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HEALTH AND POPULATION PROBLEMS IN SRI LANKA

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EXECUTIVE SUMMARY

The purpose of the project was to identify Sri Lanka health and population problems that would be amenable to USAID intervention.

The assigned scope of work called for the analysis of morbidity, mortality, and population data to assess current problems and call attention and assign priorities to unmet needs. Because of time limitations and limited computer availability during the period of the assignment, very little of the data tabulation or analysis could be performed.

Moreover, it was found that data that should already have been in place are lacking. Some surveys, for example, by the Family Health Bureau, that were actually conducted to measure the impact of health and family planning activities never reached the publication stage. Family health workers prepare many types of statistical reports but do not maintain the kinds of records that would show current contraceptive prevalence. There have been no evaluation studies that show the impact of such programs as the CARE triposha program.

Despite these difficulties, this report does identify several of the more pressing health and population problems and also some successes (e.g., EPI). Despite no further decrease in crude birth rate and an acceleration of population growth, fertility itself is still declining.

The problems, however, are very serious. Diarrhoeal diseases are highly prevalent, and ORS treatment is not routinely used. Preventable maternal deaths due to toxemia, hemorrhage, and sepsis are still common. Motor vehicle fatalities, the majority of which may be pedestrians and cyclists, are far more prevalent when measured on a per vehicle basis, than in developed countries.

The report proposes interventions for several of these problems. It also proposes a health systems management project which would be addressed to five program components -- family planning, diarrheal disease control, nutrition, perinatal care and EPI.

The report recommends consideration of various studies relating to family planning, but its major population recommendation is funding of a survey which would measure population growth awareness and attitudes followed by an effective and far-reaching program to promote awareness of population problems throughout the Sri Lanka citizenry. The aim would be to create an attitude of concern in all strata of society that population growth is disastrous and must be resisted.

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Finally, it is recommended that Dr. Pollack return to Sri Lanka to complete the detailed morbidity and mortality analysis. When the study team left Sri Lanka in March, it made arrangements for the University of Colombo to tabulate on its computer all deaths for all of the years 1971-79 and to prepare computer records of hospital-based live discharges and deaths for 1971-82, so that Dr. Pollack's analysis can be completed after she returns.

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ABBREVIATIONS USED

1. Demographic Abbreviations

ASFR	Age-specific fertility rate = births in year per number of women of a given age
CBR	Crude birth rate = births in year per 1,000 mean population
CDR	Crude death rate = deaths in year per 1,000 mean population
GFR	General fertility rate = births in year per 1,000 women at ages 15-49 (or 15-44)
GRR	Gross reproduction rate = TFR (see below) times proportion of females among newborn infants
IMR	Infant mortality rate = deaths under age 1 in a year per 1,000 live births in the year
NRR	Net reproduction rate = GRR (see above) corrected to allow for probabilities of daughter's survival to the mother's age when the daughter was born
TFR	Total fertility rate = sum of ASFR for the given year; in practice it is five times the sum since ASFR are usually given only for 5-year age groups instead of individual ages

2. Other Abbreviations

AMC	Anti-malaria campaign
EPI	Expanded program of immunization
FHW	Family health worker
GSL	Government of Sri Lanka
ICD	International classification-of-disease (or cause-of-death) code
MCH	Maternal-child health
MOMCH	Medical officer or maternal-child health

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MOH	Medical officer of health; also Ministry of Health
OPD	Out-patient department
ORS	Oral-rehydration salts
PHI	Public health inspector
PHM	Public health midwife

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INTRODUCTION

Purpose of the Assignment

The purpose of the assignment was the identification of health and population problems in Sri Lanka so as to provide guidance to the USAID Mission in its formulation of health/population sector strategy. The team assigned consisted of the following persons: George E. Immerwahr, Demographer and team leader, and Dr. Marjorie P. Pollack, Epidemiologist.

Immerwahr lived and worked in Sri Lanka during 1973-79. He was employed part of that time by WHO and assigned to the Family Health Bureau in the Ministry of Health for evaluation of the Family Health Program. Later he worked in Sri Lanka for the World Fertility Survey and taught demography at the University of Sri Lanka. Dr. Pollack was associated with the Center for Disease Control during 1977-80 and has served as a consultant medical epidemiologist since then. Both during and since her CDC years, Dr. Pollack has served as epidemiologist in many Latin American countries, mostly for PAHO/WHO, and also in India for SEARO/WHO.

The scope of work requested by the USAID Mission included the following items:

1. Analyze existing data on national and district level mortality, morbidity, fertility, and impact of current interventions.

2. Define priority (e.g., top 10 or top 20) health and population problems in current order of significance with historical trends by:

   - Nature of problems and age, sex, and location of population affected.

   - Age cohorts (e.g., infants, children, mothers, and labor force).

   - Geographic locations with age cohorts and nature of problems.

   - Other measures that are descriptively useful.

3. Discuss most likely causes, consequences, and potential interventions for priority problems. Rank potential interventions by expected value of impact.

4. Provide recommendations for phase II regarding which

problems seem to merit special attention for technical and economic analysis to determine cost-effectiveness of potential interventions.

AID/Washington suggested several additional items, including the following:

- Mortality analysis should cover at least 70 percent of total mortality.
- Team should do short field validity check of data.
- Data analysis of nutritional status.
- More definitive statement about analyzing impact of family planning activities on fertility.
- Collection of data such that healthy days of life lost analysis can be accomplished.

Itinerary

The team members arrived in Colombo on February 13, 1983, and commenced work on February 14. On February 21 and 22 they visited Kandy and Kegalle districts, accompanied by two members of the Mission's health staff. While there, they interviewed the superintendents of health services, visited both a large general hospital and a small peripheral unit, examined the work of medical officers of health, a public health inspector, a family health worker, and a lay registrar of births, deaths, and marriages. They also spent several hours examining the health facilities and services on two tea-estates. Aside from February 21 and 22, all other working days (at least 6 days a week) were spent in Colombo. They contacted a large number of local and international people working in health and population (see Appendix A). Dr. Pollack left Colombo on her return trip the night of Friday, March 11, and Immerwahr left on his return the night of Sunday, March 20.

Change in Scope of Work

The team was unable to complete the scope of work as described above, and yet the team members were able to collect a considerable amount of data which have already proved informative to the Ministry of Health and should prove valuable to the Mission. The main reason for inability to complete the work was that the computer assistance which the team and the Mission had anticipated was largely unavailable. It had been hoped that within one week a complete computer breakdown of the 1971-81 deaths (over a million in number) by cause and age at

death would have been available. Instead, because the Department of Census and Statistics was so completely engaged in the data processing of its 1981 population census and the agricultural census, it could tabulate the deaths for only 2 years, 1973 and 1979. Also because there was no programming assistance available, the computer programming for these 2 years was done by Immerwahr. Much supplemental work had to be done by hand, so that both team members were tied up with unexpected tasks, which prevented their making much headway on analysis. Also, very little could be done in morbidity analysis since the hospital data had not been computerized.

At this writing, it is understood that Dr. Pollack will return to Colombo in late April for further work on the original assignment. Before Immerwahr left Colombo, he made arrangements with the Mathematics and Computer Science Department of the University of Colombo, with the permission of the director of Census and Statistics, to do the data entry of hospital morbidity and mortality and the computer programming and tabulation necessary for Dr. Pollack to complete the analysis work when she returns. Hospital-based discharges and deaths will then be analyzed. Since the hospital death data will be available through 1982, it is hoped that a model will be derived whereby total deaths by cause (now available only through 1979) can be projected through 1982.

Some steps have been taken, with the help of Sri Lanka counterparts, to initiate the healthy days of life lost analysis, which is the last item enumerated in the scope of work. It should be possible to complete much of this analysis after Dr. Pollack returns and thereby to rank health problems in order of their seriousness in terms of both morbidity and mortality. (1)*

Methodology

The first step in mortality analysis was tabulation of 1973 and 1979 total deaths by cause and calculation of corresponding population-based death rates. This was, however, only a start in the desired analysis of causes of death for the years 1971-81. From the tabulations and calculations made, it has been possible to rank causes of death for the 2 years, and several tables are included in Appendix B together with analysis based on the death data for these 2 years.

In population analysis, the method employed was to

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* Numbers in parentheses refer to the References.

investigate fertility not merely in terms of births, but also in its relation to the dynamics of the entire population, or more specifically the increasing number of women of child-bearing age. For both mortality and population, some analysis of geographic sub-groups of the population was also performed.

The team has looked critically at the death registration data and has found some ground for suspicion that the infant mortality rate, which reportedly has dropped from 47 to 37 over the past few years, may not actually have dropped to this extent.

OBSERVATIONS AND FINDINGS

General Findings on Mortality

Sri Lanka has made very considerable progress in the control of disease and the reduction of mortality. In one of the most rapid mortality decreases in world history, the reported number of annual deaths dropped from 136,000 in 1946 to 99,000 in 1947. There has been considerable discussion of how much of this drop was the result of the anti-malaria campaign at that time, of a rapidly improved health care infrastructure, and of the resumption of a long-term mortality decline which had been interrupted by acute food shortage during the war years (2). The fact that the decline took place indicated the country's ability to put ideas into action.

Mortality has continued to decline over the years since then, and for the year 1979 the registered deaths showed a CDR (crude death rate) of only 6.1 (it had been 19.8 in 1946). The life table constructed for 1979 by the Department of Census and Statistics showed expectation of life at birth of 65.95 years for males and 70.15 for females, both very high in comparison with most developing countries.

Yet, if we compare Sri Lanka's reported mortality data with those published for 1979 for Sweden, we find very marked differences. Sweden, as is known, has about the most favorable mortality rate, age for age, in the world, and is chosen as a benchmark because it illustrates what is at least theoretically possible in the way of mortality reduction.

Sweden has of course a much older population than Sri Lanka, with 34 percent of its population age 50 or older, compared with only 13 percent for Sri Lanka. Because of its age composition, Sweden currently has a CDR of 11 in comparison with Sri Lanka's reported 6.1. On the other hand, except for males at ages 60 and over, Sweden's mortality rates age for age are less than Sri Lanka's. For males 60 and over mortality rates are roughly the same for both countries.

If we apply Sweden's recent age-specific mortality rates to Sri Lanka's population, we can gain some idea of the mortality saving, in terms of annual deaths, that Sri Lanka might achieve, disregarding the effect of environmental factors. The greatest disparities are at the infancy and childhood ages. In 1979 there were 15,800 infant deaths in Sri Lanka, but had Sweden's IMR applied, there would have been only 3,400. At ages 1-4 there were 4,800 deaths in Sri Lanka, but with Sweden's rates there would have been only 2,200. If Sweden's rates had applied to all ages, age for age, Sri Lanka would have had approximately

34,000 fewer deaths than it did have, and fully half of that saving would have been at ages under 15.*

Unfortunately we do not have deaths by cause crossed with age for Sweden, but some clue to what is happening can be found in deaths by cause without breakdown by age. In 1979, in Sri Lanka, there were 1,093 diarrhoeal disease deaths reported for infants, another 779 at ages 1-4, 248 at 5-9, and 92 at 10-14, giving a total of 2,212 at childhood ages. Sweden, with a childhood population numbering 29 percent of Sri Lanka's, had in 1979 only 4 diarrheal disease deaths for all ages combined.

One more Sri Lanka-Sweden comparison: Sweden, with 28 times as many automobiles as Sri Lanka, had only twice as many motor vehicle fatalities (1,000 to Sri Lanka's 497). Because of its much larger number of vehicles, Sweden had a higher motor vehicle fatality rate than Sri Lanka per 100,000 population, but Sri Lanka had a rate about 17 times as high per 1,000 vehicles. We would presume that in Sweden most fatalities are those of drivers and their passengers, but we suspect that in Sri Lanka most deaths would be those of pedestrians and cyclists.

In a subsequent section of the report and also in Appendix B, the team deals more specifically with Sri Lanka's mortality by cause.

Morbidity and Mortality

To achieve the first 2 points of the scope of work, sources of morbidity and mortality data were sought. Five general sources of morbidity and mortality data were identified:

1. Mortality data from vital registrars' death certificates.

2. Hospital-based morbidity and mortality data from discharge and death records.

3. MOH Division of Epidemiology Notifiable Disease reporting system.

4. Vertical program surveillance systems.

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* It should not be inferred that Sri Lanka's deaths would continue to be reduced in such proportion in all future years. With these drastic reductions in mortality at young ages, and particularly if fertility were further reduced, Sri Lanka would ultimately have a much older population than it has now and a higher CDR.

5. Special studies and publications.

Vital Registrar Mortality Data

Under the Birth and Death Registration Act of 1951 (3), the registration of births and deaths in Sri Lanka is compulsory. Failure to register such events is punishable by imprisonment of up to 6 months or a fine not exceeding Rs.200/. Late registration is also a punishable offense. The Act requires stillbirths to be registered only if they occur in certain areas of the country. Under the Birth and Death Registration Act, births must be reported to the licensed registrar within 42 days following birth, and deaths within 5 days following death. In the case of deaths, corpses cannot be disposed of without presentation of the death certificate. All births and deaths occurring on estates must be reported to the estate superintendent within 24 hours of occurrence, who in turn must report the event within 48 hours to the registrar.

Delayed reporting (past 90 days following the event) must be reported to the district registrar, and past 12 months, only to the registrar general. According to the Birth and Death Act, it is the duty of grama sevakas (village leaders) to inform themselves of all births and deaths within their jurisdiction(4).

In the event of the death of a person who has been attended by a medical practitioner, the practitioner must issue a certificate stating the cause of death (5). The code of Criminal Procedure Act (6) requires an inquirer to investigate all suicide, accidental, and sudden deaths of unknown causes, and may require a medical practitioner to perform an autopsy and submit a report as to the cause of death. Death certificates require information on the name, date of death, place of death, sex, race, age, and cause of death. A copy of all death certificates must be filed with the registrar general's office on a monthly basis. Information contained in the death certificate is analyzed in the Department of Census and Statistics. Thus, information on all deaths by age, sex, and cause of death is available through the registrar general's office. The tabulated information is published in an Annual Report on Vital Statistics. Data are routinely analyzed for infant mortality rates and a number of infant deaths by specific causes, maternal mortality rates and number of maternal deaths by specific causes, and for the total population by specific causes.

At this point, further description as to the origin of the listed cause of death on the death certificate is indicated. The Birth and Death Registration Act requires that cause of death should state the disease or condition directly leading to death and states "this does not mean the mode of dying, e.g. heart failure, asthenia, etc. It means the disease, injury or

complication which caused death"(6). Approximately 30 percent of all registered deaths occur in hospitals and government institutions. In these cases, the physicians treating the patient are required to write the cause of death on the bed ticket (hospital treatment record). All bed tickets are sent to the medical records section, where a clerk codes the cause of death by ICD (International Classification of Disease) and forwards the information to the district registrar. The licensed registrars in the country are of 2 categories: medical registrars holding a certificate of training and lay registrars holding a license but without formal training. According to the Department of Census and Statistics, 908 out of 971 of the licensed registrars (94 percent) are lay registrars. Field visits revealed that, for deaths occurring outisde hospitals and government institutions, the lay registrars interviewed relied upon a certificate from the grama sevaka citing the cause of death when an autopsy was not recommended. Reviews of bed tickets in Kandy General Hospital revealed that cause of death was often not clearly listed. Some required a review of the record to find a diagnosis. Thus, while there is fairly complete reporting of deaths, there are questions as to the reliability of the stated cause of death. Verification of causes of death recorded on the death certificates is rarely if ever performed.

Hospital-Based Morbidity and Mortality Data

All hospitals and government institutions are required to submit quarterly reports to the Division of Medical Statistics in the MOH. These reports consist of a form that should contain the number of hospital discharges and hospital deaths by diagnosis for approximately 230 selected ICD codes (using a slightly expanded version of the A code list) during the quarter reported. Prior to 1979 the seventh revision ICD was used, but beginning in 1979 there was a switch to the eighth revision. Upon receipt of completed annual reports, the Department of Census and Statistics tabulates the data and publishes an annual report containing analyses of the numbers of discharges and deaths by broad disease categories, the 10 leading causes of hospitalization and death, and the number of cases of selected intestinal infections. At the time of the team's visit (February-March 1983), data were available through 1981, and fourth-quarter returns of 1982 were being processed. The medical statistics division reports that 100 percent of institutions required to report are reporting but not always timely. Supervisory visits to institutions are conducted when reports are not received following several requests, or when questionable information is received. Data are reported (morbidity and mortality) only on in-patient cases, thus no OPD (out-patient department) diseases are reported. Field visits revealed that, due to inadequate staffing at government hospitals, the medical records departments responsible for

the ICD coding of discharge diagnosis were unable to code all live hospital discharges, but 100 percent of deaths were reported. In the case of Kandy Hospital, with approximately 225 discharges daily and one trained medical records officer, a systematic sampling of 1 in 5 discharges was coded and reported.

Discussions with personnel of medical statistics of the MOH revealed that, at Colombo General Hospital, discharges were coded consecutively on as many as could be coded daily, and the remainder were omitted at the end of each day. Thus, there is no systematic sampling technique to prevent a bias that could be introduced if the discharges were ordered by ward (medical specialty).

Notifiable Diseases Reporting System

The Epidemiology Unit of the MOH has designed a surveillance system for 20 selected communicable diseases. All health care personnel are required to fill out a special printed postcard entitled "Notification of a Communicable Disease," giving the name of the reporting institution, the disease, name and address of the patient, date of onset, age, sex, and laboratory results for every case of the diseases treated (both in-patient and OPD). The 20 diseases are cholera, plague, smallpox, yellow fever, chickenpox, whooping cough, food poisoning, enteric fever, simple continued fever of 7 days duration and over, acute anterior poliomyelitis, encephalitis, diphtheria, viral hepatitis, malaria, tuberculosis, typhus fever, human rabies, tetanus, leptospirosis, and bacillary dysentery. These cards are sent to the medical officer of health (MOH) of the area who, in turn, refers all cards to the area public health inspector (PHI) for confirmation. The PHI is required to confirm the patient's name and address and fill out an individual case investigation form collecting more detailed information (e.g., for cases of poliomyelitis, vaccination history of the case). In addition, all epidemics are investigated by the MOH and the PHI.

Reported cases of malaria and cholera require laboratory confirmation; the remainder of diseases are based on clinical diagnosis. Weekly reports are sent by the 109 MOHs to the Epidemiology Unit in Colombo on Saturdays. The Epidemiology Unit publishes and distributes to all MOHs and government institutions a weekly epidemiologic report containing the number of cases of each of the diseases reported during the week, cumulative figures for the year by district, and descriptions of special investigations of interest. In addition, annual surveillance reports are prepared for selected diseases presenting detailed epidemiologic analyses of morbidity and mortality trends, age distributions, seasonality, etc.

Field visits revealed that the notifiable disease postcards were submitted on in-patient cases; none of the out-patient departments were requiring medical personnel to report out-patient cases treated. The Epidemiology Unit confirmed that more than 95 percent of the reports were from in-patient cases. The Epidemiology Unit suggests that the majority of cases of the 20 notifiable diseases would be admitted to the hospital and would thereby be reported. Thus, little information is collected on out-patient morbidity. Of note, Ayurvedic practitioners are not required to report through the notifiable disease reporting system.

Vertical Programs

Morbidity and mortality data are collected by six vertical disease control programs covering: leprosy, malaria, filariasis, tuberculosis, and rabies. Each program prepares an annual report reviewing the morbidity and mortality trends and special epidemiologic analyses (age, sex, and district). All of the diseases covered by vertical control programs have laboratory confirmation of cases.

Special Studies

In addition to the routine morbidity and mortality data collection systems, periodic surveys are conducted on selected diseases. Examples of these include nutritional surveys conducted in 1975-76 and 1979-81, dengue fever surveys (on-going), estate infant mortality surveys (on-going), complications of measles (initiating at the time of report in March 1983), and maternal and infant mortality in selected communities.

In addition, at the time of the team's visit, a new OPD morbidity reporting form prepared by the MOH in collaboration with WHO was being field tested in Kegalle. This form will be completed by all health care personnel staffing OPD units and requests information on the number of patients treated in the OPD monthly by 14 categories:

1. Malaria
2. Measles
3. Helminthic diseases (excluding filaria)
4. Intestinal infectious disease
5. Other infectious disease
6. Nutritional deficiencies, metabolic disorders, and anemias
7. Disease of the eye and adnexa
8. Disease of the circulatory system
9. Disease of the respiratory system (excluding tuberculosis)

10. Disease of the genito-urinary system
11. Disease of the skin and subcutaneous system
12. Disease of the mucosa central system and connective tissue
13. Fractures, dislocations, burns, foreign bodies, and poisonings
14. All other disease

In addition, the form requires information on the number of routine examinations, first attendances, and reattendances. A tally sheet requiring crossing out a 0 for each case seen has been prepared to facilitate the monthly case counting.

This represents a major effort to collect information on non-hospitalized morbidity by general disease categories and for selected diseases (measles, malaria, nutritional deficiencies). One questions why the notifiable diseases have not been included, to try to ascertain information on less severe cases not requiring hospitalization.

Data Collected

As noted, the team had hoped to have tabulated full data on registered deaths by cause for each of the years 1971-81. Registered deaths had been put onto tape only through the year 1979 and, because of limited computer time available, the team was able to tabulate only 1973 and 1979. It was hoped that having 2 years several years apart, some limited trend analysis would be possible and some differences between the 2 years could readily be noted. The death rate (CDR) for 1979 was 6.4 as opposed to 7.7 for 1973 and, in fact, the total number of reported deaths in 1979 was less than that in 1973 despite an increasing population.

For each of the 2 years, 2 major sets of cause-of-death tables have been prepared, and they are included in Appendix B. Each set is prepared for individual age groups and for all ages combined. The first set, General Mortality by Broad Categories of Causes of Death, has the broad categories ranked by frequency within each age group. Note that senility and ill-defined causes, which is always a major classification, is not ranked with the other broad classes but is shown at the bottom of the page with a numeral in parentheses showing what its position would be if it were ranked. At this writing, no full analysis of the tables is being attempted.

A Note on Infant Mortality Rates

In 1978, following several years when the infant mortality rate was reported to be in the 40s (its lowest value was 42.4

in 1977), the rate dropped precipitously to 37.1. In 1979 it rose but only to 37.7.

For several reasons, the team suspects that the IMR is not as low as is presently reported. One consideration is the possibility that an infant who dies prior to being registered as a birth will also not be registered as a death. If 1 percent of births were in such a category, the infant death rate would be affected by 10 points (e.g., a true IMR of 50 could be misstated as 40). Discussions with a lay registrar during a field visit revealed that the average age of time of registration of birth had changed from 7-10 days pre-1977 to approximately 3 months post-1977. This followed the discontinuance of an infant milk ration, which apparently had been a strong incentive for the early reporting of births. Thus, the possibility of non-registration of early deaths as previously suggested was increased.

An analysis of the changes in the IMR by district (Appendix B, Table 15), shows that in the poorer districts, with low levels of education and widely dispersed populations, the IMR dropped sharply between 1976-77 and 1978. These drops could not be explained by major improvements in the health care delivery systems in those areas.

	1976	1977	1978
Amparai	39	33	25
Anuradhapura	36	35	22
Batticaloa	49	51	37
Hambantota	33	39	28
Mannar	34	30	23
Puttalam	33	30	22
Vavuniya	38	35	22

In contrast, the urban districts of Colombo and Jaffna experienced no IMR decrease at all, and in Kandy and Nuwara Eliya districts where there are large estate populations and infant births are registered promptly (with maternity benefits serving as incentive), the decrease in IMR was very slight.

Of additional interest is an analysis of the ratio of neonatal to post neonatal deaths. In developed countries with low IMRs, the proportion of neonatal to post neonatal infant deaths has been observed to be approximately 3:1, reflecting a reduction in preventable post neonatal causes of death (e.g., congenital anomalies and genetic disorders). An analysis of the proportion of neonatal to post neonatal deaths compared with IMRs by district in Sri Lanka for 1973 and 1979 (Appendix B, Table 16) reveals several inconsistencies. First, for the

country as a whole, while the IMR decreased from 46.3 in 1973 to 37.7 in 1979, the ratio of neonatal to post neonatal deaths also decreased (from 1.86 to 1.77), where it would have been expected to increase. Secondly, while one would expect to see higher ratios in districts with lower IMRs, this is not observed. Nor do the ratios consistently increase in districts with decreasing IMRs from 1973 to 1979. While this finding is not conclusive, it is suggestive of possible reporting inconsistencies.

National Health Summary

The preliminary review of the morbidity and mortality data available to the team, as presented in Appendix B, reveals a disease pattern that is mixed between that seen in developing countries and that seen in developed countries.

In terms of mortality, infectious diseases were the third leading cause of death in the country in 1979, responsible for 9 percent of all deaths. In infancy and early childhood (1-4 years old), infectious diseases were responsible for 12.6 and 24.3 percent respectively, of all deaths in 1979, with diarrheal diseases accounting for 6.9 and 16.4 percent of all deaths (or 55 and 67 percent of infectious disease causes of death). Nutritional deficiencies were registered as the cause in 7.4 percent of deaths in children 1-4 years of age and 4.5 percent in children 5-9 years. Immaturity was listed as the leading cause of infant mortality in 1978, responsible for 13 deaths in every 1,000 live births, a cause most probably related to maternal malnutrition. Maternal deaths occurred in 7 out of every 10,000 registered live births. Rabies was among the leading 10 specific causes of death in children 5-9 and 10-14 years of age.

On the other hand, the leading cause of death in 1979 was due to circulatory system diseases, accounting for 14 percent of all deaths and 25 percent of deaths in the 40-69 year old age groups. Malignancies are the 7th leading cause of death in general and in the leading 5 causes of death over age 30.

In terms of morbidity, neonatal tetanus was reported to occur in 1 of every 2,000 live births in 1981, and 53 of every 100,000 people were reported to have had a vaccine-preventable disease (diphtheria, pertussis, tetanus, poliomyelitis, and measles). Surveys to measure the prevalence of malnutrition in preschool children (6-59 months of age) by district conducted during the period 1979-82 revealed signs of acute malnutrition present in 4.6-11.8 percent of preschool children. Signs of chronic malnutrition were present in 9.5-34.6 percent of preschool children. Signs of concurrent acute and chronic malnutrition were present in 0.7-7.8 percent of preschool

children. Malaria is endemic, with a reported incidence of 3.2 per 1,000 population in 1981, and cholera is endemic, with annual rates ranging between 0.3-3.9 per 100,000 population during the period 1978-82. Hepatitis ranged in incidence from 32.0-127.9 per 100,000 population during the period 1971-81.

An as yet unexplained finding was that diarrheal diseases were among the 10 leading specific causes of death in each age group in 1979, accounting for 35.4 deaths per 100,000 population overall. Another disturbing finding was that suicide was the leading specific cause of death in individuals between 15-39 years of age in 1979.

Based on these preliminary data, the team's opinion is that many of the leading causes of morbidity and mortality in Sri Lanka are diseases that have virtually been eliminated in developed countries and could be impacted through available intervention strategies.

POPULATION, FERTILITY AND FAMILY PLANNING

Immediate and Short-Range Population Prospects

The adverse results of continued population growth in Sri Lanka will not be dealt with here, since these issues have been fully discussed elsewhere. The health problems arising from high fertility are discussed elsewhere in this report. The many other problems arising from population growth with its adverse social effects -- ever-decreasing per capita (or per family) land holdings for the agricultural population, the difficulty of supplying the population enough food for adequate nutrition, and high dependency ratio (i.e., the ratio of dependent children to persons of working age) -- all are detailed in several sources, including the USAID internal document entitled "Sri Lanka: Population Issues 1982." This chapter will instead deal with the following:

1. The immediate and short-range quantitative aspects of population growth.

2. The current attempts to contain population growth and the degree of success and failure.

3. Other aspects of the population issue.

It is widely known that Sri Lanka's crude birth rate (CBR)--the number of births in a year divided by the mean (or mid-year) population in the year and usually expressed on a per-1,000 basis--declined steadily after 1951, when it was 39.8, to a low of 27.5 in 1974. Since 1974 the CBR has not decreased, but has stayed in the range of 27 to 29. As will be explained shortly, however, the fact that the CBR is no longer decreasing does not indicate that fertility itself is no longer decreasing.

On the other hand, annual reported deaths have been decreasing, and both the annual number of reported births and the resulting natural increase (excess of births over deaths) have been increasing almost continuously since 1974, as can be seen from the following figures:

Year	Births (000)	Deaths (000)	Natural Increase (000)
1974	365.7	119.5	246.2
1975	373.1	115.1	258.0
1976	380.7	106.8	273.9
1977	389.5	103.3	286.2

Year	Births (000)	Deaths (000)	Natural Increase (000)
1978	404.8	96.0	308.7
1979	418.0	94.2	323.7
1980*	407.2	89.3	317.9
1981*	420.3	89.3	331.0
1982**	422.4	93.4	329.0

* Figures for 1980 and 1981 are provisional.
** Figures for 1982 are double the provisional figures for the first six months of 1982.

The increase in annual births does not appear to be the result of any increase in marital fertility but instead results from an increase of women in the childbearing years. Many more women were born in the 1960s than in earlier decades and, due to lower mortality, a larger proportion has survived to reach reproductive age. We consider the age range 20-34 as the peak reproductive period for women, and the 1981 census showed a total of 1,945 million women 20-34, which exceeded the corresponding 1971 total of 1,458 million by 33.4 percent. Using Abeykoon's projections (8), the number of women in this age group will increase by another 16.6 percent between 1981 and 1991 and will continue to increase substantially in subsequent decades.

The increase by 33.4 percent during 1971-81 was in contrast to the overall population increase (all ages and both sexes combined) of 17.0 percent for the same period. Actually, age-specific fertility appears to have fallen steadily during the 1970s, as indicated by the following figures from Table 2 of the Ratnayake-Retherford-Sivasubramaniam study (9).

Age-Specific Fertility Rates (per 1,000)

Years	15-19	20-24	25-29	30-34	35-39	40-44	45-49	Total
1966-70	69	196	248	216	138	59	17	4.72
1971-75	55	167	208	178	111	45	13	3.89
1976-80	49	160	191	154	94	39	13	3.50

The total fertility rate (TFR) is the sum of the age-specific fertility rates multiplied by 5 (since the age-specific rates are given for 5-year age groups). TFR is a more satisfactory measure of current fertility than the crude birth rate (CBR), which has been distorted by the fact that women at the peak childbearing ages are now so much larger a proportion of

total population than they were a decade ago.

The total fertility rate of 3.50 means that women are on the average currently bearing children, age by age, at such rates as would produce an average of 3.5 births per woman over the whole childbearing period if the age specific rates remain unchanged. Corresponding to the 3.50 TFR is a gross reproduction rate (GRR) of 1.72, which is 3.50 multiplied by 49 percent (the proportion of females among newborn children), which means that, on average, a women will bear 1.72 daughters. Corresponding to the 3.50 also is the net reproduction rate (NRR) of 1.58, which is calculated with reference to a current female life table (the Census and Statistics 1979 Life Table was used) and which takes into account the probabilities that the daughters will survive to become potential mothers themselves.

A population with an NRR value of 1.00 is said to have replacement level fertility. This does not mean, however, that population growth (i.e., natural increase) will stop when NRR= 1.00 is reached, for the age distribution will at that point still be such that the number of women entering reproductive ages will be increasing. A population with a demographic history like Sri Lanka's might still increase by 50 percent or more (and over a period of 50 or more years) after NRR=1.00 is reached, unless of course NRR continues to decrease and goes below 1.00. Frejka's (10) projections show Sri Lanka's population increasing from 21.8 million in the year 2001 to an ultimate of 30.6 million, even if NRR=1.00 is reached during the years 2000-2005.*

We have accepted Abeykoon's population projections as being reasonably accurate on the basis of the assumptions he made, the most important being that replacement level fertility will be reached in the year 2001 following continuous fertility reduction up to that date. His projections include the following mid-year population results in thousands:

	Total	Male	Female
1981	14,984	7,637	7,347
1986	16,293	8,271	8,022
1991	17,519	8,865	8,654
1996	18,705	9,440	9,265
2001	19,696	9,916	9,780

* Frejka's projections take no account of the substantial emigration since 1971.

There are some details in his projection to which exception might be taken, even though he has fairly reasonable results. Abeykoon has assumed continued net emigration for many years to come (though at a declining rate), and it appears that he has applied this equally or almost equally to each sex. As he himself says, emigration of Indian Tamils is almost at an end, and the net movement to the Gulf States, which he assumes will gradually decline, may even be reversed within the next two decades. Since probably only a small proportion of people going to the Gulf States are females, he may have figured too low a female population growth and therefore also too few births.

His most crucial assumption is that NRR will be 1.00 by the year 2001. An NRR=1.00 requires a TFR of about 2.15, which would require a TFR which was 3.50 in 1978 (the midpoint of 1976-80) to decrease by 1.35 in 23 years, or 0.059 a year. This may be overly optimistic, as the Ratnayake-Retherford-Sivasubramaniam results show TFR to be decreasing at a decreasing rate.

As is well known, delay in female marriage -- or viewed another way, decline in proportions married among females under age 30 -- has been a factor in Sri Lanka's fertility decline fully as important as decrease in marital fertility due to contraception. The 1981 census showed that the 30.1 percent of females 25-29 had never married, while for ages 30-34 the percentage was 16.0 percent. Single-year interpolations indicate that fully 20 percent of women now reaching their 30th birthday have never been married.

It is difficult, however, to see how the degree of late marriage or non-marriage can continue to increase. One of the several factors that retarded female marriage in recent years was the technical demographic phenomenon known as marriage squeeze. Because Sri Lanka women tend to marry men an average of five years older than themselves, in 1971, for example, a 20 year old woman born in 1951 would tend to seek a 25 year old mate born in 1946, but her difficulty in finding one would stem from the fact that there were considerably fewer births in 1946 than in 1951. But the annual increase in the number of births slowed during the 1960s so that the marriage squeeze will now have much less effect. In 1971, the ratio of males 25-29 to females 20-24 was only 73.4 percent, but in 1981 it had increased to 84.3 percent and by 1991 it will probably reach 97.2 percent, according to Abeykoon's projections. Still another factor operating is the greater degree of affluence and employment in several sectors of the economy, so that we can soon possibly expect many marriages to take place which otherwise would have been further delayed.

Much as one might hope for a stationary Sri Lanka population in the foreseeable future, the above suggests the virtual

certainty of increasing population growth*, due not to higher fertility but to the presence in the population of increased numbers of young women who are already born. The following presents a hypothetical illustration of the difficulty of eliminating or drastically reducing population growth, even if fertility is slashed by a large percentage. Perhaps by drastic action the annual number of births could be reduced to the annual number of deaths (see the Vernon Gunesekera articles on no-birth bonus referred to later, which talk in a similar vein).

If the annual number of births is now 425,000 and the annual number of deaths is 85,000, one can assume that the 425,000 would be reduced by 80 percent to equal 85,000. But the 85,000 annual deaths include about 15,000 infant deaths and 5,000 deaths at ages 1-4. Therefore, the 80 percent reduction in births would within a single year reduce infant deaths from 15,000 to 3,000 (it should then reduce them more because of health improvements accompanying lower fertility). And in another 4 years the 5,000 age 1-4 deaths would be reduced to 1,000. Ignoring further death reductions in later years, even if annual births were reduced from 425,000 to 85,000, we would be 5 years reducing the annual deaths of 85,000 by 16,000 (15,000-3,000+5,000-1,000) to only 69,000. Some population growth would therefore persist (ignoring emigration).

Of course it is absurd to think that annual births could possibly be reduced to so low a figure. During the next decade, an average of over 140,000 women will reach marriage age each year. Almost all will marry, and even with an average of only one live birth, they would account for well over 100,000 births a year, not to mention the additional births to women already in their childbearing years.

Current Status of Contraception

The Family Planning Association of Sri Lanka commenced its services in 1953, making 3 decades on family planning in Sri Lanka. The Swedish aid organization also began its participation in 1958, and the government program came into existence about 1965.

The Family Health Bureau has been compiling and releasing data on new acceptors of modern contraceptive methods, and these data include acceptors from the Colombo Municipality and the Family Planning Association as well as from the national program

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* While in absolute terms population growth, or at least natural increase, is rising, it is unlikely that the growth rate (growth divided by population) will increase.

administered by the Family Health Bureau. The following are the new acceptor data compiled through October 1982 for the principal modern methods:

Year	Loops (000)	Orals (000)	Sterilizations Female (000)	Sterilizations Male (000)
1966	10.0	1.0	3.0	
1967	18.5	9.0	3.6	
1968	20.6	16.0	5.2	
1969	19.5	22.3	2.9	
1970	15.8	26.9	5.0	
1971	11.4	25.8	4.1	0.2
1972	18.6	32.3	9.1	0.5
1973	27.5	34.2	18.4	1.8
1974	29.7	35.9	34.9	7.3
1975	32.8	37.7	33.1	6.0
1976	27.0	25.6	32.7	2.9
1977	21.3	27.5	17.8	1.3
1978	23.1	31.1	19.6	2.3
1979	20.2	30.4	30.0	5.6
1980	19.2	29.3	61.6	51.3
1981	13.6	21.5	37.5	28.0
1982*	13.9	21.4	34.8	9.8

Source: Family Health Bureau
* First 10 months of 1982 only.

The above acceptor data are questionable in several respects. The data through the year 1974 plus part of 1975 were discussed at length in World Fertility Survey Scientific Report No. 18 (11), and it was observed that the number of sterilized women derived from the Sri Lanka WFS data was well in excess of those accounted for by the above acceptor data.* With loops and orals, on the other hand, the authors felt that the acceptor data were excessive, even when allowing for termination of use. Furthermore, users of these methods who discontinued use and then started again on the same method were counted two or more times, so that those called new acceptors were often not first time acceptors. Before leaving the data on new acceptors, we should call attention to: (1) The substantial decline in acceptance of both loops and orals in recent years, and (2) the very high number of sterilizations beginning in 1980.

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* When the WFS data, which covered approximately 1 woman in every 300, were inflated by factor of 300, this should have made the sample data comparable to national data.

To some extent, the two phenomena are related. The large cash incentives paid to sterilization acceptors beginning in 1980 withdrew interest from the other methods, but actually the acceptance of the loop had declined steadily since 1975. The above table of new acceptors does not include acceptors of Depo Provera, for which new acceptance is now reported to be about 8,000 a year.

The most important source of contraceptive prevalence in Sri Lanka is not in the form of acceptor data but in the few island-wide impact surveys conducted over the years. The Family Health Bureau itself conducted such surveys in 1975, 1979, and 1982. None of the results were published by the bureau, but some of the results of the 1975 survey were analyzed and circulated. For example, the tape of the 1975 study was the basis of a master's degree thesis which was later circulated in abridged form (12).

The 1975 World Fertility Survey for Sri Lanka (SLFS) covered 6,810 ever-married women, giving extensive detail on marriage, fertility, fertility preferences (desired number of children and preferred sex of next child), and contraceptive knowledge and use. The Department of Census and Statistics has very generously granted a large number of analysts access to the data set, with the result that many studies supplemental to the First Report have now been published.

In 1979 the IBRD (World Bank) with the aid of the Department of Census and Statistics conducted a survey which followed up on the majority of the women who had been covered by the SLFS, likewise investigating fertility, fertility preferences of contraception, and also interviewing other family members in the same household. Unfortunately, results have not yet been published.

In 1982 the Department of Census and Statistics in collaboration with Westinghouse Health Systems Group of Colombia, Maryland, conducted a contraceptive prevalence survey (CPS), and a draft of its report has been made available to the team. This survey was less exhaustive in its inquiry than the SLFS, but like the SLFS it investigated contraceptive use and non-use and also indicated use and non-use on the part of women who wanted no more children.

The two published surveys, SLFS (1975) and CPS (1982), provide the following interesting comparison of contraceptive prevalence:

	SLFS (1975) Percent	CPS (1982) Percent
All methods	32.0	54.9
Pill	1.5	2.6
IUD	4.7	2.5
Condom	2.3	3.2
Female sterilization	9.2	17.0
Male sterilization	0.7	3.7
Injections and other scientific	0.4	1.4
Withdrawal	1.5	4.7
Rhythm	8.0	13.0
Other traditional	3.7	6.8

The above comparison reveals a much higher contraceptive prevalence in 1982 than in 1975, with significant increases in almost every method. The one exception is the IUD, whose use has dropped almost in half. It should be noted that traditional methods have increased in as high a ratio as several other methods. Details of use by age and number of living children indicate that the big increase in traditional methods has been primarily among young couples with few children.

Both SLFS and CPS surveys showed a significant proportion of women who want no more children and still use no contraception or who use only a traditional method. In the CPS, only 23.5 percent of women who wanted no more children were using a modern method, 40.5 percent used a traditional method, and 36.0 percent used no method at all. Considering that about one-half of all currently married women want no more children and that the CPS showed an extremely high knowledge of contraceptive methods -- 98 percent of all women know of sterilization (though only 72 percent mentioned it without prompting), the degree of non-use represents a very flagrant unmet need.

Discussion of specific methods is now in order. The last 3 years have witnessed a great increase in number of sterilizations, but there are no data as to the age of recent sterilization acceptors. Age, more than parity or number of living children, is the criterion which affects births averted through sterilization. Actually, the data suggest the probability that the modal (most common) number of living children of recent sterilization acceptors is three rather than four or more, as previously thought. It is still rather rare, however, to find sterilization acceptors with only two living children.

The fact that sterilization is not reaching women with fewer than three children makes it imperative that much more be done to motivate acceptance of temporary methods. Studies of both pill and condom use in Sri Lanka show very low continuance (12),

while IUD continuance is very high. It was found in one of the studies that only 6 percent of women who started on the pill, purchased as much as one pill packet a month for 24 months. Understandably, such pill users (and also condom users) experience a high pregnancy rate.

There are several reasons for decline in IUD acceptance. Even though IUD retention has been high, there have been enough dissatisfied IUD acceptors to give it some discredit. One big problem has been lack of skilled professional follow-up, which could in some cases remove the device if it really needs to be removed and encourage the woman to keep it if there are no real contraindications.

Depo Provera has been an increasingly popular method in Sri Lanka. There has been some adverse publicity given to the lack of FDA approval for use of this method as a contraceptive in the United States, but this does not appear to have been too damaging. The advantages of Depo Provera include the fact that lack of care or of motivation does not affect the efficacy of the injection until the time it is to expire. It is also a method which does not require a male doctor to have access to a woman's private parts, so it is not objectionable to Muslims or to others who might be opposed to either IUD or tubectomy. Moreover, it is reported that some women manage to take it without their husband's knowledge, which would be very difficult with the pill. One difficulty with Depo is that a woman will sometimes skip a period and become alarmed, so that here too professional follow-up and counseling are needed.

The other difficulty with Depo is its costs. It is now supplied free to the government by outside donors and therefore supplied free to users, but the government is worried about recurring costs when donor help is topped, particularly if by that time there are many thousands of women who are regularly using Depo. The team has no recommendation on this problem, other than perhaps to urge long-term donors to switch to Depo long-term funds now used elsewhere. GSL support for Depo Provera would appear to be cost-effective.

The team has been informed that the use of volunteer assistants to help the Family Health Worker with family planning activities has been fruitful and that more such volunteers should be trained. These volunteers should be carefully selected, and preferably they should be married women who are contraceptive users themselves. If well trained, they provide credibility in the community and can help in telling women what family planning really is and how it can benefit them. As mentioned below, they can also assist in maintaining registers from which contraceptive prevalence can be measured.

Data Shortfalls in Health and Population

Despite the voluminous paperwork done in Sri Lanka, there are several areas where data vitally needed for evaluation of a program are missing, or where data on a program are laboriously collected and yet fail to address the most pressing questions.

The team has found that the Family Health Workers (or Public Health Midwives) maintain several time consuming records and prepare various data reports, but it is found that: (1) Data collected in one MOH area may be different from those in another, and (2) some data collected and reported are never used. The data may be seen by a supervisor but they do not become part of national data. Most of the data the worker produces are work-load statistics: how many work items performed, how much money collected, etc., but they record little in the way of impact measurement.

The dearth of impact data seems to pervade the entire health and population front. For example, the team was unable to find any evaluation of the impact of the CARE triposha program, which is of great importance because of the seriousness of malnutrition in Sri Lanka. While health centers distributing triposha are required to record weights of triposha recipients, they seldom comply. The team would like to have seen assessments of the average weight gain of pregnant women receiving triposha, the average birth weights of their children, and the before-and-after nutritional status of children enrolled in the triposha-feeding program.

Also, the FHW could maintain a relatively simple register listing all the married women of reproductive age, indicating which ones are currently using a modern contraception method (or are sterilized or the husband sterilized) and which are not. Such a register would serve to: (1) Determine the proportion of contraceptive prevalence, and (2) locate women who should be motivated for contraception.

We learned that such registers are already being maintained by FHWs in Dr. De Fonseka's experimental areas. Registers are selected at random and their accuracy is checked by independent monitors. Dr. de Fonseka reports that, because of such checking and supervision, his system gives quick and accurate contraceptive prevalence data. He does not use volunteers to help his FHWs, but perhaps the wider use of volunteer assistants would make possible the use of these registers uniformly throughout Sri Lanka.

Another helpful piece of information would be data on births by birth order (i.e., whether each given birth is the first,

second, or third live birth of the mother). The Registrar General has recognized the value of such information, but a change in the birth registration law is needed to place birth order on the registration form. Nevertheless, the Registrar General's office has recently asked registrars unofficially to write birth order in the margin of the present form. At present, compliance with this request is low, and it will be some time before such information can be adequately tabulated. Some hospitals also report birth order on their birth registrars, but their reporting is far from uniform and the information is rarely reported.

One particular advantage of knowing births by birth order is the value in evaluating the family planning program over a period of years. If the program is successful, the higher-order births would decline progressively, though first-order births would either remain constant or would increase from year to year proportionate to the number of new entrants into the childbearing ages.

Ideally, there would be a registration system whereby infant death records could be linked with birth records, to obtain infant mortality rates broken down by birth order, birth weight, age of mother, etc. Such linkage would be very valuable for analysis purposes but seems to be a long way into the future.

Awareness and Attiutdes on Population

For a country with the majority of its people literate and apparently sophisticated in many respects, it is surprising that there is so little public awareness of the population growth problem or concern about it. Even if one questions English-speaking Sri Lankans met on Colombo streets, he would find that people are very hazy about the total population of the entire country or about population growth. There is a general awareness that Colombo is more crowded than formerly and great awareness of the housing shortage there, but little awareness or concern about population growth in the country as a whole. If the more difficult question is asked as to how many children a couple should have on the average in order for population to remain stationary in the long run, the answer is usually a blank, but also may range from zero through six.

The UNFPA has supported a program of population education in the schools, which started in about 1974, was later suspended, but is now reinstated. A visit with the director of this program in the Ministry of Education and with three of his assistants was informative. Apparently population subjects are now taught throughout much of the country in grades six through ten, though training teachers for this has been a serious problem. However,

it was admitted that not starting until grade 6 leaves Muslim girls unexposed, as relatively few of these are kept in school to grade 6. Similarly, children from poor families with high fertility also tend to be dropouts. The population education in the schools deals with the adverse economic and environmental effects of population growth, but does not deal with health effects. In fact, the aides were surprised when told of studies which find that children of high-parity women have by far the highest mortality. There are some excellent pictorial explanations available which show the adverse effects of large family size on health, particularly one by Columbia University's Center for Population and Family Health (14), which could be adapted for use in Sri Lanka.

Also it was learned that no mention is made that an average of three or more surviving children would perpetuate rapid population growth. In fact, the health education staff informed us that any suggestion of a two-child norm is strictly taboo, as this would embarrass children who come from large families. But any effective population education must relate population growth to family size.

Over the weeks the team spent in Sri Lanka, practically no articles in English-language newspapers dealing with population issues came to our attention. There are, of course, lengthy articles virtually every day discussing the economic plight of the country, the need for development assistance, and so forth, but one cannot find reference to population size or growth in this connection. A notable exception was a series of three articles in the Sunday Observer issues of February 13, 20, and 27, entitled "Bonus for No-birth" (see Appendix C) by Vernon Gunasekera. These articles show great concern over population growth and urge that the present annual level of 400,000 births be reduced to 100,00 to equal the number of deaths, and that this be done by paying married women of ages 20-44 Rs. 1,000/ for every year in which they have no birth (other than the first one). The idea is that the government's saving per birth prevented would be substantial, since the cost to the economy for each child could exceed a million rupees. The articles have a number of quantitative defects and the scheme might be called visionary--at least, there is no chance of its early adoption. However, it is interesting that it was written at all, and it would be encouraging if more articles on population were written.

There have of course been many surveys in Sri Lanka as in most other developing countries that deal at length with the micro aspects of population--e.g., with knowledge, attitude, and practice of family planning, with the woman's or couple's desired family size, etc. But no surveys have investigated awareness and attitudes on the macro aspects--on how people feel about how

population growth is affecting the society and therefore themselves and their children, and what should be done about it. Studies of this sort would be valuable to assess where peoples' thinking now stands and what educational input might be productive to bring about desirable change.

In connection with this subject, the ethnic issue should be mentioned. In our interviews with government officials and others, we have been asked how to answer the question--inasmuch as the Sinhalese are practicing contraception more than either Sri Lankan Tamils or Sri Lankan Moors--whether and when the Sinhalese will be outnumbered by them.

During the interval between the 1971 and 1981 censuses, the Sinhalese population increased at an annualized rate of 1.98 percent, the combined Sri Lanka Tamil and Sri Lanka Moor population at 2.69 percent. It may be noted that, even though the combined Tamils and Moors had higher birth rates during this period, they also had higher death rates, so that the rates of natural increase were not as far apart as the birth rates alone. The other ethnic groups, Burghers, Indian Tamils, etc., may be disregarded because they actually decreased in number during this period.

If one were to assume a long future continuation of the above respective increase rates, 1.98 percent and 2.69 percent, the Tamils and Moors would eventually overtake the Sinhalese, with the Tamils plus Moors reaching 454 million sometime during the year 2171 and the Sinhalese also reaching 454 million the same year. The combined population would be 918 million.

If the respective increase rates were altered but kept the same ratio to each other, the year of overtaking would be different, but the scenario would be approximately the same, namely that the Moors plus Tamils could not overtake the Sinhalese until after the combined population passes about 900 million. But is it conceivable that the total population could ever be permitted to reach 900 million? If this could happen, there would be 60 Sri Lankans occupying the space each single Sri Lankan occupies today. Undoubtedly, drastic intervention would be invoked to prevent the population from reaching even 100 million.

Quite aside from the absurdity of such a happening, the Sinhalese majority should be helped to understand that it is their own population growth that is really the major threat. At its intercensal rate of growth, the Sinhalese population by itself could reach 30 million in 50 years. If all non-Sinhalese were to have left the country by then, the population would nevertheless have doubled due to the Sinhalese alone.

IV. RECOMMENDED INTERVENTIONS

RECOMMENDED INTERVENTIONS

Major Health Problems and Recommended Interventions

Diarrheal diseases accounted for 53 percent of the infectious disease deaths in 1979. At the time of the team's visit, a diarrheal disease control program using oral rehydration salts (ORS) was in the implementation stage but was not progressing rapidly. ORS packets were available in the OPD departments of the general hospitals but not in the peripheral units, nor did the FHWs routinely use them. A long-term project to reduce morbidity (and thereby mortality) due to diarrheal diseases and other water-washed diseases is through improving the water availability, quality, and sanitation projects. In the short term, ORS has been well documented to reduce mortality due to diarrheal diseases by 67 percent (15).

In Sri Lanka, recent surveys have shown that, on the average, each child under 5 years has at least one episode of diarrhea annually, carrying with each episode a 0.2 per 1,000 risk of mortality. In addition, one survey revealed that 50 percent of the deaths in the under 5 year old population surveyed were associated with a diarrhoeal episode (excluding neonatal deaths) (16). Based on these survey results and other information available to the team, it is estimated that somewhere between 7 and 35 percent of deaths in this age group could have been averted through use of ORS.

Mental health programs. Of the 10,086 deaths in 1979 due to external causes of injury, 3,632 (36 percent) were reported due to suicide. In the economically active population between the ages of 20-49 years, 14 percent of all deaths were due to suicide, and 70 percent of the suicides in this age group were male. This team was not able to investigate suicide causes (though unemployment may be one) or the existence of mental health programs. Based on these findings, the team strongly recommends further consideration of suicide preventions programs.

EPI. Review of the morbidity and mortality due to vaccine-preventable diseases, presently incorporated in the EPI program in Sri Lanka, shows dramatic reductions in the morbidity and mortality due to diphtheria, tetanus (both neonatal and non-neonatal), and polio since the introduction of the vaccines and later implementations of the EPI. While the reported deaths due to measles among children less than 5 years old in 1979 represented only 0.5 percent of all deaths in this age group, the known synergism between measles and malnutrition coupled with the high prevalence of malnutrition detected in this age group raises a suspicion that measles may be a more serious problem than actually reported. With the MOHs proven successes within the EPI, the team

questions why measles vaccine has not been incorporated into the EPI and strongly recommends this action.

Health Probelms Related to a High Fertility Rate. An assessment of the hospital-based morbidity and mortality data combined with the review of the 1979 vital register mortality data revealed that the leading cause of hospitalization was for complications of pregnancy, childbirth, and the puerperium. Among women in the childbearing age group, 4 percent of deaths were directly due to complications of pregnancy. Of these deaths, 40 percent were due to postpartum hemorrhage and sepsis, both considered to be preventable deaths.

Other health problems related to the high fertility rate are anemia among women of childbearing age and malnutrition in children due to early and improper weaning practices and additional competition for the limited food resources available in the family setting. While statistical data are not available to calculate the true mortality due to the high fertility rate, the team recommends that more effort be placed on the ongoing family planning program activities, with the objectives of decreasing the fertility rate and encouraging better spacing between pregnancies.

In addition, there is evidence suggesting that improvements in delivery practices would have a measurable impact on the morbidity and mortality seen in women of childbearing age. The team questions why the FHWs, who were formerly called Public Health Midwives (PHMs) and were trained in midwifery, have now had a change in their role to emergency natal care only, reducing their potential impact on preventing maternal mortality. In addition, 10 percent of the reported perinatal infant mortality in 1979 was probably due to deficient delivery practices (problems with placenta and cord, anoxic and hypoxic conditions, and birth injury and difficult labor).

Nutritional Deficiencies. A review of surveys conducted to ascertain the prevalence of malnutrition among preschool children conducted in 1975-76 (17), and 1979-82 (18), revealed acute malnutrition present in 4.6-11.8 percent of children 6-59 months of age in the more recent survey, as compared with 3.7-8.8 percent of children 6-71 months of age in the earlier survey. Chronic malnutrition was present in 9.5-34.6 percent of children 6-59 months of age in the more recent survey, as compared with 20.7-49.6 percent of children 6-71 months old in the earlier survey. Concurrent acute and chronic malnutrition was present in 0.7-7.8 percent of children 6-59 months old in the more recent survey, as compared with 1.6-5.5 percent of children 6-71 months old in the earlier survey (17, 18).

Acute malnutrition is suggestive of a present or recent deficiency in food intake caused by either an actual decrease in availabily of food or imparied absorption of food due to

a diarrheal or other acute disease episode. Chronic malnutrition implies long-term inadequacies of food intake probably due to a combination of actual food deficiencies and recurrent diarrheal and other acute disease episodes. In addition, the observation that 35 percent (13.1/37.1) of the infant mortality was registered as due to immaturity, suggests that malnutrition among pregnant women is a significant problem.

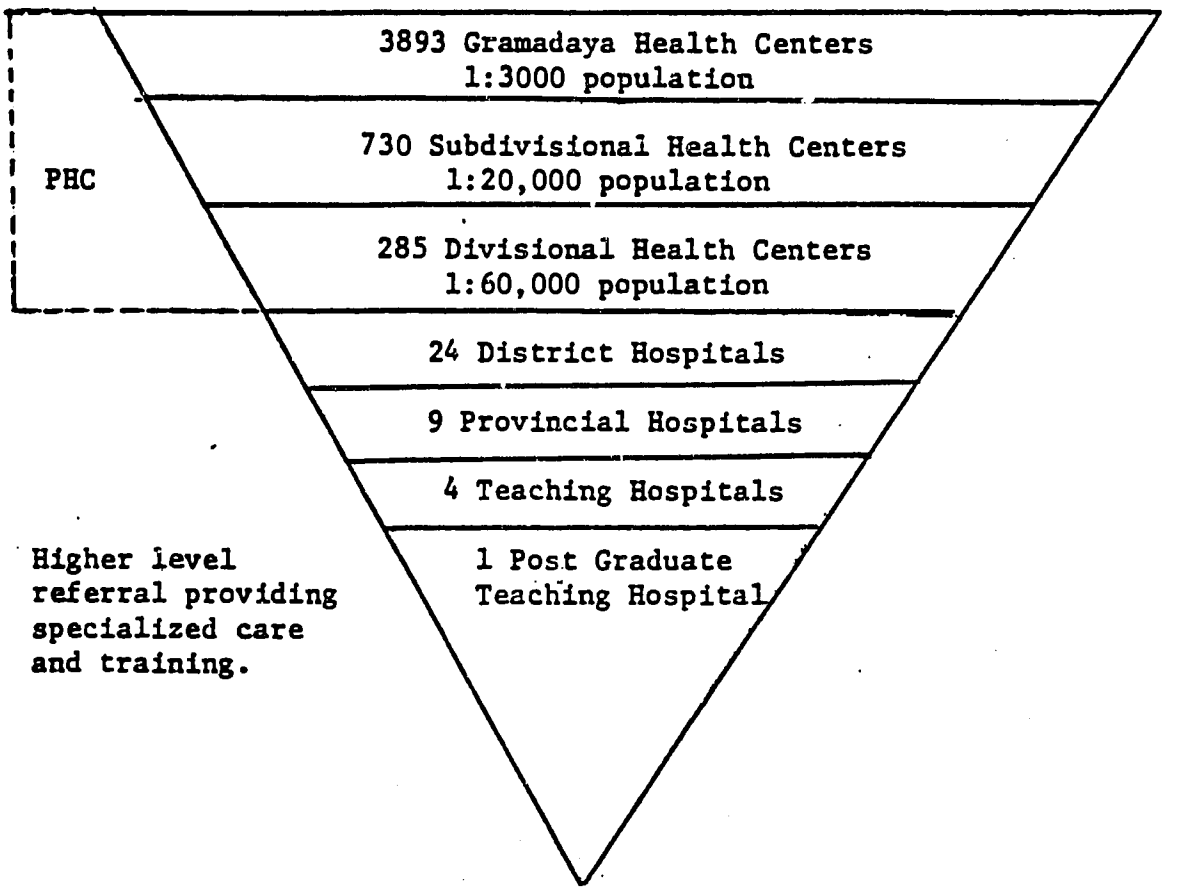
Recognizing the problems with malnutrition, the GSL has made efforts to provide relief in the area of nutrition. One of these efforts is the food stamp scheme, introduced in 1979, which provides stamps to eligible households (those earning less than Rs 300) to be used towards the purchase of rice, wheat flour, bread, sugar, milk foods, and dried fish. This system replaced a former food ration program, which provided rations of rice, flour, and milk at a cost to the government of 20 percent of total expenditures. Another effort is the triposha supplemental feeding program which distributes a high protein fortified cereal to at risk infants, preschoolers, and pregnant and lactating women. The triposha program represents a joint effort between CARE and the GSL. A third program is the school biscuit program (CARE/GSL Ministry of Education), which distributes biscuits (made of soy-fortified wheat flour, oil, and sugar) to primary school children attending schools with a high prevalence of malnutrition. For detailed descriptions of the triposha and school biscuit programs the team refers the readers to the evaluation of P.L. 480 Title II programs (19).

While there has been great concern that the changeover from a food ration system to the food stamp system would result in worsening nutritional deficiencies, data were not available at the time of the writing of this report to assess if this indeed has occurred. (See Appendix B for a more detailed discussion of the two nutritional surveys.) While routine surveillance of nutritional status was one of the recommendations of the surveys in 1975-76 and is supposed to be part of the triposha program activities, a system had not yet been implemented at the time of the team's visit. Understanding that the etiology of malnutrition is multifactorial, the team recommends that intervention strategies aimed at reducing the incidence and duration of acute illnesses in early childhood (i.e., through immunizations and early appropriate treatment of diarrheal episodes) be combined with effective nutrition education programs. While supplemental feeding programs have obvious political and social popularity, in view of the economic difficulties facing the GSL, the outlay of 25.6 million rupees in 1981 on the triposha program and 76.2 million rupees in 1981 on the school biscuit program are difficult to justify in the absence of demonstrated impact. The team strongly recommends an assessment of the impact of the program.

Malaria Control. A review of the trends in the morbidity and mortality due to malaria (see Appendix B) reveals marked successes in the anti-malaria campaign (AMC). The incidence of malaria was reduced from 28.0/1,000 population in 1975 to 3.2/1,000 in 1981. In addition, the mortality due to malaria was virtually eliminated and the proportion of falciparum was reduced from 16 percent in 1975 to 3 percent in 1981. Of future concern with respect to the AMC are possible signs of developing malathion resistance in the vector and the rapid development of the Mahaweli Project areas. These areas are known endemic foci of malaria with the potential of epidemic increases in malaria incidence due to infected cases returning to their homes in areas now considered to be relatively malaria free. In view of these concerns, the team recommends that USAID continue its present commitment to AMC, with one objective to be the elimination of falciparum transmission before malathion resistance emerges as a problem. If there were decreases in efforts of the AMC and malaria were to resurge in epidemic proportions in the Mahaweli Project area, there is the probability that the affected populations will evacuate the area. The project would fail and there would be a possibility of a country-wide epidemic of malaria.

Cancer as a Health Problem. According to the review of the vital registrar data, mortality due to carcinoma of the buccal cavity and pharynx represented 11 percent of all reported cancer-related mortality. In contrast, according to the Cancer Register, in 1978 carcinoma of the mouth and pharynx represented 30 percent of all diagnosed cases of cancer. These forms of cancer have known associations with the chewing of betel and tobacco. With a stated priority of the GSL to use FHWs in early detection of oral lesions, the team was struck by the paradox of the sale of betel at the entrance to the Kandy General Hospital.

Primary Health Care. The GSL has had a health policy committed to providing comprehensive health care to the entire population of Sri Lanka free of charge. This commitment is reflected by the health expenditure pattern during 1977-81, when 5.8 percent of GSL recurrent expenditures and 1.1 percent of the capital expenditures went to the MOH (20). The medium-term investment plan 1981-85 programme states that "the health strategy for the period 1981-85 will, therefore, place greater emphasis on aspects of primary health care, including the improvement of medical services in rural areas, by providing a well organized field-based domiciliary service using midwives as multipurpose health workers and the services of health aides" (20). With this in mind, the GSL has proposed a restructuring of the health delivery system as part of a Primary Health Care (PHC) project as shown below:



The Gramadaya Health Center will be manned by a Family Health Worker (FHW), who will have trained village level volunteers to assist in carrying out her tasks. The training of these volunteers is the responsibility of the Division of Health Education of the MOH. The team learned that the turnover rate of these volunteers was very high so that, at any given time, an FHW lacked most of the volunteers assigned to her. While the MOH feels that the training of multiple volunteers will be beneficial in the long term, as they are the future parents of generations to come, in the short-term this appears to produce inefficiencies in the operations of the proposed PHC project. The FHW has 16 assigned tasks; antenatal care, emergency natal care, postnatal care, child care, family planning, immunizations, diarrheal disease, nutrition, school health, family life and adolescent care, control of communicable diseases, treatment of minor ailments and injuries, health education, laboratory testing (sugar, albumin), blood filming for malaria parasite, and passive screening of patients. The team questions the feasibility of the FHW to provide all 16 services enumerated to a population of 3,000.

The restructuring of the health care delivery system to reflect the proposed PHC scheme has indentified several areas for donor assistance. These areas include the construction of Gramadaya Health Centers (3871), Subdivisional Health Centers (192), and Divisional Health Centers (67) and upgrading existing health facilities (538 Subdivisional Health Centers and 218 Divisional Health Centers). Additional areas identified are for projects in community strategy in health education, management and information, applied nutrition, EPI, and maintenance and repairs of electromedical equipment (20).

While the PHC proposal states as an objective to clearly define a supervisory chain, at the time of the team's visit this had not as yet been implemented. Field visits by the team revealed inconsistent supervision at all levels of attention of health care. In addition, the team was impressed with the volume of paperwork required by each category of health care worker, especially the FHW, and questioned the ability of the FHW to complete all 16 tasks in addition to maintaining the required records. With the above in mind, the team recommends as a possible intervention strategy for USAID involvement in the project described below.

Health Systems Management Project. (Similar to USAID/MSH Honduras Project.) In view of the strong commitment the GSL has placed on primary health care (PHC), a USAID-supported project within the PHC framework would probably also be supported strongly by the GSL. As envisioned by the team, a health systems management project should address components of management, planning, supervision, logistics, evaluation (data collection and management), and continuing education. These six components could be applied to selected components of the PHC strategy--relating to maternal and child health (MCH). The five MCH program components that would have a major impact on the present morbidity and mortality picture in Sri Lanka are:

1. Family planning
2. Diarrheal disease control
3. Nutrition
4. Perinatal--natal and postnatal care
5. EPI

Major Population Problems and Recommended Interventions

The preceding chapter has described some of the population problems as the team views them. These can be summarized as follows:

1. The current acceleration of population growth, due not to increased fertility but to changes in age composi-

tion of the population, the apparent continued decline in mortality, and the lessening of delayed marriage as a factor retarding population growth.

2. The decline in use of modern spacing methods and particularly the decline in acceptance of the IUD.

3. The finding that there are large numbers of women who want no more children and who say they know of modern methods but yet do not use them.

4. The continuance of health problems plus economic and social problems resulting from high fertility.

5. The apparent lack of public concern about population growth and its adverse effects.

There are several interventions which the Sri Lanka AID Mission has already considered, and some of them relate to problems which have been discussed in the preceding chapter. One in particular is to fund the training of carefully selected volunteers to assist the family health workers.

Still another is to promote and fund better systems for training and retraining the FHWs. The team met an FHW who had been on the job for 16 years but who had only one retraining session over that entire period.

There are a number of proposed studies and surveys that appear deserving of consideration for support. A study by the Family Planning Association which would involve IUD acceptance in several experiment and control areas: a proposed study (by Dr. Chinnathamby) on Depo Provera users and non-users; and a proposed study by Family Health International which would investigate deaths of women of reproductive age.

The most valuable intervention, however, might be in the promotion of awareness of population problems. While there is a population education program in the schools, it is quite weak, and the Family Planning Association's education campaigns need supplementation. What would be desirable, would be a survey to measure public awareness of the dangers of population growth and attitudes in the citizenry as a whole, followed by a strong adult education campaign to follow up the findings. Obviously the work would have to be undertaken by Sri Lankans capable of outreach in Sinhalese and Tamil. There are several people--for example, Dr. S.A. Meegama, Nimali Kannangara, or Daya Abeywickrema--whose guidance in formulating the project would be most valuable. It would be hoped that all levels of society could become so aware of and concerned over the dangers of

population growth that social consciousness would become committed to achievement of a stationary population.

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APPENDIX A

LIST OF PERSONS CONTACTED

USAID Mission

Ms. S.J. Littlefield , Director
Mr. W. Schoux , Deputy Director
Mr. J. Miller, Program Officer
Mr. R.L. Chamberlain , Chief HPHR
Mr. W.H. Johnson, Health & Population Development Officer, HPHR
Dr. C. Thenabadu, Program Specialist HPHR
Ms. Lee Ann Ross, Program Economist
Mr. T. Samaranayake, Program Officer
Mr. Larry Cowper, Malaria Consultant

Ministry of Health, Head Office

Mr. L. Panambalana, Secretary of Ministry
Dr. Malinga Fernando, Add'l Secretary, Director of Health Services
Dr. R. Liyanage, Asst Director, Planning.

Medical Statistics-Epidemiology Unit

Dr. A.V.K.V. De Silva, Epidemiologist
Dr. Maheswaran , Epidemiologist
Mrs. Samaranayake, Medical Statistician

Anti-Malaria Campaign

Mr. D.C.Subramaniam, Director
Dr.(Mrs) P.R.I. Herath, Entymologist

Medical Research Institute

Dr. Davy Perera, Director of Nutrition

Ministry of Colombo Group of Hospitals and Family Health

Mr. Tissa Devendra, Secretary of Ministry
Mr. Ratnasena, Asst. Secretary.
Dr. N. Vidyasagara, Assistant Director
Dr. K. Wickramasuriya, Evaluation Officer

Ministry of Plan Implementation

Dr. Wickrema Weerasooriya, Secretary, M.O.P.I.
Mr. D.P. Wijegunasekera, Director, Population Division
Mr. A.T.P.L. Abeykoon, Deputy Director, Population Division
Mr. Albert Fernando, Population Information Officer
Dr.(Mrs) Siva Chinnathamby, Consultant

Department of Census and Statistics

Mr. W.A.A.S.Peiris, Director
Mr. K. Gaminiratne, Deputy Director
Mr. Vithana, Asst. Director, Computer Operation

Registrar General's Office

Mr. S.L.H.Perera, Registrar General
Mr. Ramanathanpillai, Statistician

Ministry of Education

Mr. Sterling Perera, Director, Population Education

Food & Nutrition Policy Planning Division

Dr. R. Amarasekera, Director, F & N P P D

University of Sri Lanka, Colombo Campus

Dr. Earle de Fonseka, Professor, Community Medicine
Dr. Yasmin Nanayakkara, Professor, Paediatrics
Dr. Priyani Soysa, Professor, Paediatrics
Professor Samaranayake, Chairman, Mathematics Department
Dr. Abeywickrema, Computer Division, Mathematics Department
Mr. N. Puvanarajan, Demographic Training & Research Unit

UNFPA and Affiliated Agencies

Dr.(Mrs) Elina Visuri, UNFPA Coordinator
Mrs. Sarojini Abraham, Deputy Representative, UNICEF
Dr.(Mrs) Wijemanne, Consultant, UNICEF
Dr. S.A. Meegama, Consultant, UNICEF
Mr. Lateef, Representative, IBRD (World Bank)
Dr. K. Notany, Coordinator, WHO
Mr. S. Christensen WHO Project Director, National Health Information
Mr. T.J. Ramaiah, WHO Consultant in Planning and Management

CARE

Mr. Fred Davis, Director
Dr. (Mrs) Brity De Mel, Consultant

Family Planning Association of Sri Lanka

Mr. Daya Abeywickrema, Executive Director
Mr. Victor De Silva, Statistical Officer

Family Health International

Mr. Peter Miller, Representative

Persons met on Field Trip

Dr. Ranaraja, Superintendent of Health Services, Kandy
Dr.(Mrs) Visvaratnam, MOMCH, Kandy
Dr. A. Kuleratne, MO/FH/Estates,Kandy-Matale Districts
Dr. R.C. Rajapakse, Medical Superintendent, Kandy General Hospital
Dr. Buddhadasa, Superintendent of Health Services, Kegalle
Dr. Ariyasena, MOMCH, Mawanella, Kegalle District
Mrs. Gunatilleke (not sure of name) Vital Registrar, Mawanella
Mr. Henry Penehela (not sure of spelling) Superintendent, Ooduwella Estate, Kandy District

APPENDIX B

Contents

1. Analysis of Mortality by Cause from Death Certificate Registry (Vital Registrar's Data)

2. Morbidity and Mortality Trends from Hospital Discharge and Death Diagnoses

3. Vaccine-Preventible Diseases

4. Nutritional Status

5. Intestinal Infectious Diseases

6. Malaria

7. Tables and Figures

Analysis of Mortality by Cause from Death Certificate Registry (Vital Registrar's Data)

Tables 1-13 show the reported mortality by broad disease category of causes of death in Sri Lanka, comparing 1973 and 1979 for the total population and by age group. These data were derived from a computer registry of death certificate data maintained by the Registrar General's office, and routinely analyzed by the Department of Census and Statistics (as described earlier in this report). Each table presents the rank order, proportion of total deaths, and appropriate population based mortality due to each category of cause of death.

While the rank of circulatory diseases changed from two to one in 1973 and 1979, respectively, their population-based mortality remained essentially the same (88.1 to 89.5 per 100,000 population). Major decreases in mortality due to infectious diseases (-33 percent) and avitaminoses and other nutritional disorders (-63 percent) were seen. In addition, there was a 10 percent decrease in the mortality reportedly due to senility and other ill-defined causes.

It is important to mention that the diagnosis old age in Sinhalese tranlates to senility in English. A review of table 13 (mortality in ages 70 and older) shows that 60 percent of deaths are attributed to this cause.

The continued reporting of infant perinatal disorders as a cause of death in individuals over 1 year of age in 1973 is an indication of problems in reliability of the reported cause of death. Nevertheless, we feel justified in presenting this best available data as a glimpse on causes of mortality.

In a review of the infant mortality (IMR), one observes that the total IMR decreased by 18.5 percent from 1973 to 1979, with a 57 percent reduction in reported mortality due to avitaminoses and other nutritional deficiencies. Of note is that the rank order of the leading three causes of IMR are unchanged from 1973 to 1979.

In children 1-4 years of age, the mortality due to infectious diseases decreased by 50 percent; that due to respiratory diseases, by 42 percent; that due to avitaminoses and other nutritional deficiences, by 74 percent; and that due to gastro-intestinal diseases, by 40 percent. Of note, while the overall mortality in children 1-4 years of age decreased by 46 percent, the proportion of total deaths represented by this age group decreased by 38 percent (from 8 to 5 percent).

In children 5-9 years of age, mortality due to external

injuries increased by 24 percent, while mortality due to infectious diseases decreased by 50 percent; that due to respiratory tract diseases, by 38 percent; that due to avitaminoses and other nutritional deficiencies, by 72 percent; and that due to hematologic abnormalities, by 32 percent.

In children 10-14 years of age, there was a 5 percent increase in mortality due to external causes of injury, a 32 percent decrease due to infectious diseases, a 54 percent decrease due to avitaminoses and other nutritional deficiencies, and a 46 percent decrease due to gastrointestinal disorders.

In the 15-19 year old age group, there was a 9 percent increase in mortality due to external causes of injury, a 38 percent decrease in mortality due to infectious diseases, and a 40 percent decrease due to avitaminoses and other nutritional deficiencies.

In the 20-24 year old age group, there was a 22 percent increase in mortality due to external causes of injury, and a 10 percent increase due to circulatory system disease. The overall mortality in this age group increased by 2 percent. In contrast, there was a 32 percent decrease in mortality due to infectious diseases, a 51 percent decrease due to hematologic abnormalities, and a 36 percent decrease due to gastrointestinal disorders.

In the 25-29 year old age group, there was a 24 percent increase in mortality due to external causes of injury and a 50 percent increas due to psychiatric disorders, a 28 percent decrease due to infectious diseases, a 46 percent decrease due to hematologic abnormalities, and a 38 percent decrease due to maternal perinatal causes.

In the 30-39 year old age group there is a 7 percent increase in mortality due to external causes of injury, a 36 percent decrease due to infectious diseases, a 54 percent decrease due to maternal perinatal causes, and a 39 percent decrease due to hematologic disorders.

In the 40-49 year old age group, there was a 12 percent overall decrease in mortality with reductions of 17 percent due to malignancies, 27 percent due to infectious diseases, 26 percent due to gastrointestinal diseases, and 41 percent due to maternal perinatal disorders.

In the 50-59 year old age group, there was an 8 percent overall decrease in mortality, with a 5 percent increase due to external causes of injury and reductions of 7 percent due to malignancies, 18 percent due to infectious diseases, and 47 percent due to hematologic abnormalities.

In the 60-69 year old age group, there was a 12 percent overall decrease in mortality, with a 20 percent reduction due to diseases of the nervous system and sense organs, a 29 percent decrease due to infectious diseases, and a 51 percent decrease due to hematologic disorders. Of interest was the 6

43

percent increase in mortality due to senility and other ill-defined causes.

In the 70 and older age group, there was a 17 percent overall decrease in mortality and, with the exception of external causes of injury and malignancies, there were major reductions in mortality in all broad categories of disease.

Table 14 shows the maternal mortality by age group and cause of death for 1973 and 1979 (from death certificate registries). Mortality rates were calculated as the number of deaths per 100,000 women in each age group and the number of deaths per 100,000 live births in each age group (denominators were derived from projections of the age specific fertility rates). Of interest is that the age specific mortality rates per 100,000 population increase with increasing age through 35-39 years, and then start decreasing, while mortality per 100,000 live births continues to increase markedly with increasing age. There was a 50 percent decrease in overall population-based maternal mortality from 1973 to 1979, and a 37 percent decrease in mortality per 100,000 live births.

Table 15 shows the trends in infant mortality rates (IMR) by district during the period 1969-79. All districts were observed to have decreasing IMRs during this period. In 1979, the reported IMRs ranged from a low of 18 in Jaffna and Polonnaruwa to a high of 79 in Nuwara Eliya. Of note is the precipitous drop in reported IMRs between 1977 and 1978 in Matale, Hambantota, Mannar, Vivuniya, Batticaloa, Amparai, Puttlam, Anaradhapura, and Badulla--decreases which cannot be explained by rapid improvements in the health care delivery system. Because of this unexplained marked decrease, the team decided to do further analyses of IMR trends.

It has been observed that, in countries with high IMRs, an equal or greater proportion of infant deaths occur in the post neonatal period (greater than 28 days old), as deaths in this period are more likely related to environmental influences, whereas in countries where environmentally related causes of death have been greatly reduced, a greater proportion of infant deaths occurs in the neonatal period and are related to genetic, interutero, and congenital disorders. Thus, in the United States one observes a 3:1 ratio between neonatal and postneonatal deaths. Table 16 shows the ratio of neonatal to postneonatal deaths by district for 1973 and 1979. The above mentioned pattern is not observed here--there are districts with high IMRs and high ratios of neonatal to post neonatal deaths (Kandy, Badulla) and, conversely, districts with low IMRs and low ratios of neonatal to post neonatal deaths (Jaffna, Mullaitiva, Trincomalee, Polonnaruwa and Moneragala). Another perplexing finding was the

overall 19 percent reduction in IMR from 1973 to 1979 and the 5 percent decrease in the ratio of neonatal to post neonatal deaths.

Table 17 presents selected causes of infant mortality by rate per 1,000 live births, proportion of deaths, and rank order during the period 1971-78. Of interest is that, while there was a 17 percent overall reduction in IMR from 1971-78 there was variance in changes of mortality due to specific causes. Thus, there were increases in mortality due to bronchitis, emphysema, asthma and meningitis (13 and 17 percent, respectively), but there were no changes in mortality due to neonatal tetanus and acute respiratory infections. Furthermore, there were decreases in mortality due to the other causes, ranging from 5 percent for birth injuries, difficult labor, and other anoxic/hypoxic conditions to a 63 percent reduction due to erythematous conditions--findings that are difficult to interpret.

Morbidity and Mortality Trends from Hospital Discharge and Death Diagnoses

Table 18 shows the morbidity and mortality data derived from discharge and death diagnoses reported by government hospitals for selected years 1965-81 by broad disease categories.(1) It is important to note that, while the leading discharge diagnosis category was listed as complications of pregnancy, childbirth and the puerperium, normal deliveries accounted for 67 percent of these in 1970, 59 percent in 1975, 61 percent in 1980, and 62 percent in 1981. Correcting for this, in 1981 the leading discharge diagnosis was diseases of the respiratory system, followed by infectious and parasitic diseases and injury and poisoning, accounting for 30 percent of all discharges; normal deliveries accounted for 14 percent of all discharges, and complications of pregnancy for 9 percent. This morbidity pattern is consistent with patterns seen in many developing countries where access to health care services is limited, a situation not seen in Sri Lanka where over 90 percent of the population is said to reside within 3 km of a health care facility.

Of note is the observed 41 percent decrease in incidence of infectious and parasitic diseases during the period 1970-81. The 3.5-fold increase in reporting of signs, symptoms, and ill defined conditions during this same period suggests the possibilities of deficient diagnostic capabilities, inappropriate admissions to the hospital, or problems in the interpretation and/or coding of the hospital charts by the medical records

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(1) Annual Health Bulletin - 1981 - Planning Division, Ministry of Health, Sri Lanka.

personnel.

The leading causes of hospital based deaths in 1981 were diseases of the circulatory system followed by infectious and parasitic diseases and injury and poisoning, together accounting for 48 percent of all hospital based deaths. Of note is the 29 percent decrease in mortality due to infectious and parasitic diseases from 1965 to 1981 and the more striking decrease of 48 percent during the 5-year period 1975-80. Of concern is that 11 percent of deaths in 1981 were due to certain conditions originating in the perinatal period.

Table 19 is a comparison of hospital mortality with vital registrar mortality by broad disease categories for 1979. In 1979, 20.3 percent of all reported deaths occurred in government institutions. The range of deaths occurring in government institutions by broad disease categories is from 5.4 percent of senility and ill defined conditions to 82.5 percent of genito-urinary tract disorders. A disturbing finding was that more deaths were reported due to congenital abnormalities and psychiatric causes from hospitals than were reported through the death certificate registries in the Registrar General's office. This discrepancy cannot be explained other than through the existence of different reporting systems.

Vaccine Preventible Diseases (1)

Diphtheria

Figure 1 shows the annual reported incidence of diphtheria in Sri Lanka 1951-81 (excluding 1958). DPT vaccine was introduced by the GSL in 1961-62. Prior to 1967, the annual incidence ranged between 6.9-14.8 per 100,000 population. There is a downward trend starting in 1968, which is markedly accelerated beginning in 1979 when the EPI was implemented. The 1981 reported incidence of diphtheria was at an all-time low of 0.2 cases per 100,000 population. In 1974, 61.4 percent of reported cases were less than 5 years old, suggesting that there has been improved coverage of the childhood population with DPT resulting in an older susceptible population.

Pertussis

Figure 2 shows the annual reported incidence of pertussis 1951-81 (including 1958). As with diphtheria, there was a trend

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(1) The data presented here comes from the notifiable disease reporting system and reflects primarily hospitalized cases.

for decreasing incidence following the introduction of DPT in 1961-62, which further accelerated following the implementation of the EPI. Thus, where rates had ranged between 9.8-22.8 cases per 100,000 population, the reported incidence in 1981 was an all-time low of 3.4 per 100,000 population.

Tetanus

Non Neonatal. Figure 3 shows the annual reported morbidity due to tetanus during the period 1951-81 (excluding 1958). Prior to the implementation of the EPI in 1979, the annual incidence ranged between 10.0-18.5 per 100,000 population. Following the implementation of the EPI, the incidence has dropped by 40 percent to a low of 6.1 per 100,000 population in 1981. During the period 1971-80, the case fatality rate ranged between a low of 11 percent in 1980 to a high of 28 percent in 1978, with a mean of 21 percent.

Neonatal. Figure 4 shows the annual reported morbidity due to neonatal tetanus during the period 1967-81. Immunization of pregnant women with tetanus toxoid began in 1969. As can be seen in Figure 4, the incidence of neonatal tetanus prior to the implementation of the EPI in 1979 ranged from 76-227 per 100,000 live births, with a mean of 193 per 100,000 births. In 1981, incidence was at a record low of 47 per 100,000 live births, representing a 76 percent decrease. During the period 1971-80, the case fatality rate ranged from a low of 26 percent in 1978 to a high of 50 percent in 1971, with a mean of 41 percent during the 10-year period. While approximately 75 percent of all deliveries in the country occur in government hospitals, a review of 423 cases during the period 1975-80 revealed that only 49 percent were delivered in government hospitals. (1)

Poliomyelitis

Figure 5 shows the annual reported morbidity due to poliomyelitis during the period 1951-81. During the period 1962-81, poliomyelitis occurred in epidemic cycles of every 6 years. Following a major epidemic in 1962 (with an incidence of 17.8 per 100,000 population), oral polio vaccine was introduced by the GSL. As Figure 5 illustrates, following the introduction of the vaccine, each subsequent epidemic had lower peak incidences than the preceding epidemic years. Of significance is that, following the implementation of the EPI in 1979, the expected epidemic peak in 1980 resulted in an incidence of 1.8

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(1) De Silva, AVKV. "Neonatal Tetanus Problem in Sri Lanka," presented at WHO/EMRD/SEARO meeting on the Prevention of Neonatal Tetanus, Lahore, Pakistan, 22-25 February, 1982.

per 100,000 population lower than that seen in interepidemic years preceding the introduction of the vaccine, and lower than the mean incidence of 2.2 per 100,000 population of interepidemic years during the period 1965-74. In 1974, 94 percent of reported cases were less than 5 years of age, with 23 percent of cases occurring in the less than 1 year old age group. In 1981, 89 percent of cases were less than 5 years of age, with 32 percent occurring in the less than 1 year old, suggesting a change in age group of susceptibles to younger children not yet immunized by their first birthday and older children who escaped the EPI activities.

Of interest is that, in 1974, 60 percent of reported cases had a history of never receiving any doses of vaccine, whereas in 1981 only 32 percent of reported cases had never received a dose of vaccine. In 1974, 5 percent of cases gave a history of receiving three doses, whereas in 1981, 3.5 percent of cases gave a history of receiving three doses. During the 10-year period 1972-81, the case fatality rate ranged between a low of 3 percent in 1972 and 1979 to a high of 15 percent in 1974, with a mean of 9 percent. Of interest is that, in 1981, 65 percent of 109 reported cases came from families with an annual income of less than Rs 400 per month (US $20), suggesting the continued need to reach the poorer segments of the population with EPI services.

Tuberculosis

Figure 6 shows the annual reported morbidity due to tuberculosis during the period 1957-81. There has been a trend for decreasing incidence during this period, from a high of 106.3 cases per 100,000 in 1960 to a low of 42.4 per 100,000 in 1980-81. But the decrease is not as marked as that seen in the other EPI target diseases. In 1974, 6 percent of reported cases were in children less than 15 years of age and, in 1981, 4 percent were less than 15 years of age, suggesting that tuberculosis is still a disease of older age groups. If it were preventable through BCG vaccination (which is controversial), an impact would not be expected for many years.

Measles

Figure 7 shows the annual reported morbidity due to measles during the period 1951-81 (excluding 1958). During the period 1962-76, measles occurred in epidemic cycles of 2-3 years; since 1976, there has been a trend for higher reported incidence, to an all-time high of 49 cases per 100,000 in 1979. Of significance is that reported cases reflect hospitalized and thereby more seriously ill cases. Of the six EPI target diseases, a smaller proportion of cases are actually admitted to the hospital; thus,

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because of the absence of measles vaccine, measles presently represents a more serious problem in terms of disease burden than the other EPI diseases.

Nutritional Status

Table 1 shows the prevalence of malnutrition among preschool children by district and type of malnutrition as found in the nutritional status surveys conducted in 1975-76 and 1979-82. Acute malnutrition was defined as low weight for height; chronic malnutrition was defined as low height for age; and concurrent malnutrition was defined as low height for age combined with low weight for height. Caution should be exercised in the interpretation of comparisons beween the two surveys. The earlier survey included children 6-71 months of age residing in rural areas, whereas the more recent survey included children 6-59 months of age, district wide, including children from urban areas.

The difference in age groups of the two study populations can influence the results. Table 2 shows the prevalence of malnutrition by age group and type of malnutrition found in the 1975-76 study, where the highest prevalence of chronic malnutrition was seen in the 60-71 month age group, who were not included in the later study. (Comparable data in the later study were not available at the time of writing this report.) In addition, the difference in prevalence of malnutrition between urban and rural areas is not known, thereby creating difficulties with an interpretation of the possible influence of inclusion of urban children in the later survey.

Another difference in the two surveys was in geographic divisions of survey areas. In the early survey, health divisions were used whereas in the later survey, districts were used. Table 1 attempts to correlate the SHS divisions of the earlier survey with the districts used in the later survey.

Taking these limitations and cautions into account, one conclusion from reviewing the results of the two surveys is that malnutrition is a major health problem in Sri Lanka, with prevalences by district ranging from 4.6-11.8 percent of children 0-59 months showing signs of acute malnutrition, 9.5-34.6 percent showing signs of chronic malnutrition, and 0.7-7.8 percent showing signs of concurrent acute and chronic malnutrition.

In 1981, a survey of children 5-11 years old attending primary school was conducted to assess the prevalence of malnutrition in this population (1). This survey revealed that 3.5

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(1) Sri Lanka Primary School Nutrition Survey - CARE - Sri Lanka October 1981.

percent of children 5-11 years of age had signs of acute malnutrition; 50 percent had signs of chronic malnutrition; and 1.5 percent had signs of concurrent acute and chronic malnutrition. Age group analyses revealed the highest prevalence of acute malnutrition was among 6 year olds (4.3 percent) and the lowest prevalence was among 8 year olds (2.8 percent). The prevalence of chronic malnutrition was seen to increase with increasing age, from 35.1 percent in 5 year olds to 71.2 percent among 11 year olds. The highest prevalence of concurrent acute and chronic malnutrition occurred among 6 and 7 year olds (1.9 percent).

Thus, there is recent evidence that malnutrition is a significant problem among children 5-11 years old attending primary school in Sri Lanka.

The team was unable to locate data on the prevalence of nutritional deficiencies among pregnant and lactating females. One report cited a study in which low maternal height and weight were related to 20 percent of babies born with low birth weight in the DeSoysa Maternity Hospital (1). Soysa also concluded that high rates of anemias of pregnancies (62 percent of pregnant women had hemoglobin levels below WHO norms), high pregnancy wastage due to abortion, high rates of toxemias of pregnancy and sepsis in the puerperium all reflect the poor nutritional and health status of women in pregnancy, childbirth, and the puerperium. (1)

Intestinal Infectious Diseases

A review of the hospital based statistics revealed that the morbidity due to intestinal infections ranged from 458.7 per 100,000 population in 1965 to 859.3 in 1981. Part of this twofold increase could possibly be explained by increased awareness on the part of the general population to seek medical attention when ill. Nevertheless, the increase is disturbing.

In 1981, intestinal infections accounted for 31 percent of infectious disease admissions and 6 percent of all admissions. Helminthiasis was reported at a rate of 171.2 per 100,000 population in 1981 and, if added to intestinal infections, the two combined accounted for 54 percent of infectious and parasitic

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(1) Maternal and Infant Nutrition Reviews - Sri Lanka - a guide to the literature. R. Israel et al., International Nutrition Communication Service Publication 1982 - cites Soysa, PE Status of Women. Sri Lanka - Colombo: University of Colombo, pp. 613-615.

disease admissions. During this same period, intestinal infections were recorded as a cause of death in 5.6 per 100,000 population in 1965 and 11.5 in 1981--a two-fold increase.

Table 22 shows a breakdown of cause-specific hospital based morbidity and mortality due to intestinal infectious diseases during the period 1977-81. During this period, the overall morbidity decreased by 22 percent. More marked decreases by cause occurred in shigellosis (-66 percent), amoebiasis without liver abscess (-40 percent) and amoebiasis with liver abscesses (-59 percent), whereas the morbidity due to cholera increased by a factor of almost 5. Similar patterns were seen in the mortality due to intestinal infectious diseases, with an overall reduction of 50 percent with more marked reductions in the mortality due to shigellosis (81 percent), amoebiasis without abscess (100 percent), and amoebiasis with liver abscess (73 percent).

The division of epidemiology/MOH includes enteric fever as one of the notifiable diseases. A review of these records for the period 1971-80 revealed reported morbidities ranging from a low of 35.1 per 100,000 population in 1971 and 1972 to a high of 76.7 in 1975, with a mean of 51.4 per 100,000 (S.D. 13.78). An analysis of the SHS division-specific morbidity reported in 1980 revealed a range from 1.6 per 100,000 population in Galle to 149.5 in Moneragala, showing wide ranges (mean of 50.2 per 100,000 S.D. 33.93).

A review of the division of epidemiology surveillance data on cholera during the period 1973-82 revealed a range from less than 0.05 per 100,000 in 1977 to a high of 33.7 per 100,000 in 1974, with a 10-year mean incidence of 5.8 per 100,000 population (S.D. 10.32). Evaluation of the SHS division-specific morbidity due to cholera in 1982 (country-wide 2.0 per 100,000 population), revealed no cases reported from 7 SHS divisions; and in the 12 remaining SHS divisions, the morbidity ranged from 0.2 per 100,000 population in Kurunegala to 8.4 in Anaradhapura.

Analyses of the age distributions of the reported cholera cases in 1982 revealed that 11 percent of cases were children less than 5 years old, 14.2 percent were 5-14 years old, and 57.6 percent were over 20 years of age. Thus, cholera was seen proportionately in all age groups.

A review of the division of epidemiology surveillance data on reported cases of viral hepatitis during the period 1971-81 revealed annual morbidities ranged from 32.0 per 100,000 in 1980 to 127.9 per 100,000 population in 1976, with a mean incidence of 75.7 per 100,000 population (S.D. 33.15). Analyses of 16 percent of the reported cases by age group in 1980 revealed the highest age-specific attack rate in children 1-4 years old 11.9

per 100,000 population; followed by children 5-9 years old, 9.2 per 100,000; and children 10-14 years old, 8.7 per 100,000. Analysis of SHS division-specific morbidity in 1980 revealed cases reported from all SHS divisions ranging from a low of 3.7 per 100,000 population in Galle to a high of 83.3 in Moneragala.

Malaria

Table 23 shows the annual reported morbidity and mortality due to malaria in Sri Lanka 1931-81. As can be seen, malaria was a major health problem up through 1947, with 1-5 million cases and 1-47,000 deaths reported annually. Following the initiation of a program of DDT spraying 1946, the annual reported morbidity and mortality dropped markedly to rates of less than 100 cases per 1,000 population and less than 100 deaths per million population. This reduction in morbidity and mortality was further accelerated following the GSL commitment to the WHO-sponsored malaria eradication program in 1956. By 1963, there were only 17 cases reported, of which 11 were classified as imported cases (with history of travel to the Maldives preceding onset of illness). The combination of DDT resistance of the vector with decreased efforts towards an eradication strategy resulted in a rapid resurgence of malaria as a problem in the late 1960s and 1970s. In 1977, a renewed commitment towards controlling malaria combined with a switch to Malathion resulted in a reversal of the trend, so that by 1983 the reported incidence was 3.2 cases per 1,000 population and no deaths were reported.

Table 24 shows the annual number of slides examined for malaria, the total number of positive slides, and the number of positive slides by type of malaria identified during the period 1958-81. In 1975, 15.5 percent of malaria organisms identified were falciparum, whereas in 1981 only 2.6 percent of the malaria organisms identified were falciparum, representing an 83 percent reduction in the proportion of malaria due to falciparum during this 6-year period.

The 1982-86 health plan states as a goal to reduce the annual number of reported cases to 28,000 and to eradicate falciparum.

The anti-malaria campaign (AMC) is responsible for surveillance of malaria and the malathion spraying. Passive surveillance (blood films on all fever cases presented to the health care system) detects approximately 80 percent of cases. In areas with sufficient personnel, active surveillance (surveys in communities of known or suspected endemicity) detects approximately 20 percent of the cases.

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Concerns of the AMC at present center on the Mahaweli Project areas where new communities are developing overnight, presenting problems in early response of AMC workers to potential problems. In this area, teachers and village leaders have been given chloraquin for distribution. Of major concern is the inevitable development of malathion resistance and the potential impact on the success of the Mahaweli project, plus the possibility of spread of malaria into previously malaria-free zones.

At present, the anopheles vector is still sensitive to malathion in testing at WHO recommmended concentrations. Of concern is that, recently, testing with a lower concentration (which had previously resulted in 100 percent vector kills) is now showing survivors possibly indicative of early malathion resistance.

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TABLE 1

GENERAL MORTALITY BY BROAD CATEGORIES OF CAUSES OF DEATH
SRI LANKA - 1973 AND 1979
ALL AGE GROUPS (TOTAL)

Cause of Death	Rank '73	Rank '79	% of Total Deaths '73	% of Total Deaths '79	Rate/100,000 Population '73	Rate/100,000 Population '79
Circulatory System Diseases	2	1	11.4	13.7	88.1	89.5
External Causes of Injury	4	2	8.1	10.7	62.4	70.1
Infectious Diseases	1	3	11.4	9.0	88.1	59.1
Respiratory System Diseases	3	4	8.4	8.3	64.9	54.3
Diseases of the Nervous System and Sense Organs	5	5	7.4	7.0	56.8	45.8
Infant Perinatal Diseases	6	6	7.1	6.9	54.8	45.3
Malignancies	7	7	4.2	4.5	32.3	29.4
Gastrointestinal Tract Diseases	10	8	2.5	2.1	19.6	14.1
Hematologic Abnormalities	8	9	2.6	1.7	20.4	11.1
Endocrine Abnormalities	11	10	1.4	1.2	10.6	7.6
Avitaminoses & Other Nutritional Deficiencies	9	11	2.6	1.1	19.7	7.2
Genitourinary Tract Diseases	13	12	1.0	1.0	7.7	6.4
Diseases of the Musculo Skeletal System	12	13	1.2	0.9	9.2	5.8
Diseases of the Skin	14	14	0.9	0.5	7.3	3.6
Congenital Abnormalities	15	15	0.6	0.5	4.3	3.2
Maternal Perinatal Disorders	16	16	0.4	0.3	3.4	2.2
Psychiatric	17	17	0.3	0.3	2.1	2.0
Senility & Other Ill Defined Causes	(1)	(1)	28.5	30.3	220.3	198.1
TOTAL			100.0	100.0	773.0	654.6

*Total Number of Deaths - 1973: 100,678
*Total Number of Deaths - 1979: 94,244

Source: Department of Census and Statistics/MOH

TABLE 2

GENERAL MORTALITY BY BROAD CATEGORIES OF CAUSES OF DEATH
SRI LANKA - 1973 AND 1979
INFANTS (LESS THAN ONE YEAR OF AGE)

Cause of Death	Rank '73	Rank '79	% of Total Deaths '73	% of Total Deaths '79	Rate/1,000 Live Births '73	Rate/1,000 Live Births '79
Infant Perinatal Disorders	1	1	40.6	41.4	18.79	15.62
Respiratory System Diseases	2	2	11.8	14.3	5.46	5.40
Infectious Diseases	3	3	11.7	12.6	5.40	4.74
Diseases of the Nervous System and Sense Organs	6	4	2.2	3.0	1.03	1.14
Diseases of the Skin	4	5	3.8	2.0	1.75	0.76
Circulatory System Diseases	8	6	1.2	2.0	0.56	0.74
Congenital Abnormalities	7	7	2.0	1.9	1.00	0.72
Avitaminoses & Other Nutritional Deficiencies	5	8	3.4	1.8	1.58	0.68
External Causes of Injury	10	9	0.9	1.1	0.40	0.42
Gastrointestinal Tract Diseases	9	10	0.9	1.0	0.42	0.38
Hematologic Abnormalities	11	11	0.3	0.4	0.14	0.13
Genitourinary Tract Diseases	12	12	0.2	0.2	0.07	0.07
Malignancies	12	13	0.2	0.2	0.07	0.07
Psychiatric	13	14	0.0	0.1	0.02	0.05
Diseases of the Musculo Skeletal System	13	15	0.0	0.1	0.02	0.03
Endocrine Abnormalities	14	16	0.0	0.1	0.01	0.02
Senility & Other Ill Defined Causes	(2)	(2)	20.8	17.9	9.63	6.75
TOTAL			100.0	100.0	46.31	37.72

*Total Number of Deaths - 1973: 17,002
Total Population (Live Births): 367,158

*Total Number of Deaths - 1979: 15,766
Total Population (Live Births): 417,986

Source: Department of Census and Statistics/MOH

TABLE 3

GENERAL MORTALITY BY BROAD CATEGORIES OF CAUSES OF DEATH
SRI LANKA - 1973 AND 1979
CHILDREN (1 TO 4 YEARS OF AGE)

Cause of Death	Rank '73	Rank '79	% of Total Deaths '73	% of Total Deaths '79	Rate/100,000 Population '73	Rate/100,000 Population '79
Infectious Diseases	1	1	26.2	24.3	160.8	81.1
Respiratory System Diseases	2	2	20.0	21.3	122.8	71.1
External Causes of Injury	5	3	4.3	8.5	26.8	28.3
Avitaminoses & Other Nutritional Deficiencies	3	4	15.2	7.4	93.4	24.5
Diseases of the Nervous System and Sense Organs	4	5	5.8	6.9	35.5	23.0
Circulatory System Diseases	7	6	1.3	2.5	8.0	8.3
Gastrointestinal Tract Diseases	6	7	1.8	2.0	10.9	6.5
Hematologic Abnormalities	7	8	1.3	1.6	8.0	5.3
Malignancies	10	9	0.6	1.2	3.8	3.9
Diseases of the Skin	8	10	1.2	0.8	7.2	2.6
Genitourinary Tract Diseases	11	11	0.5	0.8	3.4	2.5
Congenital Abnormalities	9	12	1.0	0.7	5.7	2.3
Psychiatric	12	13	0.1	0.5	0.7	1.5
Endocrine Abnormalities	13	14	0.1	0.1	0.5	0.4
Diseases of the Musculo Skeletal System	14	15	0.1	0.1	0.4	0.2
Infant Perinatal Disorders	15	0	0.0	0.0	0.1	0.0
Senility & Other Ill Defined Causes	(2)	(2)	20.5	21.6	125.8	72.0
TOTAL			100.0	100.0	613.8	333.8

*Total Number of Deaths - 1973: 8,221
*Total Number of Deaths - 1979: 4,748

Source: Department of Census and Statistics/MOH

TABLE 4

GENERAL MORTALITY BY BROAD CATEGORIES OF CAUSES OF DEATH
SRI LANKA - 1973 AND 1979
CHILDREN (5 TO 9 YEARS OF AGE)

Cause of Death	Rank '73	Rank '79	% of Total Deaths '73	% of Total Deaths '79	Rate/100,000 Population '73	Rate/100,000 Population '79
Infectious Diseases	1	1	29.5	21.5	56.3	28.1
External Causes of Injury	4	2	10.9	19.8	20.8	25.8
Respiratory System Diseases	2	3	12.0	10.8	22.8	14.1
Diseases of the Nervous System and Sense Organs	5	4	6.0	8.9	11.4	11.6
Avitaminoses & Other Nutritional Deficiencies	3	5	10.9	4.5	20.8	5.9
Gastrointestinal Tract Diseases	6	6	5.1	3.5	9.8	4.5
Circulatory System Diseases	7	7	2.4	3.4	4.6	4.5
Malignancies	9	8	2.0	2.3	3.7	3.0
Genitourinary Tract Diseases	11	9	1.1	1.6	2.0	2.1
Hematologic Abnormalities	8	10	2.1	1.4	4.1	1.8
Congenital Abnormalities	10	11	1.2	1.1	2.2	1.5
Diseases of the Musculo Skeletal System	13	12	0.2	0.7	0.4	0.9
Psychiatric	15	13	0.1	0.6	0.1	0.8
Diseases of the Skin	12	14	0.4	0.5	0.8	0.6
Endocrine Abnormalities	0	15	0.0	0.1	0.0	0.1
Infant Perinatal Disorders	14	0	0.1	0.0	0.2	0.0
Senility & Other Ill Defined Causes	(2)	(3)	16.0	19.2	30.6	25.0
TOTAL			100.0	100.0	190.7	130.4

*Total Number of Deaths - 1973: 3,176
*Total Number of Deaths - 1979: 2,188

Source: Department of Census and Statistics/MOH

TABLE 5

GENERAL MORTALITY BY BROAD CATEGORIES OF CAUSES OF DEATH
SRI LANKA - 1973 AND 1979
CHILDREN (10 TO 14 YEARS OF AGE)

Cause of Death	Rank '73	Rank '79	% of Total Deaths '73	% of Total Deaths '79	Rate/100,000 Population '73	Rate/100,000 Population '79
External Causes of Injury	1	1	26.2	32.7	28.0	29.5
Infectious Diseases	2	2	22.2	17.9	23.7	16.1
Respiratory System Diseases	3	3	8.6	7.6	9.2	6.9
Diseases of the Nervous System and Sense Organs	4	4	7.4	7.5	7.9	6.8
Circulatory System Diseases	6	5	5.2	7.4	5.6	6.6
Gastrointestinal Tract Diseases	5	6	5.3	3.3	5.6	3.0
Malignancies	7	7	3.9	2.1	4.2	1.9
Avitaminoses & Other Nutritional Deficiencies	8	8	3.2	1.7	3.5	1.6
Genitourinary Tract Diseases	10	8	2.6	1.7	2.8	1.6
Hematologic	9	9	2.7	1.3	2.8	1.2
Congenital Abnormalities	11	10	1.4	0.9	1.5	0.8
Endocrine Abnormalities	14	11	0.3	0.5	0.3	0.4
Psychiatric	15	11	0.1	0.5	0.1	0.4
Diseases of the Musculo Skeletal System	12	12	0.4	0.4	0.4	0.4
Diseases of the Skin	13	13	0.3	0.3	0.4	0.3
Maternal Perinatal Causes	0	14	0.0	0.1	0.0	0.1
Infant Perinatal Disorders	17	0	0.1	0.0	0.1	0.0
Senility & Other Ill Defined Causes	(3)	(3)	10.1	14.1	10.8	12.7
TOTAL			100.0	100.0	106.8	90.2

*Total Number of Deaths - 1973: 1,727
*Total Number of Deaths - 1979: 1,506

Source: Department of Census and Statistics/MOH

TABLE 6

GENERAL MORTALITY BY BROAD CATEGORIES OF CAUSES OF DEATH
SRI LANKA - 1973 AND 1979
15 - 19 YEARS OF AGE

Cause of Death	Rank '73	Rank '79	% of Total Deaths '73	% of Total Deaths '79	Rate/100,000 Population '73	Rate/100,000 Population '79
External Causes of Injury	1	1	48.6	55.1	76.3	83.4
Infectious Diseases	2	2	11.1	7.4	17.4	10.8
Circulatory System Diseases	3	3	6.7	6.4	10.6	9.8
Diseases of the Nervous System and Sense Organs	5	4	6.5	5.8	10.2	8.9
Respiratory System Diseases	4	5	6.7	5.8	10.5	8.8
Malignancies	6	6	2.8	2.8	4.4	4.3
Gastrointestinal Tract Diseases	8	7	2.2	2.5	3.4	3.7
Hematologic Abnormalities	7	8	2.6	1.5	4.1	2.3
Genitourinary Tract Diseases	9	9	1.7	1.4	2.6	2.1
Maternal Perinatal Disorders	10	10	0.9	1.1	1.4	1.7
Congenital Abnormalities	11	11	0.7	0.7	1.1	1.1
Endocrine Abnormalities	14	12	0.5	0.5	0.8	0.7
Avitaminoses & Other Nutritional Deficiencies	12	13	0.6	0.4	1.0	0.6
Psychiatric	16	14	0.2	0.2	0.3	0.3
Diseases of the Skin	15	14	0.2	0.2	0.4	0.3
Diseases of the Musculo Skeletal System	13	15	0.5	0.2	0.9	0.3
Infant Perinatal Disorders	17	0	0.1	0.0	0.1	0.0
Senility & Other Ill Defined Causes	(3)	(2)	7.4	8.3	11.6	12.6
TOTAL			100.0	100.0	157.0	151.5

*Total Number of Deaths - 1973: 2,199
*Total Number of Deaths - 1979: 2,361

Source: Department of Census and Statistics/MOH

TABLE 7

GENERAL MORTALITY BY BROAD CATEGORIES OF CAUSES OF DEATH
SRI LANKA - 1973 AND 1979
20 - 24 YEARS OF AGE

Cause of Death	Rank '73	Rank '79	% of Total Deaths '73	% of Total Deaths '79	Rate/100,000 Population '73	Rate/100,000 Population '79
External Causes of Injury	1	1	44.5	53.2	96.4	117.3
Circulatory System Diseases	3	2	7.5	8.1	16.2	17.9
Infectious Diseases	2	3	11.2	7.4	24.1	16.3
Respiratory System Diseases	4	4	5.9	5.8	12.8	12.7
Diseases of the Nervous System	5	5	5.5	4.0	11.8	8.8
Maternal Perinatal Causes	7	6	3.8	2.8	8.2	6.2
Malignancies	9	7	2.2	2.4	4.7	5.3
Hematologic Abnormalities	6	8	4.8	2.3	10.5	5.1
Gastrointestinal Tract Diseases	8	9	3.2	2.0	6.9	4.4
Genitourinary Tract Diseases	10	10	1.7	1.5	3.7	3.3
Endocrine Abnormalities	11	11	1.0	0.6	2.2	1.3
Avitaminoses & Other Nutritional Deficiencies	12	12	0.5	0.6	1.0	1.2
Psychiatric	16	13	0.3	0.4	0.6	0.8
Congenital Abnormalities	15	14	0.3	0.3	0.7	0.7
Diseases of the Skin	14	15	0.4	0.2	0.8	0.5
Diseases of the Musculo Skeletal System	13	15	0.4	0.2	0.9	0.5
Infant Perinatal Diseases	17	0	0.0	0.0	0.1	0.0
Senility & Other Ill Defined Causes	(4)	(2)	6.9	8.3	14.9	18.3
TOTAL			100.0	100.0	216.4	220.5

*Total Number of Deaths - 1973: 2,834
*Total Number of Deaths - 1979: 3,224

Source: Department of Census and Statistics/MOH

TABLE 8

GENERAL MORTALITY BY BROAD CATEGORIES OF CAUSES OF DEATH
SRI LANKA - 1973 AND 1979
25 - 29 YEARS OF AGE

Cause of Death	Rank '73	Rank '79	% of Total Deaths '73	% of Total Deaths '79	Rate/100,000 Population '73	Rate/100,000 Population '79
External Causes of Injury	1	1	33.3	42.7	74.8	92.5
Circulatory System Diseases	3	2	10.2	10.7	22.8	23.1
Infectious Diseases	2	3	12.2	9.0	27.4	19.6
Respiratory System Diseases	4	4	6.8	6.5	15.3	14.1
Diseases of the Nervous System and Sense Organs	5	5	6.6	4.7	14.9	10.3
Hematologic Abnormalities	6	6	6.1	3.4	13.6	7.3
Malignancies	8	7	3.6	3.3	8.0	7.2
Maternal Perinatal Causes	7	8	4.7	3.0	10.5	6.5
Gastrointestinal Tract Diseases	9	9	3.3	2.8	7.5	6.1
Genitourinary Tract Diseases	10	10	1.8	1.1	4.1	2.5
Endocrine Abnormalities	12	11	0.5	1.0	1.1	2.2
Avitaminoses & Other Nutritional Deficiencies	11	12	0.8	0.7	1.7	1.5
Diseases of the Musculo Skeletal System	13	13	0.4	0.6	1.0	1.3
Psychiatric	14	14	0.4	0.5	0.8	1.2
Diseases of the Skin	15	15	0.3	0.3	0.7	0.7
Congenital Abnormalities	16	16	0.1	0.3	0.4	0.7
Infant Perinatal Disorders	17	0	0.1	0.0	0.3	0.0
Senility & Ill Defined Causes	(4)	(3)	8.8	9.2	19.7	19.9
TOTAL			100.0	100.0	224.5	216.6

*Total Number of Deaths - 1973: 2,261
*Total Number of Deaths - 1979: 2,621

Source: Department of Census and Statistics/MOH

TABLE 9

GENERAL MORTALITY BY BROAD CATEGORIES OF CAUSES OF DEATH
SRI LANKA - 1973 AND 1979
30 - 39 YEARS OF AGE

Cause of Death	Rank '73	Rank '79	% of Total Deaths '73	% of Total Deaths '79	Rate/100,000 Population '73	Rate/100,000 Population '79
External Causes of Injury	1	1	22.9	28.3	65.5	70.4
Circulatory System Diseases	2	2	14.8	16.5	42.4	41.0
Infectious Diseases	3	3	14.5	10.6	41.4	26.5
Respiratory System Diseases	5	4	6.9	6.7	19.7	16.8
Malignancies	4	5	7.3	6.6	20.9	16.4
Diseases of the Nervous System and Sense Organs	8	6	4.7	4.9	13.6	12.2
Gastrointestinal Tract Diseases	7	7	5.2	4.8	15.0	12.0
Hematologic Abnormalities	6	8	6.1	4.3	17.5	10.7
Genitourinary Tract Diseases	10	9	1.6	2.1	4.6	5.3
Maternal Perinatal Causes	9	10	3.9	2.1	11.1	5.2
Endocrine Abnormalities	11	11	1.2	1.0	3.5	2.6
Psychiatric	12	12	0.8	0.7	2.4	1.8
Avitaminoses & Other Nutritional Deficiencies	13	13	0.6	0.5	1.8	1.3
Diseases of the Musculo Skeletal System	14	14	0.6	0.5	1.7	1.2
Diseases of the Skin	15	15	0.3	0.3	1.0	0.8
Congenital Abnormalities	17	16	0.2	0.2	0.5	0.4
Infant Perinatal Disorders	16	0	0.2	0.0	0.6	0.0
Senility & Other Ill Defined Causes	(4)	(4)	8.1	9.8	23.3	24.4
TOTAL			100.0	100.0	286.4	249.0

*Total Number of Deaths - 1973: 4,406
*Total Number of Deaths - 1979: 4,639

Source: Department of Census and Statistics/MOH

TABLE 10

GENERAL MORTALITY BY BROAD CATEGORIES OF CAUSES OF DEATH
SRI LANKA - 1973 AND 1979
40 - 49 YEARS OF AGE

Cause of Death	Rank '73	Rank '79	% of Total Deaths '73	% of Total Deaths '79	Rate/100,000 Population '73	Rate/100,000 Population '79
Circulatory System Diseases	1	1	21.4	24.4	113.0	113.4
External Causes of Injury	2	2	14.0	15.6	73.9	72.5
Malignancies	4	3	12.4	11.7	65.4	54.3
Infectious Diseases	3	4	12.8	10.6	67.7	49.1
Respiratory System Diseases	5	5	7.8	8.0	41.4	37.1
Gastrointestinal Tract Diseases	6	6	6.1	5.1	31.9	23.7
Diseases of the Nervous System and Sense Organs	7	7	5.2	4.7	27.7	21.7
Hematologic Abnormalities	8	8	4.6	3.6	24.2	16.5
Genitourinary Tract Diseases	10	9	1.7	1.7	9.0	7.7
Endocrine Abnormalities	9	10	1.8	1.6	9.7	7.2
Psychiatric	11	11	0.8	0.8	4.1	3.9
Avitamonses & Other Nutritional Deficiencies	12	12	0.7	0.8	3.5	3.5
Diseases of the Musculo Skeletal System	11	13	0.8	0.6	4.1	2.7
Maternal Perinatal Disorders	13	14	0.6	0.4	3.2	1.9
Diseases of the Skin	14	15	0.3	0.3	1.6	1.3
Congenital Abnormalities	16	16	0.1	0.1	0.6	0.5
Infant Perinatal Disorders	15	0	0.2	0.0	1.0	0.0
Senility & Other Ill Defined Causes	(5)	(5)	8.6	10.4	45.4	48.3
TOTAL			100.0	100.0	527.5	465.2

*Total Number of Deaths - 1973: 6,118
*Total Number of Deaths - 1979: 5,913

Source: Department of Census and Statistics/MOH

TABLE 11

GENERAL MORTALITY BY BROAD CATEGORIES OF CAUSES OF DEATH
SRI LANKA - 1973 AND 1979
50 - 59 YEARS OF AGE

Cause of Death	Rank '73	Rank '79	% of Total Deaths '73	% of Total Deaths '79	Rate/100,000 Population '73	Rate/100,000 Population '79
Circulatory System Diseases	1	1	26.0	28.6	268.2	272.1
Malignancies	2	2	11.9	11.9	122.5	113.0
External Causes of Injury	4	3	8.6	9.7	88.1	92.3
Infectious Diseases	3	4	10.3	9.1	105.7	86.8
Respiratory System Diseases	5	5	7.8	8.0	80.5	75.6
Diseases of the Nervous System and Sense Organs	6	6	6.9	6.4	71.3	61.3
Gastrointestinal Tract Diseases	7	7	5.2	4.5	53.4	42.4
Hematologic Abnormalities	8	8	4.3	2.5	44.8	23.9
Endocrine Abnormalities	9	9	3.5	2.3	35.7	22.0
Genitourinary Tract Diseases	10	10	1.6	1.5	16.5	14.0
Diseases of the Musculo Skeletal System	11	11	1.1	1.0	11.7	9.5
Psychiatric	14	12	0.6	0.6	6.2	5.4
Avitaminoses & Other Nutritional Diseases	12	13	0.8	0.6	8.1	5.3
Diseases of the Skin	15	14	0.2	0.3	2.4	3.0
Congenital Abnormalities	16	15	0.0	0.1	0.3	0.9
Infant Perinatal Disorders	13	0	0.6	0.0	6.4	0.0
Senility & Other Ill Defined Causes	(3)	(2)	10.5	12.9	108.2	122.7
TOTAL			100.0	100.0	1029.8	950.1

*Total Number of Deaths - 1973: 8,253
*Total Number of Deaths - 1979: 8,811

Source: Department of Census and Statistics/MOH

TABLE 12

GENERAL MORTALITY BY BROAD CATEGORIES OF CAUSES OF DEATH
SRI LANKA - 1973 AND 1979
60 - 69 YEARS OF AGE

Cause of Death	Rank '73	Rank '79	% of Total Deaths '73	% of Total Deaths '79	Rate/100,000 Population '73	Rate/100,000 Population '79
Circulatory System Diseases	1	1	23.1	25.5	551.8	535.2
Diseases of the Nervous System and Sense Organs	2	2	11.2	10.2	267.3	213.8
Malignancies	4	3	7.9	8.2	187.4	171.7
Respiratory System Diseases	5	4	7.8	7.7	185.2	162.1
Infectious Diseases	3	5	9.0	7.2	215.5	152.1
External Causes of Injury	6	6	4.6	5.4	110.3	114.1
Endocrine Abnormalities	9	7	3.0	2.7	72.5	57.4
Gastrointestinal Tract Diseases	8	8	3.2	2.5	75.5	52.5
Hematologic Abnormalities	7	9	4.2	2.3	100.1	48.7
Diseases of the Musculo Skeletal System	10	10	1.8	1.5	42.0	30.9
Genitourinary Tract Diseases	11	11	1.4	1.3	33.9	27.9
Avitaminoses & Other Nutritional Deficiencies	13	12	0.5	0.5	10.8	10.8
Psychiatric	14	13	0.3	0.3	8.3	7.3
Diseases of the Skin	15	14	0.3	0.2	7.5	4.2
Congenital Abnormalities	16	15	0.1	0.1	1.8	1.9
Infant Perinatal Disorders	12	0	1.4	0.0	32.5	0.0
Senility & Other Ill Defined Causes	(2)	(2)	20.2	24.3	481.9	511.1
TOTAL			100.0	100.0	2384.2	2102.1

*Total Number of Deaths - 1973: 12,102
*Total Number of Deaths - 1979: 12,122

Source: Department of Census and Statistics/MOH

TABLE 13

GENERAL MORTALITY BY BROAD CATEGORIES OF CAUSES OF DEATH
SRI LANKA - 1973 AND 1979
70 YEARS AND OLDER

Cause of Death	Rank '73	Rank '79	% of Total Deaths '73	% of Total Deaths '79	Rate/100,000 Population '73	Rate/100,000 Population '79
Circulatory System Diseases	1	1	10.8	12.4	1048.7	1001.8
Diseases of the Nervous System and Sense Organs	2	2	10.3	9.2	1005.1	743.2
Respiratory System Diseases	4	3	4.4	4.2	433.4	342.3
Infectious Diseases	3	4	5.7	3.9	550.9	312.4
Malignancies	5	5	2.4	2.6	238.5	213.3
External Causes of Injury	8	6	1.9	2.3	183.7	185.8
Diseases of the Musculo Skeletal System	6	7	2.3	1.5	227.0	119.7
Endocrine Abnormalities	9	8	1.5	1.1	148.0	89.0
Hematologic Abnormalities	7	9	2.0	1.0	190.1	78.6
Gastrointestinal Tract Diseases	10	10	1.2	0.8	112.9	61.3
Genitourinary Tract Diseases	11	11	0.8	0.6	74.2	52.0
Avitaminoses & Other Nutritional Deficiencies	12	12	0.3	0.2	31.2	14.7
Diseases of the Skin	13	13	0.2	0.1	22.1	10.7
Psychiatric	14	14	0.2	0.1	17.6	6.4
Congenital Abnormalities	15	15	0.0	0.1	2.7	5.1
Senility & Other Ill Defined Causes	(1)	(1)	56.0	60.1	5461.6	4844.6
TOTAL			100.0	100.0	9747.3	8081.0

*Total Number of Deaths - 1973: 32,205
*Total Number of Deaths - 1979: 30,313

Source: Department of Census and Statistics/MOH

TABLE 14

MATERNAL MORTALITY BY AGE GROUP
AND CAUSE OF DEATH
SRI LANKA 1973 AND 1979

...se of Death	15-19 Years				20-24 Years				25-29 Years			
	Rate per 100,000 Population		Rate per 100,000 Live Births		Rate per 100,000 Population		Rate per 100,000 Live Births		Rate per 100,000 Population		Rate per 100,000 Live Births	
	1973*	1979**	1973*	1979**	1973*	1979**	1973*	1979**	1973*	1979**	1973*	1979**
...omplications of pregnancy ...d the puerperium	1.16	0.91	32.0	22.4	5.67	2.87	33.3	15.0	4.90	3.81	23.3	17.7
...nwanted abortion of pregnancy ...d childbirth	0.29	0.29	8.0	9.6	5.37	4.78	31.6	26.3	7.77	4.80	36.3	22.3
...ortion legal	-	0.13	-	3.2	-	-	-	-	-	-	-	-
...her & unspecified ...ortion	-	0.52	-	12.0	0.61	1.78	3.6	9.0	2.19	1.32	10.2	3.2
...psis of childbirth and ...e puerperium	0.58	0.13	16.0	3.2	2.15	0.14	12.6	0.0	1.39	0.50	6.5	2.3
...her complications of preg: ...ildbirth & puerperium	0.72	1.17	20.0	28.0	2.61	2.00	15.3	14.3	4.78	2.48	22.3	11.5
...livery with mention of ...mplications	-	0.13	-	3.2	-	0.14	-	0.0	-	0.17	-	0.0
...TAL	2.75	3.38	75.9	83.1	16.41	12.30	9.64	67.5	21.11	13.08	98.7	60.0
...72		* 691,586 ** 29,020				* 682,133 ** 110,900				* 502,129 ** 107,423		
...79		* 760,579 ** 31,300				* 731,793 ** 123,300				* 603,957 ** 130,000		

...se of Death	30-34 Years				35-39 Years				40-44 Years				45-49 Years				TOTAL			
	Rate per 100,000 Population		Rate per 100,000 Live Births		Rate per 100,000 Population		Rate per 100,000 Live Births		Rate per 100,000 Population		Rate per 100,000 Live Births		Rate per 100,000 Population		Rate per 100,000 Live Births		Rate per 100,000 Population		Rate per 100,000 Live Birth	
	1973*	1979**	1973*	1979**	1973*	1979**	1973*	1979**	1973*	1979**	1973*	1979**	1973*	1979*	1973*	1979*	1973*	1979**	1973*	1979
...omplications of pregnancy ...d the puerperium	3.63	1.95	20.1	13.0	9.16	2.47	45.0	27.2	3.15	1.23	88.5	47.6	-	0.69	-	166.7	3.59	1.75	30.0	18.7
...nwanted abortion of pregnancy ...d childbirth	7.78	3.50	43.1	23.4	10.04	4.94	87.6	54.3	3.53	2.05	98.3	71.4	0.76	1.37	147.2	333.3	4.99	2.50	42.0	27.5
...ortion legal	0.26	-	1.4	-	-	-	-	-	-	-	-	-	-	-	-	-	0.03	0.02	0.3	0.2
...her & unspecified ...ortion	1.82	0.97	10.1	6.5	2.44	0.99	21.3	10.9	1.41	-	39.3	-	0.38	-	73.6	-	1.14	0.76	9.0	8.1
...psis of childbirth and ...e puerperium	2.85	0.70	15.8	9.2	2.99	0.25	26.1	2.7	0.71	.31	19.7	11.9	-	-	-	-	1.56	0.25	13.3	2.6
...her complications of preg: ...ildbirth & puerperium	4.93	3.11	27.3	20.8	3.26	1.98	28.4	21.7	1.76	1.23	49.2	47.6	1.52	1.03	294.3	250.0	2.77	1.66	23.7	17.7
...livery with mention of ...mplications	-	-	-	-	0.29	0.25	2.4	2.7	-	-	-	-	-	-	-	-	0.03	0.09	0.3	1.0
...TAL	21.27	10.31	117.9	68.9	24.16	10.07	210.8	119.6	10.59	4.61	295.0	178.6	2.66	3.09	515.1	750.0	14.11	7.11	120.9	75.0
...72		* 385,552 ** 69,532				* 368,420 ** 42,219				* 283,290 ** 10,168				* 263,044 ** 1,359				* 3,148,134 ** 367,158		
...79		* 514,075 ** 78,900				* 404,779 ** 38,800				* 325,140 ** 8,400				* 292,202 ** 1,200				* 4,456,524 ** 418,000		

* Estimated Population of Females
** Estimated number of live births based on age specific fertility rates

...urce: Department of Census and Statistics/MOH

TABLE 15

INFANT MORTALITY RATES BY DISTRICT AND YEAR SRI LANKA 1969 - 1979

DISTRICT	YEAR 1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
COLOMBO	44	40	41	41	45	44	40	36	38	39	41
KALUTARA	57	44	34	33	40	53	47	43	35	31	34
KANDY	72	57	61	66	62	92	72	61	63	60	60
MATALE	51	48	50	57	53	68	49	53	53	33	31
NUWARA ELIYA	94	95	93	85	78	119	79	100	76	75	79
GALLE	51	49	40	41	50	51	50	45	44	42	38
MATARA	39	42	34	35	36	42	41	41	40	38	36
HAMBANTOTA	45	36	37	34	35	34	33	39	39	28	24
JAFFNA	34	31	26	27	24	21	17	21	21	21	18
MANNAR	48	49	39	40	40	36	29	34	30	23	25
VAVUNIYA	45	43	28	22	25	24	27	38	35	22	26
BATTICALOA	64	58	53	53	51	45	50	49	51	37	35
AMPARAI	56	45	41	41	38	39	43	39	33	25	24
TRINCOMALEE	47	37	36	39	43	32	31	25	22	19	19
KURUNEGALA	45	43	39	40	42	38	37	41	37	30	37
PUTTLAM	45	46	33	38	36	29	31	33	30	22	22
ANURADHAPURA	44	39	39	38	37	37	35	36	35	22	21
POLONNARUWA	33	33	34	28	24	24	35	24	29	20	18
BADULLA	61	61	57	59	56	73	56	51	61	47	57
MONERAGALA	52	40	38	35	33	31	28	26	28	22	22
RATNAPURA	71	64	58	61	64	66	63	64	56	50	55
KEGALLE	51	49	45	49	50	60	54	51	42	36	34

SOURCE: Department of Census and Statistics/MOH

TABLE 16

INFANT MORTALITY RATES AND RATIO OF NEONATAL TO POST NEONATAL DEATHS BY DISTRICT SRI LANKA - 1973 and 1979

District	1973 IMR	1973 Ratio Neonatal to Post Neonatal	1979 IMR	1979 Ratio Neonatal to Post Neonatal
Colombo	44.7	1.65	40.8	1.42
Kalutara	40.3	2.02	34.3	2.05
Kandy	61.7	2.50	60.3	2.29
Matale	53.4	1.54	31.0	2.21
Nuwara Eliya	77.8	1.82	79.2	1.97
Galle	49.9	2.31	38.4	2.03
Matara	35.5	1.82	35.7	2.17
Hambantota	35.2	1.93	23.7	1.26
Jaffna	23.8	1.60	18.0	2.28
Mannar	39.9	1.34	25.1	1.27
Vavuniya	24.7	1.44	26.3	1.60
Mullaitivu	-	-	17.5	0.70
Batticoloa	50.8	0.91	35.2	1.02
Amparai	38.3	1.04	23.5	0.59
Trincomalee	43.0	1.48	18.9	1.43
Kurunegala	42.2	2.14	32.4	2.55
Puttalam	35.8	1.67	21.9	1.59
Anuradhapura	32.3	1.23	21.1	1.15
Polonnaruwa	24.5	1.58	17.8	1.14
Badulla	56.2	1.87	56.6	2.09
Moneragala	32.9	1.25	22.4	1.17
Ratnapura	63.8	2.16	55.0	2.13
Kegalle	49.7	1.88	33.6	2.50
SRI LANKA	46.3	1.86	37.7	1.77

TABLE 17

CAUSES OF INFANT MORTALITY,
RTHS, PROPORTION OF DEATHS AND RANK ORDER
:I LANKA 1971-1978

	1974			1975			1976			1977			1978		
RK	Rate	%	RK	Rate	%	RK	Rate	%	RK	Rate	%	RK	Rate	%	RK
3	1	16.2	31.7	1	14.3	31.8	1	14.0	32.1	1	13.9	32.7	1	13.1	35.4	1
2	2	5.2	10.2	2	4.6	10.3	2	4.0	9.2	2	3.9	9.3	2	2.9	7.9	3
9	3	5.2	10.2	2	3.9	8.6	3	3.6	8.2	4	3.2	7.6	4	2.6	7.0	4
2	4	3.6	7.1	3	3.4	7.5	4	3.6	8.3	3	3.5	8.3	3	3.0	8.0	2
1	5	2.6	5.1	5	2.6	5.7	5	2.7	6.3	5	2.3	5.4	5	1.9	5.2	6
0	6	2.1	4.1	6	2.1	4.7	6	2.1	4.8	6	1.9	4.5	6	2.0	5.3	5
5	7	1.6	3.2	7	1.4	3.0	7	1.4	3.1	8	1.1	2.6	10	0.7	1.9	10
0	9	1.2	2.4	8	1.3	2.8	8	1.0	2.4	9	1.3	3.0	9	1.1	2.8	7
8	11	1.1	2.2	9	0.9	2.0	10	1.1	2.4	9	1.4	3.2	7	0.9	2.4	8
.1	10	1.0	1.9	10	1.1	2.5	9	1.0	2.4	9	1.0	2.4	11	0.6	1.6	12
.1	10	0.9	1.7	11	0.7	1.5	13	0.7	1.6	10	0.8	1.8	13	0.7	1.9	10
.7	12	0.8	1.5	12	0.7	1.6	12	1.0	2.4	9	1.0	2.3	12	0.7	1.8	11
.2	13	0.5	1.0	13	0.7	1.7	11	0.6	1.3	11	0.6	1.4	14	0.7	1.9	10
.8	14	0.4	0.7	14	0.3	0.8	14	0.3	0.7	12	0.2	0.5	15	0.2	0.5	13
.9	(2)	5.4	10.5	(2)	4.9	10.9	(2)	4.9	11.2	(2)	5.1	11.9	(2)	5.3	14.2	(2)
0.2	-	51.2	100	-	45.1	100.1	-	43.7	100	-	42.4	100	-	37.1	99.9	-

TABLE 18

HOSPITAL MORBIDITY AND MORTALITY IN SELECTED YEARS 1965 - 1981

Disease Group	Cases Discharged from Government Hospitals per 100,000 Population					Deaths in Government Hospitals per 100,000 Population				
	1965	1970	1975	1980	1981	1960	1970	1975	1980	1981
1. Infectious & Parasitic Diseases	1,731.8	3,206.1	2,703.0	2,065.4	1,882.3	32.5	43.3	42.1	23.1	23.1
2. Neoplasms	122.3	137.4	155.7	129.6	113.7	8.3	10.3	8.8	6.4	7.1
3. Endoor, Nutr. & Metab. Disorders & Immunity Disorders	837.2	338.9	325.2	234.1	206.9	8.6	7.1	15.9	3.5	3.8
4. Diseases of Blood and Blood-Forming Organs	611.7	533.9	450.9	359.0	338.9	8.3	6.7	10.5	3.5	3.4
5. Mental Disorders	133.2	176.8	174.3	226.9	208.0	1.0	0.6	1.5	2.2	0.5
6. Diseases of the Nervous System and Sense Organs	405.6	397.2	350.3	398.0	373.7	10.8	6.6	7.1	6.6	6.8
7. Diseases of the Circulatory System	520.7	528.7	574.9	617.4	577.5	32.0	35.4	42.1	33.7	36.6
8. Diseases of the Respiratory System	2,699.9	3,053.7	2,341.2	2,342.6	2,099.1	29.7	30.3	30.5	19.1	18.3
9. Diseases of the Digestive System	1,486.0	883.0	899.7	692.0	655.7	27.0	11.6	12.5	8.4	8.6
10. Diseases of the Genito Urinary System	468.3	598.3	577.1	662.3	597.0	5.1	5.1	4.8	3.0	3.3
11. Complications of Preg., Childbirth & the Puerperium	2,844.6	2,739.7	2,998.1	3,427.6	3,319.6	6.6	3.2	2.4	1.5	1.5
12. Diseases of the Skin & Sub-cutaneous Tissues	490.8	651.0	711.4	596.8	584.8	0.5	0.3	1.2	0.5	0.3
13. Diseases of the Musculo-Skeletal & Connective Tissues	443.9	338.0	350.4	414.7	411.1	0.4	0.3	0.2	0.2	0.2
14. Congenital Anomalies	22.7	56.6	34.0	30.6	33.2	2.4	5.4	5.7	3.3	2.1
15. Certain Conditions Originating in the Perinatal Period	167.0	104.0	89.6	90.4	180.0	23.8	23.9	17.7	20.0	18.6
16. Symptoms, Sings & Ill-Defined Conditions	264.7	711.5	920.4	1,154.9	1,192.6	11.6	10.5	15.6	14.1	12.8
17. Injury & Poisoning	1,523.3	2,055.0	1,750.7	1,743.3	1,594.5	20.6	17.8	21.2	27.5	21.0
TOTAL (All Diseases)	14,733.9	16,509.8	15,406.9	15,185.4	14,268.5	229.1	218.5	239.8	176.7	168.0

Source: Annual Health Bulletin - 1981 - Sri Lanka Ministry of Health

TABLE 19

COMPARISON OF HOSPITAL MORTALITY
VS VITAL REGISTRAR MORTALITY BY BROAD DISEASE CATEGORIES -
SRI LANKA 1979

Disease Category	VITAL REGISTRAR DEATHS Rank	No.	% of Deaths	HOSPITAL DEATHS Rank	No.	% of Deaths	% of Total Deaths by Disease Category Occurring in Hospital
Circulatory System Diseases	1	12,881	13.7	1	5,281	19.1	41.0
External Causes of Injury	2	10,086	10.7	5	2,991	10.8	29.7
Infectious Diseases	3	8,502	9.0	2	3,937	14.3	46.3
Respiratory System Diseases	4	7,821	8.3	3	3,360	12.2	43.0
Diseases of the Nervous System and Sense Organs	5	6,598	7.0	9	1,146	4.2	17.4
Infant Perinatal Diseases	6	6,527	6.9	4	3,185	11.5	48.8
Malignancies	7	4,233	4.5	8	1,216	4.4	28.7
Gastrointestinal Tract Diseases	8	2,025	2.1	7	1,347	4.9	66.5
Hematologic Abnormalities	9	1,591	1.7	12	690	2.5	43.4
Endocrine Abnormalities	10	1,900	1.2	10	)		
Avitaminoses & Other Nutritional Deficiencies	11	1,039	1.1	10	) 765	2.8	35.9
Genitourinary Tract Diseases	12	919	1.0	11	758	2.7	82.5
Diseases of the Musculo Skeletal System	13	836	0.9	17	47	0.2	5.6
Diseases of the Skin	14	515	0.5	16	50	0.2	9.7
Congenital Abnormalities	15	458	0.5	13	587	2.1	128.2
Maternal Perinatal Disorders	16	317	0.3	15	289	1.0	91.2
Psychiatric	17	294	0.3	14	405	1.5	137.8
Senility & Other Ill Defined Causes	(1)	28,512	30.3	(6)	1,543	5.6	5.4
TOTAL		94,244	100.0		27,597	100.0	29.3

Source: Department of Census and Statistics and Division of Medical Statistics

Table 20. Prevalence of Malnutrition Among Preschool* Children by SHS Division/ District and Type of Malnutrition - Sri Lanka 1975-1976 and 1979-1982

SHS Division[1] 75-76	District[2] 79-82	Acute Malnutrition 75-76	Acute Malnutrition 79-82	Chronic Malnutrition 75-76	Chronic Malnutrition 79-82	Concurring Acute and Chronic Malnutrition 75-76	Concurring Acute and Chronic Malnutrition 79-82	% Gomez 2° and 3° Malnutrition 75-76	% Gomez 2° and 3° Malnutrition 79-82
Anaradapura	Anaradapura	6.9	9.4	30.7	19.4	2.9	3.4	38.4	...
	Truncomalee		11.8		22.4		4.2		...
Badulla	Badulla	5.8	7.0	49.4	31.6	4.0	2.9	50.6	...
	Moneragala		8.7		17.9		2.8		...
Batticaloa	Batticaloa	8.4	10.3	36.5	27.4	4.0	7.8	42.3	...
	Ampara		9.7		26.9		3.2		...
Colombo	Colombo	4.9	7.6	20.7	9.5	1.9	1.8	29.1	...
	Gampaha		7.7		13.9		1.6		...
Kandy	Kandy	8.5	6.1	49.6	31.1	5.5	3.5	54.6	...
	Nuwara Eliya		5.6		34.6		2.6		...
Matale	Matale	7.2	4.7	38.9	22.1	3.8	2.0	45.9	...
	Polonnaruwa		7.7		14.6		3.7		...
Matara	Matara	6.0	5.8	29.7	22.0	2.2	2.0	37.2	...
	Hambantota		6.7		23.8		1.4		...
Vavuniya	Vavuniya		4.6		22.0		4.3		...
	Mullaitivu	5.8	4.9	29.6	28.1	2.3	1.0	36.4	...
	Mannar		6.4		26.7		4.1		...
Ratnapura	Ratnapura	8.8	8.1	37.3	22.5	4.1	0.7	49.7	...
Galle	Galle	8.2	8.0	33.3	17.7	4.1	2.7	44.6	...
Kurunegale	Kurunegale	5.7	8.3	30.4	15.5	2.3	2.6	39.6	...
Kalutara	Kalutara	6.2	7.9	26.8	15.6	3.4	1.6	35.7	...
Jaffna	Jaffna	3.7	4.9	28.4	25.0	1.6	1.6	32.5	...
Puttalam	Puttalam	5.1	10.2	24.4	15.0	1.9	4.0	34.6	...
Kegalle	Kegalle	7.1	6.4	39.6	22.6	4.0	2.4	45.4	...
Weighted Average		6.6	...	34.7	...	3.4	...	42.0	...

... Not available

*1975-1976 - 0-71 months old/1979-1982 0-59 months old

Source: [1] Sri Lanka - Nutrition Status Survey 1975-1976 GSL/CARE/CDC/USAID. [2] Nutritional Status and its Determinants and Intervention Programs - Final Report, F & NPPD/MOPI Colombo - Sri Lanka Publication No. 12 - January 1983

Table 21. Prevalence of Malnutrition by Age Group and Type of Malnutrition
Sri Lanka 1975-1976

Age Group	Acute Malnutrition	Chronic Malnutrition	Concurring Acute and Chronic Malnutrition	% Gomez 2° and 3° Malnutrition
6-11	5.0	11.8	1.6	26.2
12-23	10.8	24.8	3.8	39.2
24-35	6.9	33.1	4.0	36.3
36-47	4.8	40.8	3.4	40.2
48-59	5.0	41.9	2.6	46.6
60-71	6.2	46.2	3.9	57.3
6-71 (weighted average)	6.6	34.7	3.4	42.0

Source - Sri Lanka Nutrition Status Survey 1975-1976 GSL/CARE/CDC/USAID

TABLE 22

CAUSE SPECIFIC MORBIDITY AND MORTALITY DUE TO INTESTINAL INFECTIOUS DISEASES IN GOVERNMENT INSTITUTIONS SRI LANKA 1977-1981

Specific Intestinal Infectious Disease	Morbidity per 100,000 Population					Mortality per 100,000 Population				
	1977	1978	1979	1980	1981	1977	1978	1979	1980	1981
Cholera	0.1	0.2	0.1	1.2	5.6	0.0	0.0	0.0	0.0	0.1
Typhoid Fever	52.4	56.3	46.7	46.7	46.8	1.0	0.8	0.5	0.4	0.3
Paratyphoid Fever	7.0	7.9	4.4	3.9	4.4	0.1	0.0	0.0	0.0	0.0
Shigellosis	124.8	131.0	72.7	52.3	42.4	3.7	2.0	0.4	0.9	0.7
Food Poisoning	19.9	22.9	15.0	17.0	15.9	0.6	0.9	0.6	0.5	0.4
Amoebiasis Without Abscess	107.6	104.2	95.3	85.8	64.6	0.2	0.3	0.2	0.1	0.0
Amoebiasis With Liver Abscess	51.2	53.5	35.7	29.4	21.2	1.1	0.9	0.4	0.4	0.3
Amoebiasis - Others	...	...	38.5	29.0	26.3	...	...	0.2	0.1	0.1
Intestinal Infections Due to Other Specified Organisms			262.5	224.3	256.9			2.9	2.9	4.8
	744.2	679.4				15.2	10.1			
Intestinal Infections - Ill Defined			359.5	466.5	375.2			5.8	5.1	4.3
TOTAL	1107.2	1055.4	930.4	956.1	859.3	21.9	15.0	11.0	10.4	11.0

... Not Available

Source: Hospital Statistics Bulletin 1982 - Division of Medical Statistics - Ministry of Health

Table 23. Annual Reported Morbidity and Mortality Due to Malaria
Sri Lanka - 1931 - 1981

	MORBIDITY		MORTALITY	
Year	No. of Cases	Rate per Thousand Population	No. of Deaths	Rate per Million Population
1931	1,487,521	279	1,661	317
1932	1,538,890	286	1,683	312
1933	1,116,543	206	1,409	260
1934	2,333,945	420	2,332	419
1935	5,459,539	974	47,326	8,439
1936	2,947,539	522	7,613	1,352
1937	2,308,976	403	4,408	770
1938	2,053,079	352	4,778	820
1939	3,210,795	543	10,039	1,697
1940	3,413,618	57[illegible]	9,169	1,536
1941	3,220,360	533	7,132	1,180
1942	3,225,477	534	5,143	851
1943	2,141,329	348	6,765	1,098
1944	1,672,478	265	5,604	888
1945	2,539,949	390	8,539	1,310
1946	2,768,385	412	12,587	1,873
1947	1,459,880	211	4,562	661
1948	775,276	109	3,349	471
1949	727,769	99	2,403	328
1950	610,781	81	1,903	252
1951	448,100	58	1,599	206
1952	269,024	34	1,049	132
1953	91,990	11	722	89
1954	37,664	4.49	447	53
1955	23,370	2.72	268	31
1956	43,158	4.83	144	16
1957	36,168	3.07	8	0.8
1958	1,037	0.11	1	0.02
1959	1,596	0.1	-	-
1960	422	0.04	-	-
1961	110	0.01	-	-
1962	31	0.003	-	-
1963	17	0.002	1	0.096
1964	150	0.014	1	0.096

Table 24. Annual Number of Slides Examined for Malaria, Number of Total Positive Slides and Number of Positive Slides by Type of Malaria Identified Sri Lanka 1958-1981

Year	No. Examined	No. Positive	P. vivax	P. falciparum	P. malaria	Mixed
1958	63,866	1,037	781	251	3	2
1959	305,740	1,596	1,126	456	8	6
1960	596,933	422	376	39	7	-
1961	786,307	110	76	13	20	1
1962	1,020,622	31	14	16	1	-
1963	949,919	17	8	5	4	-
1964	1,213,133	150	13	63	73	1
1965	1,247,803	308	19	189	100	-
1966	1,455,259	499	27	161	310	1
1967	1,439,547	3,466	3,026	191	248	1
1968	1,681,052	440,644	439,618	951	8	67
1969	1,436,467	537,705	534,214	2,995	4	492
1970	1,500,414	468,202	466,587	1,358	-	257
1971	1,371,465	145,368	141,458	3,711	-	199
1972	1,545,700	132,604	129,109	3,267	-	228
1973	1,455,572	227,713	218,139	9,378	-	196
1974	1,423.000	315,448	289,241	25,180	-	1,027
1975	1,492,000	400,777	336,924	62,071	-	1,782
1976	1,408,644	304,487	285,695	18,206	-	586
1977	954,756	262,460	251,726	10,431	-	303
1978	968,327	69,685	67,809	1,826	-	50
1979	1,001,217	48,004	46,636	1,313	-	55
1980	303,692	47,949	47,474	1,423	-	52
1981	892,143	47,383	46,143	1,211	-	29

Source: Anti-Malaria Campaign, 1983

Figure 1. Annual reported incidence of Diphtheria from hospital discharge records Sri Lanka, 1951–1981

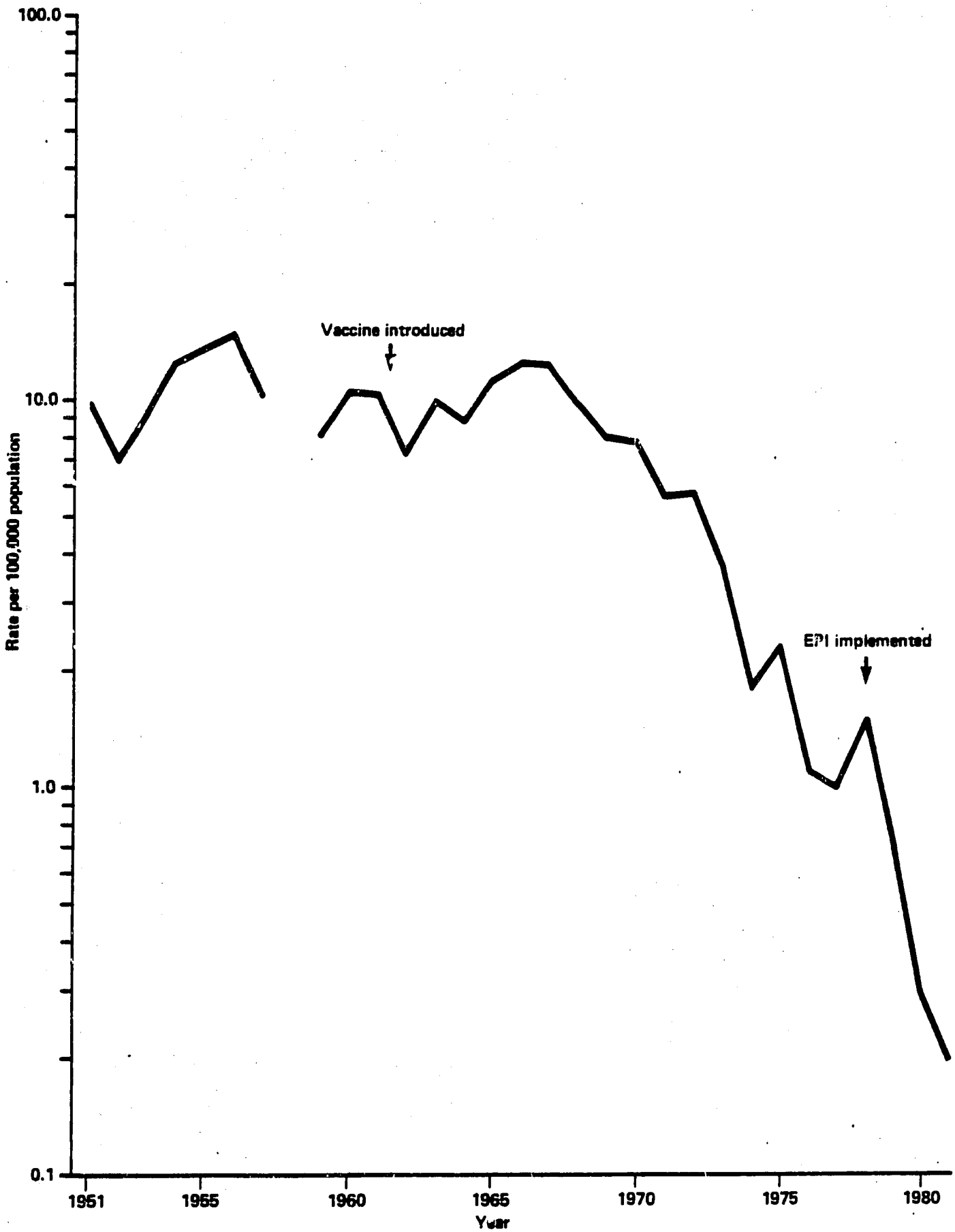

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Figure 2. Annual reported morbidity due to Pertussis from hospital discharge records Sri Lanka, 1951–1981

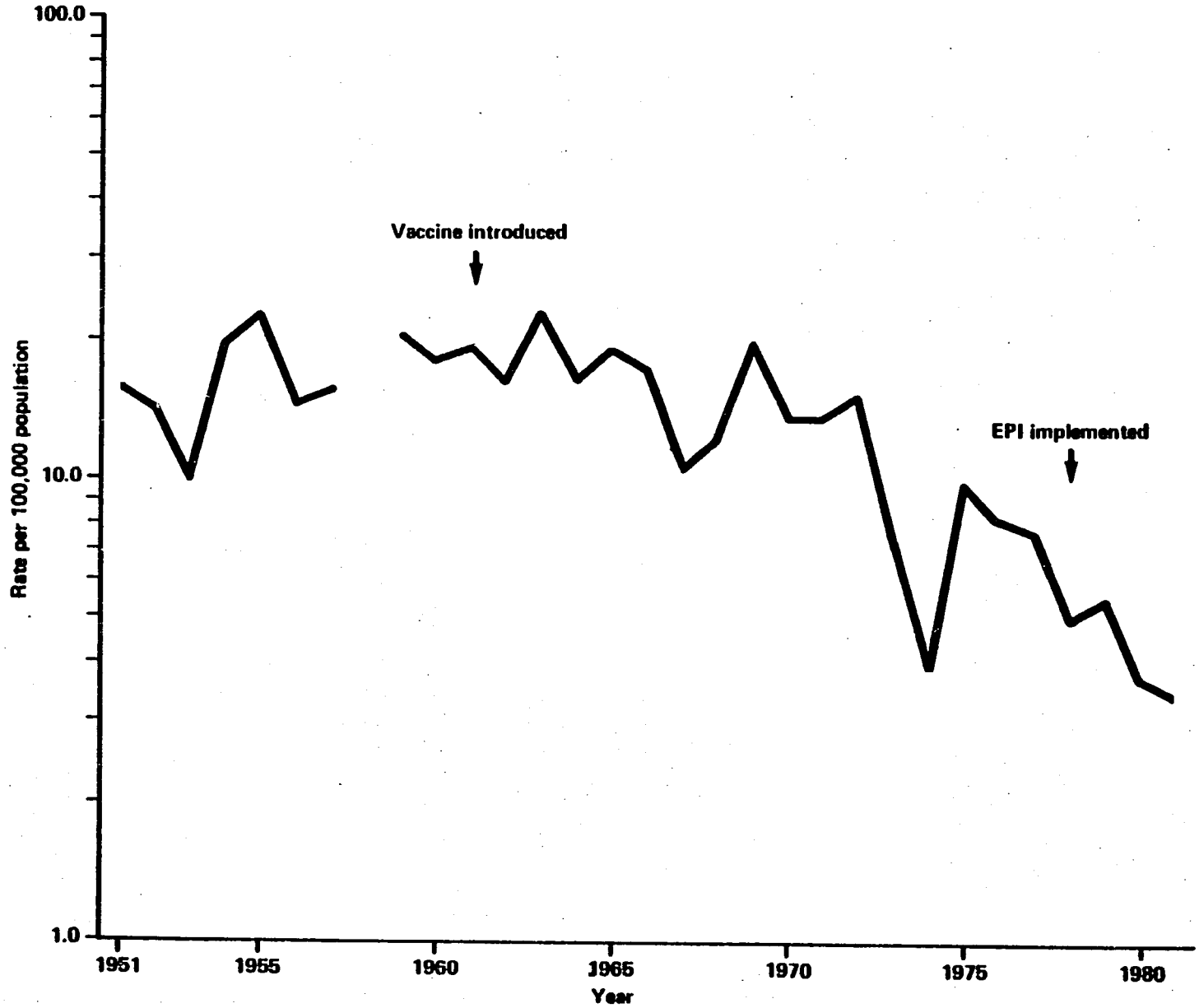

Figure 3. Annual reported morbidity due to Tetanus from hospital discharge records Sri Lanka, 1951–1981

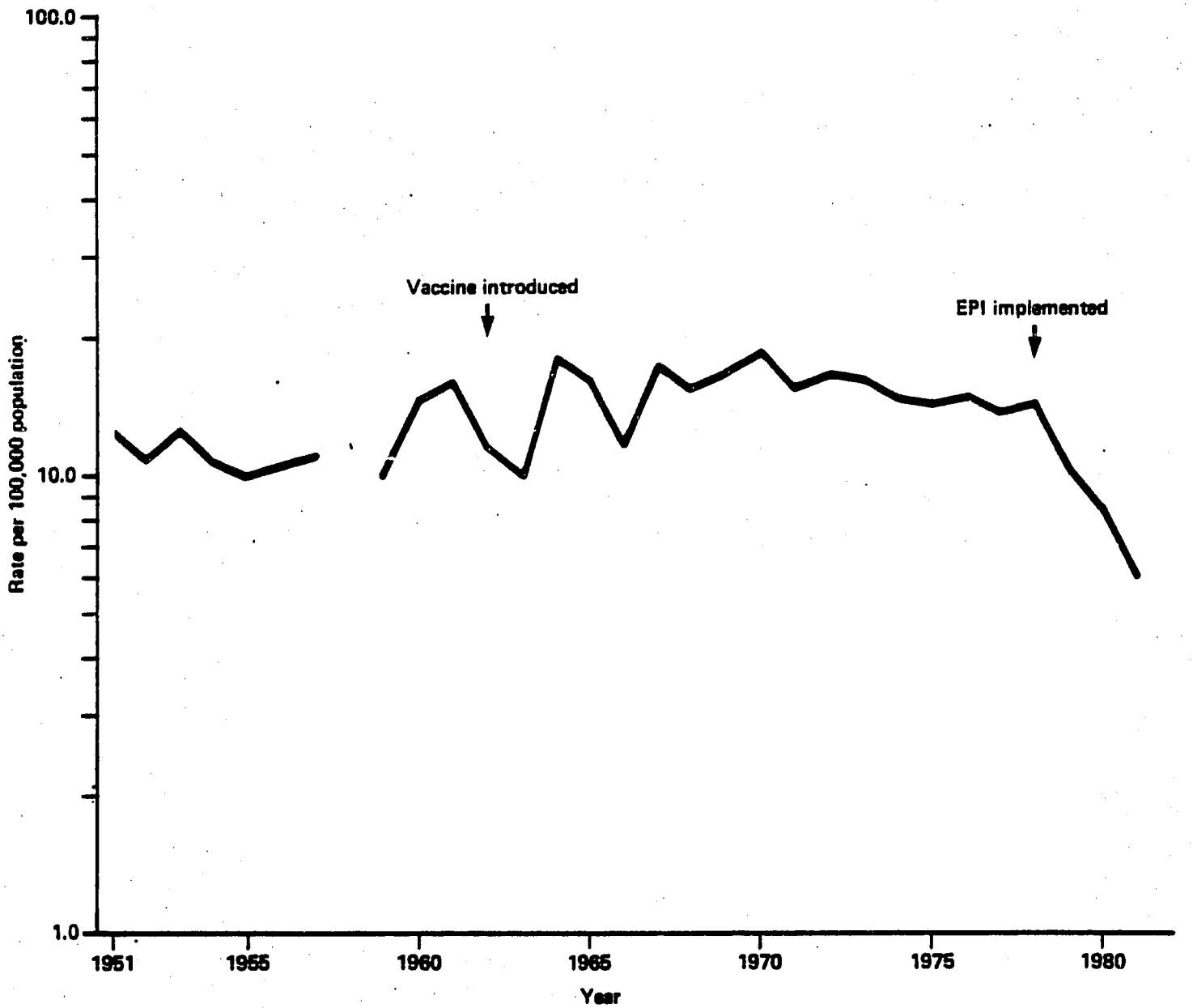

Figure 4. Annual reported morbidity due to Neonatal Tetanus from Hospital discharge records Sri Lanka, 1966–1981

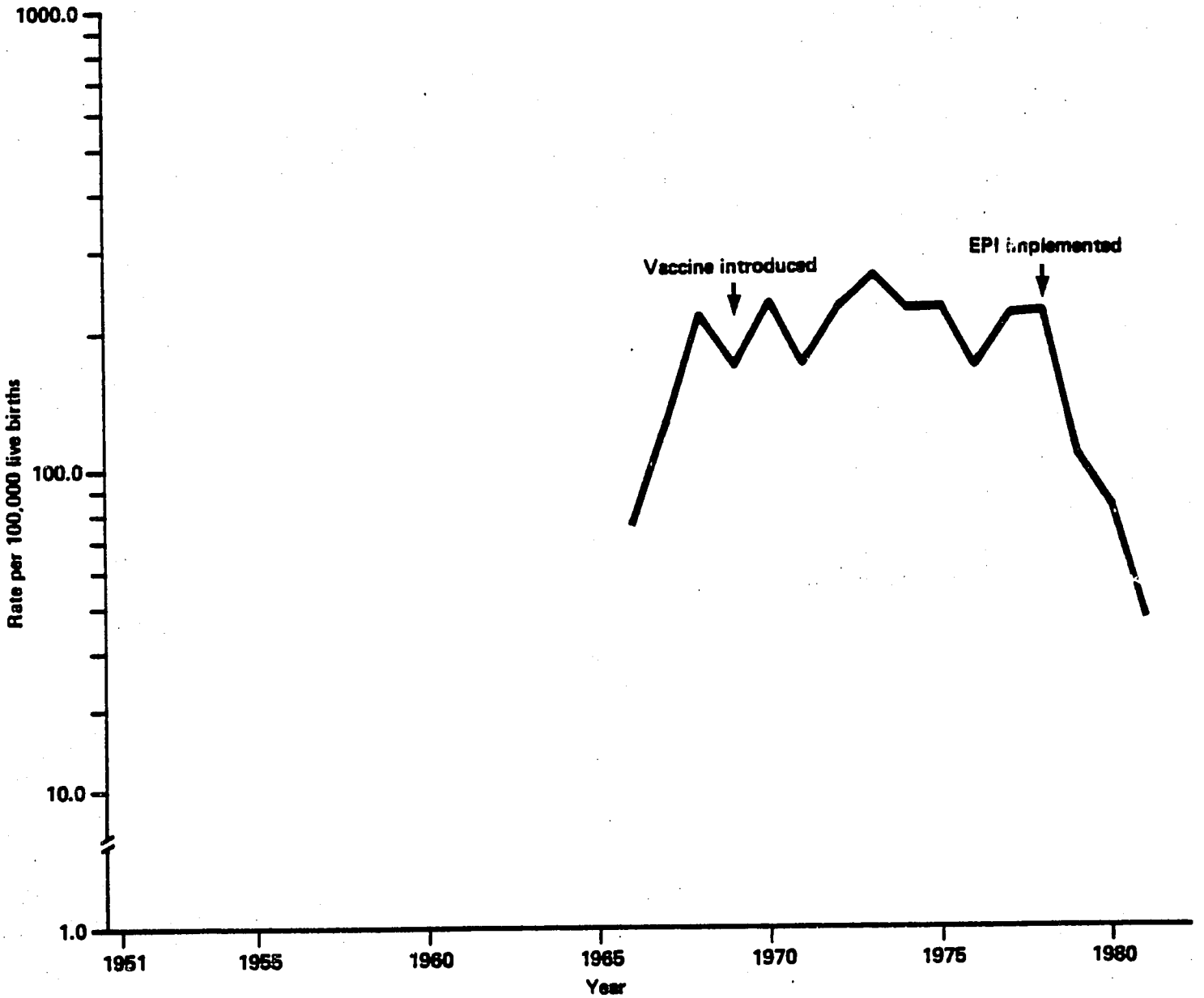

Figure 5. Annual reported incidence of Poliomyelitis from hospital discharge records Sri Lanka, 1951–1981

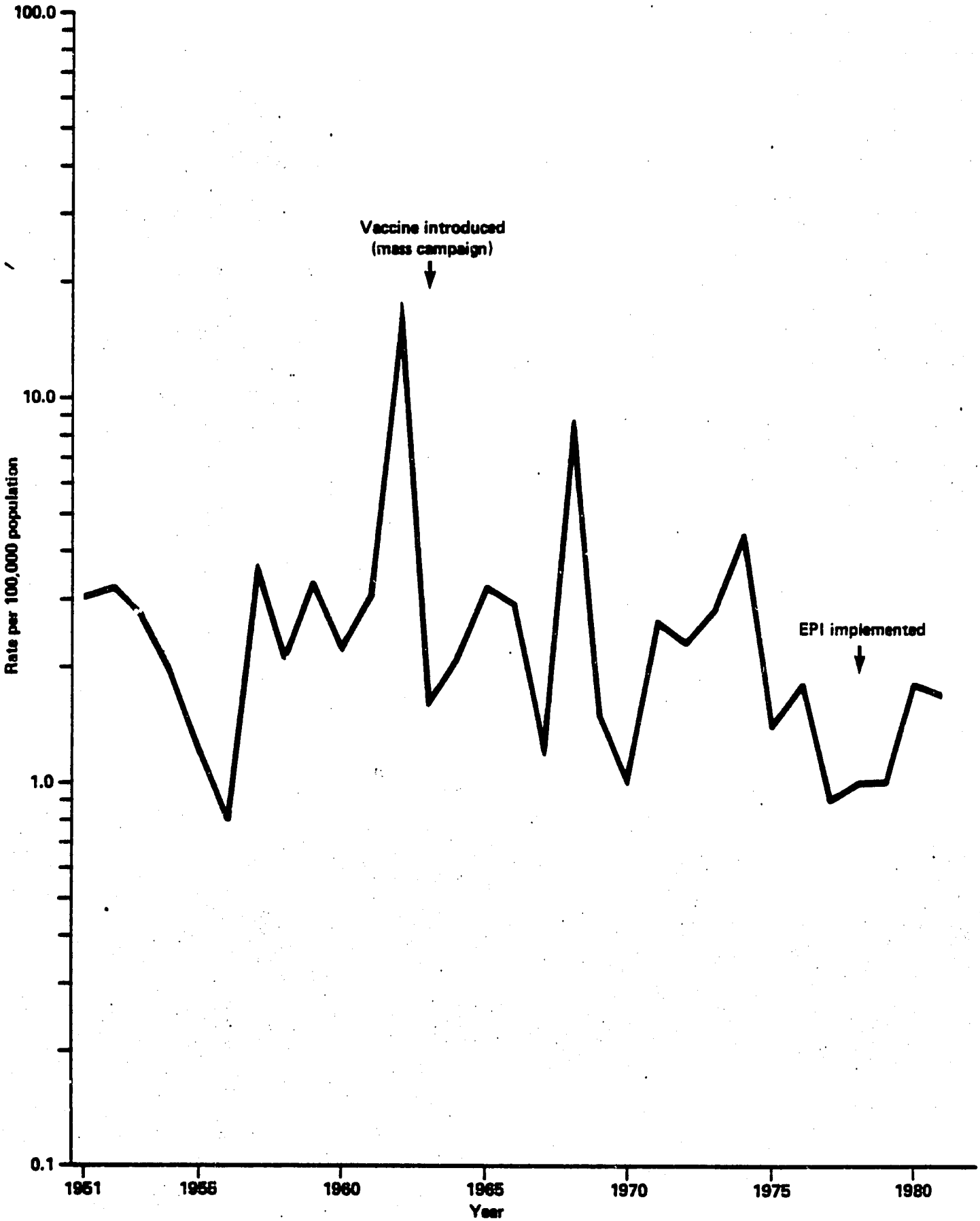

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Figure 6. Annual reported incidence of Tuberculosis from hospital records Sri Lanka, 1957–1981

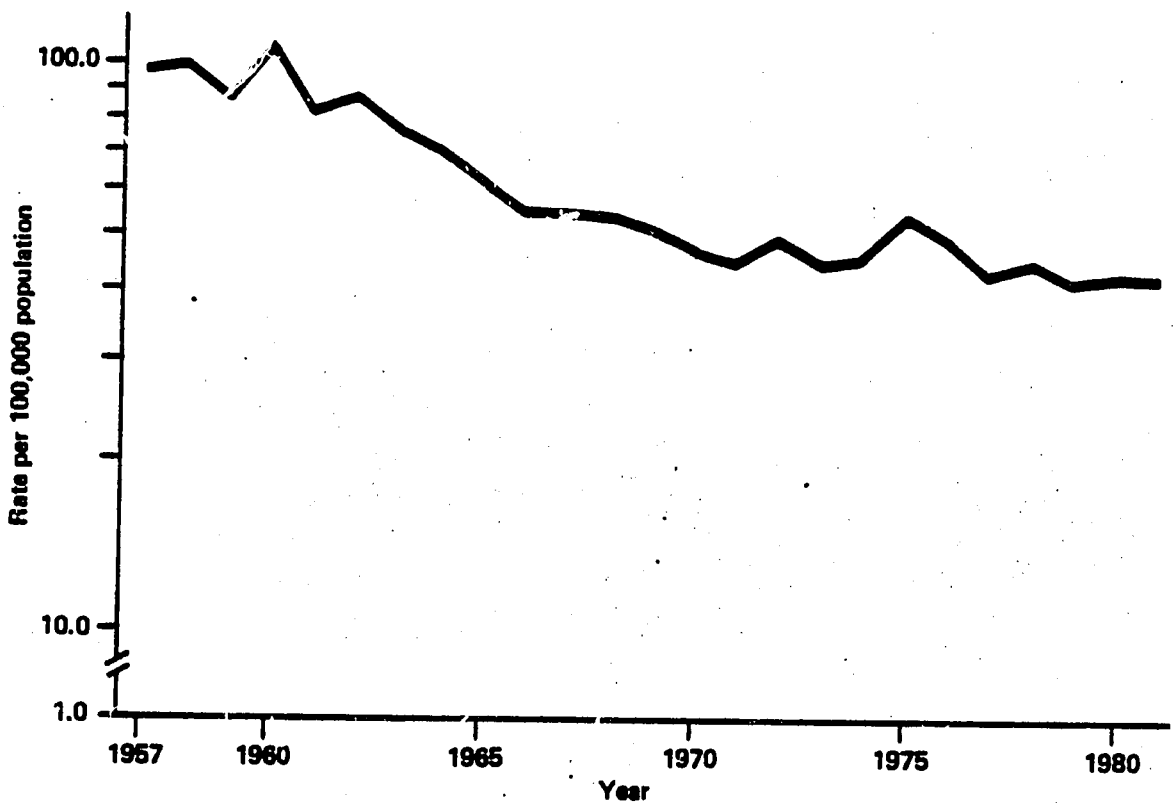
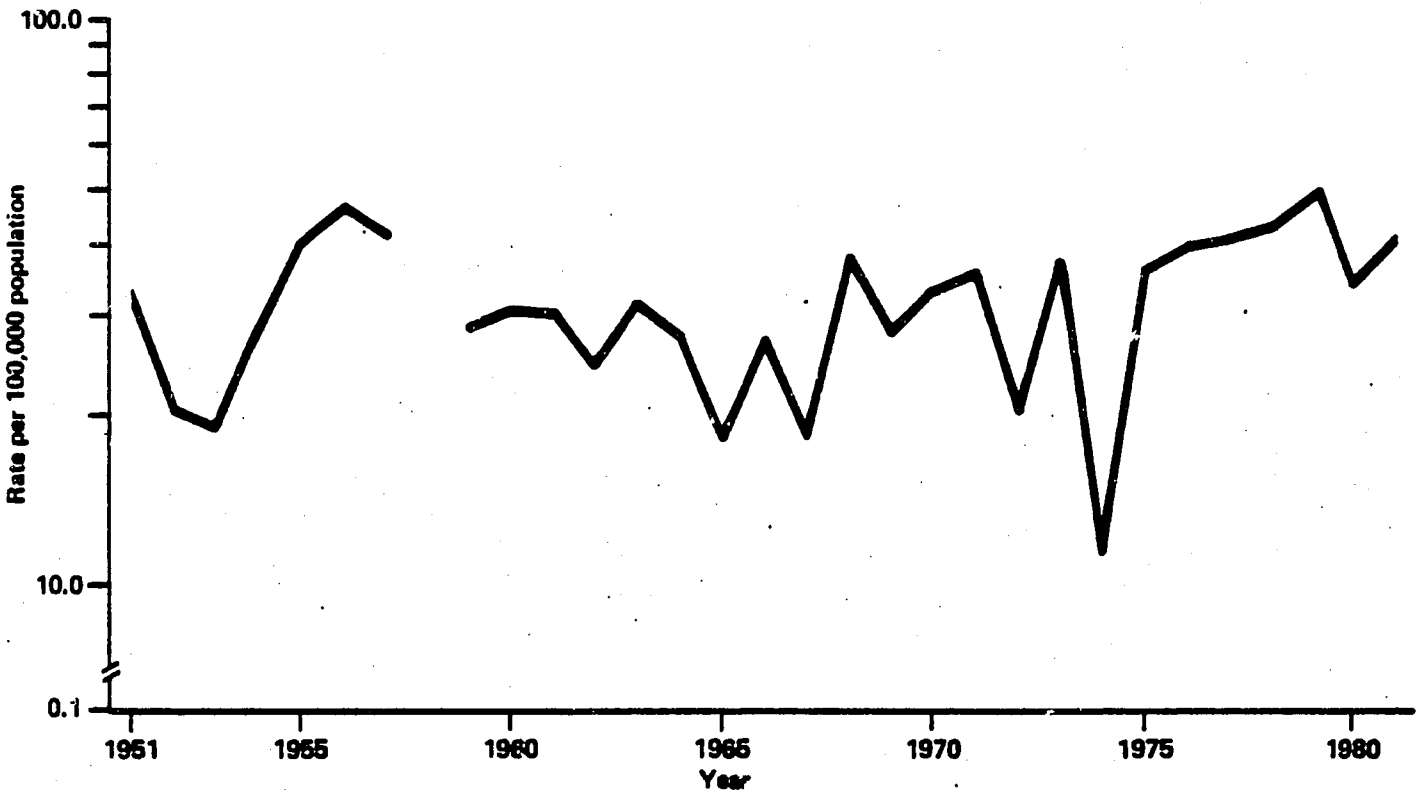


Figure 7. Annual reported incidence of Measles from hospital discharge records Sri Lanka, 1951–1981



APPENDIX C

THE SUNDAY OBSERVER FEBRUARY 13, 1983.

Bonus for no-birth

By Vernon Gunasekera

(Figures used in this article are extracted and reduced from government's statistical Abstract 1981)

Our population now stands at a little less than 15 millions with men outnumbering women fractionally While patriotic democrats thrilled with appreciation at the spectacle of thousands of splendidly healthy boys and girls marching to music at the recent Independence Day celebrations demographers and social scientists in our midst must have shivered in apprehension at what this portends for our nation's future

Rate

These boys and girls are born at the rate of 400,000 a year. It is officially estimated that in 20 years' time this rate of birth will have caused our population to pass the 25 million mark But it is only an arithmetical calculation. because in reality the intervention of disease and death is likely to reduce these number to a figure more manageable by our economy.

The expansion of population has already impelled government to embark on near-desperate schemes of economic development in order to provide us with food, employment, housing, education, clothing health and recreation Such development of productivity as is being planned for national survival is costing many billions of rupees But social productivity seems to be fighting a losing battle against human reproductivity! Since 1972 our population has increased by 2 millions.

The writer seeks in this article to make a realistic and practical approach to the problem of how to limit our population to a figure commensurate with our social resources

Our 400,000 births a year correspond to a birthrate of 27.6 for every 1000 population If the figure of 400,000 births can be reduced to 100,000 births a year, or to a birth rate of 1/4 of 27.6 (that is 6.9) we will have a birthrate matching with a margin of safety, our present death rate of 6.1 per thousand population

In other words, with this target figure of 100,000 births a year and the resulting matching of the birth rate with the death rate, we will be achieving a fixed population stabilized at the present figure of 15 million.

This is not so impossible an achievement as it may appear at first blush. It is only a question of how to persuade our women folk to restrict their annual deliveries of babies to 100,000.

Number

In my humble opinion it boils down to a question of comparative costs to the state

What does it cost the state today to provide every person born with housing, food medical care, education, school books, employment, transport, clothing, fuel and electricity for a life-time from womb to tomb?

If government statisticians, in the Central Bank or Treasury can estimate the write off of a child with a once-and-for-all payment so familiar to tax-payers such a precise figure can be taken as the cost to the state or the community of the birth of a child The figure would exceed a million rupees.

The payment of a figure of that dimension to a woman NOT to produce a child is not a transaction in which government will be the loser. Who is the woman who will get herself pregnant if she could earn say, a million rupees by avoiding pregnancy?

There you have the essence of the solution to our problem — the principle of payment for not giving birth to a child I have called it Bonus for no-Birth.

How much should the payment of bonus be? As I said earlier, success or failure is a question of comparative costs. The drawing up and implementation of any scheme of bonus payment bristles with seemingly insuperable difficulties. These involve the striking of a delicate balance between such factors as the size or attractiveness of the bonus: how much the State can afford to invest on this venture: the social needs of the community the cupidity of women versus their concupiscence: payment to unlikely mothers and so on

Costs

The reader could note two extreme possibilities at opposite ends of the scale of payment. If the bonus is really commensurate with government saving per child, it will run into a million rupees and no woman will deliver a child and the race itself will soon be extinct. On the other hand if the bonus is too small it will not attract the co-operation of a sufficient number of real child-bearers.

The proper size of the bonus can be arrived at by deciding first the approximate number to whom it is to be offered.

(To be continued)

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● POINT OF VIEW

Bonus for no-birth

By Vernon Gunasekera

Figures used in this and last week's article are extracted from government's Statistical Notebook 1981.

(Contd. from last week)

The scheme is not intended for all the 7 million females in Sri Lanka but only for a very critically selected section of women of child-bearing age. This age is from 20 to 44 years and at present totals roughly 3.8 millions of whom 2.2 millions are married women.

But all the time, it must be remembered that in any given year we are concerned only with the 50,000 women who would be getting pregnant in that year. That is to say, it will be useless paying 3.4 million women of child-bearing age if we are still saddled with 400,000 babies by 400,000 women who haven't claimed the bonus!

Mothers

We have to reach out to as near 300,000 of these 400,000 would-be mothers. To reach them we have to offer the bonus to all potential mothers.

What is the annual sum government could spend on potential mothers in order to stabilize our population at 15 million with the willing co-operation of child-bearers?

While even a carefully-devised bonus scheme cannot guarantee complete success, it cannot end in total failure. Actually, the more such a scheme succeeds the more it will cost and the less it succeeds the less it will cost. At least there is that advantage!

Fertile

The women to whom the annual No-birth bonus should be offered have naturally to be of child-bearing age ranging from 15 to 49 years. They number 3.8 million at present. This figure can be considerably scaled down by a series of steps to cover only the most fertile groups of women most prone to conceive. This will prevent throwing away money on women who, in any event, are unlikely to conceive a child.

The first step in the series is to limit the bonus scheme to married women. This immediately reduces the figure from 3.8 million to 2.2 million. We can next remove married women of two age groups from the reckoning — the 15 to 19 year group because they are few (50,000 only and in any case it will be their first or only child); and the 45 to 49 year group because although they number quarter million their proneness to conceive is negligible. The figure then falls from 2.2 million to 1.8 million. It can safely be assured that the great bulk of the 400,000 annual babies are born to this pool of 1.8 million women.

Of these 1.8 million, a further reduction could be made by disqualifying barren or infertile women and the divorced or widowed who will otherwise be claiming the bonus with no corresponding sacrifice or effort on their part.

Scheme

The operation of the scheme will be as follows: A married woman between the ages of 20 and 44 certified by her Grama Sevaka as not having delivered a live child in the 12 month immediately preceding an Appointed Day (say 1st January or 13th April) shall and receive the No-birth Bonus. Provided such applicant supplies in proof of fertility for child-bearing, evidence that she has delivered a live child within three years immediately preceding the aforesaid 12 month of no-birth.

This proviso by encouraging the birth of a "First child" will ensure the required one lakh of babies and ensure continuance of the race.

Without the aid of precise figures of fertility studies, one could say that the conditions imposed will reduce the women qualifying for the bonus and actually securing it to a figure between 1 million and 1½ million.

If the response of applications for the bonus does not affect the required reduction of actual births, the medical services for social health should be made to provide more extensive and intensive facilities for women to avoid unwanted pregnancy and claim the bonus.

Factor

The regulating factor of the whole national exercise will be the attractiveness of the size of the bonus for a 12 month no-birth. It is a question of comparative costs for government and comparative satisfactions for the women concerned.

Expert advisers fix the bonus at Rs. 4000 a year as sufficiently attractive to cut down births to the required figure. The bonus will cost Rs. 1,000 million to Rs. 1,500 million annually in the scheme set out above. This will be not money buried in cement and stone for problematic returns but spent by their recipients to improve immediately the standard and quality of their life.

This scheme seeking the willing co-operation of women has none of the drawbacks of legislative compulsion or administrative arbitrariness. It offers immediate and tangible advantages instead of grandmotherly preaching.

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R. L. Michael

ense

obscurity. Such are our values!

Best Available Document

Sun. Observer 27 Feb 83

Bonus for no-birth

By Vernon Gunasekera

The penultimate paragraph in my article last week hould read:— Expert advisers may fix the bonus for a 12-month no-birth at Rs. 1,000 as being sufficiently attractive to cut down births to the required figure of 100,000 annually.

It is envisaged that if this bonus is claimed by 1 to 1½ million women entitled to it, the cost will be Rs. 1,000 to Rs. 1,500 million every year. This is not an excessive expenditure to stabilise our population at the present 15 million mark.

Fertility

But I must admit that my scheme as described so far does not guarantee, that even after the payment of Rs. 1,000 to Rs. 1500 million in bonuses there will be only 100,000 babies born.

The reason for this is that there are 792.3 thousand females of child-bearing age between 15 and 19 years whom I have not taken into the reckoning. I have left them out as I do not think that in present conditions, unaided by detailed fertility studies, this group makes a sizable contribution to the annual 400,000 baby production

But the situation is likely to change radically when the no-birth scheme goes into operation. If there is full-scale co-operation from the pool of 1.5 million married women trying to earn their bonus, the frustrated males will increasingly tend to turn to the group of 792.3 thousand females between 15 and 19 years to satisfy their indisciplined desires.

Most girls in this 15 to 19 year age group are unattached — only 80,000 being married — and are likely to be conjoined in commercial or emotional unions with irresponsible males and thus wreck the scheme.

Babies

This is the main weakness of the no-birth bonus scheme: the danger lurking in the seven lakhs of now-unattached young girls who may well produce four lakhs of babies while we are committed to paying out up to Rs. 1,500 million to our socially loyal womanhood.

Should so important a social endeavour as population limitation be allowed to be imperilled by extra-matrimonial, temporary or even promiscuous unions stemming from the indiscipline and disloyalty of married men?

Fortunately a sufficient dis-incentive to such unions can be easily devised. Firstly, it should be legislated that no marriage should be effective with [illegible] teen years of age. Secondly, that sexual intercourse with a woman under 19 years of age be made a punishable criminal offence even if done with her consent.

If we are to insure that the no-birth bonus is to actually limit populatio expansion, it is vita hat the age of consent for sexual intercourse should be fixed at 19 years.

It is today the law of the land that having sexual intercourse with a girl under 12 years of age even with her coun- criminal offence. It is called statutory rape. Nobody has been heard to protest that it is an interference with liberty. What I propose is that the age for statutory rape be raised from 12 years to nineteen. In such a measure there will be loss of liberty only to the libertine.

It is likely in the course of time, as a consequence of the banning of sexual intense with women under 19 years, there will develop emotional and erotic attachments known as Lesbianism among women and homosexuality among men. These are not exactly unknown in our society nor particularly harmful socially. Certainly not as harmful as an unfettered output of babies!

Problem

And lastly, there is the perennial and intimate problem of the married woman whose efforts at any form of family limitation are constantly thwarted by physical force used by a drunken or brutal husband.

This problem can be finally solved by amending the law of rape from whose operation husbands are at present exempt. The removal of this exemption from prosecution for rape will give relief to many ill-treated and mis-used wives as well as remove a major impediment to all family limitation schemes.

(Concluded)

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