the birth intervals, health education to discourage smoking (the effect of tobacco chewing is unknown), and malaria control. Antenatal care and education to recognize and rapidly control premature labor may also prevent prematurity. The cost effectiveness of these interventions is unknown and should be studied prior to introduction. Research into causes and relative importance of infection in pregnancy may eventually provide low cost treatment or vaccines to prevent prematurity.

## APPENDIX B

### INTERVIEWS

#### USAID

Mr. John Rogosch  
Dr. P. Diesh  
Dr. S. Thomas  
Mr. M. Jordan  
Mr. S. Silberstein  
Dr. W. Beasley  
Mr. W. Goldman  
Mr. O. Cylka  
Mr. S. Sen Gupta  
Dr. E. Haran

#### GOI

Mr. Kang  
Dr. Umashankar  
Mr. Syiem  
Dr. Banerji

#### Bombay, August 22 and 23, Wednesday and Thursday

Dr. Badade, Joint Director, USAID, IRHP and Regional Medical Officer  
Dr. Khedekan, Planning Officer, USAID, IRHP  
Mr. Srinavasin, Secretary of Public Health  
Dr. Panse, Joint Director, Health Planning  
Dr. Chandrakepur, Director of Health Services  
Mr. Desai, Joint Secretary, Rural Development Department

#### Gujarat, August 26 and 27

##### 26 August Kapadwanj (town)

Dr. J. C. Patel, Surgeon  
Dr. K. K. Shah, General Practitioner and past PHC doctor  
Dr. Gundiloo, Surgeon  
Principal Y.S. Yadau, Principal, Arts and Commerce College

##### 27 August Ahmedabad

Ms. Nilene Patel, Nursing Supervisor, AID, IRHP  
Dr. Kamla Nair, Deputy Director, Training  
Dr. Katiya, Head of USAID, IRHP  
Mr. Joshi, Information, Education and Communications Officer

Table 1  
Population of India 1901 - 1981

Year	Population (In '000)	Decadal Growth Rate	
		Absolute Change (In '000)	Percentage
1901	238,396	---	---
1911	252,033	+ 13,697	+ 5.75
1921	251,321	- 772	- 0.31
1931	278,977	+ 27,656	+ 11.00
1941	318,661	+ 39,683	+ 14.22
1951	361,088	+ 42,420	+ 13.31
1961	439,235	+ 77,683	+ 21.51
1971	548,160	+ 108,925	+ 24.80
1981	685,185	+ 137,025	+ 25.00

Source: Census of India 1981.

Table 2  
Infant Mortality Rate in India: 1911-1980

Period	IMR
1911-1915	204 (5 years average)
1916-1920	219 "
1921-1925	174 "
1926-1930	178 "
1931-1935	174 "
1936-1940	161 "
1941-1945	161 "
1946-1950	134 "
1951-1961	146 (Actuarial Report)
1961-1971	129 "
1970	129 SRS
1971	129 "
1972	139 "
1973	134 "
1974	126 "
1975	140 "
1976	129 "
1977	130 "
1978	126 Survey
1979	120 SRS
1980	114 "

Source: Survey on Infant and Child Mortality  
1979, Office of the Registrar General.

**Table 3**  
**Age-Specific Death Rate 0-4 Years**

	Rural			Urban			Total		
	Male	Female	Person	Male	Female	Person	Male	Female	Person
1970	55.5	61.0	51.8	32.3	32.3	32.3	51.7	55.1	53.0
1971	53.2	59.3	56.2	31.1	33.3	32.2	49.2	54.8	51.9
1973	53.1	60.8	56.8	29.6	33.4	31.4	48.9	56.0	52.3
1976	54.2	55.9	55.2	29.0	30.0	29.7	49.6	51.9	51.1
1978	54.0	54.3	54.1	30.0	31.1	30.7	50.0	50.2	50.1

Source: Survey on Infant and Child Mortality, 1979, Office of the Registrar General.

**Table 4**  
**Age Sex-Specific Death Rate in India**  
**(1978)**

	Rural			Urban			Combined		
	Male	Female	Person	Male	Female	Person	Male	Female	Person
1	2	3	4	5	6	7	8	9	10
0- 4	48.9	57.9	53.2	25.5	27.2	26.3	44.7	52.1	48.3
5- 9	4.2	5.5	4.8	1.5	1.5	1.5	3.7	4.7	4.2
10-14	2.1	2.2	2.2	0.9	1.1	1.0	2.0	2.0	2.0
15-19	2.2	3.3	2.8	1.4	1.7	1.6	2.1	3.0	2.5
20-24	2.9	4.5	3.6	2.3	2.8	2.5	2.7	4.1	3.4
25-29	3.7	4.5	4.0	2.4	2.7	2.6	3.4	4.1	3.7
30-34	4.3	4.2	4.2	2.4	2.9	2.7	3.8	3.9	3.9
35-39	5.5	5.0	5.2	4.3	3.4	3.9	5.2	4.7	4.9
40-44	8.0	7.3	7.6	5.4	4.2	4.9	7.4	6.7	7.1
45-49	11.4	7.7	9.6	11.3	7.2	9.4	11.4	7.6	9.6
50-54	17.6	13.4	15.6	17.5	11.3	14.7	17.5	13.0	15.4
55-59	27.4	20.5	24.1	24.6	17.1	21.1	26.9	19.9	23.6
60-64	43.7	32.8	38.3	38.2	30.1	34.2	42.7	32.4	37.5
65-69	58.3	49.4	53.8	48.3	36.4	42.3	56.5	47.1	51.7
70+	110.3	106.6	108.4	109.6	103.1	106.2	110.2	106.0	108.0
All Ages	14.9	15.8	15.3	9.6	9.1	9.4	13.8	14.5	14.2

(Excludes Bihar and West Bengal)

Source: Sample Registration System, R. G. India.

**Table 5**  
**Access to Sanitation**  
**(Population Served in Millions)**

	1970		1975		1981	
	Population	Percentage Served	Population	Percentage Served	Population	Percentage Served
Urban	30.0	27.5	35.5	27.8	39.93	26.9
Rural	0.5	0.1	1.7	0.4	2.80	0.5
Total	30.5	5.6	37.2	6.1	42.73	6.4

Source: UNICEF. An Analysis of the Situation of Children In India, 1984.

**Table 6**  
**Access to Safe Water Supply 1970-1981**  
**(Population Served in Millions)**

	1970		1975		1981	
	Population	Percentage Served	Population	Percentage Served	Population	Percentage Served
Urban	66.3	60.8	107.0	83.8	115.48	77.8
Rural	25.0	5.7	86.0	17.9	162.07	30.9
Total	91.3	16.7	195.0	32.1	277.55	41.3

Source: National Master Plan for Water Supply and Sanitation.

**Table 7**  
**State Population 1981**

States	Population (In 000's)	Average Annual Growth Rate 1971-1981	Percentage of Total Population of India
Maharashtra	62,784	2.7	9.16
Gujarat	34,086	2.8	4.97
Punjab	16,789	2.2	2.45
Haryana	12,923	2.9	1.89
Himachal Pradesh	4,281		0.62

Source: Census of India, 1981.

**Table 8**  
**Vital Statistics of Selected States**

State	Crude Birth Rate <sup>a</sup> 1978-1980			Crude Death Rate <sup>a</sup> 1979-1981			% of Infant <sup>a</sup> Deaths to Total Deaths 1976-1978	Infant Mortality Rates <sup>a</sup> 1980			F/M Sex Ratio <sup>b</sup> 1981	Adult Literacy Rate <sup>b</sup>		
	Rural	Urban	Combined	Rural	Urban	Combined		Rural	Urban	Combined		Persons	Male	Female
Maharashtra	28.9	25.3	27.8	11.2	7.5	10.0	21.8	84	52	75	939	52	69	35
Gujarat	36.9	31.5	35.5	13.0	10.5	12.4	34.4	119	94	113	942	48	63	33
Punjab	29.8	27.7	29.3	9.7	7.3	9.2	30.4	96	58	89	886	42	51	32
Haryana	37.0	29.3	35.8	11.6	7.8	11.0	29.0	111	53	103	877	39	54	22
Himachal Pradesh	30.6	21.2	30.2	11.0	5.6	10.8	27.4	88	62	87	988	NA	NA	NA
Kerala	26.2	24.8	25.9	7.0	6.3	6.9	16.9	41	34	40	1034	78	86	71
Uttar Pradesh	40.9	32.4	39.8	17.3	10.1	16.4	35.1	167	99	159	886	30.5	45	14

<sup>a</sup> Source: Vital Statistics Division, Office of the Registrar General.

<sup>b</sup> Census of India, 1981.

**Table 9**  
**Access to Safe Water and Sanitation (1981)**

State	Sanitation: % Served			Safewater: % Served		
	Rural	Urban	Total	Rural	Urban	Total
Maharashtra	---	40	14	19	99	47
Gujurat	0.3	44	13	70	95	78
Punjab	---	39	10	20	72	34
Haryana	---	14.5	3	27	47	31
Himachal Pradesh	---	13	10	46	96	50
Kerala	0.5	6	1.5	28	61	34
Uttar Pradesh	---	16	2	7	89	19

Source: National Master Plan for Water Supply and Sanitation.

**Table 10**  
**Neonatal and Postneonatal Infant Mortality Per 1,000 Live Births\***

	Rural	Urban
Neonatal	80	40
Postneonatal	56	30
Total	136	71

\* Combined urban/rural infant mortality 126/1,000.

Source: Survey of Infant and Child Mortality, 1979.

Table 11  
Infant Mortality Rate by Sex Per 1,000 Live Births\*

	Rural	Urban
Male	130	71
Female	143	71
Total	136	71

\* Combined urban/rural infant mortality 126/1,000.

Source: Survey of Infant and Child Mortality, 1979.

Table 12

Location	Live Births	Infant (-1 year)		Neonatal (0-27 days)		Postnatal (28 days - 11 months)		Year
		No.	Rate	No.	Rate	No.	Rate	
		Rural Community	8,109	677	83.5	353	43.5	
Baliabgarh	1,529	141	92.2	78	52.0	63	41.2	1975
Urban Pondicherry	807	65	80.5	28	34.7	37	45.8	1968-72
Urban Birth Cohort								
South Delhi	5,592	254	45.4	---	21.2	---	24.2	1969-72
Narangwal, Punjab	2,984	310	103.9	178	59.7	132	44.2	1970-72
North Arcot District								
Tamil Nadu Rural	4,757	543	114.3	288	60.5	255	53.6	1970-72
Urban	3,485	381	109.3	152	43.6	229	65.7	1970-72
Ludhiana, Punjab								
Three Rural Centers	1,961	194	98.9	101	51.5	93	47.4	1978-80
Urban Center	925	51	55.1	24	25.9	27	29.1	1978-80
Rajasthan Villages	500	62	124.0	31	62.0	31	62.0	1977
Uttar Pradesh	3,267	---	168.0	---	100.0	---	68.0	1965-69
Karnataka (Rural)	1,810	102	62.0	40	1977.8	---	---	-----

**Table 13**  
**Underlying Causes of Neonatal Mortality In Three Rural Centers of CMC Ludhiana District of the Punjab 1978-80**  
**and In Rural and Urban Areas of CMC North Arcot District of Tamil Nadu 1970-72, India and**  
**Two Projects of InterAmerican Investigation of Mortality 1968-1970.**

Underlying Causes	Ludhiana		North Arcot District				Recife		California	
	Three Rural Centers		Rural		Urban		Project		Project	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
<b>All Causes</b>	<b>101</b>	<b>51.4</b>	<b>288</b>	<b>60.5</b>	<b>152</b>	<b>43.6</b>	<b>1,073</b>	<b>35.3</b>	<b>570</b>	<b>12.7</b>
Diarrheal disease	9	4.6	4	0.8	3	0.9	146	4.8	2	0.0
Tetanus	4	2.0	4	0.8	1	0.3	22	0.7	--	---
Other infectious disease	1	0.5	3	0.6	5	1.4	30	1.0	14	0.3
Diseases of respiratory system	5	2.6	3	0.6	-	--	62	2.0	13	0.3
Congenital anomalies	11	5.6	7	1.5	2	0.6	55	1.8	105	2.3
Certain perinatal causes	50	25.5	174	36.6	94	27.0	721	23.7	424	9.5
Maternal conditions	3	1.5	4	0.8	-	--	28	0.9	51	1.1
Complications of pregnancy	8	4.1	d		d		128	4.2	127	2.8
Difficult labor, birth injuries	--	--	d		d		135	4.4	42	0.9
Conditions of placenta, cord	2	1.0	d		d		58	1.9	103	2.3
Hemolytic disease	--	--	1	111	55	15.8	10	0.3	5	0.1
Anoxic, hypoxic conditions	9	4.6					260	8.6	73	1.6
Immaturity	24	12.2	32	6.7	22	6.3	59	1.9	19	0.4
Other	4	2.0	27	5.7	17	4.9	43	1.4	4	0.1
Other and unknown causes	21	10.7	93	19.6	47	13.5	37	1.2	12	0.3

Source: Puffer, Infant and Child Mortality In India, 1981.

Table 14  
Top Ten Causes of Infant Mortality<sup>a</sup> in Rural and  
Urban Areas of India - 1978

Rural Area		Urban Area	
Cause	Rate	Cause	Rate
Tetanus	2,267	Prematurity	849
Prematurity	1,179	Tetanus	501
Pneumonia	1,015	Dysentery	408
Dysentery	906	Infantile liver	338
Influenza	729	Influenza	309
Malaria	704	Diarrhea	286
Typhoid	573	Congenital	
Other Disorders of respiratory system	392	malformations	281
Diarrhea	242	Gastroenteritis	260
Gastroenteritis	195	Typhoid	250
		Malaria	180
Total-10 causes	8,202	Total-10 causes	3,662
Remainder	5,398	Remainder	3,338
All Causes	13,600	All Causes	7,000

<sup>a</sup> Per 100,000 population.

Source: Puffer, Infant and Child Mortality in India, 1981.

**Table 15**  
**Mortality<sup>a</sup> of Infants from 28 Days-5 Months Followed in Three Rural Centers of Ludhiana District in the Punjab 1978-1980 and in Rural and Urban Areas of North Arcot District of Tamil Nadu 1970-72, and Recife Project, Brazil.**

Underlying Causes <sup>b</sup>	Ludhiana		Tamil Nadu				Recife, Brazil	
	Three Rural Centers		North Arcot District <sup>c</sup>				Project	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate
<b>All Causes</b>	47	24.1	160	33.4	149	42.8	1,085	35.7
Diarrheal disease	17	8.7	33	6.9	55	15.8	729	24.0
Measles	--	--	6	1.3	2	0.6	20	0.7
Other infectious disease	--	--	10	2.1	12	3.4	53	1.7
Nutritional deficiency	--	--	--	--	1	0.3	12	0.4
Diseases of respiratory system	8	4.1	3	0.6	6	1.7	178	5.9
Congenital anomalies	2	1.0	--	--	1	0.3	40	1.3
Certain perinatal causes	12	6.1	40	8.4	14	4.0	4	0.1
Other and unknown	4	2.1	66	13.9	57	16.4	44	1.4
External Causes	4	2.1	2	0.4	1	0.3	5	0.2

<sup>a</sup> Per 1,000 live births.

<sup>b</sup> According to 1965 Revision of International Classifications Diseases.

<sup>c</sup> Total includes deaths, which were not included in the tables by causes of report, as due to other and unknown causes.

Source: Puffer, Infant and Child Mortality in India, 1981.

**Table 16**  
**Mortality<sup>a</sup> of Infants 6-11 Months of Age Followed in Three Rural Centers of Ludhiana District in Punjab, 1978-1980, and in Rural and Urban Areas of North Arcot District in Tamil Nadu 1970-72, India and in Recife, Brazil Project 1968-1970.**

Underlying Causes <sup>b</sup>	Ludhiana		Tamil Nadu				Recife, Brazil	
	Three Rural Centers		North Arcot District <sup>c</sup>				Project	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate
<b>All Causes</b>	46	23.5	95	20.0	80	23.0	615	20.2
Diarrheal disease	23	11.7	32	6.7	25	7.2	266	8.8
Measles	3	1.5	6	1.3	8	2.3	109	3.6
Other infectious disease	--	---	11	2.3	5	1.4	36	1.2
Nutritional deficiency	3	1.5	--	---	--	---	35	1.2
Diseases of nervous system and sense organs	3	1.5	--	---	--	---	15	0.5
Diseases of respiratory system	10	5.1	1	0.2	--	---	89	2.9
Congenital anomalies	--	---	--	---	1	0.3	16	0.5
Other and unknown	2	1.0	43	9.0	38	10.9	44	1.4
External Causes	2	1.0	2	0.4	3	0.9	5	0.2

<sup>a</sup> Per 1,000 live births.

<sup>b</sup> According to 1965 Revision of International Classifications Diseases.

<sup>c</sup> Total includes deaths, which were not included in the tables by causes of report, as due to other and unknown causes.

Source: Puffer, Infant and Child Mortality in India, 1981.

**Table 17**  
**Mortality in Infancy in Studies in New Delhi**  
**and North Arcot District of India**

Birth Weight In Grams	Infant Mortality per 1,000 Single Births	
	New Delhi India	North Arcot India
<b>Total</b>	<b>46.5</b>	<b>85.9</b>
1,000 or less	1,000.0 ]	568.2
1,001-1,500	615.4 ]	
1,501-2,000	242.7	218.8
2,001-2,250 ]		102.6
2,251-2,500 ]	60.4	84.8
2,501-3,000	21.6	77.2
3,001-3,500 ]		51.9
3,501-4,000 ]	17.9	35.9
4,001 over ]		37.0

Source: Puffer, Infant and Child Mortality in India, 1981.

**Table 18**  
**Range of Child Mortality Among Regions**

State	Male		Female	
	Urban	Rural	Urban	Rural
Maharashtra	<20	25-35	<20	<25
Gujarat	25-30	35-45	25-30	45-55
Punjab	<20	35-45	20-25	35-45
Haryana	<20	25-35	20-25	35-45
Himachal Pradesh	20-25	25-35	<20	35-45
Kerala	<20	<25	<20	25
Uttar Pradesh	30-35	55-65	Over 35	Over 65

Source: Office of the Registrar General, Survey of Infant and Child Mortality.

**Table 19**  
**The Top Ten Causes of Death in Rural and Urban Areas in India as a Percentage of Deaths Among Children Under Four Years of Age**

Cause	1 - 2 Years		2 - 3 Years	
	Rural (%)	Urban (%)	Rural (%)	Urban (%)
Typhoid	12.1	6.9	13.9	11.5
Pneumonia	11.8	9.2	9.3	7.4
Influenza	8.8	6.8	8.7	7.7
Dysentery	8.3	5.4	8.6	5.7
Malaria	4.5	4.3	4.8	3.6
Diarrhea	3.9	8.3	6.2	7.1
Infantile liver Jaundice	3.3	4.7	3.6	2.3
Jaundice	3.2	2.6	---	6.6
Other disorders of respiratory system	2.6	---	---	---
Bronchitis	2.4	---	---	---
Measles	---	3.0	3.1	2.9
Gastroenteritis	---	2.2	2.6	3.4
Tetanus	---	---	3.2	---

Source: Office of the Registrar General Survey on Infant and Child Mortality.

**Table 20**  
**Mortality<sup>a</sup> of Children 1-4 Years of Age Followed in Three Rural Centers of Ludhiana District of Punjab 1978-1980, and in Rural and Urban Areas of North Arcot District of Tamil Nadu 1970-72.**

Underlying Causes <sup>b</sup>	Ludhiana		North Arcot District <sup>c</sup>			
	Three Rural Centers		Rural		Urban	
	No.	Rate	No.	Rate	No.	Rate
All Causes	49	6.9	358	24.0	163	15.0
Diarrheal disease	11	1.6	90	6.0	34	3.1
Measles	8	1.1	37	0.5	36	3.3
Other infectious disease	1	0.1	29	1.9	20	1.8
Nutritional deficiency	5	0.5	--	--	--	--
Diseases of nervous system and sense organs	1	0.1	1	0.1	1	0.1
Diseases of respiratory system	8	1.1	2	0.1	--	--
Congenital anomalies	1	0.1	--	--	--	--
Other and unknown	12	1.7	191	12.8	67	6.1
External Causes	2	0.3	8	0.5	5	0.5

a Deaths per 1,000 population.

b According to 1965 Revision of International Classification of Diseases.

c Total includes several deaths, which were not included in the tables by causes of the report, as due to unknown causes.

Source: Puffer, Infant and Child Mortality in India, 1981.

**Table 21**  
**Comparative Longitudinal Surveys of Acute Respiratory Illness**  
**in Children**

Date	Place	No. of Illnesses Child/Year	Number (Percentage)		
			Respiratory	GI	Other
1947-52	Newcastle, UK	10.0	6.0 (61)	1.0 (11)	3.0 (28)
1948-57	Cleveland, US	12.0	8.0 (65)	2.0 (15)	2.0 (20)
1965-69	Seattle, US	5.5	4.5 (85)	0.5 (7)	0.5 (8)
1965-67	Vellore, India	16.0	7.0 (43)	4.0 (26)	5.0 (31)
1970-73	Narangwal, India	--	4.3	4.2	---

(Numbers and Percent have been rounded)

Source: Steinhoff, M.C. Acute Respiratory Infection of Children in India.

Table 22  
 Infant and Child Mortality in India, 1978  
 by Selected Social and Economic Characteristics

Group	Rural		Urban		
	IMR <sup>a</sup>	1-4 <sup>b</sup>	IMR <sup>a</sup>	1-4 <sup>b</sup>	
<b>Religion:</b>					
Hindu	136	228	70	94	
Muslim	108	242	79	123	
Scheduled Caste	159	268	90	199	
Scheduled Tribe	113	223	--	232	
<b>Education of Mother:</b>					
Illiterate	132	294	81	166	
Literate	90	---	53	---	
Below primary	105	65	59	67	
Primary and above	64	37*	49	24*	
Matric and above		54	--	41	
<b>Infrastructure Facilities:</b>					
Water supply	Yes	108	192	66	96
	No	134	234	94	97
Medical Facilities	Yes	102	198	57	95
	No	136	237	79	97
Motorable road	Yes	110	192	62	86
	No	139	187	82	117
Primary School	Yes	126	--	65	---
	No	145	---	71	---
Railway station	Yes	56	---	65	---
	No	131	---	69	---
Bus stand	Yes	105	---	51	---
	No	138	---	73	---
<b>Source of lighting in the household:</b>					
Electricity	87	---	56	---	
Lamp or lantern	119	---	86	---	
Oil lamp	163	---	99	---	
<b>Source of drinking water:</b>					
Tap	103	---	63	---	
Hand pump	105	---	71	---	
Well	137	---	93	---	
Pond/tank/river	105	---	91	---	

<sup>a</sup> Per 1,000 live births.  
<sup>b</sup> Per 10,000 population  
 \* Primary but below matriculation.

Source: Registrar General (1980).

**Table 23**  
**Statement Showing Targets of Health for All by 2000 A.D. and**  
**Their Plan-Wise Phasing**

Index	National Averages				
	Present	1985	1990	1995	2000 A.D.
Crude death rate	14.1	11.0	10.4	--	9.0
Infant Mortality rate	129	--	80.90	--	Below 60
Perinatal mortality rate	60-109	--	--	--	30-35
Preschool (0-5 years) death rate	35-40	--	20-25	--	10
Maternal mortality rate (MMR)	5-8	--	--	--	Below 2
Life expectancy at birth	52.6 M 51.6 F	--	58.0 M 57.7 F	--	64 yrs.
Birth weight below 2500 g.	30%	--	--	--	10%
Crude birth rate (per 1000)	33.2 (1978)	29.5 (1983)	27.0 (1988)	--	21.0
Percentage effective couples protection	22.0	35	44	--	60.0
Mean age at first marriage (female)	17.2 (1971)	20	--	--	--
Net reproduction rate	1.67	--	--	--	1.0
Natural growth rate	1.9 (1978)	1.79 (1983)	1.66 (1988)	--	1.26
Family size	4.3 (1979)	--	--	--	2.3
Percentage pregnant mothers receiving ante-natal care	Rural 56.3 (estimate) Urban 46.3 (estimate)	--	--	--	0
Percentage of deliveries by trained birth attendants	10-15% (estimate)	--	--	--	100
Percentage population with protected water supply	Rural 10 Urban 80	--	100	--	100

Table 23, Continued

Index	National Averages					
	Present	1985	1990	1995	2000 A.D.	
Percentage population with sound excreta disposal	Rural	--	--	25	--	50
	Urban	34	--	80	--	100
Immunization status (percentage coverage of pregnant mother and infants)						
a. TT		21	60	87	--	100
b. DPT		51	70	83	--	100
c. Polio		18	43	80	--	100
d. BCG		65	70	83	--	100
Percentage coverage Primary Health Centers for 50,000 population	--	30.8% (1983)	50% (1988)	80% (1988)		100%
Percentage coverage of Subcenters one for 5,000 population	--	71% (1983)	100% (1988)	--	--	--
Percentage coverage Nutritional supplement (iron and folic acid)	--	--	100% (1983)	--	--	--
a. Expectant mother	--	60 million (1983)	100% (1988)	Main- tenance	--	--
b. Children	--	60 million (1983)	100% (1988)	--	--	--
Percentage covered by Vit. "A" prophylaxis	--	--	--	--	--	--

Source: Report of the Working Group on Health for All by 2000 A.D. - 1981.

**Table 24**  
**Recommended Goals for the Seventh Five Year Plan**

Index	Nationally by 1990
Effective Couple Protection Rate	42 percent
Crude Birth Rate	27 per thousand
Crude Death Rate	10 per thousand
Annual Growth Rate	1.66 percent
Life Expectancy: Male	57.6 years
Female	57.1 years
Infant Mortality Rate	87 per 1000 live births
Maternal Mortality Rate	2.3 per 1000 live births
Perinatal Mortality	40 per 1000 live births
Percentage of Babies with Birth Weight less than 2500 grams	18 percent
Mortality in the preschool children (1 to under 6 years of age)	15 per 1000 children in that age group
Pregnant Mothers Receiving Antenatal Care	60-75 percent
Percentage of Deliveries by Trained Birth Attendants	80 percent
Immunization Coverage:	
TT for pregnant women	100 percent
TT for school children	100 percent
DPT (infants)	85 percent
Polio	85 percent
BCG	85 percent
DP (School entrants)	85 percent
Typhoid (School entrants)	85 percent

Source: Seventh Five Year Plan - Report on the Working Group in Population Stabilization and Maternal and Child Health Care 1984.

**Table 25**  
**Rural Health Infrastructure**

Unit	Population Served	Health Services
District		District Health Center
Subdivision	500,000	Subdivisional Health Center
Block	100,000	Community Health Center
	30,000	Primary Health Center
	(15-20,000 in hilly, tribal areas)	1 Medical Doctor 1 Health Assistant (Male) 1 Health Assistant (Female)
	5,000	Subcenter
	(3,500 in hilly, tribal areas)	1 MPW (F) 1 MPW (M) 1 part time attendant
Village	1,000 (500 in hilly, tribal areas)	1 Health Volunteer 1 Trained Dai

**Table 26**  
**Targets and Achievements Under Minimum Needs Program**

Sl. Components No.	No. in position as on 1.4.80	Target (1980-85)	No. in position as on 1.4.83	Achievements (1980-83)	Target 1983-84	Target 1984-85
1	2	3	4	5	6	7
1. Subcenters	47,172	37,940	65,643	18,471 (48.7%)	1,774	17,695
2. Primary Health Centers	5,482	756*	5,955	473* (62.6%)	406*	126*
3. Subsidiary Health Centers	2,056	2,270	3,182	1,126 (49.6%)	335	809
4. Upgraded PHCs	218	315	471	253 (80.3%)	39	23

\* There may be a typographical error here as these numbers do not add up.

Source: Year Book, Family Welfare Program in India, 1982-83.

**Table 27**  
**Progress in Construction Component Under MNP**

Sl. No.	Components	No. functioning as on 1.4.83	Availability of building as on 31.12.82	
			No. Constructed	No. Under Construction
1.	Subcenters	57,975	19,900 (34.33%)	4.96 (7.07%)
2.	P.H.Cs.	5,851	4,525 (77.34%)	683 (11.67%)

Source: Year Book, Family Welfare Program in India, 1982-83.

**Table 28**  
**Immunization Coverage 1982-83 and Target for 1985**  
**for Eligible Population (0-1 years)**

Vaccine	Percentage	
	Coverage 1982-83	Target 1985
DPT	38.2	70
Polio	17.7	40
BCG	8.8	70
TT (Pregnant women)	39.0	60

Source: Director General of Health Services.

**Table 29**  
**Expenditure of Family Welfare Program in Successive Five Year Plans**

Plan	Year	Outlays	Expenditure
I.	1951-56	65.00	14.50
II.	1956-61	497.00	215.60
III.	1961-66	2,697.60	2,486.00
	Inter Plan Period 1966-69	8,293.00@	7,046.40
IV.	1969-74	28,572.20@	28,443.00
V.	1974-79	28,565.22@	40,898.08
VI.	1980-85 (Outlay 107,800)		
	1980-81	14,000.00@	14,191.90
	1981-82	15,500.00@	19,301.99
	1982-83	24,500.00@	28,259.62
	1983-84	33,000.00@	37,500.00
	1984-85	*43,800.00@	

@ Budget Provision

\* Provision

Source: Seventh Five Year Plan Report of the Working Group on Population, Stabilization and MCH, 1984.

**Table 30**  
**Details of Provisions Under Revenue and Capital (Plan and Non-Plan) for**  
**1983-84 in Respect of Department of Health**

Rs. in lakhs					
Demand No.	<u>Plan</u>		<u>Non-Plan</u>		Total
1	<u>Capital</u>	<u>Revenue</u>	<u>Capital</u>	<u>Revenue</u>	6
47-Department of Health	--	--	--	115.71	115.71
48-Medical & Public Health	61.00	12,689.00	7,208.39	7,914.47	27,872.86
46-Loans & Advances to Government Servants	--	--	--	59.88	59.88
82 & 91 - Work Budget	250.00	--	128.44	--	378.44
<b>Total</b>	<u>311.00</u>	<u>12,689.00</u>	<u>7,336.83</u>	<u>8,090.06</u>	<u>28,426.89</u>

	<u>Revenue</u>	<u>Capital</u>	<u>Total</u>
Plan	12,689.00	311.00	13,000.00
Non-Plan	<u>8,090.06</u>	<u>7,336.83</u>	<u>15,426.89</u>
<b>Total</b>	<u>20,779.06</u>	<u>7,647.83</u>	<u>28,426.89</u>

Source: Government of India, Ministry of Health and Family Welfare.  
Annual Report, 1983-84.

**Table 31**  
**Health Sector Outlay - 1980-81, 1981-82 and 1982-83**

(Rs. in Lakhs)			
<b>Central Schemes:</b>	<b>1980-81</b>	<b>1981-82</b>	<b>1981-83</b>
I. Rural Health	--	200.00	100.00
II. Hospitals & Dispensaries	607.29	959.42	1,200.00
III. Medical Education & Research	1,002.15	1,234.20	1,695.00
IV. Training Program	1.73	2.50	5.00
V. Control/Eradication of Communicable Diseases	78.64	183.54	220.00
VI. Indian Systems of Medicine & Homeopathy	360.77	482.27	500.00
VII. Other Programs	151.11	174.59	175.00
<b>Total Central Schemes:</b>	<b>2,201.69</b>	<b>3,241.52</b>	<b>3,895.00</b>
II. Total Central Sponsored Schemes	8,798.31	9,258.48	8,105.00
III. Plan Outlay - States	18,958.00	20,915.00	24,340.00
IV. Plan Outlay - U.Ts.	1,722.06	2,245.00	2,543.00
<b>Total Health Sector Outlay</b>	<b>31,680.06</b>	<b>35,660.00</b>	<b>38,883.00</b>

Source: Health Statistics of India, 1983.

**Table 32**  
**Expenditures for Family Welfare and Social Service Programmes**  
**(rupees in millions at current prices)**

	1951-56	1956-61	1961-66	1969-74	1974-79	1980-85
Public Sector Plan Outlay	19,600	46,720	85,770	157,240	394,260	975,000
Social Services	4,180 (21)	7,440 (15.6)	12,960 (15.1)	24,620 (15.6)	63,720 (16.1)	140,350 (14)
Education	1,530 (7.5)	2,730 (5.5)	5,890 (6.9)	7,860 (5.0)	13,360 (3.3)	25,240 (2.6)
Health	980 (5.0)	2,140 (4.6)	2,260 (2.6)	3,370 (2.1)	7,610 (1.9)	18,210 (1.8)
Family Planning	---	20	250 (0.3)	2,780 (1.7)	4,920 (1.2)	10,100 (1)
Housing and Urban Services	330 (1.7)	800 (1.7)	1,280 (1.5)	2,470 (1.6)	11,500 (2.9)	24,880 (2.5)
Water Supply & Sanitation	---	---	1,060 (1.2)	4,740 (3.0)	10,920 (2.7)	39,220 (4)
Social Welfare & Related Fields	1,340 (6.7)	1,750 (3.7)	2,220 (2.5)	3,400 (2.1)	15,410 (3.9)	22,700 (2.3)

Note: Figures in brackets are percentages to total plan outlay.

Source: UNICEF, 1984.

**Table 33**  
**Per Capita (Public Sector) Expenditure on Health (Medical and Public Health)**  
**and Family Welfare 1979-1980 in Rupees**

State	Health	Family Welfare
Gujurat	21.57	2.93
Haryana	23.17	1.84
Himachal Pradesh	61.93	3.17
Maharashtra	25.34	2.06
Punjab	25.69	1.58

Source: Health Statistics of India, 1983.

Table 34  
Budget Proposed for Seventh Five Year Plan for Family Welfare and MCH

	Rupees in Crores
Services and Supplies:	
Maintenance of 5,600 Rural FW Centers and 18,600 subcenters (opened before 1.4.74) @ Rs. 1.10 lakhs per R.F.W. Center and Rs. 0.15 lakhs per subcenter with 10% increase	550.00
Provision of additional inputs at 10,000 PHCs for FW program (@ Rs. 50,000 recurring and Rs. 3,000 non-recurring)	130.00
Maintenance of 30,000 subcenters opened under PW Program during Sixth Plan (@ Rs. 15,000 per annum)	270.00
Establishment of 50,000 subcenters (@ Rs. 15,000 recurring and Rs. 3,000 non-recurring)	200.00
Compensation for 310 lakh Ster. and 213 lakh IUD insertions @ Rs. 195 per ster. and Rs. 12 per IUD	630.00
Payment of continuing monetary benefit to acceptors of sterilization after 2 children (35% of the total acceptors of sterilization <u>i.e.</u> 1 crore @ Rs. 2,250 per acceptor)	2,250.00
Provision of Cash Certificate of Rs. 10,000 to acceptors of sterilization after two daughters (20% of the cases under (xxiv) @ Rs. 7,750 per acceptor)	1,550.00
Initiation of Area Project in 35 districts (10% of the population)	150.00
Other services and supplies	600.00
Training	72.00
Mass education and Media	92.00
Research and Evaluation	30.05
Maternal and Child Health	174.60
Organization	<u>39.00</u>
Total (Approximately)	7,008.10

Source: Excerpted from: Seventh Five Year Plan. Report of the Working Group on Population Stabilization and Maternal and Child Health.

**Table 35**  
**Break Down of Budget Estimates for 1984-85 in Public Health, Civil Hospitals, and Medical Education in Maharashtra**

(Rs. in thousands)			
	Plan	Non-Plan	Total
I. Public Health			
a. Other than Civil Hospitals (Rural Health Plan Included)	869,090	436,282	1,305,372 (57.19%)
b. Civil Hospitals	26,242	142,244	168,486
II. Medical Education	88,797	719,685	808,482
Total of Civil Hospitals and Medical Education (I (b) and II)	115,039	861,929	976,968 (42.81%)
Grand Total (I and II)	984,129	1,298,211	2,282,340

Table 20  
Demographic Indicators - Project States and Districts

Project Districts	1/	1/	Density Per Sq. Km.	2/	2/	2/	1/	1/		1/			Doctor Pop Ratio (1976)	3/ % couples currently protected (1979)
	Population	Percentage		CBR	CDR	IMR	Depen-	Literacy Rate		Religion				
	(000's)	of Rural Population					ency Ratio	%		(%)	(%)	(%)		
								Male	Female	Hindus	Muslims	Others		
<b>GUJURAT</b>														
1. Bharuch	1,110	83	123	37.0	18.0	164	64.7	46.4	24.5	83	16	1	1: 5325	44.8
2. Panch Mahals	1,848	89	209	39.4	16.7	162	63.3	33.7	11.2	95	4	1	1: 7559	21.9
State	26,697	72	136	35.8	15.6	146	68.5	46.1	24.8	89	8	3	1: 2628	32.1
<b>HARYANA</b>														
1. Bhiwani	760	86	150	41.5	13.8	NA	NA	36.9	10.2	98	--	2	1: 11162	28.2
2. Mohindergarh	730	86	146	35.1	18.1	NA	NA	44.3	12.3	99	--	1	1: 8958	39.6
3. Sirsa	530	85	125	28.6	9.3	NA	NA	31.6	12.4	98	--	2	1: 13911	34.6
State	10,040	92	227	33.4	13.3	129.5	85.9	44.0	17.8	89	4	7	1: 14256	32.5
<b>HIMACHAL PRADESH</b>														
1. Hamirpur	265	99	237	19.7	7.6	41.8	NA	51.0	28.9	98	--	2	1: 8237	19.8
2. Kangra	800	96	140	28.9	10.0	59.9	NA	47.4	25.6	99	--	1	1: 9792	24.4
3. Sirmur	245	92	87	17.3	4.7	66.8	NA	34.0	12.9	97	--	2	1: 6422	23.7
State	3,460	92	62	27.3	11.6	127.3	NA	45.5	20.2	96	1	3	1: 6484	25.8
<b>MAHARASHTRA</b>														
1. Osmanabad	1,896	88	134	35.0	12.0	72	NA	40.3	14.7	85	10	5	1: 10834	29.6
2. Parbhani	1,507	84	121	32.5	12.0	75	NA	36.8	11.2	76	11	13	1: 13951	35.8
State	50,400	69	164	26.9	11.6	83	NA	51.0	26.2	82	8	10	1: 865	35.9
<b>PUNJAB</b>														
1. Bhatinda	1,030	82	185	28.0	9.8	107	69	29.0	14.6	23	--	77	1: 5562	37.2
2. Faridkot	1,150	80	200	30.0	10.3	108	70	34.4	21.0	21	--	79	1: 4332	26.7
3. Sangrur	1,150	80	225	28.2	11.3	103	69	30.3	17.0	32	1	67	1: 3651	27.5
State	13,551	76	269	28.3	11.5	103	71	40.4	25.9	37	1	62	1: 2069	27.5
<b>ALL INDIA</b>	<b>548,160</b>	<b>80</b>	<b>178</b>	<b>33.2</b>	<b>15.0</b>	<b>129</b>	<b>67.1</b>	<b>38.9</b>	<b>18.3</b>	<b>82</b>	<b>11</b>	<b>7</b>	<b>1: 4200</b>	<b>22.1</b>

1/ 1971 Census data.

2/ CBR, CDR and IMR are based on the Sample Registration Scheme (for the year 1978 or earlier) which is incomplete and deficient for many areas.

3/ Based on cumulative family planning performance.

Source: IRHP Project Paper, 1980

Table 37  
 Financial Inputs by Activity, Source of Funds and USAID Contribution  
 (\$ in 000's)

Activity	GOI/ States	USAID	Total	% of Total Project	% Contri- bution by AID/Activity
Construction and initial equipment	13,394	21,233	34,627	53%	61%
Salary Support	7,562	7,563	15,125	23%	50%
Training	-0-	3,783	3,783	6%	100%
Communications	-0-	973	973	2%	100%
Drugs	2,160	2,160	4,320	6%	50%
Research/Innovative/ Contingencies	-0-	2,438	2,438	4%	100%
Transport	1,629	-0-	1,629	3%	0%
Management Informa- tion Systems Development	-0-	1,050	1,050	2%	100%
Monitoring and Evaluation	-0-	581	581	1%	100%
Project Management	-0-	219	219	--	100%
<b>TOTAL</b>	<b>24,745</b>	<b>40,000</b>	<b>64,745</b>	<b>100%</b>	<b>62%</b>

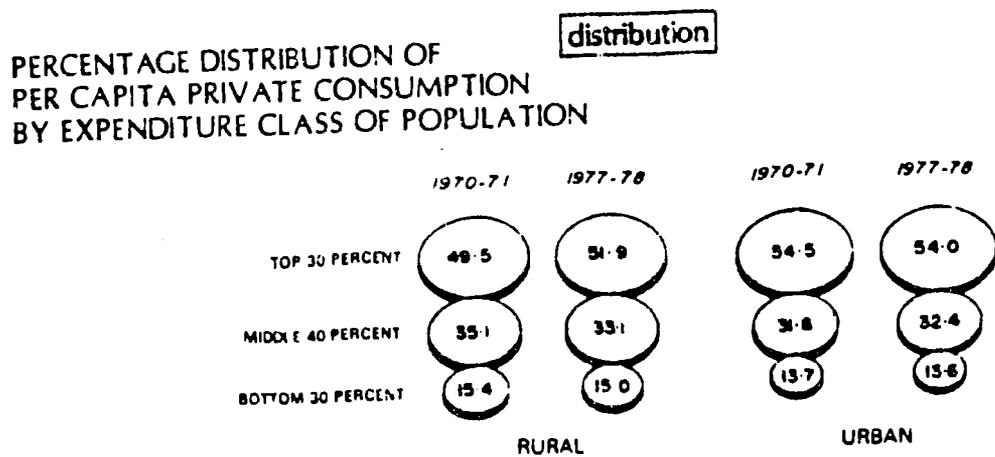
Source: IRHP Project Paper, 1980

**Table 38**  
**Summary Cost Estimate and Financial Plan for AID Assisted ICDS**  
**(\$ Thousand)**

Project Elements	Source of Funds				Total Project Costs			
	AID Loan LC	AID Grant LC	FX	AID Total	GOI	LC	FX	Total
1. Staff Costs	5,006	--	--	5,006	5,006	10,012	--	10,012
2. Operations	1,007	--	--	1,007	1,643	2,650	--	2,650
a. Petrol, Oil, Lubricant	--	--	--	--	(821)	(821)	--	(821)
b. Medicines	--	--	--	--	(822)	(822)	--	(822)
c. Others	(1,007)	--	--	(1,007)	--	(1,007)	--	(1,007)
3. Furniture and Equipment	411	--	--	411	461*	872	--	872
4. Technical Assistance	--	170	1,763	1,933	--	170	1,763	1,933
5. Training & Nutrition/ Health Education	--	1,903	202	2,105	317*	2,220	202	2,422
6. Research and Innovative Activities	--	1,963	997	2,960	1,803	3,766	997	4,763
7. Monitoring and Evaluation	--	749	--	749	9*	758	--	758
8. Food Processing Plants	--	114	--	114	--	114	--	114
9. Contingency	576	139	--	715	334	1,049	--	1,049
<b>Total</b>	<b>7,000</b>	<b>5,038</b>	<b>2,952</b>	<b>15,000</b>	<b>9,573</b>	<b>21,611</b>	<b>2,962</b>	<b>24,573</b>

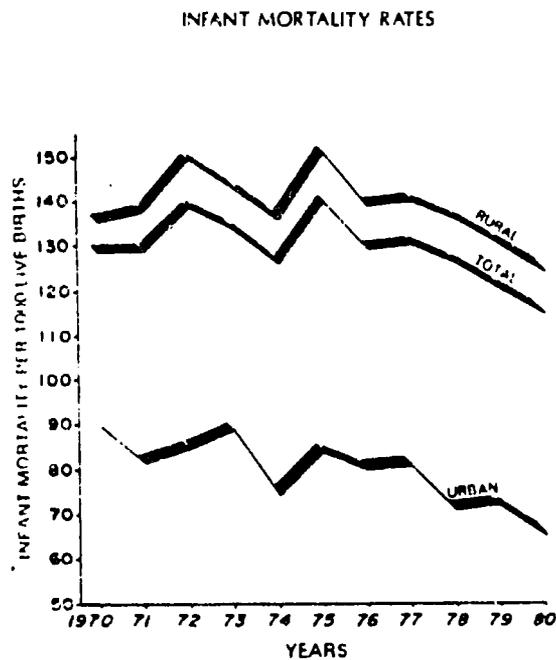
\* Includes inputs expected to be provided by UNICEF under their agreement with GOI as specified in UNICEF Master Plan of Operations, 1981-83.

Figure 1



Source: UNICEF. An Analysis of the Situation of Children in India - 1984

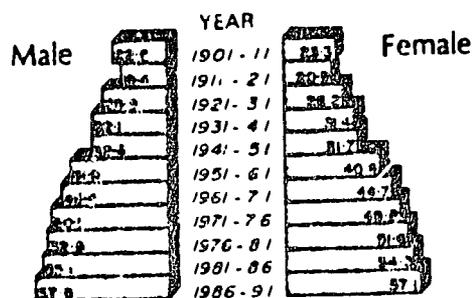
Figure 2



Source: UNICEF. An Analysis of the Situation of Children in India - 1984

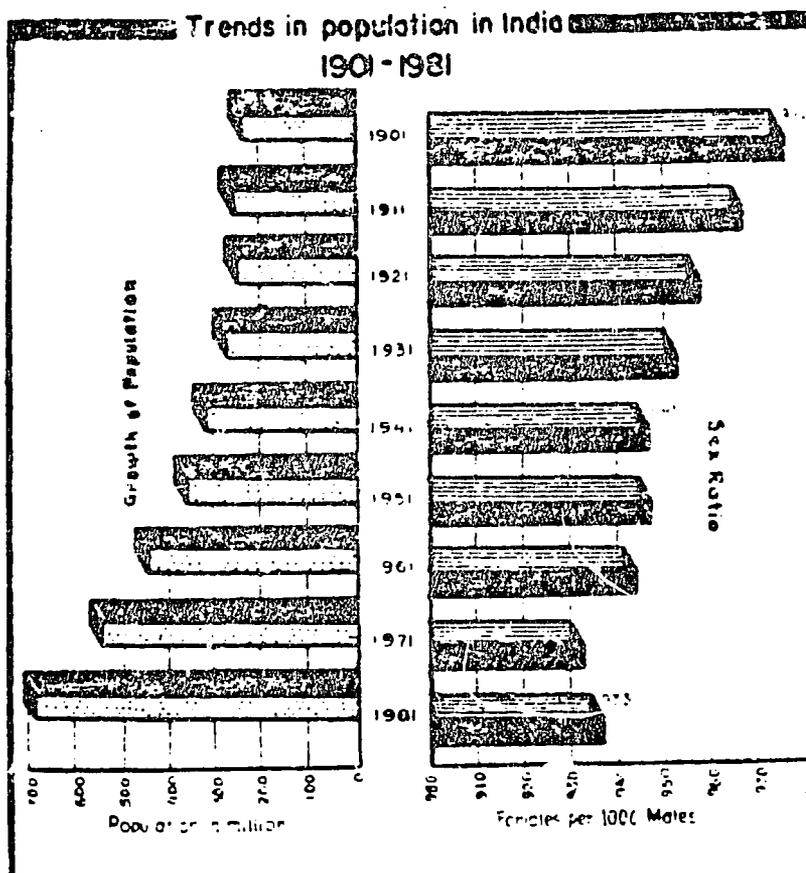
Figure 3

AVERAGE EXPECTATION OF LIFE AT BIRTH



Source: UNICEF. An Analysis of the Situation of Children in India - 1984

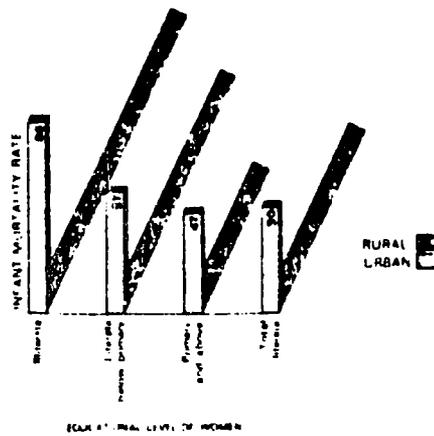
Figure 4



Source: Health Statistics of India - 1983

Figure 5

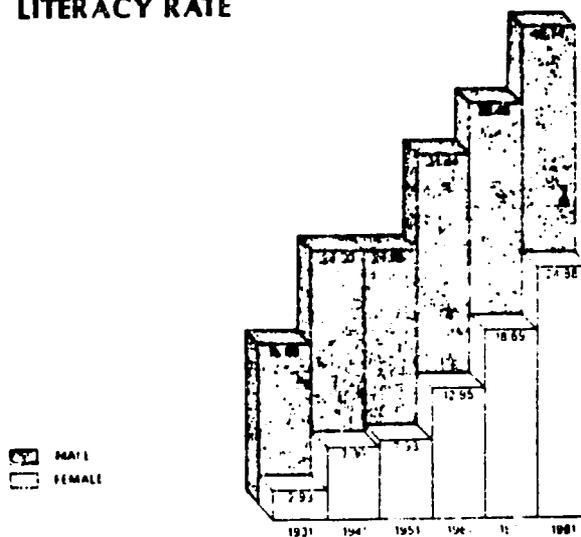
MATERNAL EDUCATION AND  
INFANT MORTALITY 1978



Source: UNICEF. An Analysis of the Situation of Children in India - 1984

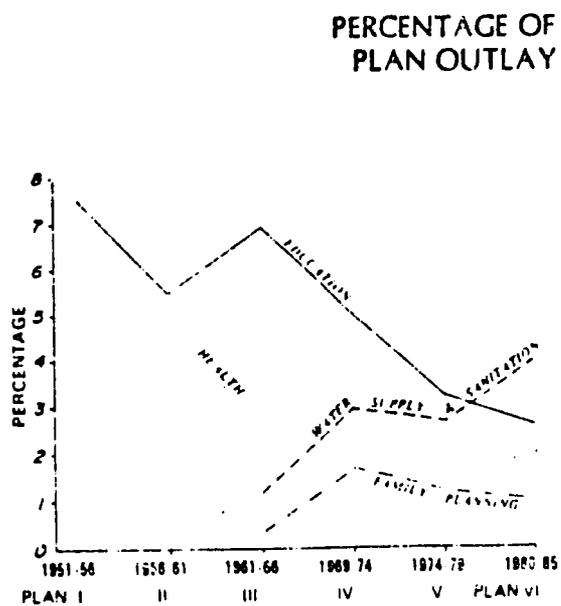
Figure 6

LITERACY RATE



Source: UNICEF. An Analysis of the Situation of Children in India - 1984

Figure 7



Source: Planning Commission

Source: UNICEF, 1984