THE MORBIDITY AND MORTALITY DIFFERENTIALS

ASEAN Population Programme Phase III

THAILAND

Country Study Report

INSTITUTE FOR POPULATION AND SOCIAL RESEARCH
MAHIDOL UNIVERSITY

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Bibliography ISBN 974-586-395-5

First published by the Institute for Population and Social Research
Mahidol University, 1988
500 copies

IPSR Publication No. 119

Printed at the Institute for Population and Social Research, Mahidol University
Bangkok, THAILAND

ACKNOWLEDGEMENTS

The Study of Morbidity and Mortality Differentials, which is one among the ASEAN Population Projects Phase III, is financially supported by the Australian Government. The first phase of the study has been completed and disseminated in 1985.

This country report is comprised of the findings from the secondary data analysis, the first phase, and the National Survey undertaken during 1985-1986, the second phase of the project.

The project team would like to express their gratitude to various government institutions and individuals who made the success of this project possible by providing great collaboration and cooperation assistances. In particular, during the first phase of the study, the National Statistical Office (NSO) of the Office of the Prime Minister has provided data from the Population and Housing Census and the Health Survey. The Division of Health Statistics and Department of Medical Services of the Ministry of Public Health have kindly supplied data on death registration and hospital discharge records.

For the Field Survey activities, the School of Public Health at Mahidol University, the School of Nursing at Prince Songkhla University and the Provincial Chief Medical Offices in the sample provinces have provided both technical and managerial assistances.

Again, the NSO is of great assistance during the data collection of the survey, namely, collaborating the cause of death enquiry into the SPC schedule, drawing sample for morbidity survey and conducting the data entry.

The Mahidol Computer Center (MUCC) is much appreciated for its primary role in providing technical services to the project during data analysis.

Appreciation is extended to Dr. Pirote Ningsanonda, the Under Secretary of State of Ministry of Public Health for his valuable advice and suggestions.

We would like to extend our appreciation to Dr. Pudjo Rahardjo, Regional Project Coordinator of the ASEAN Study of Morbidity and Mortality Differentials, Mr. Visit Boonyakesanond, the ASEAN Country Project Coordinator for Thailand and, Dr. Benjamin D. de Leon, Executive Director of the ASEAN Population Coordination Unit, for their effective and friendly coordinating efforts which greatly contribute to the success of this project.

Special thanks to Dr. Harald Hansluwka, Disision Chief of Epidemiological Surveillance and Health Situation and Trend Assessment, WHO for his valuable comments on the first draft of this report.

Lastly, we would like to express our gratitude to the Australian Government for the financial support to the project.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I
INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Development in Thailand, as in other developing countries, generally results from the efforts of a government through various socio-economic development plans. It is speculated then that the development plans of previous years may improve living conditions of the Thai population in later years. Demographically speaking, a decline of mortality, particularly infant and child mortality, should occur as the impact of development programmes takes effect. Explicitly, the infant mortality and crude rates during 1950 to 1980 declined from 132 per 1,000 live births and 27.3 per 1,000 population to 51 per 1,000 live births and 7.7 per 1,000 population respectively. Although this rapid decline of mortality is approaching the same level of that of developed nations, mortality in several parts of the country is speculated to be still high. Mortality differences still exist among some regions and certain socio-economic characteristics of the Thai population.

Specifically, infant and child mortality are still higher in rural and poverty-stricken areas than in urban areas and cities (Sermsri, 1980; Chira, 1987; Knodel and Chamratrithirong, 1978; Rungpitarangsi, 1974). The northeastern region, characterized as the poorest region,has shown the highest mortality. At the individual level, persons with higher socio-economic status tend to have lower child mortality experience than those of lower status (Sermsri, 1980;Knodel and Chamratrithirong,1978;ESCAP,1976). From this, it is speculated that the differences revealed may reflect differences in the quality of the development. However, these differences are not necessarily maintained over place and time. A detailed investigation of mortality differences among geographical regions, socio-economic status and cultural areas has useful implications for policy planning. Strategies to reduce the levels of mortality, particularly infant and child mortality as well as adult mortality, and to narrow the existing differences will be achieved when a broader understanding of mortality differences is gained.

The morbidity situation is considered as part of both the quality of development and health status. Morbidity differences are often used to identify the onset of ill health of the society and also to locate a proper health service system appropriate to specific groups of the population.

A pattern emerging from the ASEAN Population Programming Exercise points to the fact that with the exception of Singapore, there is a dearth of accurate data on morbidity and mortality. The inadequacy is such that in some instances policy makers are compelled to resort to inaccurate estimates to arrive at health status figures in their efforts to formulate health

intervention programmes. This problem is greatly amplified when one proceeds from the national/macro scope further down to sub-national and local levels. In many instances one observes readily that formulations of population-related policies, are often confronted with contradictory data. In a similar fashion health related programmes are often hazardously designed and, in turn, do not meet the actual needs of the people.

It is also noticed that the need for health services, as perceived by health professionals, is in many instances different from the needs felt by the people. This, in turn, leads to wastage of scarce resources. Furthermore, available data also point to the fact that provision of health services is generally inadequate, both in terms of quality and quantity.

The present state of the art on morbidity and mortality rate estimations indicates that these are, to an undetermined degree influenced by socio-economic status, cultural norms, and environmental factors. It has also been often hypothesized that rates are determined by the degree of modernization which brings about greater aspirations and increased scale of needs for better living standards, and policy makers are often cautioned of the interlinkages between morbidity and mortality with other demographic variables, most notable of which are fertility and migratory patterns.

Whereas nationwide efforts to arrive at accurate figures for policy makers are not feasible at this point the present study shall focus on selected areas, which are calculated to represent a variety of programme intervention schemes. The advantage of this approach over nationwide coverage is that more in-depth information may provide rigorous analysis on the differentials within and among each type.

The importance of accurate information on mortality and morbidity differences is necessary to reveal and understand the intricate relationship between mortality and morbidity differentials and socio-economic characteristics of the Thai population. Since the need to arrive at such information is present, the existing data available now are a prime concern for assessing morbidity and mortality differentials for further detailed study in the following stages.

The Morbidity and Mortality Differentials Project (MMD) is one of the seven projects under Phase III of the ASEAN Population Programme. It is an extension of the research project undertaken during the Phase II of the programme namely "Studies on Health and Family Planning in ASEAN Countries".

1.2 OBJECTIVES OF THE STUDY

The long-term objectives of this project are to provide correct estimates of morbidity and mortality levels and trends, and to establish the determinants of these conditions. The

project is divided into two stages, the first is secondary data analysis and the second are the morbidity and mortality surveys.

The secondary data analysis has set the following immediate objectives :

a) To assess available data and knowledge about morbidity and mortality patterns and their causes.

b) To conduct an in-depth analysis on morbidity and mortality patterns using available data, e.g., the Population Census, National Health and Welfare Survey, Vital Registration, Hospital Admission Records and the Records of Notifiable Diseases.

c) To establish appropriate techniques to estimate morbidity and mortality measures both at the national, regional and rural-urban levels.

For the field survey, the objectives are as follow :

a) To access morbidity and mortality patterns and their differences at national and regional levels.

b) To identify salient influencing factors of mortality and morbidity.

c) To examine health behaviors and causes of death or illness of the Thai population.

It is expected that major findings resulted from the MMD study will aid in submission of policy recommendations regarding appropriate population and health intervention programmes.

1.3 DATA SET

1.3.1 SOURCES OF EXISTING DATA

Four major sources of data are used in the secondary data analysis. They are the Vital Registration Data of Deaths 1968-1983, Population and Housing Census 1980, National Health and Welfare Survey 1981 and the Hospital Admission Records in 1981. Supplementary information is obtained from the Survey of Population Change (1964-67, 1974-76), the Contraceptive Prevalence Survey (1978, 1981) and the Report of Notifiable Diseases.

1.3.1.1 THE VITAL REGISTRATION

The main source of data on mortality in Thailand is the Vital Registration System. A system of registering vital events has been in existence since 1917, though the official vital registration statistics, especially death registration suffers severely from underregistration as

indicated by the dual-record system methodology of the two rounds of the Survey of Population Change (1964-67,1974-76).

By law, births must be registered within 15 days of their occurrence, death and still-births within 24 hours. The head of the household or mother of a baby is responsible for seeing the birth is registered. For death, the responsibility lies with the head of the household except when the event occurs outside of the house, or any institution; the person who finds the body is responsible for registration.

The Ministry of Interior is in charge of registering births and deaths at the local administrative level. The Ministry of Public Health is responsible for processing the vital statistics data for the whole country and disseminating the information on an annual basis, known as the Report of Public Health Statistics.

Certificates of birth, death and stillbirth are used for the registration of events. The detailed information for births, deaths and stillbirths collected on these certificates basically conforms to international standards.

The death certificate consists of three parts. Parts 1,2 and the upper half of part 3 contain the characteristics of the event itself, e.g., characteristics of parents, event informant, etc,. The lower half of part 3 contains the detailed characteristics of attendance and the cause of death according to the International Classification of Diseases (WHO/ICD).

Upon registration of the vital event, Part 1 of the certificate is given to the person who registers the event. In municipal areas, the vital event is to be reported to the local registrar and the reports must go to the Kumnan (sub-district chief) when the event occurs in a non-municipal area. The Kumnan and local registrar send Parts 2 and 3 with a monthly summary report on the number of the events to the District Office (Amphur) on the 5th of the following month. Part 2 of the certificate is kept at the District Office. Part 3 of the certificate will then be sent to the Provincial Chief Medical Officer within the 15th of the following month.*

At the provincial level, an officer under the Provincial Chief Medical Officer makes a summary of monthly statistical reports for the whole province and sends this to the central office of the Division of Health Statistics, Ministry of Public Health and retains Part 3 of the certificate at the PCMO office.

Concerning deaths, the reports prepared by the Provincial Chief Medical Officer use the standard summary forms designed by the Division of Health Statistics, Ministry of Public

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* Thailand is administratively divided into 73 provinces, approximately 700 districts, 5,000 tampon or sub-districts and 55,000 villages (as of December 1987).

Health. The monthly standard forms comprise two tables, one for deaths of all ages and another for infant deaths. The table records the cause of death along with the ICD codings, age at death and sex. No classification on occupation, education or rural/urban place of residence of the deceased is included.

By and large, in Thailand, the death is usually registered at the place of occurrence and by law it will be transferred to the local registrar at the place of residence (if not the same place by the head of the household in order to notify the registrar to delete that dead person from the list of the household registration form.

From the points mentioned above, it should be understood that when the mortality analysis is done by province or region, from death certificate, it refers to the place where the death occurred.

The purpose of this study is to review and estimate levels, trends and differentials in mortality in Thailand during the current period. Difficulties involve the assessment of mortality data which are in limited supply and suffer severely from underregistration. In the 1974-75 Survey of Population Change, it was found that as high as 41 percent of deaths were unregistered (Table 1.1). The underregistration was especially pronounced in the rural areas. It is expected that improvement in registration up to the present time has not been rapid. Underregistration is still a serious problem in Thailand.

Table 1.1

Percent completeness of the official death registration by sex for Bangkok, municipal areas, non-municipal areas and the Whole Kingdom of Thailand, 1974-76 Survey of Population Change

Sex	Municipal Areas			Non-Municipal Areas	Whole Kingdom
	Bangkok Metropolis	Other	Total		
Total	90.0	73.5	81.1	58.0	59.2
Male	90.0	75.0	81.8	57.7	59.0
Female	86.7	71.4	80.0	58.3	59.3

The quality of the diagnosis of cause of death depends largely upon the attendant at death. A manual, prepared by the Division of Health Statistics of the Ministry of Public

Health on the diagnosis of cause of death using symptoms leading to death, has proved to be very helpful to those local health personnel and local registrars when death occurs outside the hospital. However, the mortality statistics reported by the Provincial Chief Medical Office around the country are the only continuously available source for analyzing and obtaining the patterns and trends of the major causes of death in Thailand.

1.3.1.2 THE POPULATION AND HOUSING CENSUS 1980

The availability, through the census data, of the child survivorship data by age of mother, makes it possible for application of the indirect estimation techniques to obtain the trends of the infant and early childhood mortality. In addition, the pattern and differentials of the infant mortality rate (IMR) by some socio-economic characteristics could be estimated by using data on education, work status, occupation and religion of mothers.

1.3.1.3 NATIONAL HEALTH AND WELFARE SURVEY, 1981

In realization of the importance of morbidity data, the National Statistical Office (NSO), Bangkok, Thailand, has conducted a national morbidity survey on Health and Welfare in 1981 in order to understand better health status of Thai population and more importantly to obtain health information of the Thais for planning the health services and manpower development. The range of morbidity classifications is very great, starting with vague symptoms, to recognizable conditions requiring hospitalization. Morbidity measures in this survey include three different stages of ill health, namely illness, injury and hospitalization. Respondents were asked whether, during a month preceding the interview, the respondent or any of the members of the household had (1) an illness, (2) injury or (3) were hospitalized. The population covered by the Health and Welfare Survey is the civilian non-institutional population which consists of all persons who reside in private households excluding special households, institutions and households of foreign diplomatic personnel, in the country. The data of the survey were obtained by interviewing the household head or a responsible adult living in the sample household.The morbidity rate obtained from this survey refers to their place of residence.

1.3.1.4 HOSPITAL ADMISSION RECORDS, 1981

The year 1981 is selected for the analysis in this report in order to present the data on hospitalized cases by diagnosis in conjunction with the data obtained from the survey data (1.3.1.3) mentioned above. The hospitals under the responsibility of the Department of Medical Services of the Ministry of Public Health located in Bangkok and in all four regions of Thailand are included in this study. Therefore, the study excludes the teaching hospitals of all seven

medical schools, private hospitals and hospitals under jurisdiction of to other ministries. The general summary of the discharge sheet of each patient is the basic data for the analysis.

Eventhough not all hospital admissions are available, the patterns of diseases or diagnosis of hospitalized patients for the national as well as regional level are certainly accurate.

1.3.1.5 THE REPORT OF NOTIFIABLE DISEASES

Another important source of morbidity and mortality data is the disease notification system operated under the Division of Epidemiology, Ministry of Pubic Health. For disease surveillance purpose, all hospitals, health centres and clinic are requested to report occurrence of 55 notifiable diseases/conditions, most of which are infectious diseases, using notification card-506, to provincial health offices for their information. The notification cards are further submitted to the Division of Epidemiology when country data are collected, analyzed and report.

The diagnosis of cause is subject to the quality of health personnel at each level of health outlet. However, the variations of the diagnosis are assessed and have proved to be within acceptable limits.

1.3.2 THE FIELD SURVEY

Regarding to the exchange in a common conceptual framework introduced in the First Inter-Country Meeting has led of expert reviews in reference to appropriate conceptual frameworks, variables to be involved, and designs was initially made. Particularly, research design was adjusted to feasible local situation. Mortality and Morbidity studies are finally separated field data collection.

Mortality and Morbidity studies were finally separated with respect to field data collection. Mortality questionnaire was well integrated into a field data collection of the intercensal National Survey of Population Change, 1984-1986 (SPC 3). Morbidity study, on the otherhand, was separately conducted by the MMD research team. However, the morbidity survey design was made paralleling to the SPC design.

In February, 1985, the MMD research team met several times to discuss the methodology and operation of the field surveys. The plan for the field surveys was completely laid out.

CHAPTER II
METHODOLOGY

2.1 METHODS OF ANALYSIS OF THE SECONDARY DATA

Due to the limitations of data, the accurate estimation of morbidity and mortality levels and trends at small units may not be feasible at this stage, if not possible at all. The purpose of our analysis of secondary data follows the main objective of the study to provide correct estimates of morbidity and mortality levels and trends. Thus the units of analysis used in this stage of study are limited to national and regional levels. These national and regional estimates will be advantageous to policy makers and planners to formulate policy in allocating budget for health intervention programmes. At the national level, rural-urban residence is a key geographic factor for this study of morbidity and mortality differentials. for the analysis of regional differentials, the morbidity and mortality levels and trends of the four regions of Thailand namely the Central, North, Northeast and the South are compared.

2.1.1 ON LEVELS, TRENDS AND DIFFERENTIALS OF INFANT AND CHILDHOOD MORTALITY

In this report various sources of data are presented with cautious interpretation. These include death registration rates with appropriate corrections for underregistration; data collected and adjusted under the dual record system from the two Surveys of Population Change in 1964-65 and 1974-75/1974-76; figures estimated by "the death distribution method". The infant and child mortality derived through application of indirect estimation techniques applied to child survivorship data from the 1970 and 1980 censuses and other national demographic surveys around 1980. These indirect techniques make possible the investigation of trends and differentials. These include analysis in terms of region, rural-urban residence and socio-economic characteristics such as education, occupation, work status and religion of the population.

The direct estimates of the infant mortality rate (IMR) are taken from the two Surveys of Population Change (SPC 1964-65 and 1974-75/1974-76) including the probability of dying at age one ($_1q_0$) from SPC life tables. Indirect estimates of infant and child mortality are derived from the proportion dead among children ever born by age of mother.

The Trussell technique (1975) with the "North" model life table is the choice used here (Knodel and Chamratrithirong, 1978 and National Research Panel on Thailand, NAS, 1980). These include the probability of dying at age one for infant mortality and age five for child

mortality. Data for these indirect estimates are from the 1970 and 1980 censuses and other national surveys including both the Survey of Population Change, the Survey of Fertility in Thailand 1975, and the Contraceptive Prevalence Surveys, 1978-79 and 1981.

Trends in infant mortality can be examined further by the use of the Feeney technique (1976). Calculations are made based on the data from the 1970 census and SPC in 1974 (Knodel and Chamratrithirong, 1978). More currently, data from the 1980 census are also available and used here. The adaptation of the Trussell technique for data on CPS1 and CPS2 is also made to confirm the levels and trends of the IMR.

The indirect techniques of estimating infant mortality from child survivorship data have the advantage of providing mortality differentials by socio-economic characteristics of the mother. This is especially beneficial since such mortality differential analysis would be extremely expensive to obtain through other procedures such as the national mortality survey, vital registration or the dual record approach. With special tabulations from the 20 percent sample of the 1980 census, indirect estimates of infant mortality are computed by selected socio-economic characteristics of the mother. The methodology is similar to previous studies using the 1970 census. (Knodel and Chamratrithirong, 1978). The socio-economic characteristics include educational attainment, occupation, work status and religion.

2.1.2 ON THE CAUSES OF DEATH

The cause of death data are usually tabulated according to the International Classification of Diseases (ICD), or Basic Tabulation List based on the 9th Revision. Certainly, international statistical comparability on cause of death data has been seriously affected by the successive revisions of the International list. Thailand mortality statistics are not an exception. The cause of death data from the vital statistics are tabulated according to the ICD List which was changed from the 8th Revision to the 9th Revision in 1979.

It must be borne in mind that the data refer to the mortality experience of the national population and as such reflect an aggregate of subnational differentials which may vary markedly from group to group. Variation in diagnostic fashions and precision among subgroups of death attendants within the country as well as among countries are of somewhat greater concern when interpretation is made. Cultural differences appear to play a significant role in the classification of an external cause of death as either a suicide, a homicide or an accident. Suicides in particular are underreported in some subgroups of the population due to the social or religious stigma associated with the act, and in such cases the death would usually be classified to the broader category of external causes. A similar pattern of diagnostic preference within a broader category of related conditions has been reported for similar reasons. For the circulatory and respiratory diseases, there is an evidence that a number of bronchitis deaths are assigned to cardiovascular

disease. The broader category of related conditions would, however, overcome such problems of diagnosis.

The relative propensity of certifiers to code deaths to ill-defined and unspecified diagnosis also affects the comparability of cause of death between countries and among subgroups within the country. It is possible to look at the trend of a specific disease or a broader category of related conditions over time in one country, assuming a similar pattern of coding deaths to ill-defined and unspecified diagnosis has been practiced consistently. Thailand data falls into this coding fashion. About 45 to 50% of deaths are coded as ill-defined and unspecified diagnosis and these proportions are relatively consistent over time, with a smaller proportion of about 30 percent of ill-defined diagnosis among infant deaths.

In order to see the changing patterns of cause of death and the trends over time of some major diseases, the number of deaths coded as ill-defined and unspecified conditions will be ignored in the analysis.* The tabulations have been prepared from the provincial summary reports from the year 1970 through 1983. The trends over time of some selected diseases or a broader group of related conditions were analyzed to demonstrate any changes which occurred in the general population, as well in selected groups of population.

The rate per 100,000 of population at risk is used as an indicator, sometimes along with the absolute number of reported deaths. The estimated population by age group and by year are adopted from the Report of Working Group on Population Projections. The number of registered live- births** from the Report of Vital Registration of Ministry of Interior are used as the denominator for the rates among children under one year of age.

The cause of death codings are adopted from the Division of Health Statistics, Ministry of Public Health. The ICD coding list used in this report is displayed in Appendix 9.

2.1.3 ON THE ESTIMATES OF ILLNESS

The rate per 1,000 population is calculated from survey data. Analysis estimates of the rate of illness, injury and hospitalization by region, urban/rural, and selected socio-economic

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* The implicit assumption is that the pattern of reporting deaths as of ill-defined or unspecified causes has not changed significantly over the study period.

** Unadjusted for underregistration

variables is carried out to determine the socio-economic perspective of morbidity among the Thai population in 1981.

2.1.4 ON THE DIAGNOSIS OF HOSPITALIZES PATIENTS

Totals of summary of discharge reports from six general hospitals in Bangkok during 1981 are used for analysis. Due to the large number of hospital admissions in 84 provincial hospitals in the 4 regions of the country a random sample of 10 percent of all discharge sheets is taken. The sampled discharges total 126,315 cases were included in the analysis.

2.2 SAMPLING DESIGN FOR THE SURVEY

2.2.1 MORBIDITY SURVEY

In February through March, 1985, the national sample for the morbidity survey was selected by the sampling specialist of the NSO. The sampling scheme used in the morbidity survey was similar to that used in the SPC. The sample covered 19 provinces in all regions of the country, both in rural and urban areas. It was planned to cover 6,958 households with the target population of approximately 35,000.

The sampling procedure was designed as described belows.

A stratified two-stage sampling and self-weighting were adopted for this survey. A group of provinces in each region and Bangkok Metropolis were formed as strata. Hence there were altogether 5 strata. The primary and secondary sampling units were districts, / provinces and blocks (municipal areas)/villages (non-municipal areas) respectively.

a) SELECTION OF PRIMARY SAMPLING UNIT

1. MUNICIPAL AREAS (URBAN)

1.1 BANGKOK METROPOLIS

A number of sample districts was selected with probability proportional to size (number of blocks were used as measure of size), totalling 7 sample districts.

1.2 OTHER STRATA (EXCLUDING BANGKOK METROPOLIS)

A number of sample provinces was selected from each strata, totalling 5 sample provinces.

2. NON-MUNICIPAL AREAS (RURAL)

A number of sample provinces was selected from each strata with probability proportional to size. (number of villages were used as measure of size), totalling 15 sample provinces.

b) SELECTION OF SECONDARY SAMPLING UNIT

1. MUNICIPAL AREAS (URBAN)

A number of sample block was selected randomly from each sample districts/province, totalling 12 sample blocks.

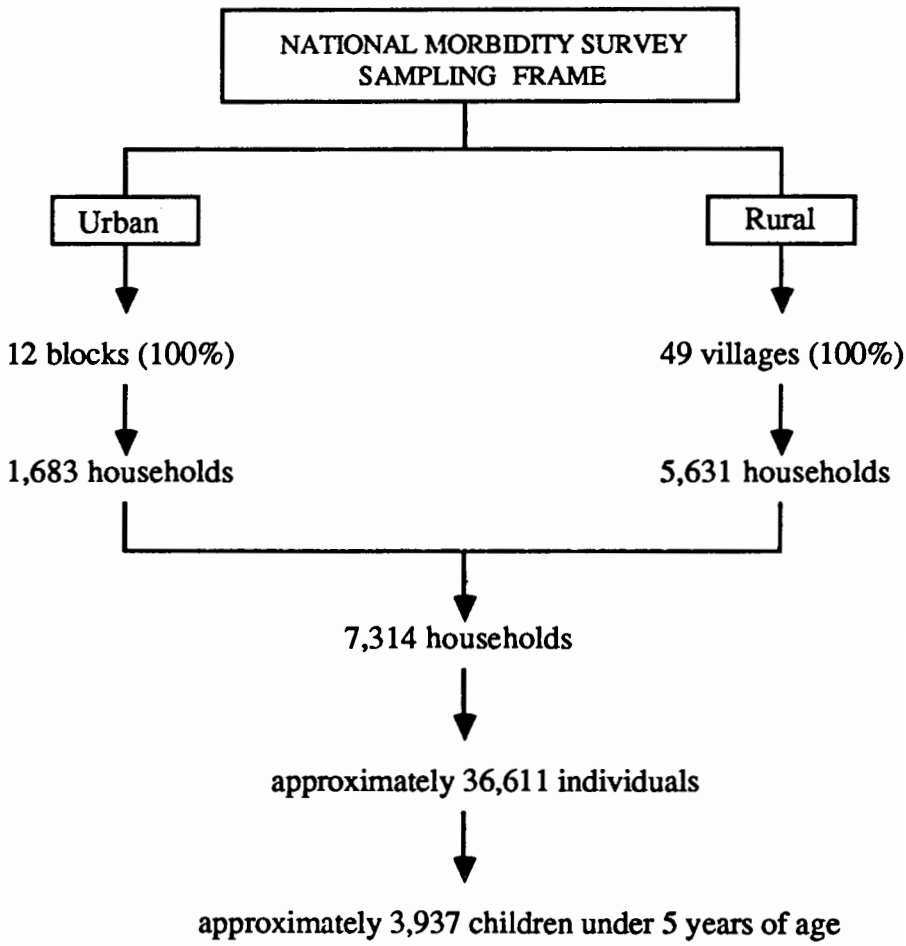
2. NON-MUNICIPAL AREAS (RURAL)

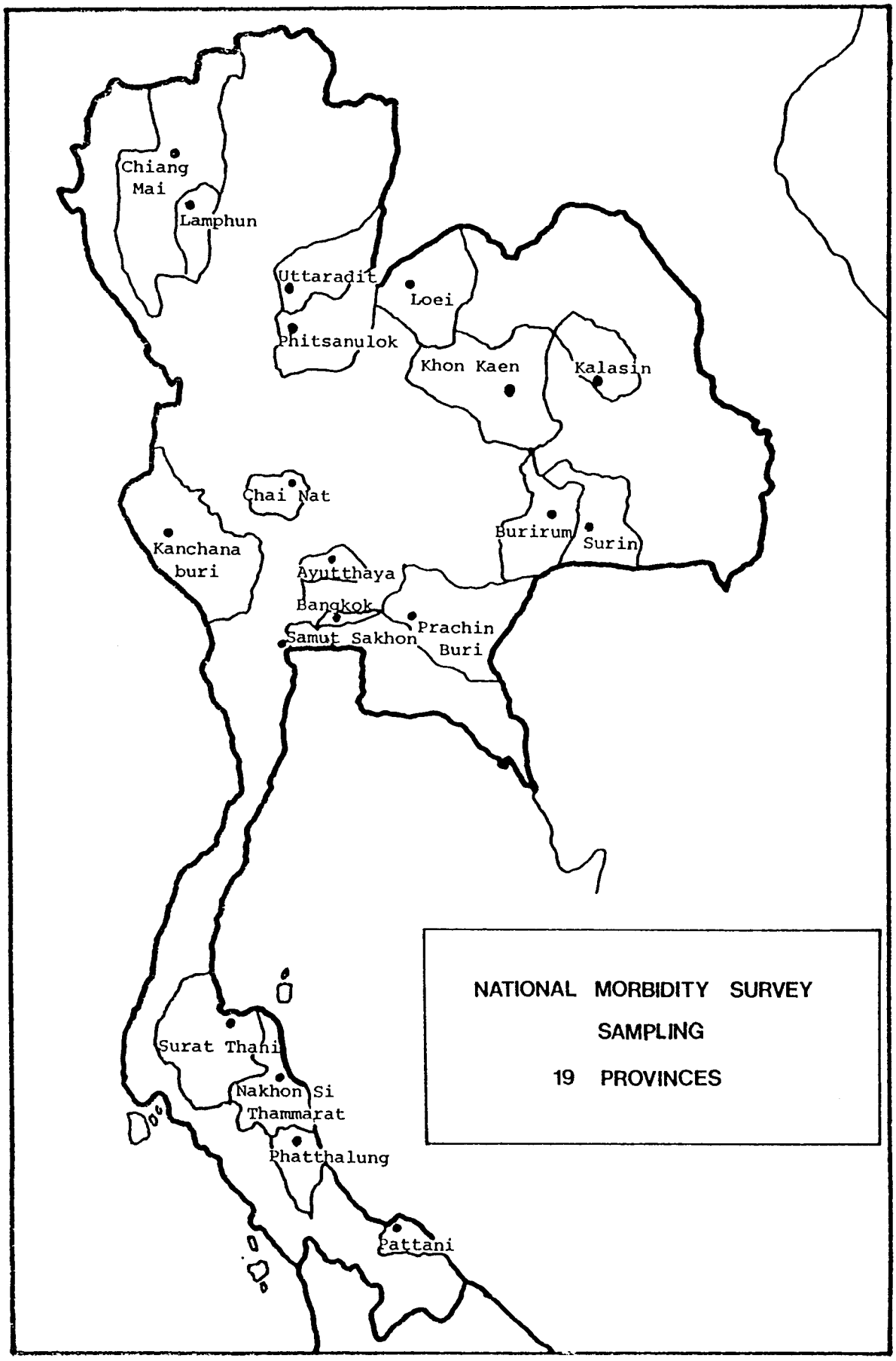
A number of sample villages was selected systematically from each sample provinces, totalling 49 sample villages.

The overall sampling fraction for non-municipal areas in each region is presented as the following.

North	1/1,000
Northeast	1/1,500
Central (excluding Bangkok Metropolis)	1/1,200
South	1/800

All households and all persons residing in each sample block/village were interviewed on characteristics of morbidity using the questionnaires prepared by the research investigators.


NATIONAL MORBIDITY SURVEY
SAMPLING FRAME
Urban
Rural
12 blocks (100%)
49 villages (100%)
1,683 households
5,631 households
7,314 households
approximately 36,611 individuals
approximately 3,937 children under 5 years of age


Chiang Mai
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Surin
Ayutthaya
Bangkok
Prachin Buri
Samut Sakhon
Surat Thani
Nakhon Si Thammarat
Phatthalung
Pattani
NATIONAL MORBIDITY SURVEY
SAMPLING
19 PROVINCES

2.2.2 MORTALITY SURVEY (ON CAUSES OF DEATH)

The Survey of Population Change (SPC III) was planned and undertaken by the National Statistical Office (NSO). The survey design was dual record system attempting to measure the correct levels of current vital rates and to estimate the degree of underregistration of births, deaths and the likes. It was planned to collect data during 1984 through 1986 on quarterly basis. The total of nine rounds was scheduled, with the plan to enumerate the baseline households and population at the first round and re-enumeration of the second year on the fifth round. The rest would be the four-month recall of vital events occurring in the sample households. The date of each round of the SPC is illustrated on the following table.

The MMD survey had integrated the questionnaire enquiry on "cause of death" to each death occurred in the sample household on the third round of the SPC survey onwards.

Survey of Population Change Schedule

Round	1 July 1984	- Base population I
	2 October 1984	
	3 January 1985	*
	4 April 1985	*
	5 July 1985	- Base population II
	6 October 1985	*
	7 January 1986	*
	8 April 1986	*
	9 July 1986	*

* cause of death enquiry was attached to the SPC questionnaire.

SAMPLING DESIGN OF THE SPC (1984-86)

The sample design used was stratified two-stage sampling with groups of province in the same region as stratum. The whole country was divided into four regions according to geographical setting,and Bangkok Metropolis is treated as an additional region. Hence there were altogether five strata. Municipal areas of districts are primary sampling units, and block (in municipal areas) or village (in non-municipal areas) were secondary sampling units. Every household in the sample blocks and sample villages were enumerated.

a) Selection of primary sampling units

Each stratum was classified into two types of administrative areas, namely, municipal areas and non municipal areas. The municipal areas of districts from each type (or sub-strata) were selected at random using proportional to size of the population (PPS). By this procedure 88 municipal areas and district were then selected into the sample.

b) Selection of secondary sampling units

In each sample municipal areas or sample districts, a number of blocks or villages were drawn systematically in order that the sample blocks or sample villages were self- weighted within there sub-strata. The ultimate sample was consisted of 245 blocks and 255 villages, totalling 500 blocks and villages.

It was assumed that the average number of households per one block or one village was 130. Thus, the sample covered 31,850 households in the municipal areas and 33,150 households in the non-municipal areas. The total of 65,000 households and 300,000 persons constituted the base population of the survey in 52 provinces throughout the whole kingdom.

The sampling fraction for municipal and non-municipal areas in each region was as follows:

Region	Sampling Fraction	
	Municipal Area (urban)	Non-municipal Area (rural)
Bangkok Metropolis	$\frac{1}{90}$	-
Central	$\frac{1}{20}$	$\frac{1}{200}$
North	$\frac{1}{20}$	$\frac{1}{200}$
Northeast	$\frac{1}{20}$	$\frac{1}{300}$
South	$\frac{1}{20}$	$\frac{1}{150}$

2.3 CORE VARIABLES

The core variables for morbidity and mortality surveys were listed and adopted during the First Inter- Country Meeting in Kuala Lumpur, January 1985.

2.3.1 MORTALITY

Individual Level

: Age at death (all ages), date at death
: Sex
: Education
: Working status
: Occupation
: Marital status
: Age of mother (for deaths of under five)
: Parity (for deaths of under five)
: Cause of death
: Attendant at death

2.3.2 MORBIDITY

a) Individual Level

: Household head (household enumeration)
: Place of residence : urban/rural, regional
: Age
: Sex
: Education
: Working status
: Occupation
: Marital status
: Religion
: Risk factors - smoking, drinking, drug used
: Illness, disease or diagnosis - Duration
- Absence from school
: Injury
- Source of health service
: Hospitalization
: Disability
: Disease specific question on
- Diarrheal (Child under 5)
- Accidents
- Malignancy (50^{+})
- Heart disease (50^{+})
- Disease associated with pregnancy and child birth

: Health utilization
: Personal illness control behavior

b) Household Level : Household environmental contamination
: air; food/water/fingers;
skin/soil/inanimate objects; insect or vectors
: Household members and density
: Household ownerships of durable goods
: Dietary intake and distribution in the family

c) Community Level : Accessibility and availability of health services
: Ecological setting and environmental health condition
: Existing health and nutrition program
: Cultural factors affecting food and protein intake
: Socio-economic determinant ie., poverty index

THE QUESTIONNARIES

During February to early March, 1985, the interview schedules for the morbidity survey were designed. The core variables were included in our set of questionnaires.

There were two levels of questionnaires used in the morbidity survey; household interview schedule and village profile schedule. The village profile was used for rural samples only and was not applicable to sample areas in Bangkok Metropolis and other municipal areas.

The household interview schedule composes of three parts, Part I was household information and listing of household members. Part II contained questions on illness enquiry and Part III emphasized on KAP and incidence of diarrheal diseases among children under five.

In March 1985, the pretest of questionnaires was conducted at Buriram Province. The revision of questionnaires was then made.

For the mortality survey, questions on causes of deaths were added to the SPC interview schedules. The pretest was conducted in late February, 1985 at Nakornpathom Province.

The lay-out of cause of death enquiry is presented in the appendix.

2.4 FIELD DATA COLLECTION

2.4.1 RECRUITMENT AND TRAINING OF FIELD PERSONNEL

During the months of March and early April 1985, the recruitment of the field staffs was undertaken. The interview team was composed of one supervisor, one assistant supervisor and 5-6 interviewers, which made up of 10 interview teams. Most of the interviewers were selected from the graduates of the School of Public Health, Mahidol University and the rest were from the Faculty of Nursing, Prince of Songkhla University. The supervisors were senior instructors from the IPSR and the School of Public Health of Mahidol University. The assistant supervisors were recruited from the graduate students whose majors were population and social research, and biostatistics.

The training of interviewers and supervisors was conducted by MMD research investigators in April 1985. The sessions included in-class and field practices which lasted 5 days. It was emphasized on specific research studies and interview techniques.

2.4.2 FIELD SURVEY

The field work for morbidity survey was carried out during April 15 to the end of May, 1985. Two interview teams were assigned to each region including Bangkok Metropolis. It resulted in obtaining the complete questionnaires from 7,314 households (instead of 6,958 households), 3,080 households with children under five and covering 36,611 population.

The field survey for mortality cooperated with the SPC Round 4 was undertaken during the month of April 1985. The recall of deaths occurred during the passing 6 months was made. The enquiry for causes of death was carried out. The 627 death enquiries were returned to the MMD research staff in July 1985. Additional data from round 6th and round 7th of the SPC were obtained by April 1986.

The research investigators have made spot supervision to the sample areas during the data collection period.

Time Table for National Morbidity Survey, 1985

Sample Province	Survey Date	Survey Team
North		
Chiengmai	21 April - 7 May	Team 1
Lumphun	8 May - 20 May	
Uttaradit	21 April - 1 May	Team 2
Pittsanulok	2 May - 16 May	
Central		
Kanchanaburi	18 April - 1 May	Team 3
Samutsakhon	2 May - 13 May	
Prachinburi	19 April - 30 May	
Ayutthaya	1 May - 7 May	Team 4
Chainat	8 May - 12 May	
Northeast		
Khonkhen	19 April - 2 May	Team 5
Leoi	3 May - 19 May	
Surin	19 April - 30 April	
Buriram	1 May - 4 May	Team 6
Kalasin	6 May - 19 May	
South		
Pattani	23 April - 29 April	
Phatthalung	30 April - 3 May	Team 7+8
Suratthani	4 May - 12 May	
N. Sithammarat	12 May - 20 May	
Bangkok Metropolis	22 April - 20 May	Team 9+10

2.5 DATA PROCESSING

2.5.1 DATA MANIPULATION

The editing of the Morbidity questionnaires was undertaken at the central office during June and July, 1985 with close supervision by senior research staffs. The coding of the

questionnaires took about three months. The data entry took about one month. Machine editing and filing of data were undertaken in two months afterwards.

The majority of the coders was recruited from our interviewers, the rest was also university graduates who have had experienced in field survey. The MMD research investigators and research associates gave them training on coding instruction and a checking on consistency among items in the questionnaires.

The data entry was performed on to the computer tapes during the months of October-November 1985.

For mortality data, the diagnosis of cause of death by medical investigator finished in August then the data were returned to the NSO for coding. The data entry of the first set of the data from SPC round 3 and 4 was carried out in November 1985. The similar procedure was undertaken on data from SPC round 6 and 7 and the data entry was finished in August 1986.

2.5.2 PLAN FOR DATA ANALYSIS

A meeting of Advisory Committee was called for in late August 1985 and several meetings among MMD research teams thereafter. The scheme for data analysis was agreed upon in the Second Inter-Country meeting held in Chiengmai, May 1986.

With the use of main-frame computer at Mahidol University Computer Centre (MUCC) made possible the analysis and tabulation of these huge data set. However it took 3 months to edit, verify and merging the files of morbidity data.

2.5.3 WEIGHTING

The morbidity survey data collected from households and individuals whose residences are in both urban (municipal) and rural (non-municipal) areas. The proportions of urban to rural residents of the samples are not proportional to size of the urban to rural population enumerated by the National Census. In order to adjust for obtaining the national estimates to correspond with the real proportion, a weighting procedure was applied to the samples. The details on the weighting procedure are presented in the Appendix 8 of the report.

2.6 TIME TABLE OF MMD PROJECT

May 1984 - June 1987

May	1984	- Pre-implementation Workshop (Tacloban, Philippines)
May	1984 - Nov.1984	- Finalization of Country Project Design
May	1984 - Nov.1984	- Secondary Data Analysis
Jan.	1985	- First Inter-country Meeting on Methodology and the Results of the Secondary Data Analysis (Malaysia)
Nov.	1984 - Jan.1985	- Finalization of Study Instruments
Feb.	1985 - Mar. 1985	- Listing and Sampling
April	1985-May 1985	- Fieldwork of Morbidity Survey
Oct.	1984- Jan.1986	- Data collection for Mortality Survey
June	1985-	- Preparation of Coding Manuals
July	1985- Dec.1985	- Data preparation and filing
May	1986	- Second Inter-country Technical Meeting on Data Analysis (Thailand)
July	1986- Nov.1986	- Data Analysis and Report Writing
Dec.	1986	- Third Inter-country Meeting for Presentation of Country Report (Singapore)
June	1987	- National Seminar
May	1987	- Final Inter-country Meeting (Bangkok)
June	1987- Dec.1987	- Finalization of the Country Report

2.7 LIMITATION OF SURVEY DATA

Both the morbidity and mortality surveys are national sample and main method of data collection adopted is household interview by structured questionnaires. Theoretically, sampling errors are one source of variations on the estimation of study variables. Non-sampling errors such as measurement techniques, interviewing procedures and bias in memory recall of the respondents, will encounter the estimates especially on the complicate subject as incidence or prevalence of illness and the cause of death. However, household or personal interview survey is one method widely adopted in the national health surveys in other developed and developing countries for their advantages in cost- related and relatively high degree of precision when quality control procedures are applied at all stages of data collection and data processing. The medical examination and laboratory investigation, though more accurate, are too expensive and time consuming to be adopted in our present study, hence the interview surveys seem to be of most appropriate for our financial and technical situations. The quality control procedure of each stage

of research process will be discussed under the topic of specific data collected and the quality of data.

Apart from the above technical limitation, there is also a problem on time frame involved in the survey. The morbidity survey was taken place in April and May, the summertime of the Country. The disease incidences appearing in the survey result might not be similar through- out the year because of the well-known seasonal variations in the disease patterns. As well, the number of episode of illness is assumed to be evenly distributed over the 12 months as similar to the months of the survey. However, the previous surveys related to health or morbidity status in Thailand were under-taken in the dry season(March, April and May) so, the data on the trends or disease patterns could be compared since the seasons are already controlled.

With references to time conflict between the two surveys, the MMD survey and the SPC, though the number of deaths collected for this study covers 12 months period but some specific months are duplicated, ie., the data were collected during the months of October, November and December 1984 and 1985. No records are available during the months of April, May and June, so the diseases causing death on this season might not be reflected in the data on cause of death. However, the NSO has integrated the cause of death enquiry to their SPC schedules for Round VIII and IX, these data are now available but the analysis has not yet performed. It is a hope to obtain the results of the all- year-round causes of death in the near future, whereby the comparison and validation of the data could be made.

CHAPTER III
MORBIDITY

3.1 DESCRIPTION OF DATA COLLECTED

Afore mentioned under Chapter 2, there are two levels of questionnaires used in the National Morbidity Survey : the household interview schedule and the village profile schedule. Specification of each schedule will be described under this section.

Household Interview Schedule

This schedule is composed of 3 parts aimed at collection of information pertaining the core variables and addition variables required by the MMD research team.

1. Form A : Household questionnaires.

Form A, the household questionnaires, is composed of 3 parts : enumeration of household members and their characteristics, household information and hospitalization of the members of household.

The respondent refers to the wife of the head of the household or any housewife who will give the best information especially on the illnesses of the household members.

The listing of household members in **Form A 1** of the schedule consist of individual characteristics, ie., name, relationship to the household head, sex, age, education (for persons 7 years of age and older), occupation (for persons aged 11 and over), marital status (for persons aged 13 and over), religion, residential status, presence of illness episode at time of the survey and / or taken ill during one month prior to the survey date, alcoholic beverage consumption, cigarrette smoking, habitual drug use, and raw food eating habit.

Form A 2 on household information, the interviewers were instructed to observe as well as to interview the respondent and record the information on type of the house, area of the house (estimated in square meters), presence of animal pens or stables under the house, ownership, sources of drinking water, sewage and garbages treatment, using of latrine, using of electricity, possession of durable household appliance, ownership of lands, agricultural land tenure, number of livestock and type of animal raising, sprayed DDT in the house, use of insecticide, herbicide and lastly participation of any member of the household in existing social organizations. These information are pertaining socio-economic, sanitary environment and social participation of the household members.

Form A 3 Hospitalization, the question is asked about the household members who were admitted to any hospitals during the past one year prior to the survey date, including delivery. The diagnosis of the illness told by the hospital authority will be recorded on the schedule as well as the duration of illness, location and name of the hospital. In case that the name of disease was not known, the signs and symptoms would be recorded and the diagnosis of that disease will be validated by the medical researcher.

2. Form B : Morbidity of individual person.

The instruction is given to the interviewer to inquire about illnesses occurring among household members within one month prior to the survey date regardless of whether he or she was recovered or not at the survey date.

Illness (according to definition of National Statistical Office in 1981) refers to departure from a state of physical or mental well-being which is determined by

1. Examination and diagnosis by a medical doctor or,

2. A person who is classified as ill must have one of the following characteristics:-
    a. being unable to perform his usual daily routine for at least 24 hours.
    b. being unable to take food normally for at least 24 hours.
    c. required rest on bed for at least 24 hours.

Ordinary headache or running nose regardless of whether treatment is required or not, which do not cause that person to discontinue his usual daily routine for at least 24 hours is not considered to be an illness.

Respondent refers to a person who was recorded in Form A as a sick person during one month prior to the date of interview whether his/her illness episodes were cured or not, including a person who has been ill during one month or more than one month prior to the survey but his/her illness episodes still remain at the date of interview.

Interviewer should ask those who were ill one by one, for child or eldely person who could not answer the questions, interviewer should obtain the information from housewife. Interviewer must use one morbidity form for each illness whether the sick person would have been ill more than one time in a month or not. Interviewer should ask and record the information in each form.

Illness is classified into 4 categories in the layout of interview schedule in order to facilitate the interviewer in asking and recording the symptoms of illness episode or the name of the diseases.

1) Acute condition refers to acute episode of illness, these diseases classified as acute; or the duration of illness, counting from the first onset until recovery or death would not be more than 3 months, such as, influenza, cold, haemorrhagic fever.

2) Chronic condition refers to chronic episode of illness listed in card 1 or the symptoms of disease occur continuously in a period of more than three months.

CARD I
National Morbidity Survey
Check List of Chronic Conditions

- Asthma
- Tuberculosis
- Chronic bronchitis
- Repeated attacks of sinus
- Rheumatic fever
- Hardening of the arteries
- High blood pressure
- Heart trouble
- Stroke
- Trouble with varicose veins
- Hemorrhoids or piles
- Hay fever
- Tumor, cyst or growth
- Chronic gallbladder or liver trouble
- Stomach ulcer
- Any other chronic stomach trouble
- Kidney stones or chronic kidnes trouble
- Mental Illness
- Arthritis or rheumatism
- Diabetes
- Thyroid trouble or goitre
- Any allergy
- Epilepsy
- Chronic nervous trouble
- Cancer
- Chronic skin trouble
- Hernia
- Prostate trouble

3) Accident and Injury

An injured person refers to a person who has received physical harm or damage from external causes to the point of being in need of medical attention such as an injury caused by a motor vehicle traffic accident, falling from the tree, firing, fighting or violence etc.

4) Disability

Refers to a person who has unusual physical condition at any parts of body until can not work as any others or cannot work completely such as deafness or serious trouble hearing with one or both ears, missing fingers, hand or arm toes, foot, or leg including unusual brain. However, disability may be caused by illness, accident or heredity. Selected impairments are listed in Card II.

CARD II
National Morbidity Survey
Check List of Selected Impairments

DOES ANYONE IN THE FAMILY HAVE ANY OF THESE CONDITIONS?

- Deafness or serious trouble hearing with one or both ears.
- Serious trouble seeing with one or both eyes even when wearing glasses
- Cleft palate
- Any speech defect
- Missing fingers, hand, or arm-toes, foot, or leg
- Palsy
- Paralysis of any kind
- Repeated trouble with back or spine
- Club foot
- Permanent stiffness or any deformity of the foot, leg, fingers, arm or back
- Any condition present since birth

Severity of illness

By means of personal interview, severity of illness will be told oftenly by the sick person's perception or in case of young children, by mother's or caretaker's perception which is subjective to the respondent. One way of our attempt is to standardize objectively the degree of severity by ability or activities of the ill-person during the episode. CARD III is used for this purpose. Four specific groups of ill-person are referring to, a) workers and other persons except housewife and children, b) housewife, c) children from 7 through 16 years old, and d) children aged 6 and under 6. To equalize the limiting of activities to degree of severity : 1 is severe, 2 is moderate, 3 is slightly moderate and 4 is mild.

Specific card will be handed to referent ill-person or respondent if they are literate and have them check the item by themselves, read each item to the respondent otherwise.

In summary, for each illness record, the information obtained are : age, sex, diagnosis of illness (or symptoms) duration of illness, degree of severity, type of treatment and its outcome. For accident or injury, type of external cause is additional item, and also the cause of impairments.

CARD III
National Morbidity Survey

A. For : Workers and other persons except Housewives and children

1. Not able to work at all.
2. Able to work but limited in amount of work or kind of work.
3. Able to work but limited in kind or amount of other activities.
4. Not limited in any of these ways.

B. For : Housewife

1. Not able to keep house at all.
2. Able to keep house but limited in amount or kind of housework.
3. Able to keep house but limited in kind or amount of other activities.
4. Not limited in any of these way.

C. For : Children from 7 through 16 years old

1. Not able to go to school at all.
2. Able to go to school but limited to certain types of school or in school attendance.
3. Able to go to school but limited in other activities.
4. Not limited in any of these ways.

D. For : Children aged 6 and under 6

1. Not able to take part at all in ordinary play with other children.
2. Able to play with other children but limited in amount or kind of play.
3. Able to play but limited in kind or amount of other activities.
4. Not limited in any of these ways.

3. Form C : Diarrhea in children 5 years of age and under.

The respondent refers to a mother whose children aged 5 years and under or a person who takes care of those children.

The sample of the children of 5 years of age and under is listed under part 1 of form A, the household enumeration. Only the household with these specified samples will be interviewed.

The interview schedule is consisted of 5 parts; part 1 knowledge and attitudes towards diarrheal diseases, part II practice when taken ill with diarrhea, and part III practices towards prevention against and factors related to occurrances of diarrhea, part IV feeding practices for children under 2 years of age and part V prevalence of diarrheal diseases in the family.

The reference period for inquiring about the episode of diarrhea is similar to illness condition in Form B, one month prior to the survey date.

The difinition of diarrheal disease is to have loose stool or watery stool at least 3 times per day.

The Village Profile

The assistant supervisor of the interviewing team is responsible for the village profile study by observation and interview of village key informants, ie., village headman, school teacher or members of village development committee. Information on 49 villages in the rural sample was collected.

Basic information of village climate, geography, demography, transportation facilities, roads, education facilities, water supply, irrigation structure, market, social and political activities, are constituted in the first part of the village profile. Existing of health infrastructure, availability of health services, specific health development programs or activities, and personal health care practice are of major portion as the determinants of illness patterns and utilization of health services among the villagers. The final part of the schedule is consisted of data on community development and community participation status.

3.2 QUALITY OF MORBIDITY DATA

The quality control procedures have been adopted prudently at all stages of research process, especially, the data collection and data analysis. On the part of data collection besides the careful lay-out of the interview schedule and the operationalized definitions given to each significant variables under study, the field staff are selectively recruited for this purpose.

The interviewers, the key persons of this interview survey, were selected from the newly graduates from School of Public Health of Mahidol University for their knowledgable skills in the disease-oriented field survey. Apart from the courses taken in class, in the final academic year; the students have to participate in the six week field training in the rural areas of

the country and health survey is a part of data collection for planning the module health programmes. They are composed of 85% of all interviewers undertaken the tasks.

The rest of the interviewers were the senior nursing students from the Faculty of Nursing, Prince of Songkhla University. A disease-oriented skills among these interviewers were substantive, eventhough they had been exposed less to the field survey. This group was assigned to collect the data from the sample villages in the Southern part where the lauguage of the minority group is still a problem. Moreover the supervisors assigned to the southern team were instructor from Faculty of Nursing who graduated her master's in population and social research and another one instructor from Faculty of Science who graduated her master in biostatistics. Besides, they were working in the Regional University in the South, Songkhla Province. The assistant supervisor of these teams were selected from researchers who could speak Yawi language and being Islam.

Supervisors, as mentioned earlier, were researchers and instructors who had long experiences in the field survey. The assistant supervisors were postgraduate students majoring in population and social research, their classroom knowledge and field experiences gained from previous field study assurred their skills.

For the part of data analysis, by grouping the diseases or symptoms into 17 broad categories similarly what have been undertaken by routine report of the outpatients of the Ministry of Public Health, helps in avoiding miscategorization of specific symtoms and thus increase in degree of precision of diagnosis of illness. However, about 13 percent of total ill-persons was classified as ill-defined symptoms.

From Table 3.15, rates per 1,000 population classified as "ill-defined symptoms" by place of residence are demonstrated. For the whole kingdom, the rate of this particular category is 21.6 per 1,000. In urban areas and Bangkok, this corresponding rates were less than 10 per 1000. For the rural and all regions except the South, ill- defined symptoms constituted only 20 per 1,000 population. It was apparent that this magnitude of ill-defined symptoms does not disturb the proportion of known cases when place of residence was taken into consideration.

The rates of ill-defined symptoms were relatively high among the ill-persons aged 50 and over (Table 3.16), for the severe cases (Table 3.17), or even those who had seen medical doctors for treatment of their illnesses (44.5/1,000). The interpretation might be that this group tended to be eldery rural persons who had taken ill during the past one month, they could not remember the name of the diseases or the symptoms eventhough they had gone to seek treatment at the hospitals. This evidence was unavoidable in this method of data collection on morbidity.

Apart from the diagnosis of cause of illness, the incidence of illness and/or injury, prevalence of hospitalization and episodes of illness are all in the level of high confidence that salient findings can be drawn succintly.

3.3 CHARACTERISTICS OF THE SAMPLE

The sample of the study population which was drawn through out the four regions of the Kingdom and the capital city, with a proportion of 29.2, 22.1, 17.3, 14.4 and 16.9 percent in the Northeast, Central, North, South and the city of Bangkok, respectively, indicated a large share of rural population of 77 percent, paralleling with a general pattern of Thailand population. Socio-economic characteristics of the study population emphasizing mainly on education and occupation, offered the general understandings that the population generally finished Grade 4, approximately about 56 percent. A few portion of less than 6 percent were in a university education. A majority of them were farmers, with 44.6 percent of an agricultural occupation. This pattern was however different, as expected, between rural and urban population.

Urban samples were characterized by higher educational obtainments. About 17 percent graduated university level. In contrast, the rural consisted of only 2 percent in this highest educational level. Specifically, the proportion of educational obtainment of urban sample were in a category of higher education, with a percentage of 21.8, 15.1 and 37.7 in Secondary, Grade 5-7 and Grade 1-4, respectively. For the rural about 61.6, 19.3 and 6.4 were in Grade 1-4, Grade 5-7 and Secondary levels, respectively. In respect to occupation achievements, urban residents were proportionately engaged in clerical, sales, laborers and students with a percent of 29.6, 21.2 and 20.9. A pattern of occupational characteristics in rural areas seemed to follow the pattern of the country. That was, a majority of rural residents approximately 58 percent, were farmers. Less than 12 percent were laborers, housewife and clerical workers. It was worth mentioning about other two social characters of Thais that the samples were generally buddhists and married. A place of regular stay was rather a permanent residence. (Table 3.1).

Demographic characteristics of the study population including age and sex, were presented in Table 3.2 and 3.3 lean toward a large proportion of working middle age persons (about 50-62 percent) falling in ages between 15-49 years. Less than 7 percent were in ages of 60 years and over and smaller than 10 percent are children aged between 0-4 year. No significance of sex differences was found (Table 3.2)

Table 3.1

Percentage distribution of the sample population by region and residence, 1985

Regions	Urban	Rural	Total
North	7.8	20.2	17.3
Northeast	3.9	36.8	29.2
Central	9.7	25.8	22.1
South	5.1	17.2	14.4
Bangkok	73.5	-	16.9
All regions	100	100	100
No.of sample population	8,426	28,185	36,611
	(23%)	(77%)	(100%)

Table 3.2

Percentage distribution of the sample population by age and sex and by residence, 1985

Age group (years)	Urban		Rural	
	Male	Female	Male	Female
Under 1	1.8	1.9	2.2	1.9
1-4	7.4	6.8	8.7	7.7
5-9	9.2	8.5	11.8	11.2
10-14	11.0	8.3	13.6	13.1
15-24	21.2	25.3	20.5	20.8
25-49	36.5	36.7	29.4	29.7
50-59	6.5	6.7	7.0	7.6
60-79	5.8	4.9	6.1	6.8
80 and over	0.6	0.9	0.7	1.2
All ages	100	100	100	100
No. of sample population	3,989	4,435	13,973	14,198

Table 3.3

Socio-demographic characteristics of the sample population by residence, 1985

Regions	Urban	Rural	Total
Marital status			
Single	41.9	34.1	36.0
Married	49.7	56.9	55.1
Widowed	4.6	6.3	5.9
Divorced or separated	3.8	2.7	3.0
Total	100	100	100
No. of sample aged 13 and over	6,498	19,864	26,362
Religion			
Buddhist	98.7	93.1	94.4
Islam	0.8	6.9	5.5
Catholic	0.5	0.05	0.2
Total	100	100	100
No. of sample population	8,426	28,184	36,610
Residential status			
Permanent	98.4	97.5	97.7
Temparary	1.6	2.5	2.3
Total	100	100	100
No. of sample population	8,426	28,183	36,609
Education attainment			
No education	8.1	10.4	9.9
Grade 1-4	37.7	61.6	56.0
Grade 5-7	15.1	19.3	18.4
Secondary	21.8	6.4	10.0
University and higher	17.2	2.2	5.7
Total	100	100	100
No.of sample aged 6 and over*	7,239	23,563	30,802
Occupation			
Professional & administrative workers	2.5	1.0	1.4
Clerical & sales	29.6	5.2	11.1
Service workers	2.2	0.5	0.9
Farmers	2.2	58.0	44.6
Transport workers	1.6	0.4	0.7
Labores	21.2	11.1	13.5
Students	20.9	12.8	14.7
Housewife/looking for jobs	19.4	10.6	12.7
Others	0.3	0.4	0.3
Total	100	100	100
No.of sample aged 11 and over**	6,710	21,281	27,891

Note : * aged 6 is compulsory for formal education.
** aged 11 and over is considered a person engaged in labour force

3.4 ESTIMATES OF MORBIDITY LEVEL

Regarding level of illness and disease patterns among Thai population, very limited reliable sources of data are available. Further, even it is available, the access to the data is not always possible.

Several surveys conducted in Thailand since 1970 (Ministry of Public Health 1970; AFPH 1979, 1981) reveal of the pattern of illness prevailed. However, the level of illness estimates connot be compared due to differences in methodology and definition of illness adopted by each surveys. The Health and Welfare Survey conducted in 1981 by the National Statistical Office seemed to draw a reasonable and reliable estimates. The definition used was precise and the sample scheme was national representation, eventhough the results from this survey is also cross-sectional in nature.

The level of morbidity among Thai population were estimated for 1981 from this survey, along with disease patterns as described in the Report on the Secondary Data Analysis of this project (IPSR 1985). Despite of similar difinitions of illness used in the 1981 survey and our MMD survey, the questionnaires were somewhat different. Thus, the trends of illness, injury or hospitalization will not be discussed here. The results showed under this section were solely derived from the present national morbidity survey conducted in 1985.

Illness, injury and hospitalization were defined as the followings.

Illness refers to a departure from a state of physical or mental well-being which in the case that (1) examination and diagnosis of illness is made by a medical doctor or (2) a person is unable to perform his usual daily rountine for at least 24 hours or (3) a person is unable to take food normally for at least 24 hours, or (4) a person requires bed rest for at least 24 hours. Ordinary headache or chronic cold regardless of whether treatment is required or not, which do not cause that person to discontinue his usual daily routine for at least 24 hours is not considered to be an illness.

Injury refers to a person who has received physical harm or damage from external causes to the point of being in need of medical attention, such as an injury caused by an accident, fighting or violence.

Hospitalization refers to a person who is admitted to be an in-patient in a hospital.

Disability refers to a person who has unusual physical condition at any parts of body, until cannot work as any others or cannot work completely.

3.4.1 LEVELS OF ILLNESS, INJURY AND HOSPITALIZATION

During one month prior to the survey period, April- May, 1985, there were 5,638 persons who reported that they were taken ill or injured. This figure constituted a rate of ill-persons at 15.4 percent. 1,878 persons were admitted to the hospitals during one past year or 5.13 percent of 36,611 population in the sample.

Table 3.4 reveals of the episodes of those who taken-ill within the reference period classified by place of residence. As hypothesized, the illness rate for urban population was lower than that of the rural ones.

Table 3.4

Percentage distribution of the sample population reported of taken ill during April-May 1985, by episode of illness and by place of residence

No. of episode	Urban	Rural	Whole Kingdom
0 (not ill)	86.6	83.9	84.5
1	11.8	14.5	13.9
2	1.4	1.5	1.5
3 and over	0.2	0.1	0.2
Total	100.0	100.0	100.0
Percent of ill persons (Within one month period)	13.4	16.1	15.4
No. of sample population	8,426	28,185	36,611

Level of morbidity in this study was indicated by two separate indices, prevalence rate and the episode of illness per person per year. Morbidity is classified into two groups namely illness or injury and hospitalization. Disability is however presented separately.

3.4.1.1 PREVALENCE OF ILLNESS OR INJURY AND HOSPITALIZATION

With reference to the period prevalence rate as shown on Table 3.5, the prevalence of illness or injury occurring within one month in Thailand was 156.4 persons per 1,000 population. Rural population had the higher rate of 161.5 than that of urban population with 134.2. Regional differences among five regions, indicated the highest rate in the Central, as being 184.7 per 1,000 and the lowest recorded in Bangkok metropolis, with a rate of 139.5 per

1,000. Hospitalization measure provides interesting finding indicating a difference of morbidity pattern. The Northern region and Bangkok metropolis were found the highest rates of hospitalization, with the level of about 65 per 1,000 population and the rest had smaller morbidity prevalenc.

Table 3.5

Prevalence of illness or injury* and hospitalization per 1,000 population by region, 1985**

Region	Illness of Injury	Hospitalization
Whole Kingdom	156.4	51.3
Urban	134.2	64.1
Rural	161.5	48.3
North	154.2	65.6
Northeast	144.6	38.9
Central[1]	184.7	59.9
South	151.6	34.1
Bangkok Metropolis	139.5	65.2

1 excluding Bangkok Metropolis
* Illness or injury occurring with in one month prior to the survey date.
** Hospitalization occurring with-in one year prior to the survey date.

It is worth noting here about the fact on supply creates demand, availability and accessibility to health care services of people residing in Bangkok and Northern region were tended to do so with respect to higher hospitalzation rates.

Age-sex differences in illness or injury, as expected, follow a general understanding. Males had a low rate of illness prevalence in both urban and rural places. The prevalence of illness or injury for males was about 152 while the rate of female was about 160. A risk of illness or injury was more prevailing among younger and older population with the rate of around 200 per 1,000 for children aged below 5 and also for persons with ages of 50 years and over (Table 3.6). These patterns difference were also found in the other regions of the Kingdom (Table 3.7).

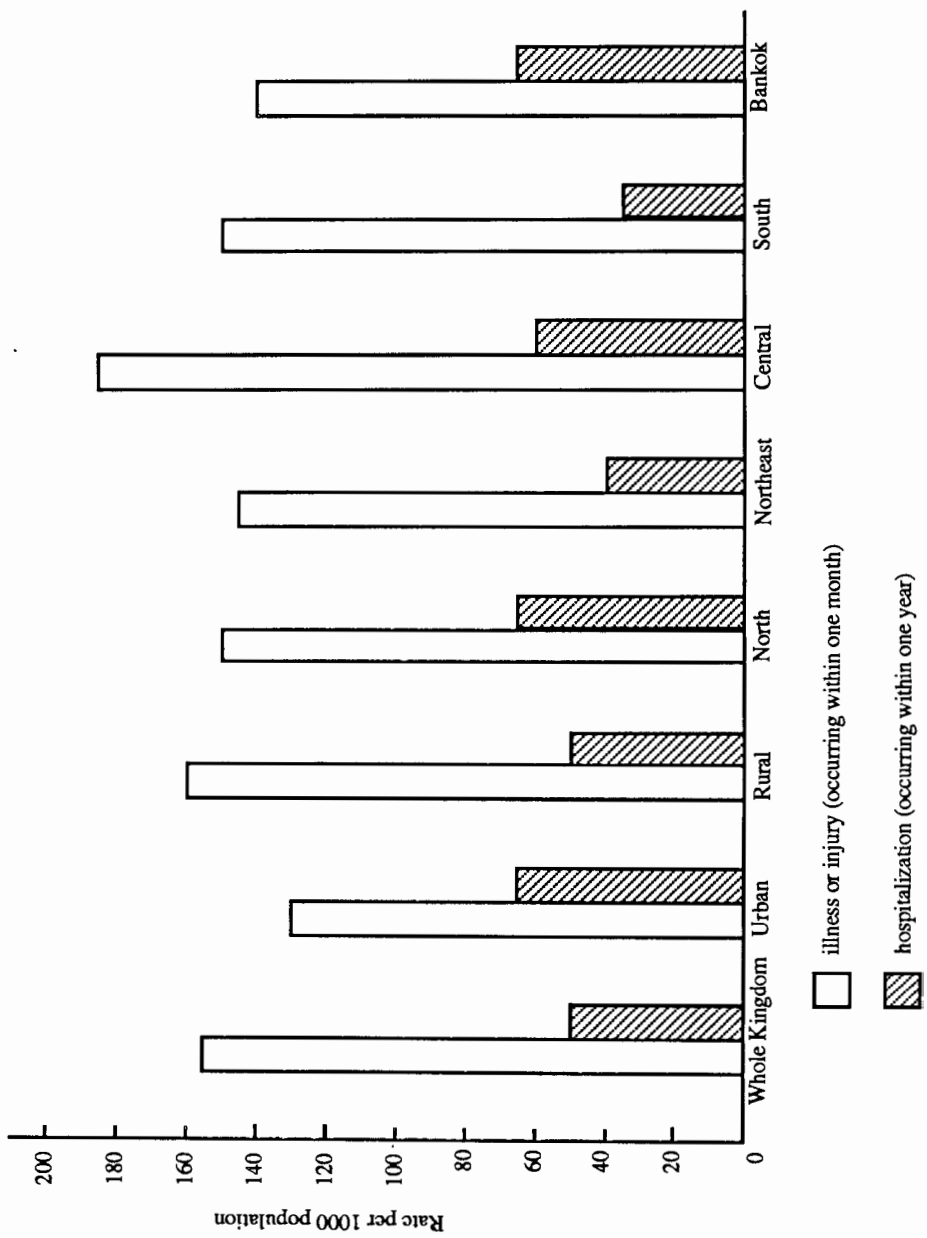


Figure 1 Prevalence of illness of injury and hospitalization by place of residence and region, Thailand, 1985

Table 3.6

Prevalence of illness of injury occurring within one month prior to the survey date per 1,000 population by age and sex and by place of usual residence, 1985

Age group (years)	Urban		Rural		Whole Kingdom	
	Male	Female	Male	Femal	Male	Female
under 1	274	181	271	293	272	272
1-4	189	135	295	258	278	236
5-9	128	90	141	139	139	132
10-14	84	96	92	85	91	86
15-24	68	76	81	88	79	85
25-49	119	148	151	173	144	167
50-59	188	314	211	259	206	269
60 and over	250	326	324	290	311	296
All ages	126	142	158	165	152	160
Age standardized rates	126	137	156	161	151	156

Note : 1. rate per 1,000 persons, rounded to nearest 1 per 1,000
2. 1980 Population Census is adopted as base population for age-standardized rates.

It could be seen clearer from Figure 2 the urban male seemed to have lowest level of illness or injury for all ages whereas the corresponding prevalence for urban females was highest when they reached age 40 years and over. Rural male and female prevalence rates appeared to be almost similar up to 40 years of age and prevailed lower rural male rates thereafter.

3.4.1.2 EPISODE OF ILLNESS AND HOSPITALIZATION

Regarding the episode of illness, Table 3.8 presents the findings for the Whole Kingdom, regions and urban- rural residence. On the average, Thai population had 2.1 episodes of illness and 0.05 episodes of hospital admission per person per year.

Table 3.7

Prevalence of illness or injury occurring within one month prior to the survey date per 1,000 population by age and sex and region of usual residence, 1985

Age Group (years)	Bangkok		Central		North		Northeast		South	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
under 1	267	177	279	264	224	275	308	287	257	321
1 - 4	212	144	284	236	262	228	303	266	274	253
5 - 9	126	97	155	165	127	98	136	131	141	138
10 - 14	75	91	113	118	90	75	88	62	78	102
15 - 24	58	90	123	100	67	88	60	69	90	77
25 - 49	126	160	166	201	172	167	150	149	119	153
50 - 59	214	351	230	273	187	268	217	254	166	221
60 and over	262	302	334	375	305	289	331	227	280	272
All ages	128	150	179	190	147	161	149	141	145	158
Age standardized prevalence rates	129	145	175	181	150	150	152	143	140	152

Note : the rate is rounded to the nearest 1 per 1,000

Table 3.7

Prevalence of illness or injury occurring within one month prior to the survey date per 1,000 population by age and sex and region of usual residence, 1985

Age Group (years)	Bangkok		Central		North		Northeast		South	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
under 1	267	177	279	264	224	275	308	287	257	321
1 - 4	212	144	284	236	262	228	303	266	274	253
5 - 9	126	97	155	165	127	98	136	131	141	138
10 - 14	75	91	113	118	90	75	88	62	78	102
15 - 24	58	90	123	100	67	88	60	69	90	77
25 - 49	126	160	166	201	172	167	150	149	119	153
50 - 59	214	351	230	273	187	268	217	254	166	221
60 and over	262	302	334	375	305	289	331	227	280	272
All ages	128	150	179	190	147	161	149	141	145	158
Age standardized prevalence rates	129	145	175	181	150	150	152	143	140	152

Note : the rate is rounded to the nearest 1 per 1,000

Table 3.8

Episodes of illness and hospitalization per person per year by region of usual redidence, 1985

	Illness	Hospitalization
Whole Kingdom	2.1	0.05
Urban	1.8	0.06
Rural	2.2	0.05
North	2.0	0.07
Northeast	1.9	0.04
Central[1]	2.6	0.06
South	2.0	0.04
Bangkok Metropolis	1.9	0.07

[1] excluding Bangkok Metropolis

The Central region was still in the highest episode averaging around 2.6 per person per year. The lowest was in Bangkok accounting for only 1.9 per person per year. Hospitalization of persons per year was also revealing a similar pattern found in the previous studies. The highest rates were found in the Central and the North. The capital, Bangkok, in contrast, had the lowest hospitalization rate.

Age-sex differences in episodes of illness or injury follow a similar condition in the pattern of prevalence of morbidity previously discussed. That is, males had lower episode of illness, averaging 1.7-2.0 per person per year and females had higher episodes, with an average around 2.0-2.2 per person. This pattern was also true for all age groups. Age difference in the illness is however greatly existing. Episodes of illness or injury among population aged 0-4 and 50 years and over fall in the same level but these levels were actually lowest among population aged between 15-24 years (Table 3.9).

Eventhough, similar episodes of hospital admission were observed among male and female of all ages for the Whole Kingdom, urban female seemed to have highest episode of hospitalization as indicated in Table 3.10 as 8 per 100 persons per year while these corresponding measures for others were around 5 and 6.

For infant of under one year of age, it is worth to note that the hospitalization were highest when compared with other age groups. Furthermore, higher admission rates were found among urban infants, twice the rates of the rural infants.

Table 3.9

Episodes of illness or injury per person per year by age and sex and by place of usual residence, 1985

Age group (years)	Urban		Rural		Whole Kingdom	
	Male	Female	Male	Femal	Male	Female
0	4.6	2.3	3.5	4.4	3.7	4.0
1-4	2.5	1.8	4.2	3.6	3.9	3.2
5-9	1.5	1.1	1.9	1.8	1.8	1.6
10-14	1.1	1.3	1.2	1.1	1.2	1.1
15-24	0.8	1.0	1.0	1.1	1.0	1.1
25-49	1.6	2.1	2.0	2.3	1.9	2.2
50-59	2.6	4.5	2.8	3.6	2.8	3.8
60 and over	3.4	5.3	4.3	4.0	4.2	4.2
All ages	1.7	2.0	2.1	2.2	2.0	2.2
Age standardized hospitalization rates	1.7	1.9	2.1	2.2	2.0	2.1

Regional differences in the episode of illness or injury presented in Table 3.11, reveal a similar direction. Bangkok residents had the lowest episodes of illness and the highest were found in the Central. Males than females had lower episode of illness, and younger and older population had higher episodes of the illness than those in middle age groups.

With respect to episode of hospitalization, female tended to have more episode than male for most regions, especially Bangkok (Table 3.12). Highest episodes were seen in the North and lowest in the South. However, the age differences were in similar patterns in every region of the country, for both sex. An exceptionally high rate of hospital admission was found among females aged 20-49 years in Bangkok. This measure of illness somewhat reflects an accessibility to the services and perception of health service utilization rather than their severity of illness alone, in spite of the facts that there were lower hospital admission rates among infants in the Northeast and the South whereas the prevalence of illness were higher in these two regions among the corresponding population (Table 3.7).

Table 3.10

Episods of hospitalization per 100 persons per year by age and sex and by place of residence, 1985

Age group (years)	Urban		Rural		Whole Kingdom	
	Male	Female	Male	Femal	Male	Female
0	79	75	35	29	42	38
1-4	6	6	5	4	5	4
5-9	4	3	3	3	3	3
10-14	3	3	2	2	2	2
15-24	2	7	3	5	4	8
25-49	3	9	4	7	5	6
50-59	6	8	5	5	5	6
60 and over	6	6	9	6	8	6
All ages	5	8	5	5	5	6
Age standardized episodes of hospitalization	6	8	5	6	5	6

Note : Average number of episodes is rounded to the nearest 1 per 100 persons.

3.4.1.3 OCCUPATIONAL DIFFERENCES IN PREVALENCE OF ILLNESS.

As predicted, among males and females of each occupational group, there is an inverse relationship between labour force participation and morbidity. Persons in labour force are likely to have lower prevalence rate of illness or injury than those not in labour force (except the students). As shown on Table 3.13, a higher occupational categories, namely professional and administration tend to have lower morbidity prevalence. A lower occupation had higher morbidity. No significant different patterns were observed between males and females. The prevalence rate of illness or injury for males and females in agricultural occupations was 150 and 154, respectively. For those in professional and administrative workers, the rate were only 117 for males and 139 for females.

Evidently, the highest prevalence rates were appeared among the no occupation group, 10 years and over, being over 200 per 1,000 population for both males and females. Moreover, the rates were increasing with age and reached the levels of over 300 per 1,000 for the 60 and over age group.

Table 3.11

Episodes of illness or injury per person per year by age and sex and by place of residence, 1985

Age Group (years)	Whole Kingdom		Bangkok		Central		North		Northeast		South	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
under 1	3.7	4.0	4.6	2.3	3.7	4.2	3.2	4.5	4.0	4.1	3.1	4.5
1 - 4	3.9	3.2	2.9	1.9	4.0	3.2	3.5	3.0	4.1	3.6	3.9	3.8
5 - 9	1.8	1.6	1.5	1.2	2.2	2.1	1.5	1.2	1.8	1.6	1.8	1.8
10 - 14	1.2	1.1	1.0	1.2	1.6	1.6	1.1	1.0	1.2	0.8	1.0	1.3
15 - 24	1.0	1.1	0.6	1.2	1.6	1.3	0.9	1.1	0.7	0.9	1.2	1.1
25 - 49	1.9	2.2	1.7	2.2	2.2	2.8	1.8	2.2	1.9	1.9	1.6	1.2
50 - 59	2.8	3.8	3.1	5.0	3.3	4.3	2.5	3.5	2.7	3.5	2.2	2.5
60 and over	4.2	4.2	3.7	4.7	4.5	5.7	4.1	4.2	4.3	3.0	3.8	3.3
All ages	2.0	2.2	1.7	2.1	2.4	2.7	1.9	2.1	2.0	1.9	1.9	2.0
Age standardized episodes of illness or injury	2.0	2.1	1.7	2.0	2.4	2.5	1.8	2.0	2.0	1.9	1.9	1.8

Table 3.12

Episodes of hospitalization per 100 persons per year by age and sex and by region, 1985

Age Group (years)	Bangkok		Central		North		Northeast		South	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
under 1	82	77	50	50	76	61	19	16	15	14
1 - 4	6	6	5	5	7	3	6	5	3	1
5 - 9	3	3	4	5	4	2	4	3	2	2
10 - 14	2	3	2	2	4	3	2	2	2	1
15 - 24	2	7	2	4	4	7	2	4	2	4
25 - 49	2	10	5	5	4	9	5	5	3	6
50 - 59	6	9	5	4	5	6	5	4	4	4
60 and over	4	6	11	4	8	6	11	4	5	4
All ages	4	9	4	4	6	7	4	4	3	4
Age standardized episodes of hospitalization	5	9	5	5	6	7	5	4	3	4

Table 3.13

Prevalence of illness or injury occurring within one month prior to the survey date per 1,000 population aged 10 and over by age and sex and by occupation, 1985

Age Group (years)	Professional and Administrative Workers		Clerical and Sale Workers		Service Workers		Farmers		Transport Workers		Laborers and Related Workers		Students		No Occupation	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
10 - 14	-	-	111	111	-	250	88	61	-	-	21	87	85	78	149	188
15 - 24	-	158	54	96	56	94	86	-	125	-	73	91	56	77	127	95
25 - 49	108	139	113	149	230	173	150	173	125	200	137	154	133	77	344	187
50 - 59	182	333	138	226	59	400	220	241	222	-	180	245	-	-	450	387
60 and over	364	-	272	295	-	**	294	266	-	-	274	345	-	-	356	306
10 and over	117	139	121	158	173	156	150	154	129	111	123	137	75	77	274	228
Age standardized rates	82	125	109	143	108	205	136	114	102	75	111	145	82	66	255	184

Note : Rate per 1,000 population is rounded to the nearest 1 per 1,000
*no occupation includes housewife and those looking for jobs.

**small sample

With this perspective, it is speculated that persons working in well-established organizations like those in professional, administrative and service jobs benefit from the system of social welfare, fringe benefit and health facilities.

3.4.1.4 EDUCATIONAL DIFFERENCES IN PREVALENCE OF ILLNESS.

The overview of the data shown in Table 3.14, the following generalization emerges. There is a strong inverse relationship between illness and level of educational attainment in Thailand. Among those with no education, elementary and secondary education morbidity differentials are largest for no education and elementary schooling. In this group of three educational levels, prevalence of illness or injury ranged from approximately 90 per 1,000 for those in grade 5 to 7 of schooling to the level of 260 per 1,000 population with no education. People in highest education level, the university, had lowest prevalence rate of illness. Male rates were somewhat lower than female rates, especially among the higher educational levels.

In particular, educational differences in prevalence of morbidity observed from this section further lean support to the patterns of occupation.

The different occupational and education patterns in level of morbidity discovered by this survey were consistent to the findings from previous studies stated in the Report on the Secondary Data Analysis (IPSR 1985).

In conclusion, from the socio-economic perspectives, improvement in the conditions of life of certain broad occupational groups may help result in morbidity reduction. Two groups that could benefit from this improvement are service workers, and labourers. Moreover, improved socio-economic conditions associated with education may have a marked effect on illness and injury. The variations in morbidity by region and urban-rural place can serve as indicators of specific areas in which more investigation should be conducted and also serve as areas in which experimental activities can be launched to effect reductions in illness incidence and prevalence.

3.5 ILLNESS PATTERNS

3.5.1 URBAN/RURAL AND REGIONAL DIFFERENCES

A changing patterns on leading causes of death from infectious diseases to non-infectious or degenerative diseases have been portrayed among Thai population for the last decade, however, regarding morbidity or illness patterns it is apparent that acute infectious diseases are prevailing as major causes. The findings demonstrate the top leading illness is acute

Table 3.14

Prevalence of illness or injury occurring within one month prior to the survey per 1,000 population aged 10 and over by age and sex and by education, 1985

Age group (years)	No Education		Grade 1 -4		Grade 5 - 7		Secondary		University	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
10 - 14	482	279	86	80	90	86	41	44	-	-
15 - 24	213	209	87	89	81	75	60	83	54	65
25 - 49	259	190	151	171	123	148	104	169	90	108
50 - 59	171	269	221	269	152	333	167	227	71	167
60 and over	294	305	332	289	250	143	350	286	143	*
10 and over	261	259	153	158	93	89	86	106	76	88
Age standardized rates	280	226	139	147	116	130	103	135	66	109

* Small sample

infectious and parasitic diseases at the rate of 41.5 per 1,000 population. Next are the diseases of respiratory system which includes acute respiratory infection (30.4/1000), the diseases of digestive system (20.9/1000), and diseases of circulatory system (10.5/1000). The groups of diseases which have similar incidence rates at 5 per 1000 population are the diseases of eye and ear, diseases of skin and subcutanous tissue, diseases of urinary tracts and sex organs, endocrine disturbance, and accidents/injury (Table 3.15).

It is obvious to note that place of residence, urban or rural, is one of the determinants of specific disease occurrence. The incidence of acute infectious and parasitic diseases, diseases of eye and ear, diseases of urinary tract and sex organ and accidents are higher among rural population than urban population especially the acute infectious diseases. Environmental sanitation, personnal hygiene and coverage of the health services are factors affecting these rural-urban differences. Hence this is an indication for the continuously strengthening of health services delivery system in rural areas of the country in order to reduce the incidence of such diseases.

On the contrary some diseases, eventhough not large in magnitudes, are higher among urban population than the rural. For instance, endocrine disturbance, benign tumors, diseases of nervous system and the diseases of circulatory systems, the incidences among urban population are almost twice as much of the rural rates. These diseases are oftenly occurred in a more developed and modernized society.

When consideration is made on the regional differences of disease occurrance, acute infectious and parasitic diseases are found to be highest rate (53.2/1000) in the Northeast. Besides, the diseases of respiratory system and digestive system are also on the leading list.

The South is having similar disease patterns as the Northeast with an inclusion of diseases of eye and ear, and diseases of skin and subcutaneous tissues, apart from the three major groups of illness mentioned above.

Disease patterns of the North and the Central are relatively the same for the first four leading illness, the differences are the incidence rates. Moreover, the fifth rank for the Central is accidents and injury and the rate is highest among regions (9.8/1000). Endocrine disturbance, ie., goitre, diabetes mellitus, is appeared as the fifth rank for the North.

Bangkok the most developed area of the country reveals the ranking of leading disease groups as follows : diseases of respiratory system, acute infectious diseases, diseases of circulatory system, diseases of digestive system and endocrine disturbance. It should be noted here that the incidence rate for endocrine disturbance in Bangkok is high at almost the same as the Northern rate.

Table 3.15

Diagnosis of illness per 1,000 population by place of residence, 1985

Diagnosis	Whole Kingdom	Urban	Rural	Bangkok	Central	North	Northeast	South
1. Infectious diseases	41.5	24.9	45.3	25.5	46.5	30.9	53.2	35.8
2. Malignancy (all types)	0.7	0.6	0.7	0.6	1.1	0.5	0.6	0.6
3. Benign growth	1.1	1.1	0.5	1.4	0.6	0.3	-	1.3
4. Endocrine disturbance	5.0	10.3	3.8	9.2	4.6	10.6	2.1	1.9
5. Diseases of blood & blood forming organ	0.8	0.8	0.8	1.1	0.6	1.0	0.5	1.0
6. Mental disorder	0.6	0.2	0.7	0.2	0.2	0.3	0.8	1.5
7. Diseases of nervous system	3.8	6.0	3.3	6.9	7.8	3.3	1.7	3.6
8. Diseases of eye and ear	5.5	3.0	6.1	3.2	8.9	6.8	4.4	2.8
9. Diseases of circulatory system	10.5	18.5	8.7	20.7	12.5	17.2	4.3	3.2
10. Diseases of respiratory system	30.4	29.4	30.6	30.7	38.1	27.4	21.4	39.9
11. Diseases of digestive system	20.9	20.4	21.0	20.7	29.2	18.6	19.6	13.6
12. Diseases of urinary tract & sex	5.1	3.0	5.6	2.6	5.7	5.2	6.0	4.4
13. Abortion	0.1	0.1	0.1	0.2	-	0.3	0.1	-
14. Diseases due to obstetric causes	0.1	-	0.1	-	0.1	0.2	-	-
15. Diseases of skin & subcutaneous tissue	5.9	5.1	6.1	6.1	5.6	4.3	6.8	6.2
16. Diseases of muscle & skeleton & conn. tissue	3.4	5.5	3.0	6.5	3.8	3.9	2.1	2.3
17. Accidents/injuries/violence	4.9	4.4	5.0	3.7	9.8	5.0	2.4	3.6
18. Ill-defined sysmtoms	21.6	9.4	23.7	9.7	21.6	21.0	20.6	30.1
Total sample population	36,611	8,426	28,185	6,194	8,090	6,344	10,699	5,284

Note : incidence during one month prior to the survey date (April - May 1985)

3.5.2 AGE-SEX DIFFERENCES

Table 3.16 shows the illness rates per 1,000 population by age and sex. Acute infectious and parasitic diseases affect every age group of the population, the highest rate is observed among the under five, 176.4/1,000 for males and 144.6/1,000 for females. Incidences of this disease group are lowest for females in 15-49 age group and have tendency to increase with age, to around 40/1,000 among males of 60 and over. The rates for females are lower than male rates for all age group.

Malignant neoplasms (all forms) are apparent as cause of illness for all age groups at low magnitude, except males 5-14 years of age. The highest incidence of 5.8 per 1,000 is observed among aging males, 60 years and over.

Benign growth reveals in the population aged 5 and over and the incidence is very low when compare to other diseases.

Endocrine disturbance affects also every age group, tends to increase with age. It should be pointed out that the incidence rates for females are two to three times of the male rates from age group 15 and over. The highest rate is observed among females of 60 and over at 25.7 per 1,000.

Diseases of circulatory system appear to have similar age-sex patterns as endocrine disturbance. The incidence rates for females age 15-49 years are 14/1,000 as compared to 4.8/1,000 for males under the corresponding age. The highest incidence is found among females aged 50-59 years at the rate of 53.3/1,000. Similar incidences are obtained for both sexes 60 years and over.

Diseases of respiratory system follow the patterns of acute infectious diseases, but with lower incidence rates among the under five (about 85/1,000).

The diseases of digestive system are also having the incidence rates increase with age up to aged 50-59 and then decreased. Female rates are observed to be relatively lower than male rates and the highest rate at 54.4/1,000 is seen among males aged 50-59 years.

Females of reproductive age, 15-49, are not surprising to have the incidence rate for the diseases of urinary tract and sex organs twice the male rate at the same age. The incidence increases among 50-59 age group, more males are affected at the highest rate of 12/1,000.

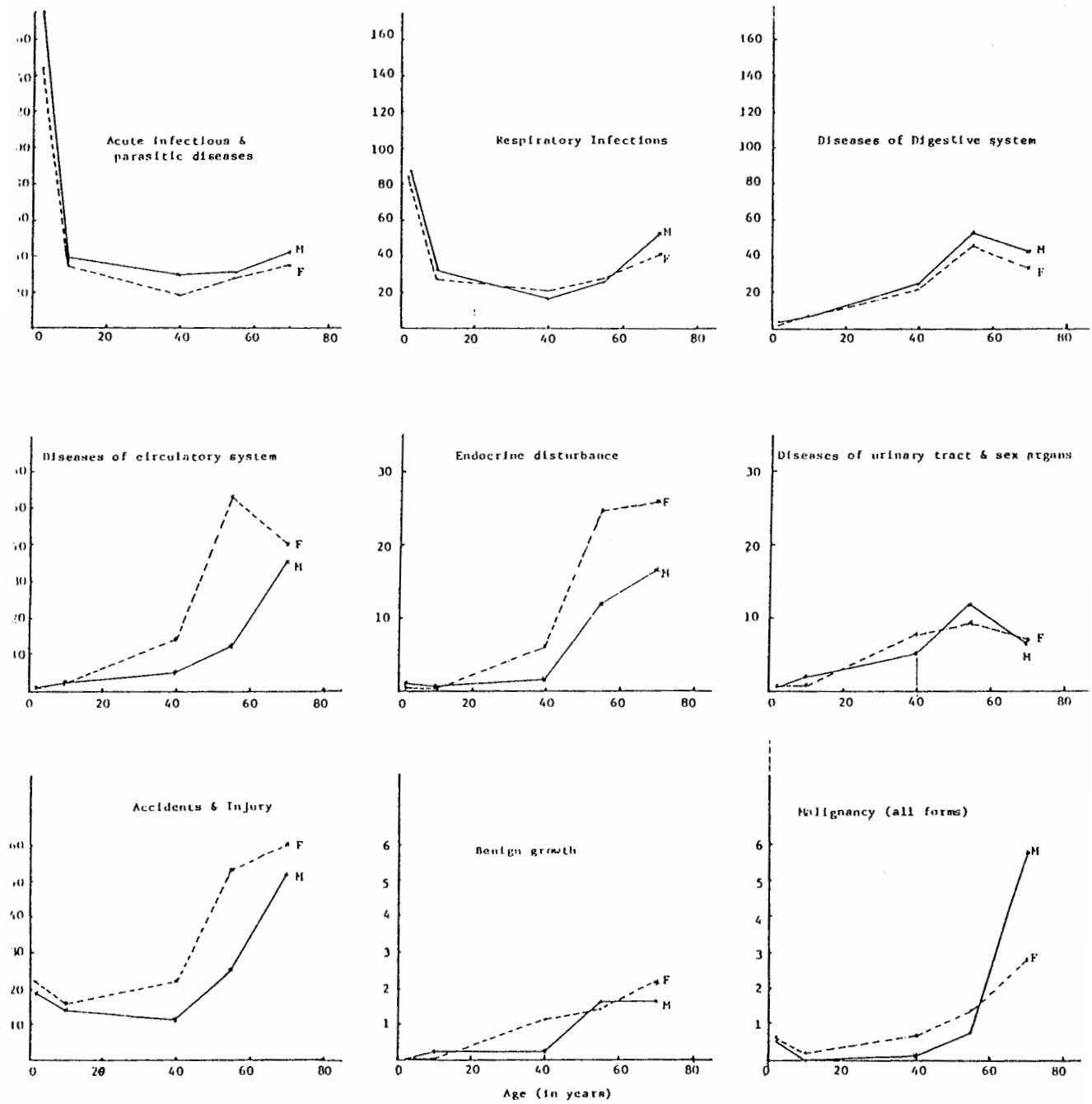
Incidences of accidents and injury are higher among females than males at all age-groups, but the degree of severity is not demonstrated or coupled with these incidence rates. So it must be cautious before the interpretation is made on this respect. However, the age groups

Table 3.16

Diagnosis of illness per 1,000 population by age group and sex, 1985

Diagnosis	Age Group (years)									
	0 - 4		5 - 14		15 - 49		50 - 59		60+	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
1. Infectious diseases	176.4	144.6	38.2	35.7	28.0	19.8	30.4	27.4	40.4	35.7
2. Malignancy (all tyes)	0.5	0.6	-	0.2	0.1	0.7	0.8	1.4	5.8	2.8
3. Benign growth	-	-	0.2	-	0.2	1.1	1.6	1.4	1.6	2.1
4. Endocrine disturbance	1.0	0.6	0.4	0.2	1.4	5.8	12.0	24.5	16.5	25.7
5. Diseases of blood & blood forming organ	0.5	0.6	0.4	-	0.3	1.4	-	2.9	1.6	0.7
6. Mental disorder	-	-	-	0.2	1.2	0.5	-	1.4	1.6	-
7. Diseases of nervous system	1.0	1.7	1.1	1.4	3.6	4.7	7.2	10.1	8.2	8.6
8. Diseases of eye and ear	4.7	6.3	3.6	2.8	3.9	4.9	8.0	11.5	11.5	21.4
9. Diseases of circulatory system	0.5	0.6	1.8	1.9	4.8	14.0	12.0	53.3	35.5	39.9
10. Diseases of respiratory system	86.4	83.7	32.1	27.9	17.0	20.4	24.8	25.9	51.1	40.7
11. Diseases of digestive system	4.2	1.7	7.0	7.3	25.1	23.1	54.4	46.8	42.9	33.5
12. Diseases of urinary tract & sex organs	0.5	0.6	1.8	0.9	4.9	8.1	12.0	9.4	6.6	7.1
13. Abortion	-	-	-	-	-	0.4	-	-	-	-
14. Diseases due to obstetric causes	-	-	-	-	-	0.1	-	-	-	-
15. Diseases of skin & Subcutaneous tissue	7.9	9.1	6.8	5.7	4.6	5.1	6.4	7.2	8.2	8.6
16. Diseases of muscles & skeleton & conn. tissue	-	0.6	-	0.7	2.0	2.8	8.8	15.8	14.0	19.3
17. Accidents/injuries/violence	4.2	5.1	3.9	2.8	7.1	3.2	4.8	7.2	9.1	5.7
18. Ill - defined symptoms	19.0	22.2	14.1	15.8	10.9	21.6	24.8	52.6	51.9	59.9
Total sample population	1,899	1,756	4,398	4,233	9,239	9,823	1,250	1,388	1,213	1,402

Figure 3 Incidence rates per 1000 population on selected diagnosis.



of high risk for accidents and injury could be located from these findings, which are 50-59, and 60 and over especially females.

Diseases of eye and ear, and the skin prevail at the low rates among the under five and the age group 5-14. These are usually occur at the mild or moderate degree of severity.

3.5.3 DEGREE OF SEVERITY OF THE ILLNESS

There are small number of cases (less than 30) for malignant neoplasm, benign tumor, diseases of blood, mental disorder, abortion and obstetric causes. Thus, it will not be classified by its severity on this table, but one could see details on Table 3.17.

Causes of illness classified by degree of severity, 1985

Causes of illness	Degree of severity		
	mild	moderate	severe
Acute infectious & parasitic dis.	46.6	26.6	26.8 (1508)
Dis. of respiratory system	48.3	32.7	19.1 (1113)
Dis. of digestive system	29.0	35.1	35.9 (766)
Dis. of circulatory system	30.8	43.8	25.4 (386)
Dis.of skin and subcutaneous tiss	13.8	19.4	66.8 (217)
Dis. of eye and ear	11.5	28.5	60.0 (200)
Dis. of urinary tract and sex organs	35.7	43.8	20.5 (185)
Endocrine disturbance	14.1	42.4	43.5 (184)
Dis. of nervous system	38.7	40.7	20.7 (150)
Dis. of muscles and skeleton	26.2	53.2	20.6 (126)
Accidents and injury	42.9	29.4	27.7 (177)

Considering the degree of severity of the 11 groups of disease in the above table, it is apparent to be reasonable for instance, the diseases of eye and ear and diseases of skin by their nature will not get the patient to have bed rest or hospitalized. The majority of patients will still carry on their routine activities then they will be classified as mild or moderate degree of severity. All others are depending on their certain symptoms which would limit routine physical activities or not.

Table 3.17

Percentage distribution of ill-persons by diagnosis and by severity, 1985

Diagnosis	Degree of severity			
	Mild	Moderate	Severe	Total
1) Infectious diseases	46.6	26.6	26.8	100(1508)
2) Malignancy, benign growth	23.4	31.9	44.7	100 (47)
3) Endocrine disturbance	14.1	42.4	43.5	100 (184)
4) Diseases of blood & blood forming organ	32.1	50.0	17.9	100 (28)
5) Mental disorder	42.9	42.9	14.3	100 (21)
6) Diseases of nervous system	38.7	40.7	20.7	100 (150)
7) Diseases of eye and ear	11.5	28.5	60.0	100 (200)
8) Diseases of circulatory system	30.8	43.8	25.4	100 (386)
9) Diseases of respiratory system	48.3	32.7	19.1	100(1113)
10) Diseases of digestive System	29.0	35.1	35.9	100 (766)
11) Diseases of urinary tract & sex organs	35.7	43.8	20.5	100 (185)
12) Abortion	100.0	-	-	100 (4)
13) Diseases due to obstetric causes	100.0	-	-	100 (2)
14) Diseases of skin & subcutaneous tissue	13.8	19.4	66.8	100 (217)
15) Diseases of muscles & skeleton & conn. tissue	26.2	53.2	20.6	100 (126)
16) Accidents/injuries/violence	42.9	29.4	27.7	100 (177)
17) Ill - defined symptoms	53.9	31.3	14.9	100 (767)

The groups of disease which contain more than 40 percent of severe illness during the reference period are acute infectious and parasitic infections, diseases of respiratory system and accidents. While the majority of disease of circulatory system, diseases of urinary tract and sex organ, diseases of nervous system and diseases of muscles and skeleton fall under moderate classification.

3.6 HEALTH BEHAVIORS AND PRACTICES

Two aspects of health behaviors will be covered under this section; utilization of health services and consumption or exposure to selected health risk factors. Patterns of utilization of health services when one is taken ill are of interest as they indicate an accessibility and acceptability of proper health facilities as well as the degree of over or under. Utilization of exististing health interventions. It is one of the determinants of health status of the population. On the other hands, an exposure to some health hazards, i.e., eating raw food, drinking alcoholic beverages, cigarette smoking, could be associated to occurrence of specific diseases or aggrevating the course of the diseases, that preventive measurer could be implemented to the identification and reduction of these risk factors.

3.6.1 UTILIZATION OF THE HEALTH SERVICES

Availability of health services is an important factor determining accessibitily and utilization of health facilities. Accessibility can be viewed in three aspects namely geographic, socio-economic, and psychologic. Geographic accessibility refers to the factors related to location of the service outlets, travelling time, terrain condition, and means of transportation. In socio-economic sense it refers to monetary expenditures involved in service cost, travelling cost, time spent for travelling and waiting to get treatment. Education attainment and knowledge in selection of appropriate health intervention and facilities are also included under this category. Psychological accessibility refers to an individual's perception and satisfaction with the services. Moreover goodwill of specific health service outlets indicates as well the dimension of psychological accessibility.

Under this section, the individual's behavior in seeking health care when they are taken ill will be taken into consideration exclusively from different dimensions of accessibility and availability of health facilities mentioned above. The determinant factors used here are illness patterns, severity of illness, education, occupation and place of residence of the ill-persons.

The source of services are classified into 4 broad categories namely a) the health service outlets manned by physician, b) health service outlets manned by non- physician, c) traditional healers and d) self treated or buy drug from the drug stores. The health service outlets manned by

physician refer to hospital, governmental or private owned; private or polyclinic; Public health centre in Bangkok Metropolis; mobile medical unit; specificislized hospital; or treated at home by physician. Rural health centre, health post, health volunteer, and malaria centre are included in category of health service outlet manned by non-physician. Traditional healers refer to herb medicine, traditional birth attendent, and quacks.

3.6.1.1 PLACE OF USUAL RESIDENCE

It could be observed from Table 3.18 that over half of the ill-persons[1] seek treatment from physician at different types of health outlet which is about 10 percent increased from the findings obtained in 1981.[2] The next source is drug store or self treatment which constitutes 29 percent of total ill-persons, out of this proportion only 5 percent said they let it go without any treatment.

If we were to use the proportion of ill persons treated themselves by modern health practitioner as an indicator for development, it is worth to note that Thailand has been substantially improved in health service development since the rate of treating by traditional healers has decreased to 2.5 percent only. As far as the traditional treatment is concerned, two types of explanation can be made. One is those who reside in the remote areas where modern health services are not easily accessible, they tend to have traditional treatment, or rather they still believe in traditional healer. Another reason is possible that the ill persons have sought modern treatment at the first or second time but the disease is incurable, like malignant nesplasm, they have to find other alternatives, the traditional healers, for remedy and delay death.

In urban areas, where the sources of modern medicine and facilities are densely prevailing and of large varieties, the findings reveal that more ill-persons go to see physicians than the rural ill persons. Urban population oftenly are better off in socio-economic perspectives, coupled with the more accessibility to modern health services reflect the phenomena as demonstrated.

3.6.1.2 EDUCATION DIFFERENTIALS

It is as expected, education attainment is having impact upon type of health service utilization. Higher the level of education, the more the rate of seeking service from physician. On the contrary, the rate of traditional treatment of ill person is inversely related to educational

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[1] illpersons refer to those taken ill within one month prior to the survey and exclude those hospitalized cases.

[2] The AFPH survey, 1981.

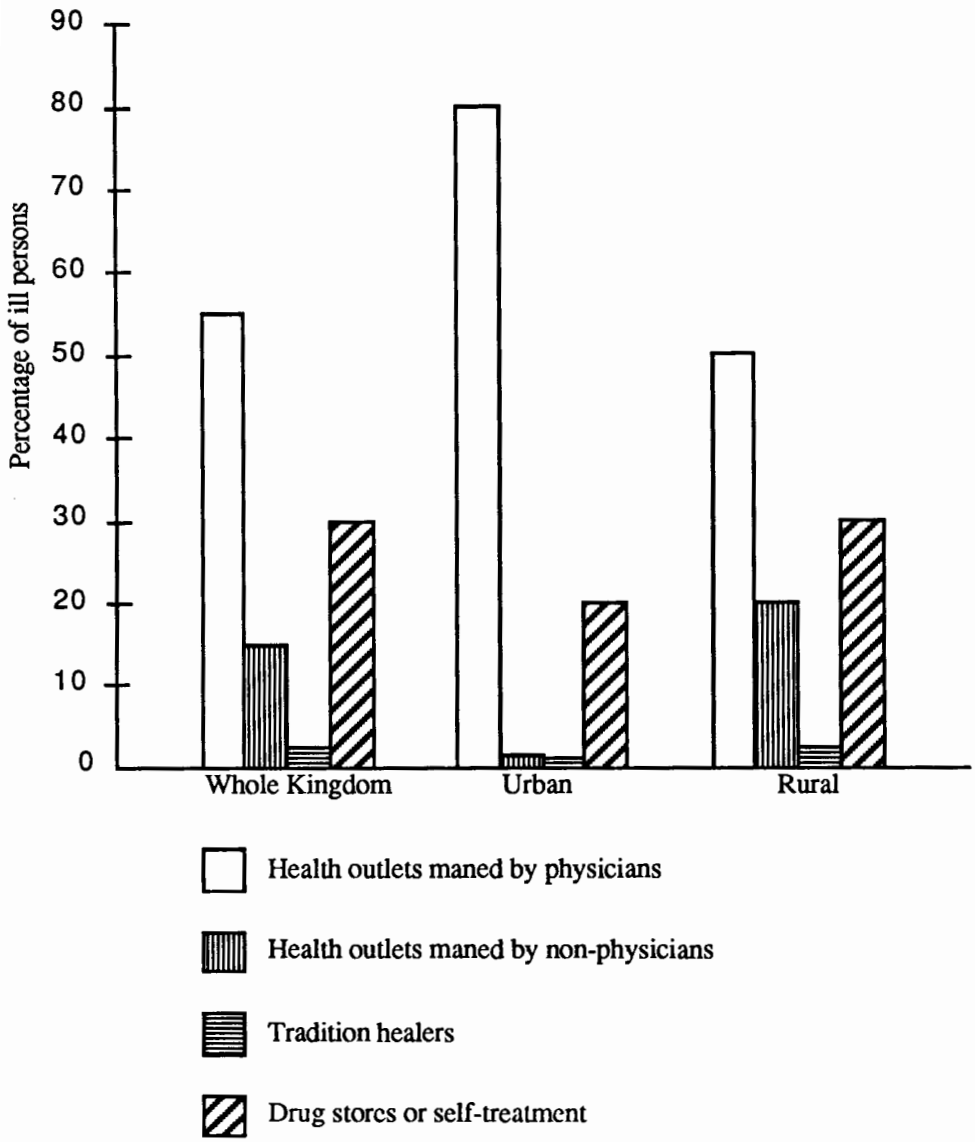
Table 3.18

Percentage distributions of ill persons by type of treatment and place of residence, 1985

Type of treatment	Total	Urban	Rural	North	Northeast	Central	South	Bangkok Metropolis
Health outlets manned by physicians	54.3	81.0	47.3	61.9	46.3	47.0	43.4	81.3
Health outlets manned by non-physicians	14.7	1.1	18.2	15.2	15.2	21.0	17.1	0.5
Traditional healers	2.4	1.0	2.8	1.9	1.3	3.8	4.1	1.0
Drug stores or self-treatment	28.6	17.0	31.7	21.0	37.2	28.2	35.4	17.1
Total	100 (5,850)	100 (1,203)	100 (4,647)	100 (993)	100 (1,567)	100 (1,566)	100 (802)	100 (922)

Figure 4

Type of treatment of ill persons by place of residence, 1985



level as seen from Table 3.19. Almost 80 percent of university graduates go to see physician when the are taken ill and the corresponding rate for population with lower than secondary education is 50 percent.

It is apparent that place of residence, urban or rural, also have impact upon the utilization of health services (Table 3.20). The proportion of university graduates get modern treatment is still high at 75 percent even though they are in the rural areas. Despite of those treating themselves by buy drug from drug store, the proportion of using traditional healers among non-education is high as 6.7 percent in the rural areas, whereas the corresponding rate for urban population is only 2 percent. The health centres in the rural areas seem to be the facilities for a certain proportion about 20 percent of low educated ill persons.

3.6.1.3 OCCUPATION DIFFERENTIALS

Occupation is used as proxy variable for socio- economic status under this section to study its impact on pattern of health service utilization and also classified by place of residence (Table 3.21 and 3.22). The findings indicate that the occupations which use more of the modern treatment are professional and administrative workers, service workers. The students and farmers are seeking less for physician, they would rather go to drug store or let the illnesses healed by themself. This evidence for the students might be that they are young and physically strong, no need to go to hospital or private clinic.

Farmers have the lowest rate going to health service outlet manned by physician, 51.9 percent. They went to non-physician health outlets at 18.1 percent. Inspite of the facts that farmers live in the rural area, the government health centres are the accessible facilities for them when taken ill.

When the place of residence is taken into consideration along with occupation, it is of interesting to note that urban or rural residence relatively have no effect on the selection of service places. The exception is that the professional and administrative workers in urban place choose only physician or drug store for treating their illnesses.

3.6.1.4 DISEASES PATTERNS

With respective to type of treatment sought by ill persons, (Table 3.23) it appears to be relevant to the severity of each diagnosis. Taking only those went to health service outlets manned by physicians of over than 75 percent are persons who taken ill by relatively more severe than the rest or severe in nature of the disease. For example in case of malignant neoplasm, 76 percent seek care at the hospitals and none reports of treating themself, 89 percent of patients diagnosed as endocrine disturbances go to any hospital. Those who realize that they

Table 3.19

Percentage distribution of ill persons' educational attainment by type of treatment, 1985

Education	Type of treatment				Total
	Health outlets manned by physicians	Health outlets manned by non-physicians	Traditional healers	Drug stores or self-treatment	
No education	56.5	14.3	5.9	23.4	100 (728)
Grade 1 - 4	56.1	14.9	2.7	26.3	100 (2,822)
Grade 5 - 7	49.0	17.6	1.4	32.0	100 (516)
Secondary	76.2	6.3	0.7	16.8	100 (286)
University and higher	79.4	3.6	0.7	16.3	100 (141)

Table 3.20

Percentage distribution of ill persons' educational attainment by type of treatment and by place of residence, 1985

Education	Type of treatment				Total
	Health outlets manned by physicians	Health outlets manned by non-physicians	Traditional healer	Drug stores or self-treatment	
Urban					
No education	84.4	-	2.2	13.4	100 (135)
Grade 1 -4	82.3	1.5	0.9	15.3	100 (458)
Grade 5 - 7	75.5	0.9	0.9	22.7	100 (110)
Secondary	86.9	0.6	1.0	11.5	100 (183)
University and higher	82.2	1.6	0.9	15.3	100 (118)
Rural					
No education	51.2	16.9	6.7	25.2	100 (586)
Grade 1 - 4	52.1	17.0	2.9	28.0	100 (2,322)
Grade 5 - 7	43.4	21.1	1.5	34.0	100 (406)
Secondary	68.9	14.3	-	16.8	100 (119)
University and higher	75.0	7.5	-	17.5	100 (40)

Table 3.21

Percentage distribution of ill-persons' occupation by type of treatment, 1985

Occupations	Type of treatment				Total
	Health outlets manned by physicians	Health outlets manned by non-physicians	Traditional healers	Drug stores or self-treatment	
Persons in labour force					
- Professional and administrative workers	82.0	2.0	-	16.0	100 (50)
- Clerical and sale workers	68.0	7.2	5.1	19.8	100 (431)
- Service workers	76.9	10.3	2.6	10.3	100 (39)
- Farmers	51.9	18.1	3.4	26.7	100 (2,022)
- Transport workers	66.7	4.2	-	29.2	100 (24)
- Laborers and related workers	61.4	11.6	2.5	24.5	100 (490)
Persons not in labour force					
- Students	49.7	16.1	0.3	33.9	100 (310)
- Housewife and those looking for jobs	67.6	8.6	3.2	20.7	100 (793)

Table 3.22

Percentage distribution of ill persons' occupation by type of treatment and by place of residence, 1985

Occupations	Type of treatment				Total
	Health outlets manned by physicians	Health outlets manned by non-physicians	Traditional healers	Drug stores or self-treatment	
Urban					
Persons in labour force					
- Professional and administrative workers	88.9	-	-	11.1	100 (27)
- Clerical and sale workers	79.7	1.3	1.6	17.3	100(306)
- Service workers	88.9	3.7	3.7	3.7	100 (27)
- Farmers	67.9	3.6	3.6	25.0	100 (28)
- Transport workers	50.0	-	-	50.0	100 (16)
- Laborer and related workers	82.9	1.2	0.6	15.3	100(170)
Persons not in labour force					
- Students	79.1	0.9	-	20.0	100(115)
- Housewife and those looking for jobs	87.4	0.7	1.1	10.8	100(269)

Table 3.22 (Cont.)

Occupations	Type of treatment				Total
	Health outlets manned by physicians	Health outlets manned by non-physicians	Traditional healers	Drug stores or self-treatment	
Rural					
Persons in labour force					
- Professional and administrative workers	76.9	3.9	-	19.2	100 (26)
- Clerical and sale workers	53.8	16.9	5.0	24.4	100 (160)
- Service workers	60.0	20.0	-	20.0	100 (15)
- Farmers	51.4	18.4	3.4	26.9	100 (1,889)
- Transport workers	81.8	9.1	-	9.1	100 (11)
- Laborer and related workers	52.1	15.9	3.4	28.7	100 (328)
Persons not in labour force					
- Students	36.6	22.8	0.5	40.1	100 (202)
- Housewife and those looking for jobs	59.8	11.6	4.1	24.5	100 (542)

Table 3.23

Percentage distribution of ill-persons by diagnosis classified by type of treatment, 1985

Diagnosis	Type of treatment				Total
	Health outlets manned by physicians	Health outlets manned by non-physicians	Traditional healers	Drug stores or self-treatment	
1) Infectious diseases	35.3	19.1	1.4	44.2	100(1517)
2) Malignancy (all types)	76.0	16.0	8.0	-	100 (25)
3) Benign growth	54.5	13.6	9.1	22.7	100 (22)
4) Endocrine disturbance	89.0	4.4	1.7	5.0	100 (182)
5) Diseases of blood & blood forming organ	70.4	22.2	-	7.4	100 (27)
6) Mental disorder	81.0	9.5	4.8	4.8	100 (21)
7) Diseases of nervous system	72.9	7.1	7.1	12.9	100 (140)
8) Diseases of eye and ear	36.3	6.0	4.5	53.2	100 (201)
9) Diseases of circulatory system	82.4	13.0	0.5	4.2	100 (386)
10) Diseases of respiratory system	52.6	17.8	1.4	28.2	100(1112)
11) Diseases of digestive system	65.6	11.1	6.1	17.1	100 (765)
12) Diseases of urinary tract & sex organs	78.5	13.4	1.6	6.5	100 (186)
13) Abortion	75.0*	-	-	25.0*	100 (4)
14) Diseases due to obstetric causes	-	100*	-	-	100 (2)
15) Diseases of skin & subcutaneous tissue	48.9	17.1	7.8	26.3	100 (217)
16) Diseases of muscles & skeleton & conn. tissue	66.1	12.6	3.9	17.3	100 (127)
17) Accidents/injuries/violence	43.6	18.4	6.7	31.3	100 (179)
18) Ill-defined symptoms	44.5	17.3	3.3	34.9	100 (767)

* small sample

are taken ill by mental disorder, only less than 10 percent treat themself or go for traditional healers.

For acute infectious and parasitic diseases, as expected, people who got ill by this group of disease tend to buy drugs or self-treated (44.2 percent). Only 35.3 percent go to see physicians and almost 20 percent go to the health centres, eventhough about 47 percent of them are diagnosed as severe. Similar situation happens to those taken ill with disease of eye and ear and skin diseases.

Diseases of muscle and skeleton bring patients to see doctors at a larger proportion as compared to their severity. However, almost 20 percent still buy drug or treat themselves.

The rate of treatment by medical doctors for accident or injury seems to correspond to the proportion of serious illness among this group. Cross tabulation is needed for concrete couclusion where possible.

3.6.1.5 SEVERITY OF ILLNESS

With regards to degree of severity, the nature of illness namely acute episode, chronic episode and injury might distort the evidents if they are mixed. The three categories are thus separated when attempt is made to correlate with type of treatment. The place of residence is another control variable used. Table 3.24 desplays the type of treatment sought by urban/rural population when they were taken ill by acutc episodes. The association between degree of severity and modern type of treatment are demonstrated, both among urban and rural population, unless the rates for rural sample are lower than the urban by half. For the rural population, about 20 percent go to health centres or health outlets without physician, explicitly the only places they could go for besides drug stores. The mild cases in the rural, more than 50 percent buy drug or treat themself and the corresponding rate for urban sample is 46.7 percent which is rather reasonable to do so.

Concerning chronic episode of illness, around 90 percent and over of urban sample have seen the physicians for treatment. However, the rates of seeing physician is associated with degree of severity.

Similar patterns are observed among rural sample who get sick by chronic diseases (Table 3.25). The second rank for severe cases is the health centres. Traditional healers are apparently on the lowest priority, the rate of utilization at 3-4 percent. The patterns of treatment of chronic diseases are rather complicated because of its nature, long-term illness and some of them are incurable.

Table 3.24

Percentage distribution of persons taken ill of acute episode classified by severity and type of treatment sought, 1985

Severity of chronic episode of illness	Type of treatment				Total
	Health outlets manned by physicians	Health outlets manned by non-physicians	Traditional healers	Drug stores or self-treatment	
Urban					
severe	70.0	1.3	-	28.7	100 (150)
moderate	60.9	4.3	2.1	32.6	100 (46)
slightly moderate	58.5	-	-	41.5	100 (41)
mild	52.6	0.8	-	46.7	100 (133)
Rural					
severe	35.1	22.8	1.8	40.3	100 (1,269)
moderate	30.7	23.3	0.3	45.7	100 (392)
slightly moderate	31.2	17.6	0.9	50.2	100 (221)
mild	23.2	21.1	2.6	53.1	100 (418)

Table 3.25

Percentage distribution of persons taken ill of chronic illness classified by severity and type of treatment sought, 1985

Severity of chronic episode of illness	Type of treatment				Total
	Health outlets manned by physicians	Health outlets manned by non-physicians	Traditional healers	Drug stores or self-treatment	
Urban					
severe	92.5	0.6	-	6.9	100 (160)
moderate	86.6	2.1	6.2	5.1	100 (97)
slightly moderate	92.6	0.6	-	6.7	100 (163)
mild	89.9	0.3	1.3	8.6	100 (376)
Rural					
severe	64.3	16.2	3.6	15.9	100 (641)
moderate	72.9	15.0	3.3	8.8	100 (399)
slightly moderate	67.0	12.6	4.3	16.1	100 (485)
mild	56.7	12.7	3.6	27.0	100 (675)

Table 3.26

Percentage distribution of injured persons classified by severity and type of treatment sought, 1985

Severity of injury	Type of treatment				Total
	Health outlets manned by physicians	Health outlets manned by non-physicians	Traditional healers	Drug stores or self-treatment	
Urban					
severe	100.0	-	-	-	100 (6)
moderate	50.0	16.7	-	33.3	100 (6)
slightly moderate	77.8	-	-	22.2	100 (9)
mild	53.3	13.3	-	33.3	100 (15)
Rural					
severe	50.0	19.7	6.1	24.2	100 (66)
moderate	38.1	23.8	14.3	23.8	100 (21)
slightly moderate	29.4	17.6	17.6	35.3	100 (17)
mild	25.9	12.9	-	61.3	100 (31)

The injured cases are always sudden and obviously observed whether it is serious or not. Unfortunately there are smaller cases under this category to make a substantial statement concerning correlation between severity and type of treatment. Neverthless, the association is observed in Table 3.26 both in urban and rural areas. Among urban sample, no injured cases went for traditional treatment, but it was appeared at a certain portion among corresponding rural samples. Again, the health centres and drug stores are still the accessible place of treatment for rural injured patients.

3.6.2 HEALTH RISKS

A brief discription on selected health risk factors will be given under this section and no intention at the moment to correlate these health risks to any disease incidence (Table 3.27, 3.28).

Table 3.27

Percentage distribution of the sample population by episode of illness and selected health risks by place of residence, 1985

	Urban	Rural	Total
Episode of illness			
(within one month)			
0	86.6	83.9	84.5
1	11.8	14.5	13.9
2	1.4	1.5	1.5
3 and over	0.2	0.1	0.2
Total	100	100	100
No.of sample population	8,426	28,185	36,611
Alcoholic beverage consumption			
Everyday or almost everyday	5.3	3.1	3.7
1-2 times a week	3.6	3.7	3.6
Occasionally	12.4	19.3	17.6
Never drink	78.8	73.9	75.1
Total	100	100	100
No.of sample population aged 15 and over	6,159	18,409	24,568

(Cont.)

Table 3.27 (Cont.)

	Urban	Rural	Total
Cigarette smoking			
(Average. no. per day)			
1-10	12.5	23.6	20.8
11-20	9.6	8.9	9.1
21.30	0.5	0.9	0.8
31-40	0.7	0.2	0.4
41-50	0.2	0.2	0.2
51 and over	0.2	0.2	0.2
Never smoke	76.3	66.0	68.6
Total	100	100	100
No.of sample population age 15 years and over	6,129	18,304	24,433
Habitual drug intake			
Everyday or almost everyday	8.6	13.2	12.1
1-2 times a week	0.6	2.0	1.7
Rarely	0.4	1.4	1.1
Never	90.4	83.4	85.1
Total	100	100	100
No.of sample population (all ages)	8,405	28,133	36,538
Raw food consumption			
Everyday or almost everyday	1.0	14.6	11.4
1-2 times a week	1.7	6.1	5.1
Rarely	9.9	19.3	17.1
Never	87.3	60.0	66.4
Total	100	100	100
No.of sample population (all ages)	8,424	28,153	36,577

Table 3.28

Percentage distribution of sample population by selected health risks consumption by region, 1985

	Bangkok Metropolis	Central	North	Northeast	South
Alcoholic beverages					
- Everyday or almost everyday	5.6	5.6	3.8	1.7	1.8
- 1-2 times a week	3.6	6.0	4.5	1.8	2.4
- Occasionally	12.4	14.8	20.8	25.4	9.0
- Never drink	78.5	73.7	70.9	71.1	86.8
Total	100	100	100	100	100
No.of sample population aged 15 and over	4,515	5,404	4,603	6,739	3,307
Cigarette smoking					
(Average no. per day)					
1-10	12.8	16.1	27.5	27.2	17.0
11-20	10.3	11.8	6.9	5.7	13.1
21-30	0.5	1.3	0.4	0.4	1.8
31-40	0.8	0.3	0.1	0.1	0.5
41-50	0.1	0.2	0.1	0.2	0.3
50 and over	0.2	0.1	0.1	0.2	0.1
Never smoke	75.3	70.2	64.9	66.2	67.2
Total	100	100	100	100	100
No. of sample population aged 15 and over	4,485	5,362	4,600	6,679	3,307
Habitual drug intake					
- Everyday or almost everyday	8.6	14.5	15.1	12.2	8.8
- 1-2 times a week	0.3	2.0	2.9	1.7	1.3
- Rarely	0.4	1.4	1.0	1.8	0.3
- Never	90.7	81.9	81.0	84.3	89.6
Total	100	100	100	100	100
No. of sample population	6,179	8,075	6,337	10,665	1,282
Raw food consumption					
- Everyday or almost everyday	1.3	9.4	1.8	30.1	0.1
- 1-2 times of week	1.7	3.5	7.7	8.8	1.2
- Rarely	9.3	15.1	29.8	22.9	3.0
- Never	87.7	72.0	60.7	38.2	95.7
Total	100	100	100	100	100
No. of sample population	6,193	8,089	6,340	10,711	5,280

3.6.2.1 ALCOHOLIC BEVERAGE CONSUMPTION

It is rather fortunate to find that two third of total sample does not drink and only 3.7 percent is heavy drinker. Occasional drinkers are about 18 percent, the rest drinks alcoholic beverages 1-2 times a week. Among the heavy drinkers, who have to drink every day, samples from Bangkok and the Central come at the first rank and the Northeast and the South ranked fourth and fifth. It seems obvious to note that 86.8 percent of the South reported of never drink at all which is highest among other regions.

3.6.2.2 CIGARETTE SMOKING

About 69 percent of the sample reported as non-smoker. This proportion is unexpectedly higher among urban sample (76.3 percent). Regional differences are observed. The South appears to have low rate of non-smoker and highest rate (2.7 percent) of heavy smokers (more than one pack a day). The rankings of non-smoker from high to low are Bangkok, the Central, the Northeast, the South and the North. Those who smoke less than a pack (20 cigarettes) a day are in the ranges of 20-30 percent, highest rate in the North (34.4%) and lowest in Bangkok (23.1%).

It is worth to note that no brand or filter type are given in this data.

3.6.2.3 HABITUAL DRUG INTAKE

Regardless of specific type of drug, habitually intake of drug can be used as an indicator for mental ill- health or hypochondria cases. Of total sample 12.1 percent reported of taking any drug every day, the more proportion is seen among rural sample. The evidence is explained by the corresponding rates of 14.5 percent and 15 percent among the Central and the North. Next on the ranking are the Northeast (12.2 percent), the South (8.8 percent) and Bangkok (8.6 percent).

The pain-killing drugs are apparent to be used oftenly by the farmers and other rural people, while the tranquilizer mostly used among urban population who are under stressful life events.

3.6.2.4 RAW FOOD CONSUMPTION

Raw food especially meat is major mode of parasitic infestation among rural population. Around 11 percent of the sample reported of eating raw food everyday, of which the

majority falls in the rural sample. The urban sample said that almost 10 percent are rarely having it which the corresponding rate for rural of 19.3 percent. Not surprisingly, the Northeast reported of 30.1 percent eating every day raw food and only 38.2 percent have never eaten it. The Southern people ranks lowest on this particular aspect. The second to last is Bangkok. The North contains more proportion of people who eat raw food every day than the Central.

By and large, the Southern people seem to expose least to these health hazard factors, certainly by their traditional and religious beliefs.

CHAPTER IV
MORTALITY

A data collection described under this chapter is specific to the Mortality Survey of the MMD Project conducted during 1985-1986. The data sources for the analalysis of secondary data are already presented elsewhere (Chapter II). The main findings include both the results of the secondary data analysis and the field survey They are in fact pertaining to three major headings namely, levels, trends and differentials of mortality; causes of death, trends and differentials on leading cause of death, current levels of leading causes and their determinants; and the attendants at death which is partially reflected the quality of health care services of the country.

4.1 DESCRIPTION OF DATA COLLECTED

The actual data collected by the field survey are the cause of death, both direct cause and underlying cause where possible; the place of death; and medical attendant before death. All other socio economic and demographic variables of the deceased are obtained from the original SPC schedule. The Cause of Death Enquiry adhered to the SPC schedules in Round IV, VI, VII. The interviewers were instructed to identify all deaths occurring during the past 6 months for Round IV and recall of the past 3 months for Round VI and VII. Finally, total sample of 1,306 completed death enquiries was received in the office. The data collected covers the period of October 1, 1984 through March 31, 1985 and July 1 through December 31, 1985.

4.1.1 CAUSE OF DEATII ENQUIRY

The cause of death enquiry was designed and laid- out to facilitate probing specifically the cause of death. For this purpose, the causes are thus classified into 4 broad categories : illness, accident, suicide, and homicide. The definitions of them are given as the following :

1. Illness refers to the death from diseases such as heart disease, cancer, haemorrhagic fever, tetanus, including senility without psychosis, etc.

2. Accident refers to the death from external causes, such as, motor vehicle accidents, accidental poisoning, drowning and submersion, falls, etc., whether or not death was instant.

3. Suicide refers to deaths occuring from hanging, injection, taking drug etc. whether the death was instant or not.

4. Homicide refers to death from murderer such as gun shot, being stabbed, sabred, poisoned, etc., whether death was instant or not.

When death taken place at home or outside medical institutions without qualified personnel attended, the cause of death is dubious. However, symptoms and signs prevailing before death or leading to death might be of helpful in the diagnosis of cause of death. The attempt was made in this survey to get as close as possible the diagnosis on cause of death, thus a set of questions will be asked pertaining signs and symptoms prior to the events, type of treatment, ie., by medical doctors or else, duration of illness. Altogether, the interviewers were asked to record any suspect illness that would lead to or related to the death. If death occurred in the hospital or other medical institutes, then the respondent will be asked of the name of the disease which caused death as told by the medical doctors. Apart from these questions, there are entries for "cause of death" as recorded in the death certificate for that deceased person if it was registered, for checking of the consistency.

After the death is classified under the other three categories : accident, suicide or homicide, record the place of occurrance. The next question asked is whether the death is instant or not. If not, type of treatment and the duration of illness accounting from these external causes are asked. Additionally the underlying illness that led to the accidental death such as heart diseases or any specific symptoms before death will be recorded if there is any.

4.1.2 GUIDELINES FOR VERBAL AUTOPSY

This guideline is one form of lay-reporting on cause of death adopted from those used by the Health Statistics Division of the Ministry of Public Health in Thailand. It is used for the interviewers to get acquainted to the signs and symptoms which may lead to the disease diagnosis. The symptoms are classified into 9 broad groups:

1. symptoms due to delivery, pregnancy and abortion
2. fever
3. abnormalities of the alimentary system
4. cough symptoms or abnormalities of respiratory system
5. abnormalities of the central nervous system
6. deaths due to heart disease and circulatory system
7. other disease with specific signs and symptoms
8. causes of death in infants
9. aging diseases

The details of the guideline are in appendix 6.

The interviewers which were recruited and trained by the NSO personnel have had one-day session contributed to the training and practices on the using cause of death enquiry and the guidelines for verbal autopsy. The field practices was supervised by MMD researchers on this perticular section.

The interviewer used the cause of death enquiry together with questionnaire of the Survey of Population Change in Round 4, 6 and 7. One form of enquiry was used for one death. If any household had a death in Rounds 3, 4, 6 and 7 of the survey (a person who has been recorded code "4" in the column of residential status and whose death was recorded) the interviewer used the enquiry section. When finished, the interviewer clipped it with form of SPC.

4.1.3 HOW INFORMATION WAS RECORDED

The interviewer copied the code of province, district, subdistrict, enumeration no., block no., village no., and household no., from the cover of SPC.2, including order of member in the household, name and surname of death from Col. F.1 and F.2. The remaining is the cause of death enquiry format.

4.1.4 CODING OF CAUSE OF DEATH

The cause of death enquiries were returned to the Bangkok office at the end of each round as stated above. The diagnosis on cause of death for each deceased person was checked whatever the name of disease, signs and symptoms or the underlying illness which are recorded on the form and diagnosis was then given by medical research investigator. Cause of death coded will be at the most probable specific disease or group of illnesses (heart diseases, etc.) that leads to a person's death.

Specific data collected on this file are :-

a) Base population enumerated at Round 1 of the SPC classified by place of residence, age, sex, marital status, occupation and working status, education attainment.

b) Data on deceased persons (all ages) classified by age, sex, place of residence, place of death, cause of death (and underlying cause of death if any), medical attendant before death.

Medical attendant at death is classified into 7 categories : medical doctor/hospital, health personnel (including nurse, midwife and junior sanitarian), village health volunteer, traditional healer, quacks (Moh Pra, Moh Pee and Moh Klangbaan), friends/relatives, and no attendant at death.

For infants and children of under 5 years of age, parity and age of mother will also be recorded.

For deceased persons aged 10 and over, additional data on education attainment, occupation and working status, and marital status are included.

4.2 QUALITY OF MORTALITY SURVEY DATA

Quality control procedures in the collection and analysis of cause of death as described in the previous section are assured of reliability and precision of obtained information. Additionally, the recall of number of deceased persons and their possible causes of death within 3 months period tends to reduce the memory bias, especially those who died from accidents, suicide and homicide. These external causes of death are apparently obvious and thus may be overstated when compare to other causes of death such as infectious diseases.

Information on medical attendant before death is a significant source to confirm the quality of data on the cause of death. On the death enquiry, there are three entries for the first, second and third attendant before death. Out of 1,306 deaths, about 30 percent death was instant which no treatment is required. The rest of them, 50 percent was attended by medical doctors at least once out of the maximal three attendants, 5 percent saught treatment from health personnel (nurses, midwife, sanitarian) and only 15 percent went for traditional healers. In conclusion, apart from ignorance or memory bias of the respondent, up to 60 percent of the deaths would be assured of diagnosis on the cause of death. Almost 15 percent of all deaths are accidents or injuries, suicide and homicide of which constitutes large proportion of the instant deaths without treatment.

Moreover, it was found that 80 percent of total deaths registered the events but only half of the death certificates were seen by the interviewers, then the cause of death from the two entries could be checked for consistency. Of all deaths attended by medical doctors, 85 percent registered with the cause of death presence on the death certificates.

On the other hand, the proportion of deaths caused by "pyrexia of unknown origin", "ill-defined symptoms", and "senility without psychosis" are indicators for under-qualified information. The percentage of deaths from the first two causes is 11.5 and the last one is 15.6 (totally 27 percent). Senility without psychosis will be diagnosed on those died at age 65 and over, without any signs or symptoms stated on the enquiry. The diagnosis on the death certificate is also " senility". Those of ill-defined causes, the entries for diagnosis are blank or some other irrelevant information is filled. A small proportion of less than 5 percent of all

deaths is lost to follow-up. The reasons given are : no one to give information on deceased persons, the whole family moved away, or non-response.

4.3 CHARACTERISTICS OF THE SURVEY SAMPLES

As described above, the SPC survey covered 52 provinces including Bangkok Metropolis into the sample. The districts were randomly selected from each sample province with probability proportional to size. The self weighting procedure was applied to select the villages (in non municipal area) or blocks (in the municipal area) into the sample. All households in each sample block or village were included as sampling units. Finally, 49,000 households were enumerated and 292,212 persons are constituted population base of the survey.

In this section, the characteristics of the sample population in mortality survey such as age-sex structure, place of residence by region, education, occupation and work status, and marital status are described, as well as the characteristics of the deceased persons.

4.3.1 BASE POPULATION

4.3.1.1 GEOGRAPHICAL DISTRIBUTION OF THE POPULATION

The regional patterns of sample proportions were shown in Table 4.1 with classification into urban and rural residences. The Northeast constitutes the largest sample size, 23.2 percent, followed by the North (22.5%) the Central (21.9%) and the South (19.5%). Bangkok metropolis represents by only 12.9 percent of the total sample. When classified by residence, it can be seen that the rural distribution among 2 regions, the Central and the North is quite similar, at 25 percent. The largest proportion is still the Northeast (29.5%) and the smallest is the South (20.9%). Bangkok sample represents the majority of urban sample population, it constitues 25.6 percent of the total. While the smallest proportion falls in the Northeast, next is the South (18.1%), the Central (18.9%) and the North (20.5%). The urban sample totals 147,301 persons whereas the rural sample is 144,911 persons.

Table 4.1

Percentage distribution of the sample population by region and residence, 1985

Region	Urban	Rural	Total
Central	18.9	25.0	21.9
North	20.5	24.6	22.5
Northeast	16.9	29.5	23.2
South	18.1	20.9	19.5
Bangkok	25.6	-	12.9
Total	100	100	100
No. of sample population	147,301	144,911	292,212

Table 4.2

Percentage distribution of the sample population by age and sex, 1985

Age	Total	Male	Female
0-4	10.8	11.4	10.3
5-14	23.3	24.3	22.3
15-24	22.3	21.9	22.7
25-44	26.8	26.5	27.1
45-64	12.9	12.5	13.3
65+	3.9	3.4	4.3
Total	100	100	100
No. of sample population	292,212	142,622	149,590

4.3.1.2 AGE-SEX STRUCTURE

The age-sex structure of the sample population is displayed on Table 4.2. It may be observed that the age distributions by sex are similar to the nation as a whole, census 1980 figures. The age grouping in this study is used to facilitate the programme implemented by health sector. The population under 5 years old (10.8%) is smaller than all other age-groups

except the groups of 65 years and older (3.9%). The groups for 5-14, 15-24, and 25-44 years have more or less equal proportions of 23-26 percent and 13 percent constitutes the population 45-64 years. The male proportions of population distribution by age are quite similar to the females', apart from the fact that the proportions of the female population is 1 percent less than male in the age groups 0-4 and 5-14 years, and more than the male in the age groups 25-44, 45-64 and 65 over.

The age distribution of the sample population by region are also illustrated in Table 4.3. Similarity in age distributions among regions and urban/rural are observed. Bangkok sample seems to have the smallest proportion of population under fiver years of age, 9.3% as compared to the largest of 12.5% of the South. Among the aging population, the Northeast appears to constitute the smallest proportion of 3.1%, and 4.3% of this age groups belongs to the Central.

4.3.1.3 SOCIO-DEMOGRAPHIC CHARACTERISTICS

Data on education attainment for sample population aged 6 years and over are presented in Table 4.4. Of the total of 252,080 persons, 12.3% reported of no formal education. The largest proportion of 65.5 percent attained the primary level of education (1-6 years), and 5.4 percent finished their education at university level. The rest belongs to the secondary level (7-12 years).

Regarding the main occupation of the population aged 11 and over, about 32 percent does not have any occupation or reported of "do not work" which is quite large proportion when compared with the national estimates. Those who engaged in agriculture consists of 33.7 percent, the largest proportion. Next are clerk and trading (13.2%) labourer (9.8%) professional and administrative workers (5.1 percent). The transport workers constitute the smallest proportion of 2.5 percent of total population.

Among 148,993 persons who reported having an occupation, the largest proportion of 36.8 percent is unpaid family worker. It is interesting to note that those who work as government enterprise employee and who are employers are less than 2 percent. Other two large work statuses are own-account worker (28.3%) and private employee (22.7%). Almost 10 percent reports as government employee.

Table 4.3

Percentage distribution of the sample population by age and region of residence, 1985

Age	Whole Kingdom	Urban	Rural	Bangkok	Central	North	Northeast	South
0-4	10.8	10.0	11.6	9.3	10.7	10.0	11.1	12.5
5-14	23.3	20.7	25.8	18.5	22.8	22.0	26.0	25.1
15-24	22.3	24.6	20.0	25.4	21.5	22.4	22.7	20.5
25-44	26.8	28.6	25.0	29.9	27.1	27.5	25.5	25.0
45-64	12.9	12.4	13.4	12.9	13.5	14.0	11.5	12.7
65+	3.9	3.7	4.1	4.0	4.3	4.0	3.1	4.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
No. of sample population	292,212	147,301	144,911	37,663	64,065	65,891	67,652	56,941

Table 4.4

Socio - demographic characteristics of the sample population

Characteristics	Percent
Education (6 yrs and over)	
No education	12.3
Primary level	65.5
Secondary level	16.8
University level	5.4
Total	100
No. of sample population aged 6 and over	252,080
Occupation	
Did not work	31.8
Professional & administrative workers	5.1
Clerk & trading	13.2
Service workers	4.0
Farmers	33.7
Transport workers	2.5
Laborers	9.8
Total	100
No. of sample population aged 11 and over	218,877
Work status	
Employer	1.7
Own account worker	28.3
Government employee	9.0
Government enterprise employee	1.4
Private employee	22.7
Unpaid family worker	36.8
Total	100
No. of sample economically active population aged 11 and over	148,993
Marital Status	
Single	35.6
Currently married	55.4
Widowed	5.8
Divorced and separated	2.1
Priests	1.1
Total	100
No. of sample population aged 13 and over	202,441

Table 4.5

Total number of deaths by causes and age,1985

Basic Tabulation List* /Causes of Death		Under 1	1-4	All ages
01	Diarrheal diseases	12	2	41
02	Tuberculosis	1	-	53
037	Tetanus	1	-	3
047	Rabies	-	-	2
052	Malaria	-	-	7
065	Haemorrhagic fever	-	10	15
07	All other infectious diseases	2	-	4
08-14	Malignancy	2	-	129
181	Diabetes mellitus	-	-	27
200	Anemia	1	-	6
242	Tyrotoxicosis	-	-	3
21	Psychosis/drug dependence	-	-	10
22	Meningtis, encephalitis, epilepsy	6	1	13
25,260,270, 28	Heart diseases, hypertensive diseases.	3	2	114
29	Cardiovascular accidents (CVA)	-	-	75
32	Pneumonia, bronchitis, asthma	15	2	87
34	Peptic ulcer, appendicitis, intest. obstruction	1	-	30
347	Cirrhosis of liver, hepatitis	-	-	45
350, 36	Nephrosis, prostrate touble	1	-	30
39	Direct obstetric cause	-	-	1
45	Certain conditions originating in the perinatal period	55	-	55
44	Congenital anomalies	2	-	2
E47-E53	Accidents & injury	2	9	121
E54	Suicide	-	-	23
E55	Homicide	1	-	56
465	Senility without mentioning psychosis	-	-	204
460	Pyrexia of unknown origin	11	4	48
467	Ill-defined causes	11	2	102
	Total	127	32	1,306

* WHO, International Classification of Diseases, 1975 Revision, Volume 1, Geneva, 1977, page 746-755.

Marital status of the population 13 years of age and over in the sample is similar to the national picture. Slightly more than one-third of the population remains currently single. The largest proportion of 55.4 percent are currently married. Persons whose marital status are widowed, divorced, and separated are about 8 percent. The rest are Buddhist monks.

4.4 LEVELS, TRENDS, AND DIFFERENTIALS OF MORTALITY

4.4.1 CRUDE DEATH RATE 1950-1983

Mortality prior to 1950 should be briefly discussed here[1]. Bourgeois-Pichat's (1959) yearly estimates of crude death rates show that the beginning of mortality decline probably signifies the period of 1948 to 1955 when crude death rates dropped from 27.3 to 18.0. Before 1948, for almost 30 years, crude death rates are in the neighbourhood of thirty per thousand or at least in the upper twenties's (Bourgeois-Pichat, 1959:Table 9). As a supplement to the data on crude death rates, life expectancy data before 1950 from independent sources also confirmed that mortality declined after, rather than before World War II. Rungpitarangsi (1974) used the Brass death distribution method to estimate life expectancy in 1937, 1947, 1960 and 1970 to be 39,40,51 and 56 years for men and 42,44,55 and 56 years for women respectively. That is, a significant rise in life expectancy occurred after, rather than before 1947. These estimates are considered to be accurate and coincide with the principal decline in malarial mortality which came after 1947 (Arnold et al., 1977:19; Unhanand et al.,1972:3, Thomlinson, 1971:65). It can be concluded here that mortality in Thailand started to decline after the World War II. The year 1950 probably marks the beginning of the mortality transition in the country. (Knodel, Chamratrithirong, 1978).

Although vital statistics in Thailand suffer a great deal from underregistration, the official crude death rates during 1950-1983 show quite a secular decline. The unadjusted crude death rate was around 10 in 1950 and gradually fell to 5.1 in 1983 (Table 4.6). The estimated crude death rates adjusted for underregistration also shows this secular trend. Crude death rates are estimated by Bourgeois-Pichat to be 24 in 1950 declining to 18.0 in 1955. In 1960, estimations by different means mark the crude death rate in a range of 12.0 to 15.2. According to the dual record system methodology in the Survey of Population Change 1964-65, the crude death rate in the mid-1960s was found to be 10.8. It is estimated further that in 1970 the crude death rate had fallen to around 10. In 1975 again, information on the extent of underregistration from the latest Surveys of Population Change help to estimate that the death rate was 8.9 in SPC 1974-75 and 8.6 in SPC 1974-76. In general, it is not surprising to find that the decline in the death rate was faster in the earlier period between 1950 and the mid-1960s. In the later period when mortality was relatively low, the pace of decline had become relatively slow.

4.4.2 AGE-SPECIFIC DEATH RATES

Age-specific death rates are shown in Figure 5. The data are taken from the two Surveys of Population Change in 1964-1965, 1974-1975 and 1984-1986. The mortality pattern by age is revealed to be a U shape curve. Death rates are very high at ages under five then low at the adult age groups, and start to increase after age around 35. Female mortality is generally lower than male, and the gap is especially larger at older ages. In general, the mortality pattern by age and sex are similar in both periods of time of the surveys.

Table 4.7 illustrates the age-sex specific death rate per 1,000 in 1974-76 and 1985 from the Survey of Population Change. Similar patterns are observed as well as the magnitudes of rates for each age group.

4.4.3 LIFE EXPECTANCY AT BIRTH 1960-1985

For overall mortality, the two SPCs indicate that during the period of 1965 to 1975, the life expectancy at birth was higher for women than men. It rose from 56.2 to 58.0 for men and from 60.0 to 63.8 for women, for an increase of about two years and three years for men and women respectively. Data from other sources in general support this rise in life expectancy at birth dating to at least 1960 (Table 4.8). During the course of about 20 years from 1960 to 1980, men and women had an increased expectation of life in the range of six to ten years. The increase in life expectancy had occurred since 1947. The estimates by Rungpitarangsi using the Brass death distribution method indicate that a gain in life expectancy of about 11 years for both men and women occurred during the period 1974 to 1960. The increase in life expectancy has continued for both sexes up to the present time.

4.4.4 INFANT AND CHILD MORTALITY, 1962-1978

Data on infant and child mortality during the period under study are presented in Table 4.9. These include infant and child mortality rates for selected years for which data are available during 1962-1978. Direct estimates in this table are taken from the two Surveys of Population Change. These include infant mortality rate (IMR) and the probability of dying at age one (1q0) as derived from SPC life-tables. Indirect estimates of infant and child mortality are derived from the proportion dead among children ever born, by age of mother. The Trussell technique with the "North" model life-table system is used here. These include the probability of dying at age one for infant mortality and at age five for child mortality. Data for these indirect estimates are from the 1970 for these indirect estimates are from the 1970 for these indirect estimates are from the 1970 and 1980 censuses and other national surveys including both Surveys of Population Change, the Survey of Fertility in Thailand 1975, the Contraceptive Prevalence Survey (CPS) 1978-1979, 1981 and 1984.

Table 4.6

Registered and Estimated Crude Death Rates in Thailand, 1950-1985

Year	Registered C D R (per 1,000 pop.)	Estimated C D R	
		1	2
1950	10.0		
1951	10.4		
1952	10.0		
1953	9.5		
1954	9.8		
1955	9.4		
1956	9.1		
1957	9.5		
1958	8.3		
1959	8.0		
1960	8.4		12.8
1961	7.8		11.9
1962	8.0		12.0
1963	8.2		12.5
1964	7.9		12.0
1965	7.1	10.8 (SPC)	10.8 (SPC)
1966	7.6	12.2	11.6
1967	7.2	11.6	10.9
1968	7.1	11.5	10.8
1969	7.2	11.8	10.9
1970	6.5	10.6	9.4
1971	6.4	10.5	9.3
1972	6.5	11.2	9.9
1973	6.0	10.6	9.1
1974	6.1	10.6	9.3
1975	5.6	8.9 (SPC)	8.9 (SPC)
1976	5.5		8.7
1977	5.4		8.6
1978	5.4		8.6
1979	5.2		8.3
1980	5.3		8.4
1981	5.0		8.0
1982	5.1		8.2
1983	5.1		8.2
1984	4.5		7.4
1985	-		5.8 (SPC)

1. Misistry of Public Health and Mahidol University (1983 : Table 6.1) from 1976-1984 CDR is adjusted for 15 percent underregistration estimated from SPC, 1985 (round I)
2. Krongkaew (1979), (adjusted registered death rate for underregistration estimated from the survey of population change 1964-65 and 1974-75;

Table 4.7

Age specific death rates per 1,000 population, Thailand, 1974-76 and 1985-86.

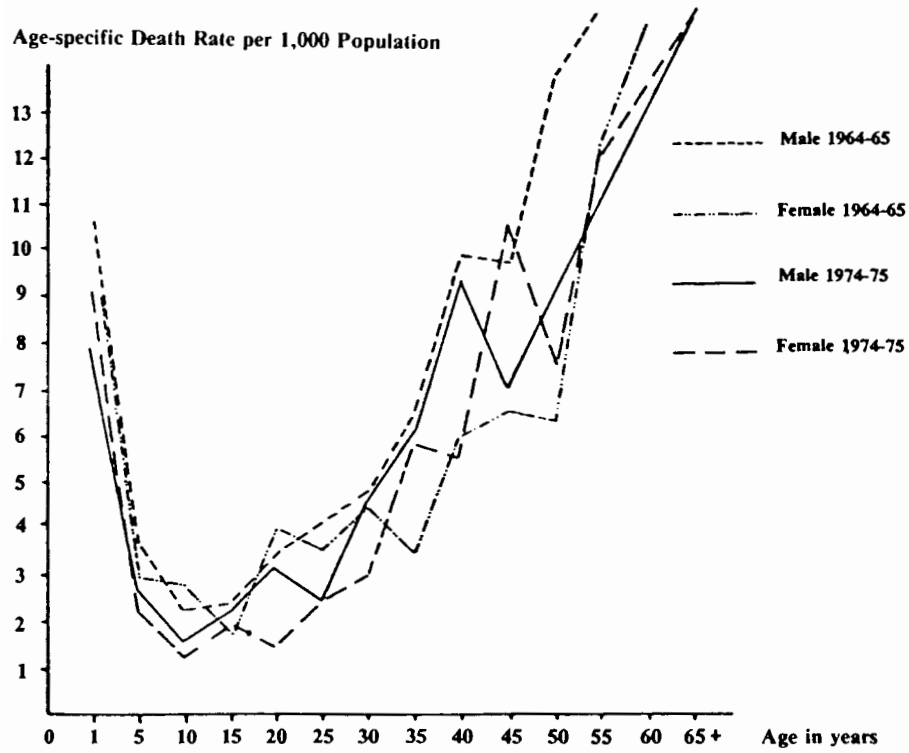
Age group	1974-76		1985
	Male	Female	Both sexes
under	87.1	57.3	49.5
1-4	7.8	7.8	1.8
5-9	2.4	3.6	1.3
10-14	1.8	1.2	0.9
15-19	2.2	2.7	1.5
20-24	2.9	2.2	1.8
25-29	3.0	2.3	2.5
30-34	5.5	3.2	2.7
35-39	7.5	4.3	3.1
40-44	9.2	6.2	4.2
45-49	9.8	9.7	5.8
50-54	16.6	7.8	8.9
55-59	18.4	13.0	15.3
60-64	30.4	18.9	23.4
65-69	65.5*	55.5*	33.0
70-74	-	-	53.0
75-79	-		63.8
80 and over	-		104.3

Source : NSO, the Survey of the Population Change 1974-76 Table 11 ; 1984-86 forth coming report.

Note: * 65 years and over.

Figure 5

Death Rate by Age Group and Sex : 1964-65, 1974-75 Survey of Population Change



Source : Report on the Survey of Population Change 1974-1975, National Statistical Office.

Table 4.8

Life Expectation at Birth, 1960-1985

Mortality Indicators	Year					
	60	65	70	75	75-80	80-85
All mortality						
Expectation of life at birth						
SPC life tables						
males		56.3		58.0		
female		60.6		63.8		
Estimated[1]						
males	50.9		55.5			
female	55.1		59.8			
Estimated[2] (1959-1961)						
males	53.6					
females	58.7					
Estimated[3] (1969-1971)						
males			57.7			
females			61.5			
Estimated[4]						
males	54	56	56	58		
females	56	62	60	64		
Estimated[5]						
males					59	61
females					63	65

Source : 1 Rungpitarangsi (1974 : 61-64), (Brass' death distribution method).
2 United Nations, (1966 : Table 21).
3 Rachapaetayakom, (1975 : Table 5).
4 U.S. Bureau of Census (1978 : Table A-5 and A-6)
5 Reports of Working Group on Population Projection, National Statistical Office, July 1981.

Table 4.9

Infant and Child Mortality
Direct and Indirect (Trussell's Method) Measures, 1962-1978

Mortality Indicators	Year															
	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78
Infant mortality																	
IMR (from SPC)																	
1964-65/																	
1974-75/																	
1974-76			84.3										56	52			
1q0																	
SPC Life Tables			86										76	68			
Indirect																	
1970 Census	77			71		63											
1974 SPC							68		59	56							
1975 SPC								67		58	60						
1975 SOFT								74		66	65						
1978 CPS1														57			
1981 CPS2																	52
1980 Census															43		
Child mortality																	
(5q0)																	
SPC Life Tables		123												97			
Indirect																	
1970 Census					110												
1974 SPC									94								
1975 SPC										94							
1975 SOFT										106							
1978 CPS1											74						
1981 CPS2														85			
1980 Census												67					

Source : National Research Panel on Thailand (1980 : Table 10); National Statistical Office (1977); Kamnuansilpa and Chamratrithirong (1982 : 114) ; National Statistical Office's unpublished tables.

Table 4.10

Time trends in infant mortality based on indirect estimation techniques (Feeney's Method) of 1qo and the number of years(1*) prior to the Census to which estimate corresponds, as applied to Census data

Data	Whole Kingdom		Municipal Areas		Non-Municipal Areas		Central		North		Northeast		South	
	t*	1q0	t*	1q0	t*	1q0	t*	1q0	t*	1q0	t*	1q0	t*	1q0
1970 Census[1]	2.4	.0584	2.1	.0228	2.4	.0622	2.1	.0471	2.4	.0721	2.1	.0670	2.5	.0383
(2 percent sample)	4.2	.0685	3.8	.0222	4.2	.0735	3.9	.0501	4.2	.0848	3.9	.0783	4.3	.0571
	6.4	.0768	5.8	.0277	6.4	.0828	5.7	.0560	6.4	.0862	6.0	.0957	6.5	.0591
	8.9	.0880	8.3	.0339	8.9	.0945	8.5	.0596	8.9	.1010	8.5	.1101	9.0	.0659
	11.9	.1011	11.2	.0417	11.9	.1080	11.4	.0747	11.9	.1220	11.5	.1187	12.1	.0795
	15.1	.1052	14.4	.0535	15.2	.1112	14.6	.0824	15.2	.1303	14.7	.1185	15.3	.0785
1980 Census[2]	2.3	.0365	2.0	.0235	2.4	.0377	2.15	.0266	2.4	.0444	2.4	.0394	2.4	.0318
(20 percent sample)	4.1	.0380	3.8	.0208	4.2	.0407	3.93	.0258	4.2	.0487	4.2	.0428	4.2	.0298
	6.2	.0409	5.8	.0213	6.3	.0440	5.98	.0284	6.3	.0532	6.3	.0473	6.3	.0313
	8.7	.0441	8.3	.0191	8.8	.0477	8.45	.0293	8.9	.0574	8.9	.0522	8.8	.0303
	11.6	.0508	11.2	.0227	11.8	.0546	11.38	.0340	11.9	.0654	11.8	.0606	11.8	.0348
	14.8	.0570	14.3	.0276	15.0	.0614	14.52	.0394	15.0	.0705	15.0	.0673	15.0	0.398

Source : 1 Knodel and Chamratrithirong (1978 :table 6).
2 Unpublished tables from the 20 percent sample of the 1980 census.

The Feeney technique using 1970 and 1980 censuses confirms the declining trend in infant mortality in Thailand (Table 4.10). The levels of infant mortality derived from the indirect techniques, however, are lower than the direct measures from the SPC. This is due to the underenumeration of infant and child death regarding the questions on children ever born and children living in the censuses. Nevertheless, both series of measures confirm that infant mortality has been declining in Thailand, in the last two decades.

4.4.4.1 CURRENT LEVELS OF INFANT MORTALITY

Taking into account the direct measures of derived from the Survey of the Population Change (NSO, 1974-1976; NSO, 1985), the current levels of the infant mortality rates for the Whole Kingdom, and urban-rural areas are illustrated as the followings :

	Whole Kingdom	Municipal area	Non-municipal area
SPC 1 (1964-1965)	84.3[a]	67.6[a]	85.5
SPC 2 (1974-1976)	56.3	39.6	58.7
SPC 3 (1984-1986)[b]	40.7	27.6	42.6

[a] excluding Bangkok-Thonburi
b NSO forthcoming report

A reduction from the rate of 84.3 per 1,000 livebirths in 1964-65 to the level of 40.7 per 1,000 in 1985 is well-recognized. The trends for urban-rural differences are demonstrated graphically in Figure 6.

4.4.4.2 RURAL-URBAN AND RECIONAL DIFFERENTIAL OF INFANT MORTALITY

Figure 7 and Table 4.11 show the dramatic difference in infant mortality levels between the urban and rural areas in Thailand. In both places, the decline in infant mortality occurs since at least 1955. The decline in the rural areas especially in more recent years seems to be slightly faster than in the urban places where the mortlity level is already very low and the decline is leveling off.

Regional differentials in the level and trend of infant mortality are shown in Figure 8. Mortality conditions appear to be considerably worse in the North and Northeast than in the South and the Central. However, in all four regions, the decline in infant mortality is quite evident. The pace of decline is also not so different among the four regions. However, in more

Table 4.11

Comparison of the indirect estimates of infant mortality rate and index no. from the population census 1970, 1980 and the survey of population change 1984-86 (Trussell's method based on North Model life table) by education and place of residence of mother

	Census 1970	Census 1880	SPC 1984-86
The Whole Kingdom			
IMR of no schooling mother	83.1	62.1	58.8
Index no: no schooling	100.0	100.0	100.0
primary	81.9	66.9	55.8
secondary	25.1	38.3	33.2
university		25.1	16.5
Municipal Area			
IMR of no schooling mother	38.0	46.9	45.9
Index no : no schooling	100.0	100.0	100.0
primary	79.2	61.4	58.0
secondary	42.3	38.4	37.7
university	-	27.7	19.8
Non-Muncipal Area			
IMR of no schooling mother	87.0	64.7	59.6
Index no : no schooling	100.0	100.0	100.0
primary	82.1	67.4	62.2
secondary	31.1	45.6	37.1
university	-	26.9	19.5

Source : Table 6, Pejaranonda, 1987.

Figure 6 Levels of Infant Mortality Rates estimated by SPC surveys for Whole Kingdom, municipal and nonmunicipal areas, 1964-65, 1974-76 and 1985-86.

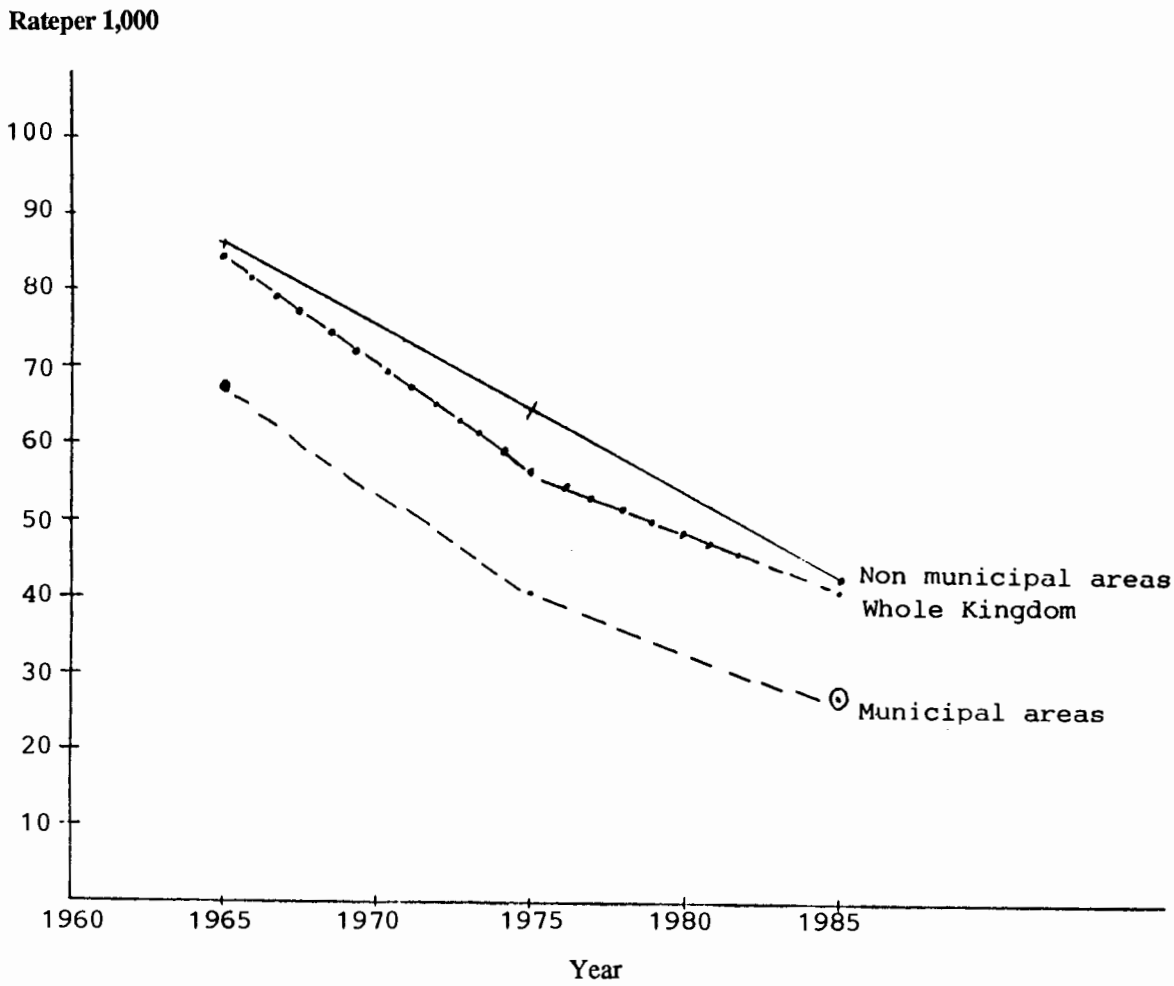
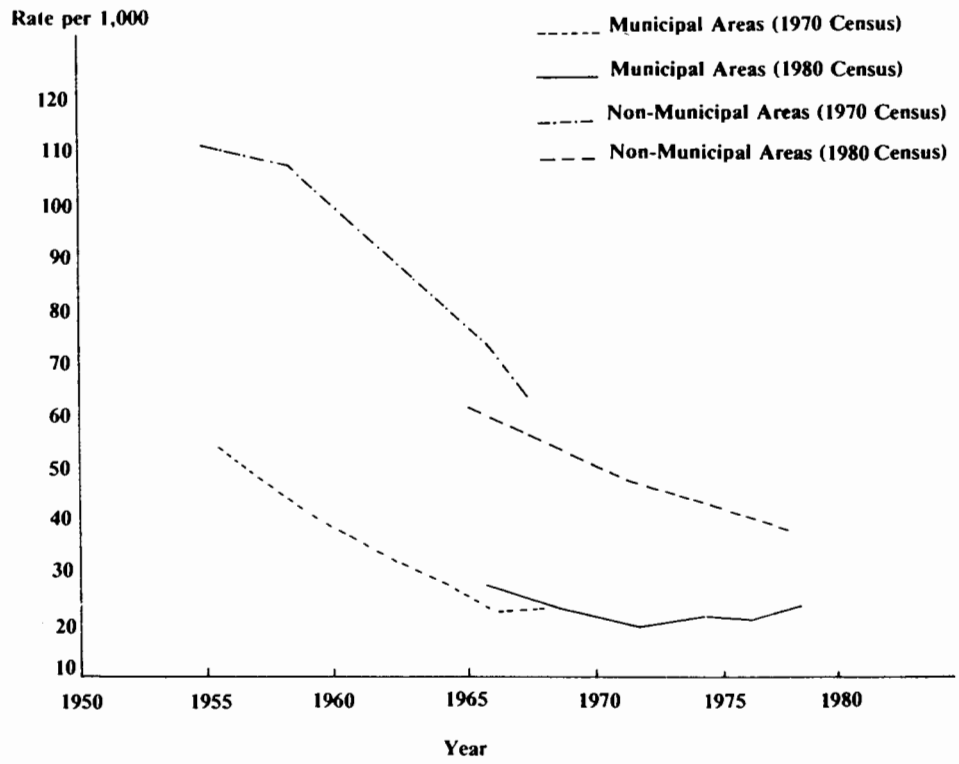


Figure 7

Trends in Infant Mortality Rate Based on Indirect Estimation Techniques (Feeney's Method) for Municipal and Non-Municipal Residence



recent years, the decline in the Central and the South seems to have leveled off since the level is already low. In sum, infant mortality in Thailand appears to have been declining not only at the national level but also at the regional and rural and urban levels.

4.4.4.3 SOCIO-ECONOMIC DIFFERENTIALS OF INFANT MORTALITY

It is revealed that the educational attainment of the mother had great influence on the mortality experience of the child. In both municipal and non-municipal areas, infant mortality is several times higher for children whose mothers had no schooling than for those children whose mothers had higher education. In the extreme case, the probability of dying before age one are 3-4 times greater for children born to rural mothers with no schooling than children born to urban mothers with university education. The effect of education on the mortality condition is consistently substantial and confirmed even when controlled for by rural-urban residence.

It should be noted also that the strong influence of the urban setting on mortality also persists even when controlling for educational level. It is interesting to note that both environmental factors represented by the rural- urban residence, as well as personal factors reflected in the educational attainment reinforce each other in their impact on mortality. Even though mothers attained a secondary or university education, for example, their infants living in urban places were still better off than those living in the rural areas.

Table 4.11 compares the 1980 estimates with the 1970s by education of mother and controlling for place of residence. Similar patterns hold for the two sets of the estimates with the reduction in rates for all education categories in 1980s. When consideration is given to the index numbers, the levels of infant mortality for each category of education attainment as a percentage of the level at "no schooling", the rate of differences by level of mother's education seems to be almost the same for both urban and rural residence. The gaps between urban-rural places tend to be narrower on this particular aspects.

Infant mortality differentials by occupation are also presented in Talbe 4.12. In both urban and rural areas, mortality is the highest among those engaged in agriculture and mining and related occupation, who constitute about 85 percent of the population. Mortality among people involved in sales and other occupations including wage labour, crafts, transport, service and production is also at a high level. Professional administrative and clerical workers experienced the lowest infant mortality of their children. Women of the same occupation tended to have similar mortality experience of their infants in either rural or urban areas. An exception was found among labourer, those staying in the urban areas had distinctly less infant mortality than their rural counterparts.

Table 4.12

Indirect estimate of IMR from the 1970, 1980 Census, and SPC 1984-86 (Round 5) (Trussell's method based on North Model life table) by occupation of mother

Data source	1970 Census	1980 Census	1984-86 SPC
Reference year	**1966**	**1976**	**1981**
Kingdom			
Administrative, executive, managerial and government official	26.4	22.4	16.7
Sales	59.3	34.7	27.8
Agricultural/farmer	76.0	47.8	38.9
Service workers*	55.5	33.9	27.3
Municipal Areas			
Administrative, etc.	14.2	12.7	-
Sales	29.7	33.5	-
Agricultural/farmer	55.3	49.4	-
Service workers*	35.5	33.4	-
Non-Municipal Areas			
Administrative, etc.	41.6	27.8	-
Sales	75.9	34.8	-
Agricultural/famer	76.1	45.6	-
Service workers*	69.3	41.6	-

* Including "labourer" in to this category of occupation in the 1970 Population Census.

Table 4.13

Indirect estimate of the infant mortality rate from the 1970 and the 1980 census (Trussell's method based on North Model life table) by religion of mothers and place of residence

	1970 census[a]	1980 census[b]
Kingdom		
Buddhism	69.7	43.8
Islam	72.4	47.5
Rural		
Buddhism	74.2	43.9
Islam	73.9	47.6
Urban		
Buddhism	29.2	33.1
Islam	56.6	32.7

Source: a Knodol, John and Aphichat Chamratrithirong, Infant and Child Mortality in Thailand : Levels, Trends and Differentials as Derived Through Indirect Estimation Techniques, 1978, table 9.
b Chamratrithirong, Aphichat and Chintana Pejaranonda. "Levels, trends and Differentials in Mortality in Thailand" New Developments in the Analysis of Mortality and Causes of Death, 1986.

Comparison between 1970 and 1980 indirect estimates are shown on Table 4.12 by selected occupations of the mother. A reduction in infant mortality in 1980 is observed for every occupation classification and even more for rural residences than the urban infants.

Mortality by religion is also presented. Buddhists which constitute 95 percent of the population and Moslems, 4 percent, are compared. Moslem children are found to experience slightly higher mortality, especially in the rural areas and the South than Buddhists. In the urban areas, however, mortality among the Moslems appears to be slightly lower than among the Buddhists. It is suspected that this may be due to the socio-economic characteristics of the Moslems who live in the Bangkok Metropolis against those living in the rural South. The effect of religion on mortality in the South is evident but may be only reflecting socio-economic factors other than religion. Table 4.13 demonstrates a reduction of infant mortality from 1970 to 1980 for rural residences but not the urban children which show relatively no difference for Buddhists but almost 50 percent reduction in rate for Moslems during this 10 years period.

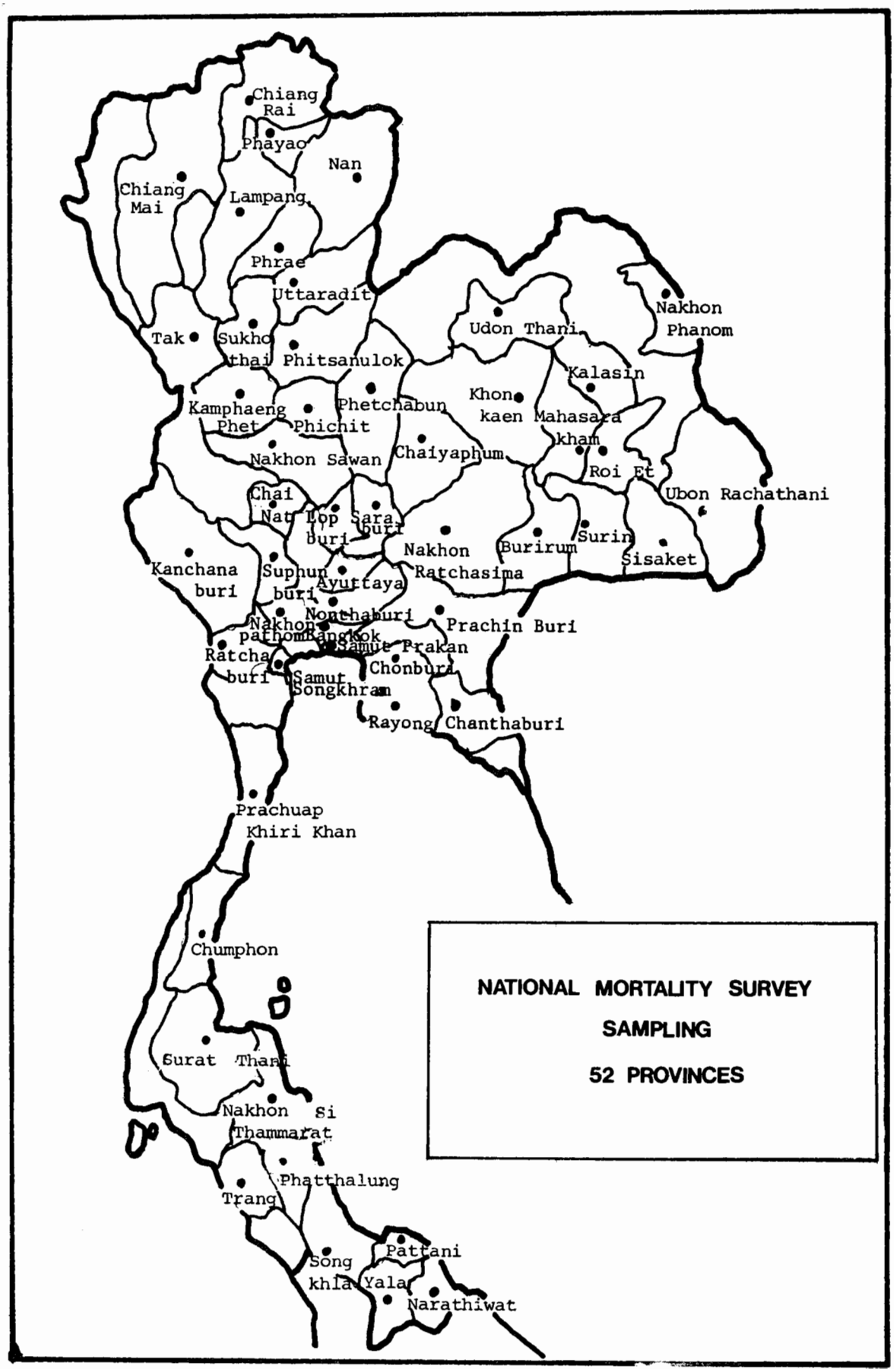
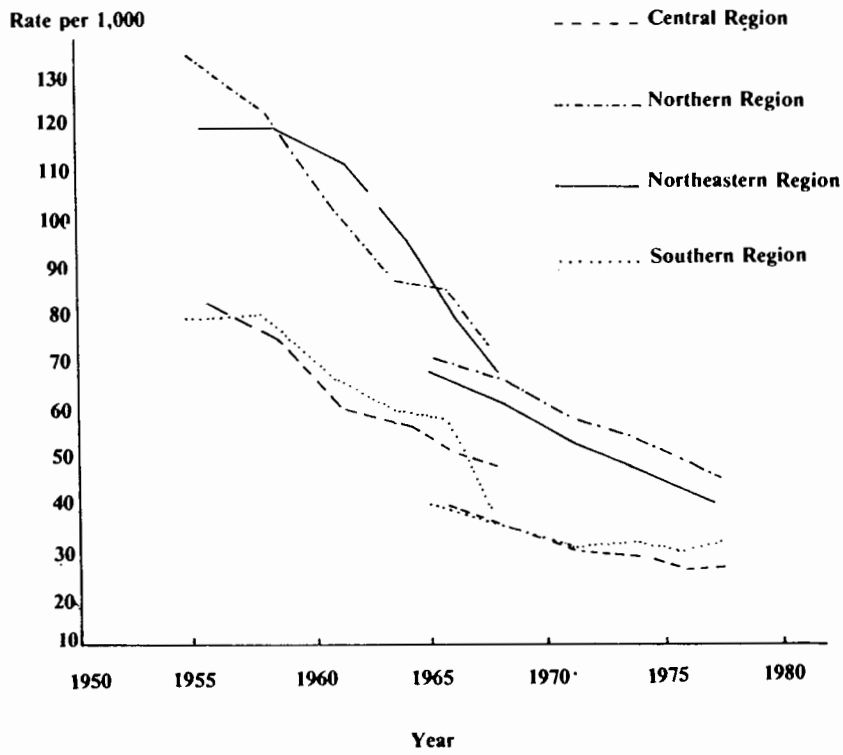

Chiang Rai
Phayao
Nan
Chiang Mai
Lampang
Phrae
Uttaradit
Nakhon Phanom
Udon Thani
Tak
Sukho thai
Phitsanulok
Kalasin
Khon kaen
Mahasara kham
Kamphaeng Phet
Phichit
Phetchabun
Nakhon Sawan
Chaiyaphum
Roi Et
Ubon Rachathani
Chai Nat
Lop buri
Sara buri
Surin
Nakhon Ratchasima
Buririum
Sisaket
Kanchana buri
Suphun buri
Ayuttaya
Nonthaburi
Prachin Buri
Nakhon pathom
Bangkok
Samut Prakan
Ratcha buri
Samut Songkhram
Chonburi
Rayong
Chanthaburi
Prachuap Khiri Khan
Chumphon
Surat Thani
Nakhon Si Thammarat
Phatthalung
Trang
Pattani
Song khla
Yala
Narathiwat
NATIONAL MORTALITY SURVEY
SAMPLING
52 PROVINCES

Figure 8

Trends in Infant Mortality Rate Based on Indirect Estimation Techniques (Feeney's Method) by Region



4.4.5 TRENDS OF MATERNAL DEATHS

The levels of death rates from causes related to pregnancy, childbirth and the puerperium in Thailand have been as low as 3 per 1,000 livebirths and decreased to lower than 1 per 1,000 from the year 1980. Even though the number of maternal deaths is believed to be an under-estimate either because of underregistration or miscategorization, the decreasing trend in this category as a cause of death seems to be significant. Table 4.14 displays the classification of maternal deaths into three categories, abortion-related, complications of pregnancy and delivery, and complications of the puerperium. The study period is from 1970-1983.

The proportion of deaths due to abortion was about 5 percent in the 1970's and increased to around 8 percent from 1980 up to 1983. In the opposite direction, deaths from complications of the puerperium to all maternal deaths decreased from 25 percent in 1970 to around 1 percent since 1980. Assuming that the report of the number of maternal deaths due to complications of the puerperium is reliable, this decreasing trend reflects the impact of improved maternal care services of the country.

4.4.6 TRENDS OF MORTALITY DUE TO VACCINE PREVENTABLE DISEASES

Diphtheria, pertussis, tetanus and poliomyelitis are selected for discussion under this category of vaccine preventable diseases. Tuberculosis was mentioned previously in this report*

The trends and levels of reported cases and deaths due to the four diseases are classified into two age groups, under 5 and 5-9 years and are demonstrated in Figure 9. It is apparent that for the underfives, only diphtheria and poliomyelitis are decreasing for both cases and deaths, while the other two have remained at the same level from 1973 through 1983. Moreover, tetanus neonatorum, the major cause of neonatal death, shows an increasing trend over time.

Disregarding tetanus neonatorum, tetanus death rates among the underfives have been declining, from 0.5 per 100,000 population in 1973 to 0.2 per 100,000 in 1983.

For poliomyelitis, the reported cases among children underfives has dropped around ten-fold during this period, and the fastest decrease occurred after 1979. This reduction in poliomyelitis is most likely the impact of the Expanded Programme of Immunization.

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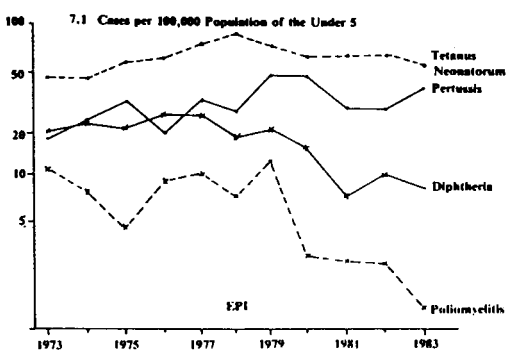
* Measles vaccine has been introduced into Thailand EPI programme since 1984.

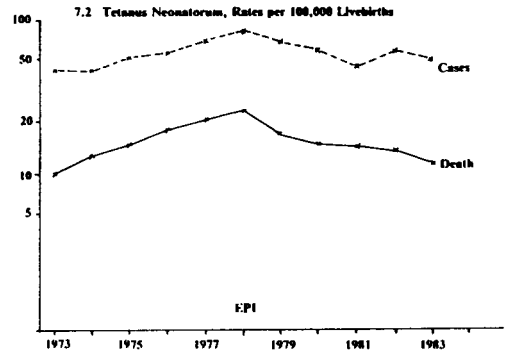
Table 4.14

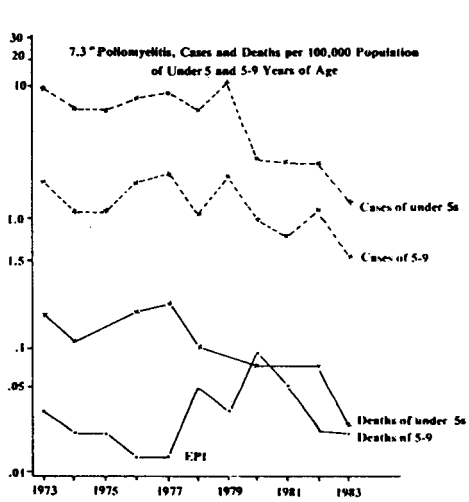
Cause of Maernal Deaths, Rate per 1,000 Livebirths, 1970-1983

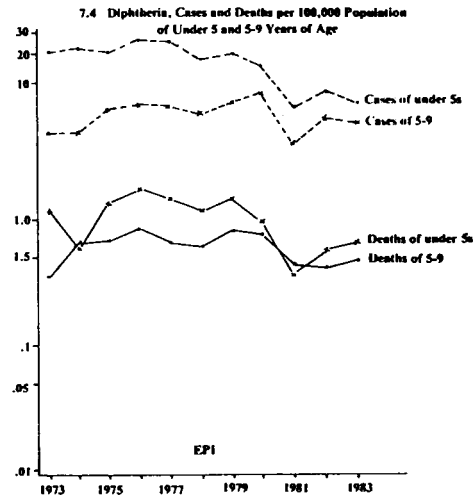
Cause of Maternal Death	1970		1975		1980		1982		1983	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
Pregnancy with abortive outcome	129	0.11	137	0.12	85	0.08	56	0.05	51	0.05
Complications of the puerperium	650	0.57	356	0.31	10	0.01	12	0.01	11	0.01
Complications of pregnancy and delivery	1810	1.58	1451	1.28	966	0.87	681	0.62	608	0.57
Total	2589	2.27	1944	1.72	1061	0.96	749	0.68	670	0.63

Figure 9
Cases and Deaths per 100,000 Population of Vaccine Preventable Diseases, Thailand, 1973-1983









4.5 CAUSE OF DEATH : TRENDS AND DIFFERENTIALS

The results of this section are derived from the analysis of death registration data from 1968 to 1984.

4.5.1 TRENDS OF LEADING CAUSES OF DEATH

Death rates per 100,000 population by cause of death in the general population for Thailand from 1968 to 1985 is shown in Figure 10. The figure shows the changes in the pattern of the leading causes of death during past decades. In 1968, it was apparent that infectious diseases ranked top as the cause of mortality among the Thai population, e.g., diarrhoeal diseases, respiratory infections especially tuberculosis and pneumonia. The non-infectious diseases (diseases of the heart, malignancy and nutritional deficiency) had lower rates. The transition in the changing pattern of cause of death seems to occur during 1970s and then shifted to the opposite direction in early 1980. The infectious diseases seem to be of less importance as a leading cause among the population which coincides with the relatively successful health programmes in combatting, and in some areas eradicating these life-threatening diseases.

Accidents, poisonings and violence became the leading causes of death in 1983. The rate of this condition was 24 per 100,000 population in 1968 and rose to 36 per 100,000 in 1983, about a 1.5 fold increase in 15 years. It should be noted that the revision of the coding list does not have any effect upon the trend of this category which includes all deaths by external causes as well as suicide and homicide.

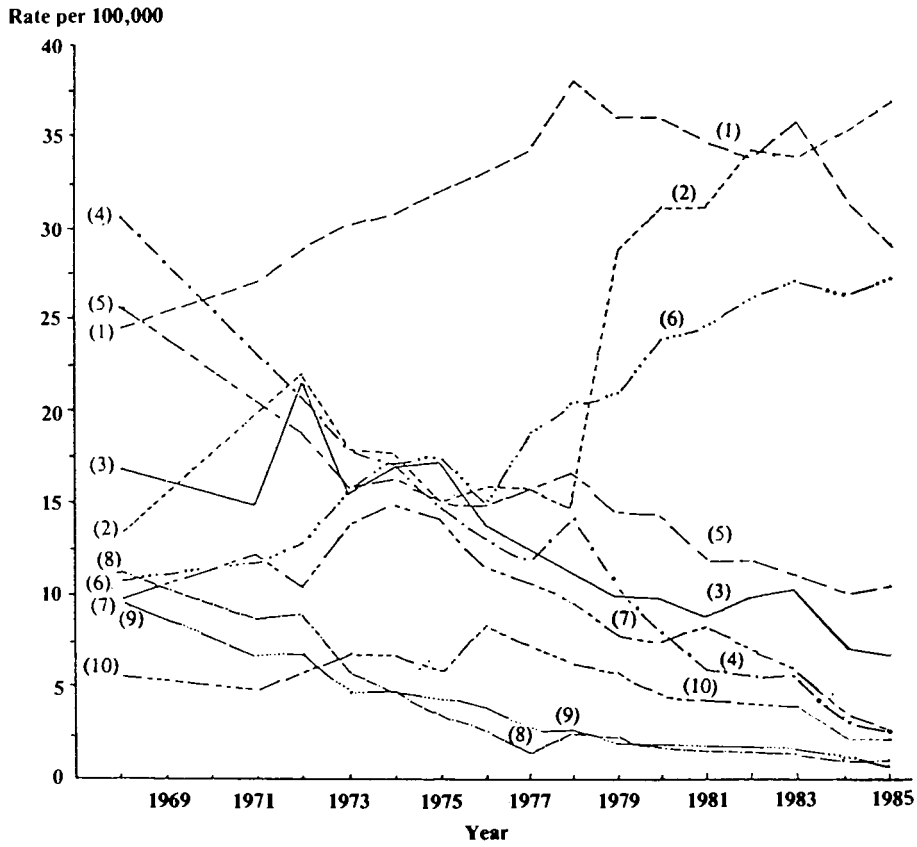
Heart disease is becoming an increasingly important killer in Thailand. Its rank has changed from 5th in 1968 to 2nd in 1983 for a relative increase of three-fold. The drastic increase in the death rate of this group of diseases occurred in 1979 and the rising trend is observed thereafter. The change in death coding from the 8th to 9th Revision in 1979 (which included into this category the diseases of pulmonary circulation) might explain the abrupt increase in 1979.

Malignant neoplasm is a major killer in the population. A continuous increase in its death rate is observed over the study period. It is known among Thai people today that malignancy largely prevails in all areas of the country and that prevalence and deaths are increasing. One factor contributing to the increase in the proper diagnosis of this disease because of advanced medical technology and the increased coverage of qualified medical and health services system.

Among the infectious desease which caused deaths among the general population in previous decades, diarrhoeal disease at the top. The trend of the deaths by diarrhoeal disease has

Figure 10

Death Rate per 100,000 Population by Cause of Death,1968-1985



(1) Accidents and Poisonings

(2) Dieases of the Heart

(3) Pneumonia

(4) Diarrhoeal Diseases

(5) Tuberculosis of the Respiratory

(6) Malignant Neoplasm (all forms)

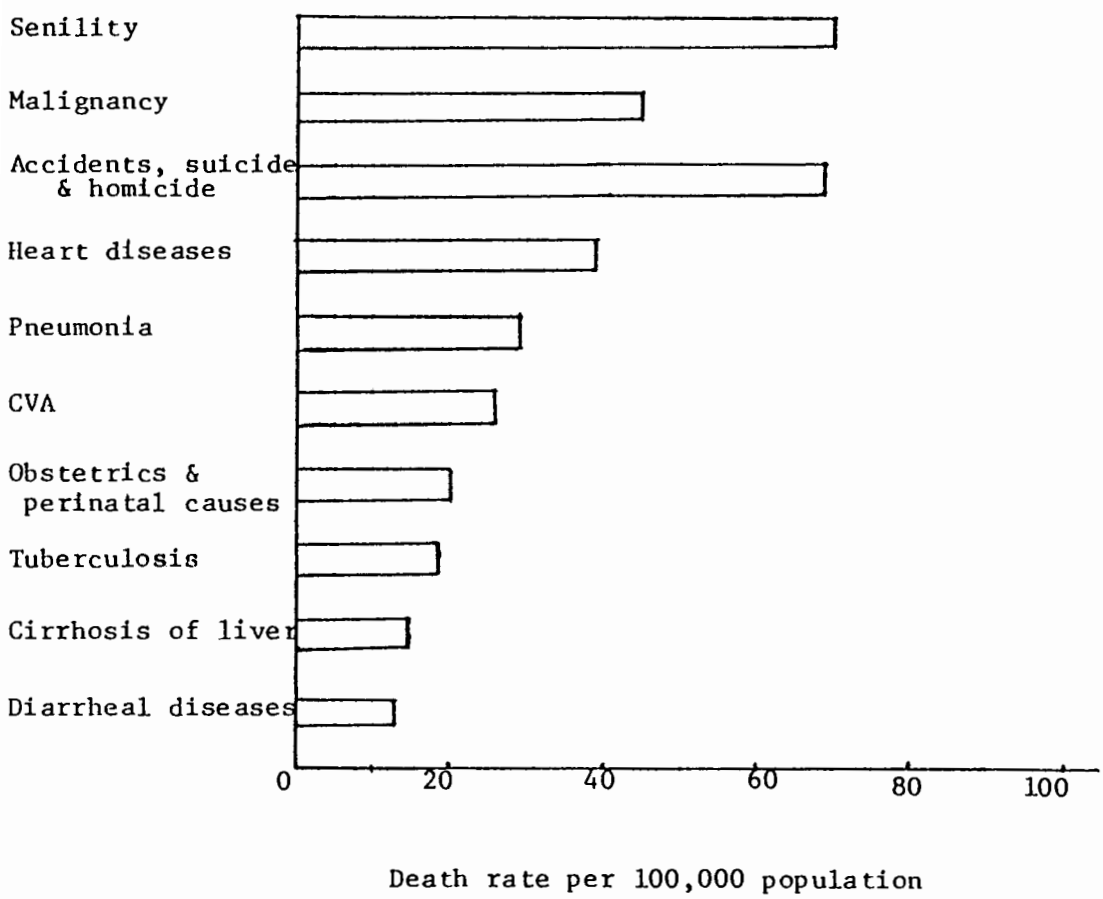
(7) Malaria

(8) Avitaminoses and other Nutritional Deficiency

(9) Diseases of Pregnancy, Childbirth and the Puerperium

(10) Diseases of the Stomach and Duodenum

Figure 11 Ten leading causes of death, Thailand, 1985.



dropped remarkedly from 32 per 100,000 population in 1968 to 6 in 1983 or about 5 times. The occurrence of diarrhoeal is an indicator of poor environment and personal hygiene and should disappear as a leading cause of death among the Thai population in this decade of sanitation and safewater supply.

Tuberculosis of the respiratory system and pneumonia, historically great killers, have decreased in their severity and prevalence. The death rate of these diseases is decreasing and their ranks as a leading cause of death were fourth and fifth in 1983.

Though their ranking as cause of death does not change very much over time, the death rates for avitaminosis and other nutritional deficiencies, decreased from 11 in 1968 to 1.4 in 1983. A similar trend and magnitude of the death rates due to diseases of pregnancy, childbirth and the puerperium is observed.

4.5.2 CURRENT LEVELS ON CAUSES OF DEATH (m0rtalily field survey 1985-86)

4.5.2.1 CAUSES OF DEATH AMONG GENERAL POPULATION

Death rates per 100,000 population by causes of death in the general population are shown in Figure 10 and Table 4.15. When the 10 leading causes of death are taken into consideration, it is worth to note that senility without psychosis which is the diagnosis for the deceased persons aged 65 and over comes into the first rank. Accidents, suicide and homicide, when grouped together, appear as the second rank and next are malignancy and heart diseases. The data shows that some of infectious diseases, ie., pneumonia, tuberculosis and diarrheal diseases, are still among the 10 leading causes eventhough on the lower rankings. And hence, diseases of pregnancy, delivery and peuperium are still an important cause of death among Thai population. It is thus observed that cirrhosis of liver and hepatitis have become one of the leading killer among our population.

In the following table, a comparison between registration data and survey data on ten leading causes of death is illustrated :

Ten leading causes of death from the two sources.

Survey data 1985-1986		Death certificate * 1984	Ranking
Senility without psychosis	69.8	Diseases of the heart	1
Accident, suicide, homicide	68.5	Accidents & Poisoning	2
Malignancy (all forms)	44.1	Malignancy	3
Heart diseases	39.0	Tuberculosis (Palmonary)	4
Pneumonia, bronchitis, asthma	29.8	Pneumonia	5
Cardio vascular accidents	25.7	Malaria	6
Conditions originating during	19.2	Diarrheal diseases	7
perinatal period		Dis. of the stomach	8
Tuberculosis (pulmonary)	18.1	Dis. of pregnancy, child-birth	9
Cirrhosis of liver, hepatitis	15.4	and puerperium	
Diarrheal disease	14.0	Nurtition deficiencies	10

* Health Statistics Division, Ministy of Public Health.

Data on cause of death from the death certificate which the Health Statistics Division of the MOPH has undertaken the responsibility, senility without psychosis is treated under " ill-defined symptoms" or "unknown cause of death", therefore it will not appear as the leading cause of death. In fact among the aging population of over 70 years of age, death oftenly occurs during sleep without prior signs or symptoms of illness. This particular deceased could however be diagnosed as "senility " with no doubt. The older the population of the country, the more will die at old age. Therefore in this survey "senility without psychosis" is adopted as the cause of death, separately from "ill-defined symptoms".

Apart from senility without psychosis, accidents and injury, heart disease and malignancy remain as the three top causes of death among the Thai population observed from these two particular sources. From the survey data, cardio vascular accidents (CVA)and cirrhosis of liver (or hepatitis), other two non-infectious diseases, reveal on the next ranks among the ten leading causes. The rest are pneumonia, conditions originating during perinatal period, pulmonary tuberculosis and diarrheal diseases, which are also on the list of ten leading causes of death from the report of Health Statistics Division of the MOPH.

4.5.2.2 URBAN-RURAL DIFFERENCES

Considering separately the urban and rural residence, deaths from violence reveals on the top ranking in the urban. The next are all non-infectious diseases, ie., senility, heart

Table 4.15

Death rates per 100,000 population (all ages) on causes of death by region, 1985/86

Cause of death	Whole Kingdom	Urban	Rural	Bangkok Metropolis	Central	North	Northeast	South
1. Diarrheal diseases	14.0	6.1	22.1	10.6	14.0	9.1	17.7	17.6
2. Tuberculosis	18.1	10.9	25.5	5.3	17.2	21.2	17.7	24.6
3. Tetanus	1.0	-	2.1	-	-	3.0	1.5	-
4. Rabies	0.7	0.7	0.7	-	1.6	-	-	1.8
5. All other infectious disease	1.4	0.7	2.1	-	1.6	3.0	1.5	-
6. Malaria	2.4	1.4	3.4	2.7	1.6	1.5	5.9	-
7. Malignancy	44.1	36.0	52.4	58.4	40.6	48.6	41.4	33.4
8. Diab. Mellitus	9.2	14.3	4.1	8.0	9.4	9.1	10.3	8.8
9. Psychosis/drug dependence	3.4	2.7	4.1	5.3	4.7	1.5	3.0	3.5
10. Meningitis encephalitis, epilepsy	4.4	4.1	4.8	-	4.7	6.1	4.4	5.3
11. Heart diseases, hypertensive disease	39.0	40.7	37.3	47.8	37.5	54.6	32.5	24.6
12. Cerebro vascular accidents(CVA)	25.7	27.8	23.5	13.3	28.1	34.9	20.7	26.3
13. Pneumonia, bronchitis, asthma	29.8	17.7	42.1	13.3	20.3	42.5	26.6	40.4
14. Peptic ulcer, appendicitis, int. obstruction	10.3	8.8	11.7	2.7	1.6	27.3	8.9	7.0

(Cont.)

Table 4.15 (Cont.)

Cause of death	Whole Kingdom	Urban	Rural	Bangkok Metropolis	Central	North	Northeast	South
15. Cirrhrosis of liver, hepatitis	15.4	11.5	19.3	15.9	9.4	15.2	3.1	3.5
16. Nephrosis, prostrate troubles	10.3	8.8	11.7	-	6.2	24.3	8.9	7.0
17. Conditions originating during perinatal period	19.2	3.4	35.2	5.3	9.4	15.2	36.9	22.8
18. Pyraxia of unknown origin	16.4	7.5	25.5	8.0	12.5	18.2	22.2	17.6
19. Ill-defined cause	34.9	23.8	46.2	18.6	43.7	31.9	23.7	52.7
20. Accidents & injury, Suicide,Homicide	68.5	58.4	78.6	74.8	64.0	101.7	48.8	72.1
21. Senility without psychosis	69.8	42.1	98.0	29.2	87.4	74.4	59.1	84.3
22. Thyroid trobles	1.0	0.7	1.4	-	-	3.0	1.5	-
23. Anemia	2.0	0.7	3.4	2.7	6.2	1.5	-	-
24. Congenital anomalies	0.7	-	1.4	-	-	-	1.5	1.8
25. Haemorrhagic fever	5.1	1.4	9.0	2.7	3.1	1.5	14.8	1.7
All cause	446.9	329.9	565.9	297.4	424.6	594.4	440.5	456.6
Total sample population	292,212	147,301	144,911	37,663	64,065	65,891	67,652	56,941

diseases, malignancy and CVA. Pneumonia or bronchitis as cause of death appear with low magnitude of 17.7/100,000 population. (Fig.12)

Among rural residents, senility as cause of death comes up at the highest rate of 98 per 100,000 population. Deaths from violence is on the second rank but the magnitude is high at the rate of 78.6. If should be noted here that deaths caused by homicide among rural population is as high as 29/100,000. As well, the suicide rate is 11.7/100,000 in rural areas whereas it is 4.1/100,000 in the urban population. However, deaths from accidents and other violence for rural is lesser as it is 4.1/100,000 in the urban population. However, deaths from accidents and other violence for rural is less than the urban's.

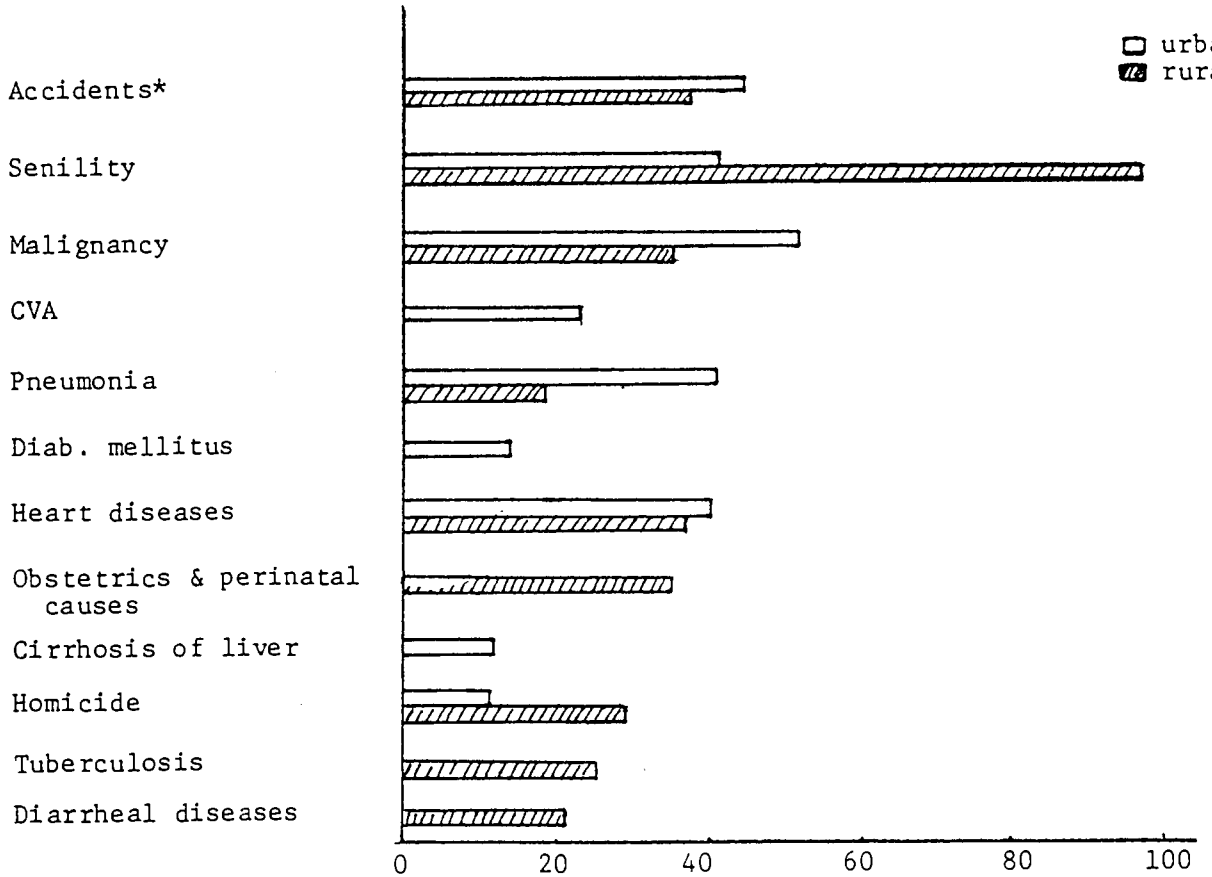
Malignancy (all forms) is also the major killer among rural population and the rate is higher than that among the urban sample (52.4 vs 36.0). Infectious diseases like pneumonia and conditions originating during perinatal period, are prevailed as the major contribution to deaths among rural population.

Major causes of death between urban and rural population, 1985.

urban		rural	
Accidents, suicide, homicide	58.4	Senility without psyhosis	98.0
Senility without psychosis	42.1	Accidents, suicide, homicide	78.6
Heart diseases	40.7	Malignancy	52.4
Malignancy	36.0	Pneumonia	42.1
CVA	27.8	Heart diseases	37.3
Pneumonia, bronchitis	17.7	Conditions originating during perinatal period,	35.2

From Table 4.15, it could be observed also the proportion of ill-defined cause of death. Rate from ill-defined causes is 35 per 100,000 for Whole Kingdom and it is apparent to be better off among urban residence with the rate of 23.8 but almost double of the urban rate is the rural's. These proportions reflect the quality of data as well as the ignorance of the respondents, whether they were not properly informed by the healers or the deceased persons were not accessible to the qualified medical attendants before death.

Figure 12 Leading causes of death, urban-rural, Thailand, 1985



Death rate per 100,000 population.

*Accidents and injury excluding suicide and homicide

4.5.2.3 SEX DIFFERENCES

The well-known sex differential on mortality that death rate for males is higher than for female are also demonstrated in this study. The life expectancy at birth estimated by the working Group on Population Projections (1981) yield the averages for 1980-1985 as 60.7 years and 64.8 years for Thai males and females repectively.

Table 4.16
Selected leading cause of death (rate per 100,000 population) by sex and sex ratios of the rates, 1985

Causes of death	M	F	Ratio M:F
Diarrheal diseases	12.6	15.4	0.8
Tuberculosis	23.8	12.7	1.9
Malaria	3.5	1.3	2.7
Pneumonia	35.8	24.1	1.5
Diseases of Stomach and Duodenum	9.8	10.7	0.9
Conditions originating during perinatal period	22.4	16.0	1.4
Malignancy (all forms)	48.4	40.1	1.2
Heart diseases	47.0	31.4	1.5
CVA	30.1	21.4	1.4
Cirrhosis of Liver, hepatitis	24.5	6.7	3.7
Accidents and injury	58.9	24.7	2.4
Suicide	11.2	4.8	2.3
Homicide	3.3	6.0	0.6
Senility without psychosis	64.5	74.9	0.8

The cause - sex specific death rates due to selected major causes of death are shown in Table 4.16 along with the sex ratio of the rates male to female. It is observed that there are more male deaths than female deaths for almost all major causes with the exception of diarrheal diseases, diseases of stomach and duo-denum, homicide and senility without psychosis. The patterns of sex differences on cause of death in this study are consistent with the data obtained from the death certificates in 1983 (Secondary Data Analysis, IPSR, 1985).

The sex ratios of the rate are in the ranges of 1.2 to 1.9 for malignancy (all forms), Conditions originating during the perinatal period, pneumania, heart disease, cardio vascular accidents (CVA), and tuberculosis. For malaria, the ratio is 2.7, almost three times of males died by this disease than females. Malaria, today in the disease endemic areas at the border of the country and in the jungle where male workers are predominant and this may be the explanation

of this incidence. Evidently, cirrhosis of liver or hepatitis cause male's deaths almost four times than the female's. Major health risk confounding these diseases is alcoholic beverage which is observed to be largely consummed by males than females in this country.

Accident and injury when classified separately from suicide and homicide, are still in the ratio of 2.4. More males died from accidents and violence and it coincides with the ratio of male to female death rates cause by suicide. Suicide rate is used as an indicator measuring mental health status of the community. Without the data on attempted suicide, it may be presummed that males have more serious mental health problem than the female population.

For the deaths diagnosed as senility without psychosis, the rates are highest being 64.5 and 74.9 for male and female respectively. The sex ratio of the rates is in the expected pattern, that is more females died at the age of 65 and over. The evidence is relevant to the longer average life expectancy among females than the Thai males.

4.5.2.4 REGIONAL DIFFERENCES

The four regions of the country, with an inclusion of Bangkok Metropolis treated as the fifth region in this study, refers to the region where the death is taken place which is also the place of usual residence of the deceased. An exception regarding different place of residence and place of occurrence is for the deceased causes by accidents and violence. However an aggregrated data by region here appears to yield significant meanings relatively correlated with socio-economic perspectives as well as degree of development of the regions. Death rates per 100,000 population on causes of death by region is displayed on Table 3.5.

Figure 13, illustrates six infectious diseases which are major causes of death classified by regions; diarrheal diseases, pulmonary tuberculosis, malaria, pneumonia, perinatal causes, and dengue haemorrhagic fever. The northeastern population appears to have highest death rates caused by these diseases except tuberculosis which the South won over. Bangkok Metropolis and the Central seem to portray the lower rates. The North has the highest death rate from pneumonia. Obviously, there is no malaria deaths from the South. In conclusion, it is apparent that the Northeast and the South have sustained the higher death rates from infectious diseases.

Regarding the non-infectious or degenerative diseases, ie., malignancy, heart diseases, cardiovascular accidents, cirrhosis of liver and psychosis/drug dependence, the higher death rates reveal among Bangkok Metropolis, the Central and the North, the more developed regions.

Fig.13 **Regional Differences of the Major Causes of Death, 1985**

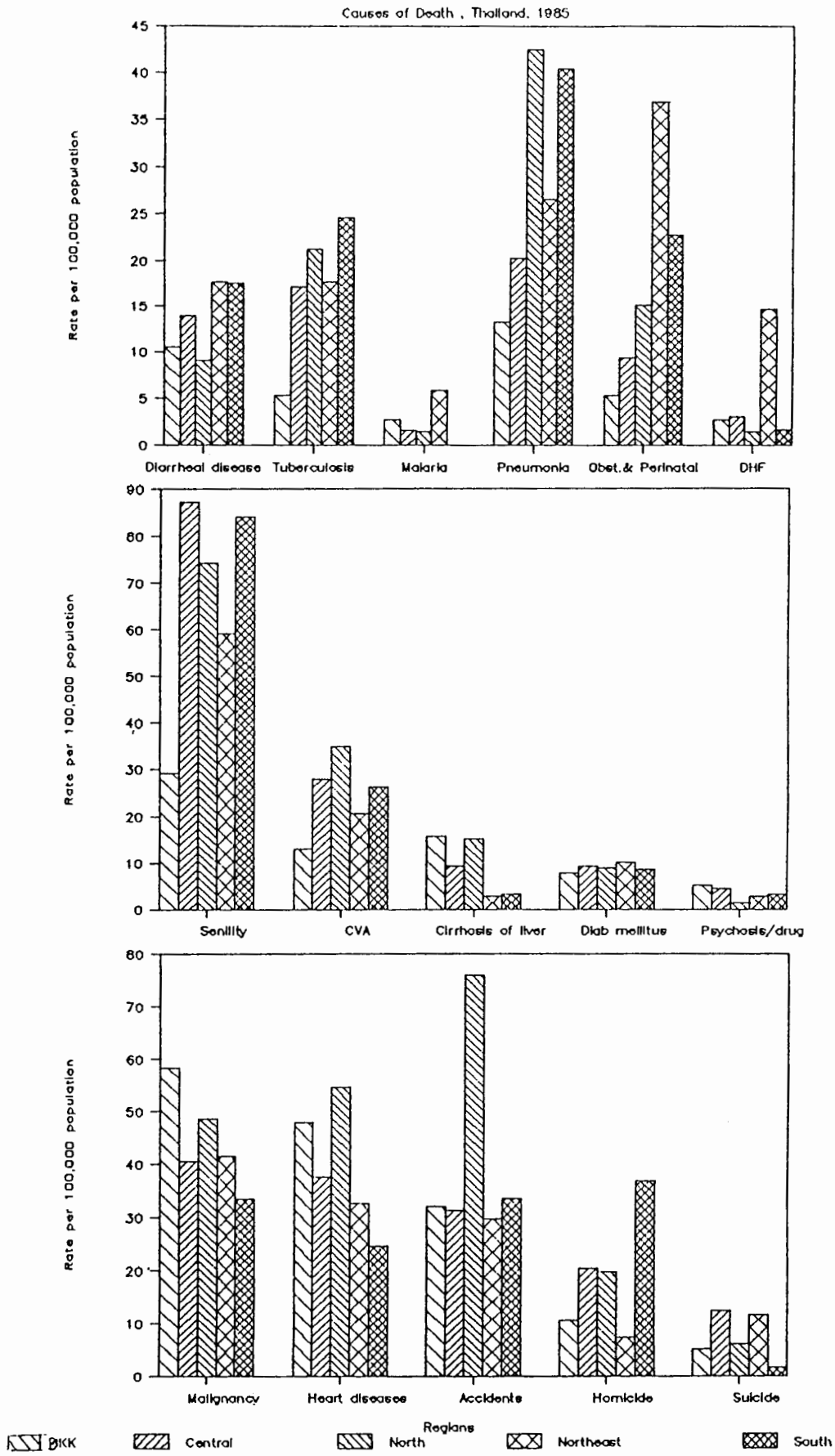


Table 4.17

Death rates per 100,000 population (all ages) on causes of death by sex, 1985/86.

Cause of death	Male	Female
Diarrheal diseases	12.6	15.4
Tuberculosis	23.8	12.7
Tetanus	2.1	-
Rabies	1.4	-
All other infectious Disease	2.1	0.6
Malaria	3.5	1.3
Malignancy	48.4	40.1
Diab. Mellitus	6.3	12.0
Psychosis/drug dependence	6.3	0.6
Meningitis encytalitis, epilepsy	3.5	5.3
Heart diseases, hypertensive dis.	47.0	31.4
Cerebro vascular accidents	30.1	21.4
Pneumonia, bronchitis, asthma	35.8	24.1
Peptic ulcer, appendicitis, int. obstruction	9.8	10.7
Cirrhrosis of liver, hepatitis	24.5	6.7
Nephrosis, prostrate	9.1	11.4
Certain conditions orignating during the perinatal period	22.4	16.0
Pyraxia of unknown origin	14.7	18.0
Ill-defined cause	46.3	24.1
Accidents & injury	58.9	24.7
Suicide	11.2	4.8
Homicide	3.3	6.0
Senility without psychosis	64.5	74.9
Tyroid troubles	-	2.0
Anemia	0.7	3.3
Congenital anomalies	1.4	-
Haemorrhagic fever	7.7	2.7
All causes	572.3	370.3

Accidents and violence with respect to regional differences, the patterns are still similar to the 1985 death registration rates. The level for the Central is highest and next are the South, Bangkok, the Central and the Northeast. It should be worth to note that rate of homicide is highest in the South whereas the suicide rate is lowest among other regions.

4.5.2.5 CAUSES OF DEATH AMONG THE UNDERFIVES

Infants and the early childhood (1-4 years) are the population under the surveillance of health and nutrition programmes for their sensitivities to disease occurrance and death when exposed to health hazards or any risk factors. The major causes of illness and death among this group of population are still the preventable infectious diseases therefore they are always under consideration among health and social related development programme authorities.

In terms of absolute number, deaths of the underfives constituted 12.2 percent of total death enquiries and the infant deaths contribute as 79.2 percent of all death from the underfives. It could be observed that conditions originating during the perinatal period caused half of infant deaths (42.9%). The rest was caused by the infection of respiratory system including pneumonia, bronchitis and asthma (11.9%), diarrheal diseases (10%), and meningitis or encephalitis (6%). The ill-defined causes and pyrexia of unknown origin are also listed under the cause of infant deaths. (17.5%).

It can be seen from Table 4.18 that the cause- specific death rates of the under five classified by place of residence and the region. The first in rank are conditions originating in the perinatal period and the rate is as high as 174.1 per 100,000 population. Next are the infections of the respiratory system including pneumonia, bronchitis and asthma, the rate is 53.8 per 100,000. Diarrheal diseases ranked third and pyrexia of unknown origin comes at almost the same magnitude. Accidents and injury and Dengue haemorrhagic fever kill more than 30 children of the under fiver per 100,000 population of the same age. Meningitis or encephalitis, heart diseases, malignancy and congenital anomalies are also included in the first 10 causes of death among these children.

Rural death rates of all infectious diseases mentioned earlier as the major causes for death among the under five, are two or three times higher than the urban death rates. Deaths originating from the perinatal period are 34/100,000 and 296/100,000 for urban and rural respectively. Congenital anomalies are the cause of death among rural children only, as well as nephritis.

Not only infectious diseases, heart diseases, malignancy, disease of blood and blood forming organs and accidents, all causes more deaths among rural children of under five years.

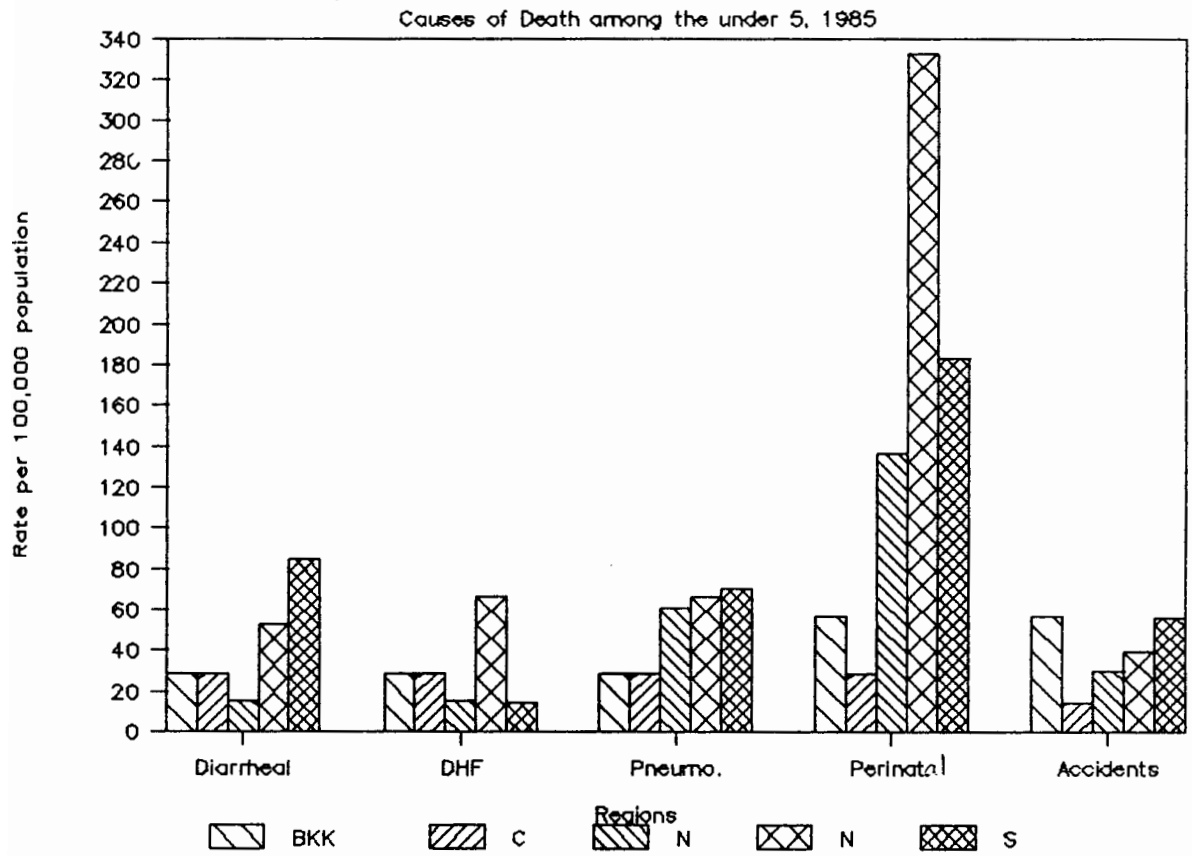
Regional differences of the major causes of death among the under five is shown in Figure 14. For diarrheal diseases, the South shows the highest magnitude with the rate of 84.4 per 100,000. Next ranks the Northeast, Bangkok and the Central are having the similar low rates. The lowest rate appears in the North.

Table 4.18

Death rates per 100,000 population aged under five by causes of death and place of residence, 1985/86

Cause of death	Whole Kingdom	Urban	Rural	Bangkok Metropolis	Central	North	Northeast	South
1. Diarrheal diseases	44.3	20.4	65.2	28.5	29.0	15.2	53.3	84.4
2. Tetanus	3.2	-	5.9	-	-	15.2	-	-
3. Haemrrhagic fever	31.7	13.6	47.4	28.5	29.0	15.2	66.7	14.1
4. Other infectious & parasitic diseases	6.3	6.8	5.9	-	-	30.4	-	-
5. Malignancy	9.5	6.8	11.8	-	14.5	15.2	13.3	-
6. Dis. of blood & blood forming organs	3.2	-	5.9	-	14.5	-	-	-
7. Meningitis, enceptalitis, epilepsy	22.2	20.4	23.7	-	14.5	30.4	26.7	28.1
8. Heart disease	15.8	6.8	23.7	28.5	14.5	45.6	-	-
9. Pneumonia, bronchitis, asthma	53.8	34.0	71.1	28.5	29.0	60.7	66.7	70.4
10. Peptic ulcer, appendicitis, intestinal obstruction	3.2	6.8	-	-	-	15.2	-	-
11. Nephritis	3.2	-	5.9	-	-	15.2	-	-
12. Congenital anomalies	6.3	-	11.8	-	-	-	13.3	14.1
13. Conditions originating during perinatal period	174.1	34.0	296.2	57.0	87.1	136.7	333.3	182.9
14. Pyrexia of unknown origin	47.5	6.8	82.9	-	43.6	75.9	53.3	42.2
15. Ill-defined causes	41.2	34.0	47.4	-	43.6	60.7	53.3	28.1
16. Accidents & injury	38.0	20.4	53.3	57.0	14.5	30.4	40.0	56.3
All causes	503.4	210.8	758.3	228.0	334.0	561.9	720.0	520.6
Total sample population (<5 yrs)	31,586	14,706	16,880	3,508	6,886	6,585	7,500	7,107

Figure 14 Regional Differences of the Major



As expected, the Northeast contains the highest death rate from haemorrhagic fever, while the rest has low and relatively similar death rates.

Infections of the respiratory system including pneumonia seems to demonstrate also the same and low rates for Bangkok and the Central. The third to the fifth ranks are the North, Northeast and the South.

Death from conditions originating from the perinatal period is very high for the under-fives in the Northeast (330 per 100,000). The corresponding rate for the South is also high at 183 per 100,000. Next is the North, Bangkok and the Central region.

Accidents and injury even among the early childhood are highest in Bangkok as cause of death, lowest in the Central and high in the South.

As far as the sex difference is concerned, no definite patterns are observed among death rates of these populations from infectious diseases, as shown in Table 4.19. The rates from diarrheal diseases are almost the same for boys and girls, but the sex ratio of the rates, male to female, for haemorrhagic fever is high at 3.8. All other illness are not very different between sexes including conditions originating from the perinatal period. Accidents and injury cause death in the girls of under 5 almost twice as often as of the boys at the same age.

One of the determinants of early childhood mortality which has been empirically observed is the age of the mother. Figure 14 demonstrates the cause-specific death rates among the under 5 by age of the mother. The age is classified into 3 broad categories : 15-19, 20-34 and 35-49 years. It is obvious to say that death rates for conditions originating during the perinatal period seems to have negative association with age of mother, highest among the youngest mothers, and lowest among the oldest group. Congenital anomalies cause death of children under 5 from only mothers 35 years and over. Infections of the respiratory system including pneumonia yield the highest death rate among young mothers and reduced by half among mothers of 20-34 and 35-49. Similar rates caused by accidents and injury are observed among the three groups of mothers (Figure 15).

4.5.2.6 AGE-CAUSE SPECIFIC DEATH RATES 1985-1986

Under this section, age at death is grouped into broad categories according to phase of the human life cycle which are differentially exposed to health risk factors or health hazards. Table 4.20 and Figure 16 show the age-sex cause specific death patterns. It is apparent that the age- cause patterns derived from this survey is similar to the 1981 data (Secondary Data Analysis), however the survey estimates reveal the higher magnitude expecially for male rates.

Table 4.19

Death rates per 100,000 population aged under five by cause of death and sex, 1985/86

Cause of death	Male	Female
1. Diarrheal diseases	43.3	45.4
2. Tetanus	6.2	-
3. Haemrrhagic fever	49.4	13.0
4. Other infectious & parasitic diseases	6.2	6.5
5. Malignancy	6.2	6.5
6. Dis. of blood & blood forming organs	6.2	-
7. Meningitis, enceptalitis, epilepsy	18.5	26.0
8. Heart disease	30.9	-
9. Pneumonia, bronchitis, asthma	55.6	51.9
10. Peptic ulcer, appendicitis, intestinal pbstrictopm	-	6.5
11. Neptivitis	6.2	-
12. Congenital anomalies	12.4	-
13. Obstetrict & perinatal causes	191.5	155.8
14. Pyrexia of unknown origin	61.8	32.5
15. Ill-defined cause	68.0	13.0
16. Accidents & injury	24.7	51.9
Total sample population (<5 yrs.)	16,184	15,402

The list of major causes of death by sex for each age group is clearly demonstrated on Table 4.21. Apart from the causes of death among the population aged under five described in the previous section, relatively low cause-specific death rates are apparent among the age groups 5-14, 15-24 and 25-44 years.

Male population aged 15-24 years are exposed most and died from accidents and injury at the rate of 67.3 per 100,000, as compared to the rate of 2.9 per 100,000 for females of corresponding age group. Suicide, at the higher rate than males 5-14 years, comes up on the second rank as cause of death. The death rates among these age-group are all less than 10 per 100,000 for both sexes, nevertheless some specific diseases or conditions are located under the major causes of death. For instances, malaria, tuberculosis, malignancy, psychosis/drug dependence and CVA for males, and obstetric cause, peptic ulcer, psychosis or drug dependence, malaria, diarrheal diseases for females.

Table 4.20

Age-cause specific death rates per 100,000 population by sex, 1985/1986

Cause of death	Age at death (years)											
	0-4		5-14		15-24		25-44		45-64		65 and over	
	Male	Famale	Male	Famale	Male	Famale	Male	Famale	Male	Famale	Male	Famale
1. Diarrheal diseases	43.3	45.4	5.8	-	3.2	5.8	5.3	4.9	11.2	25.2	81.3	107.6
2. Tuberculosis	-	6.5	-	-	6.4	2.9	1.3	9.8	89.5	20.1	223.7	76.9
3. Tetanus	6.2	-	-	-	-	-	2.6	-	5.6	-	-	-
4. Rabies	-	-	2.9	-	-	-	-	-	5.6	-	-	-
5. All other infectious Disease	6.2	6.5	-	-	-	5.8	-	-	11.2	-	-	-
6. Malaria	-	-	-	3.0	9.6	-	-	-	11.2	5.0	-	-
7. Malignancy	6.2	6.5	5.8	-	6.4	-	21.2	24.7	207.0	140.8	386.3	292.0
8. Diab. Mellitus	-	-	-	-	-	-	2.6	2.5	11.2	45.3	122.0	123.0
9. Psychosis/drug dependence	-	-	-	-	6.4	5.8	7.9	-	11.2	5.0	40.7	-
10. Meningitis encytalitis, epilepsy	18.5	26.0	-	9.0	-	-	-	2.5	11.2	-	-	-
11. Heart diseases, hypertensive dis.	30.9	-	11.5	-	3.2	-	37.1	17.3	123.1	95.6	406.7	292.0
12. Cerebro vascular accidents	-	-	-	-	6.4	2.9	13.2	2.5	100.7	45.3	366.0	338.1
13. Pneumonia, bronchitis, asthma	55.6	51.9	2.9	3.0	3.2	-	10.4	4.9	95.1	35.2	386.3	261.3
14. Peptic ulcer, appendicitis, int. obstruction	-	6.5	-	-	-	5.8	26.5	-	11.2	55.3	223.7	46.1
15. Cirrhrosis of liver, hepatitis	-	-	-	-	3.2	-	21.2	4.9	106.3	35.2	142.3	15.4
16. Nephrosis, prostrate	6.2	155.8	-	-	-	-	5.3	4.9	28.0	35.0	101.7	46.1
17. Cond. originating dur. perinatal period	191.5	5.8	-	-	-	5.8	2.6	-	-	-	-	-
18. Pyraxia of unknown origin	61.8	32.5	5.8	9.0	-	17.7	-	7.4	16.8	25.2	122.0	169.1

(Cont.)

Table 4.20 (Cont.)

Cause of death	Age at death (years)											
	0-4		5-14		15-24		25-44		45-64		65 and over	
	Male	Famale	Male	Famale	Male	Famale	Male	Famale	Male	Famale	Male	Famale
19. Ill-defined cause	74.1	13.0	2.9	-	16.0	8.8	26.5	10.0	14.0	80.5	264.3	184.4
20. Accidents & injury	24.7	45.5	17.3	21.0	67.3	2.9	95.3	12.3	67.1	45.3	101.7	46.1
21. Suicide	-	-	5.8	-	16.0	-	10.6	7.4	22.4	5.0	20.3	-
22. Homicide	-	6.5	5.8	-	-	-	68.8	14.8	44.8	-	40.7	15.4
23. Senility without psychosis	-	-	-	-	-	-	-	-	11.2	10.0	1830.0	1660.0
24. Thyroid troubles	-	-	-	-	-	-	-	-	-	15.0	-	-
25. Anemia	6.2	-	-	6.0	-	-	-	2.5	-	10.0	-	-
26. Congenital anomalies	-	-	-	-	-	-	-	-	-	-	-	-
27. Haemorrhagic fever	49.4	13.0	8.6	6.0	-	-	-	-	-	-	-	-
Total sample of population	16,184	15,402	34,664	33,312	31,215	33,985	37,770	40,505	17,871	19,880	4,918	6,506

Table 4.21

Leading causes of death by age and sex

Age 0-4

Male Perinatal causes / Pyrexia of unknown origin / Pneumonia, bronchitis, asthma / Haemorrhagic fever / Diarrheal diseases / Heart diseases / Accidents & injuries / Meningtis, encephalitis

Female Perinatal causes / Pneumonia, asthma / Accidents & injuries / Diarrheal diseases / Pyrexia of unknown origin / Meningitis, encephalitis / Haemorrhagic fever / Tuberculosis

Age 5-14

Male Accidents &injuries / Heart diseases / Haemorrhagic fever / Homicide / Suicide / Malignancy / Diarrheal diseases

Female Accidents & injuries / Meningitis, encephalitis / Pyrexia of unknown origin / Anemia / Haemorrhagic fever / Pneumonia, asthma / Malaria

Age 15-24

Male Accidents & injuries / Suicide / Malaria / Tuberculosis / Malignancy / Psychosis, drug dependence / Cerebro-vascular accidents

Female Pyrexia of unknown origin / Obstetic causes / Pepticuleer, intestinal obst. / Psychosis, drug dependence / Malaria / Diarrheal diseases / Accidents & injuries

Age 25-44

Male Accidents & injuries / Homicide / Heart diseases / Pepticuleer, intestinal obst. / Cirrhosis of liver, hepatitis / Malignancy / CVA / Suicide

Female Malignancy / Tuberculosis / Heart diseases / Homicide / Accidents & injuries / Pyrexia of unknown origin / Suicide / Cirrhosis of liver, hepatitis

Age 45-64

Male Malignancy / Heart diseases / Cirrhosis of liver / CVA / Bronchitis, asthma / Tuberculosis / Accidents & injuries

Female Malignancy / Heart diseases / Pepticuleer, intestinal obst. / CVA / Diab. , Meltitus / Accidents & injuries / Neptrisis, nephrosis

Age 65 and over

Male Senility without psychosis / Heart diseases / Malignancy / Pneumonia, bronchitis, asthma / Cerebro vascular accidents / Tuberculosis / Pepticuleer / Cirrhosis of liver, hepatitis / Diale, mellitu

Female Senility / CVA / Malignancy / Heart diseases / Pneumonitis / Pyrexia of unknown origin / Diab. mellitus / Diarrheal diseases / Tuberculosis

Figure 15

Death among the under five
by age of mother, 1985

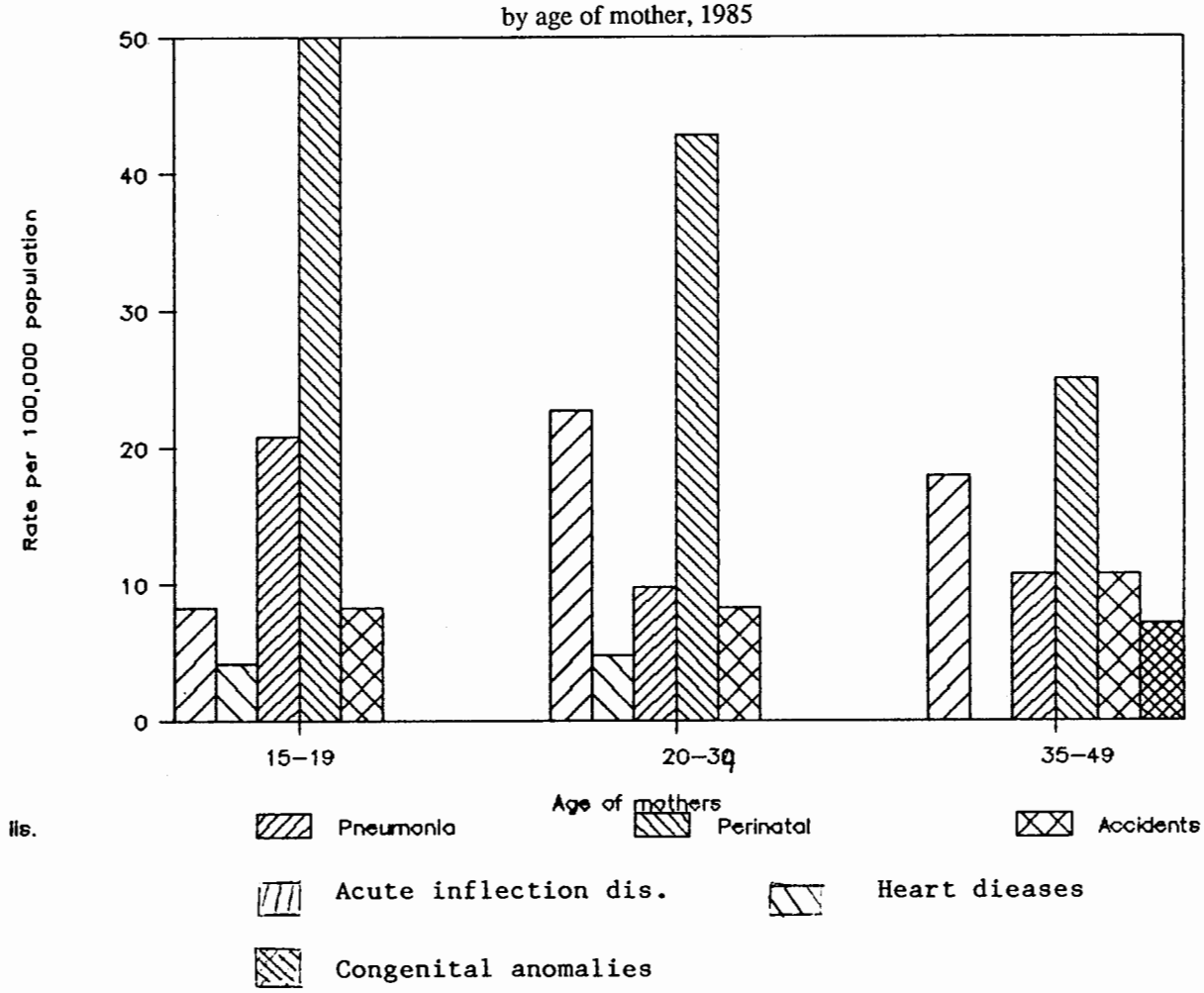


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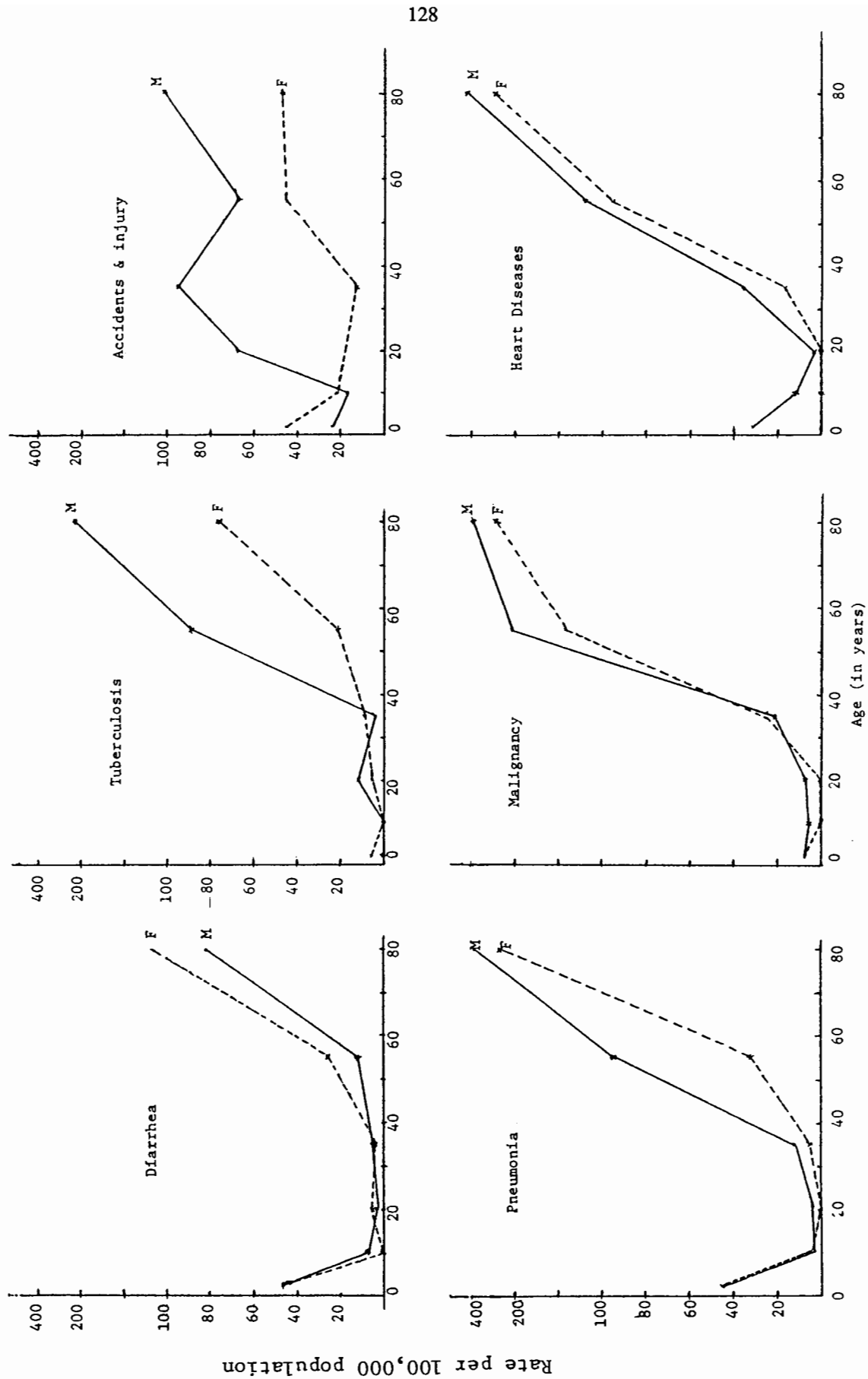
Figure 16

Age sex specific death rates on six major causes of death, Thailand, 1985.



Accidents and injury are still the major cause of death among males aged 25-44 years of age and homicide is the next in order. These two conditions ranked fourth and fifth as the causes among females in the corresponding age group. No infectious diseases involved as leading causes of death among males, only tuberculosis appears on the second rank, but at low magnitude for females. Among male deaths, heart diseases, peptic ulcer, cirrhosis of liver or hepatitis, malignancy, CVA, including suicide are listed as major causes of death. Females have somewhat different rankings of these conditions and with lower rates than the males.

For the population 45-64 years of age, malignancy and heart diseases are a major killer for both sexes with lower magnitude among females. Cirrhosis of liver and CVA come at the third and fourth rank among males of this age group. As well infectious of respiratory system, ie., pneumonia, bronchitis, asthma and tuberculosis are also the major causes of death for males, while the diseases of gastro-intestinal tracts are more important among females for this corresponding age group. Accidents and injury are of lower rank for both sexes because of their low risk of exposure due to reduction in physically active activities. However, homicide is still one of the leading cause of death among males 45-64 years of age.

For the aging population, 65 years and over, certainly senility without psychosis appears on the top rank for both sexes. Heart diseases and malignancy are on the next order of importance, with lower rates for female than male. The aging population is alike the infants for their low immunity level, thus the infectious diseases, ie., pneumonia, tuberculosis, diarrheal diseases, are playing a major role among the leading causes of death. Other non- infections conditions which occurred more among this group are cerebrovascular accidents, Diabetes mellitus and for males, cirrhosis liver of hepatitis.

Six specific diseases which cause death among the Thai population for almost all ages and their death rates separated for males and females are displayed on Figure 13. They are diarrheal diseases, tuberculosis, pneumonia, malignancy, heart diseases and accidents & injury (excluding suicide and homicide).

4.5.2.7 SOCIO-ECONOMIC DIFFERENTIALS

Socio-economic variables have been demonstrated to be one of the determinants of disease occurrence, course and outcomes, depending on a particular disease or condition. However, it should be borne in mind that some confounding variables might be associated directly or indirectly between socio-economic variables and such diseases. For instance, age, sex, marital status or cultural variables may be the intervening factors. Without controlling on such variables, the association or effect of socio-economic variables on the disease occurrence and/or cause-specific death rate can not be succintly concluded.

Neverthless, occupation and working status alone have played an important role as the determinant of a particular disease such as truck driver and traffic accidents. It is worth, however, to see the occupation or work status differentials of some selected diseases for the reason that occupation may be the major risk factor. Education attainment and marital status are selected for the study for similar reasons.

a. OCCUPATION DIFFERENTIALS

Table 4.22 illustrates the occupation differences on selected causes of death. It is superative to note that death rates here are not yet standardized for age or sex. The "Do not work" group which includes housewife, retired person and the unemployed, is a mixed group with respect to age and sex in such that substantive interpretation cannot be drawn. For other occupation categories though similar effect might interfere but seems to be to a lesser degree.

Death rate of malignancy is lowest among clerical and sales and moderately high among farmers and transport workers. Professional and labourer are experiencing similar rates at less than 30/100,000.

Diabetes mellitus is found to be the causes of death among clerical & sales, transport workers, and farmers. All of these occupation categories are almost on the same scale of socio-economic status. It could be postulated that for this particular disease, occupation alone does not play a role as the determinant but economic status and health behavior and practice may be coupled with occupation.

Psychosis or drug dependence as causes of death appear under only some occupation categories which are believed to be related to the condition, service workers, farmers, labourers and the unemployed.

Heart diseases and cardiovascular accidents affect all occupation categories. Age and sex seem to have an impact on these conditions along with occupation upon the death rates. Clerks and sales have highest death rate from CVA (excluding "did not work") and transport workers attain the highest rate from heart diseases.

Deaths from infections like pneumonia are prevailing more among the under privileged occupations ie., transport workers, farmers and labourers. The three selected diseases namely peptic ulcer, cirrhosis of liver and diabetes mellitus, transport workers and labourers seem to have higher death rates among other occupation categories which might be due to ignorance and late detection of the diseases.

Table 4.22

Death rates per 100,000 population aged 11 years and over by selected causes of death and occupation, 1985/86

Cause of Death	Profess & Admin	Clerical & sales	Service workers	Farmers	Transport workers	Laboreeers	Did not work
1. Malignancy	27.0	4.5	11.5	54.2	55.5	23.4	87.7
2. Diab Mellitus	-	6.9	-	5.4	18.5	-	28.8
3. Psychosis/drug dependence	-	-	11.5	4.1	-	9.4	5.8
4. Heart diseases, hypertensive diseases	27.0	10.3	34.5	50.2	74.1	28.1	69.0
5. Cerebro vascular accidents	9.0	34.5	11.5	12.2	18.5	4.7	73.4
6. Pneumonia, bronchitis, asthma	9.0	6.9	11.5	21.7	37.0	14.0	60.4
7. Peptic ulcer, appendicitis, int. obstruction.	-	-	11.5	13.6	18.5	4.7	21.6
8. Cirrhrosis of liver, hepatitis	-	-	11.5	19.0	37.0	23.4	31.6
9. Accidents & injury	80.9	79.3	-	28.5	166.6	79.5	31.6
10.Suicide	-	10.3	-	14.9	74.1	-	5.8
11. Homicide	9.0	17.2	23.0	42.0	18.5	42.1	5.8
All causes	170.8	262.1	184.2	399.9	629.5	318.1	855.9
Total sample population aged 11 years and over	11,127	28,994	8,686	73,776	5,401	21,374	69,519

Table 4.23

Death rates per 100,000 population aged 11 and over on selected causes of death by working status, 1985/86

Cause of Death	Employer	Account worker	Employee			Unpaid family worker
			Government	Government enterprise	Private	
1. Tuberculosis	40.0	28.4	22.2	-	11.8	10.9
2. Malignancy	80.0	71.1	44.5	46.6	14.8	38.3
3. Diab. Mellitus	-	11.9	-	-	3.0	1.8
4. Psychosis/drug dependence	40.0	-	-	-	11.8	1.8
5. Meningitis cenceptalitis, epilepsy	-	-	-	-	3.0	1.8
6. Heart diseases, hypertensive dis.	-	56.9	44.5	-	26.6	31.0
7. Cerebro vascular accidents	-	33.2	7.4	-	11.8	7.3
8. Pneumonia, bronchitis, asthma	40.0	33.2	7.4	-	8.9	10.9
9. Peptic ulcer, appendicitis, int. obstruction	-	20.0	-	-	5.9	5.5
10. Cirrhrosis of liver hepatitis	-	33.2	7.4	-	17.7	1.8
11. Ill-defined cause	40.0	45.0	44.5	-	32.5	18.2
12. Accidents & injury	80.0	61.6	74.2	46.6	47.3	40.1
13. Suicide	-	16.6	7.4	-	8.9	12.8
14. Homicide	80.0	52.1	14.8	-	29.6	23;.7
All causes	493.6	552.3	282.8	93.2	260.3	244.2
Total sample population aged 11 and over	2,502	42,190	13,484	2,147	33, 805	54,865

Not surprisingly, transport workers have highest death rate among other occupations. They are more prone to accidents because of higher exposure to risk. Other occupations have similar rates, and lowest among farmers.

Homicide as cause of death has the highest rates among farmers and labourers, lowest among the professional and administrative. Service workers are also prone to homicide.

By and large, transport workers are apparent to be the worst occupations. They are mortality-prone since this occupation is involved in hard work and stressful life events. Cause-specific death rates among this occupation are higher than other groups including death from suicide.

b. WORK STATUS DIFFERENTIALS

Of all those who had occupation, work status are classified into : employer, own account worker, employee and unpaid family worker. Table 4.23 shows death rates of selected diseases by work status.

Employer and own account worker evidently are prone to die by infection such as pneumonia and tuberculosis as well as non-infectious diseases like malignancy and heart diseases. These diseases cause more deaths among middle age and elderly. Thus, the evidence of work status differentials on these causes of death seems to be the impact of age coupled with work status and occupation.

On the other aspect, it is worth to point out that there is no death of "government employer" under the cause " senility without psychosis" because this group is retired before age 65. The evidence suggests a good quality of date.

c. EDUCATION DIFFERENTIALS

Apparently, educational attainment yields salient association with selected causes of death, however, not without impacts of age. It could be observed from Table 4.24 that the group without any education has the highest death rates on all selected causes among other educational levels, except cardiovascular accidents, psychosis or drug dependence, suicide and homicide.

Work status and death rates of selected diseases

Tuberculosis	Employer	40.0
	own account worker	28.4
	gov't employee	22.2
	private employee	11.8
	unpaid family worker	10.9
Pneumonia	Employer	4.0
	own-account worker	33.2
	unpaid family worker	10.9
	private employee	8.9
	gov't employee	7.4
Malignancy	Employer	80.0
	own account worker	71.1
	gov't employee	48.0
	unpaid family worker	38.3
	private employee	14.8
Psychosis/drug dependence	Employer	40.0
	private employee	11.8
	unpaid family worker	1.8
Heart diseases	Own-account worker	56.9
	gov't employee	44.5
	unpaid family worker	31.0
	private employee	26.6
CVA	Own account worker	33.2
	private employee	11.8
	gov't employee	7.4
	unpaid family worker	7.3
Peptic ulcer	Own account worker	20.0
	private employee	5.9
	unpaid family worker	5.5
Cirrhosis of liver	Own account worker	33.2
	private employee	17.7
	gov't employee	7.4
	unpaid family worker	1.8
Accidents & injury	Employer	80.0
	gov't employee	74.2
	own account	61.6
	private employee	47.3
	unpaid family worker	40.1
Suicide	Own account	16.6
	unpaid family worker	12.8
	private employee	8.9
	gov't employee	7.4

Homicide	Employer	80.0
	own account	52.1
	private employee	29.6
	unpaid family worker	23.7
	gov't employee	14.8
Senility without psychosis	Employer	40.0
	own account worker	33.1
	unpaid family worker	14.6
	private employee	3.0

Table 4.24

Death \rates per 100,000 population aged 6 and over on selected causes of death by education level, 1985

Cause of death	None	Primary	Secondary	University
Diarrhea	42.0	7.8	2.4	-
Tuberculosis	64..6	18.2	4.7	-
Pneumonia	135.6	15.7	4.7	-
Malaria	9.7	1.8	-	-
Malignancy	116.2	49.0	14.2	22.0
Heart Diseases	122.7	36.3	14.2	14.7
CVA	113.0	17.6	16.5	14.7
Cirrhosis of liver	35.5	20.0	2.4	-
Diabetes mellitus	35.5	8.5	-	-
Psychosis/drug dependence	3.2	4.2	4.7	-
Accidents/injury	42.0	37.5	51.4	80.8
Suicide	3.2	10.9	4.7	14.7
Homicide	12.9	25.4	14.2	14.7
Senility without psychosis	545.7	15.7	11.8	-
Pyrexia of unknown origin	71.0	6.7	-	-
Ill-defined causes	80.7	32.1	18.9	-
All causes	1533.6	338.5	167.6	168,9
Total sample 6 yrs+	30,972	165,138	42,354	13,616

Infectious diseases , ie., diarrhea, tuberculosis, pneumonia and malaria are the causes of death for those attained up to secondary education and not including university graduates unlike the group of non-infectious or degenerative disease which affect those university attainment and even with higher death rate or similar rates to the secondary education group. They are malignancy, heart diseases and CVA.

Substantially, accidents and injury tend to cause death in all education levels. Further more, the death rates are more or less increasing with level of education. The evidence appears to indicate the impacts of age and sex coupled with education on this cause of death, as well as, suicide and homicide.

The groups of senility without psychosis, pyrexia of unknown origin and ill-defined causes do not appeared under university category and low rates are observed among secondary education. Aging coupled with no education yields the highest death rates among these cause-groups, especially senility without psychosis. The 1980 census of Thailand indicates the illiteracy rates among 65-69 at 52.3 percent and 68.3 percent for population aged 70 and over.

d. MARITAL STATUS DIFFERENTIALS

Marital status of the deceased is classified into 4 categories : single, married, widowed or divorced and the priests, of the population 13 years and over. Table 4.25 displays the selected causes of death by marital status.

The findings suggest that infectious diseases are prominent as cause of death among ever-married, widowed or separated population. The highest death rate at 132/100,000 from pneumonia is seen under this group. Death from obstetric cause only occurs among married females.

The association between marital status and deaths caused by noninfectious and degenerative diseases are found here, but also tend to be coupled with age. Malignancy causes high death rate among the priests, as well as, heart diseases and cardiovascular accidents. The lower death rates among the widowed or separated are caused by peptic ulcer, cirrhosis of liver and nephrosis or prostrate troubles. And high death rates among this corresponding group are caused by malignancy, heart diseases and CVA.

With reference to accidents and injury, the highest rate is attained among the married couples. Next are single and evermarried. Suicide rates are lowest among married couples, higher among single and surprisingly highest among the priests. It is noteworthy to indicate that no homicide causes death among the priests, the Buddhist monks in general.

In conclusion, besides the socio-economic and demographic differentials on selected causes of death demonstrated under this section, it is suggested that multivariate analysis should be performed to investigate the impact of each determinant variable on diseases causing death among the Thai population so that a succint interpretation could be drawn.

4.6 ATTENDANT AT DEATH OR BEFORE DEATH

Out of 1,306 death enquiries, only 1,299 cases have filled out the entry on attendant before death or at death. Generally speaking about a little over 30 percent of deaths were instant and no treatment was required. The rest which needed treatment (49 percent of total deaths or 72 percent of deaths not instant) went to see medical doctors or to the hospitals before death occurred. A smaller proportion went for paramedical personnel and the remaining portion still sought care from traditional healers or quacks. The proportions of medical attendant at death or before death are varied from urban to rural and from region to region as shown on Table 4.26 and 4.27. In urban areas where accessibilities to the hospitals or private clinic are almost universal, the proportion of death attended by medical doctors are as high as 87.4 percent and increased to 95 percent for deaths in Bangkok.

Table 4.25

Death rates per 100,000 population aged 13 and over on selected cause of death by marital status, 1985.

Cause of death	Single	Married	Widowed/divorced	Priests
Diarrheal diseases	2.8	13.4	56.6	-
Tuberculosis	4.2	31.2	81.8	-
Meningitis/encephalitis	1.4	1.8	6.3	-
Pneumonia	8.3	35.6	132.2	-
Obstetric causes*	-	0.9	-	-
Malignancy	11.1	78.4	176.2	138.4
Heart diseases	16.6	57.9	163.6	92.3
CVA	11.1	31.2	188.8	92.3
Peptic ulcer	2.8	15.1	62.9	-
Cirrhosis of liver	5.5	27.6	56.6	46.1
Nephrosis/prostrate troubles	1.4	16.9	56.6	-
Accidents and injury	43.0	53.5	37.8	-
Suicide	13.9	8.9	12.6	46.1
Homicide	19.4	29.4	37.8	-
All causes	178.7	557.0	2114.5	553.8
Total sample population 13 years +	72,172	112,212	15,890	2,167

* Only one death caused by direct obstetic cause which is maternal death in demographic/heath oriented terminalogy.

Regionalwise, the North has the highest rate of medical attendant at death, the next in order are, the Northeast, the Central and the South. The South seems to be the poorest region in this particular, the deaths were attended by the unqualified personnel at almost 40 percent. Cultural and religions affiliation might play a major roles under the reason apart from the coverage of health services.

On the supply side, the number of important health personnel and health service outlets are displayed on Table 4.28. A marked increase in health infrastructures and health manpower with improved distribution to the rural areas of the country, especially during the fourth and fifth National Development Plan, has a substantial impact upon the utilization of qualified health services among the rural population in Thailand.

Table 4.26

Percentage distribution of deceased persons by type of attendant at death, by place of residence, 1985

Type of attendant	Whole kingdom	Urban	Rural
Medical doctors	48.9	60.2	42.2
Paramdical personnel	4.5	0.4	6.9
Unqualified personnel*	14.8	8.3	18.7
Death was instant or no treatment	31.8	31.1	32.2
Total	100	100	100
No. of deaths	1299	482	817

Table 4.27

Percentage distribution of deceased persons by type of attendant at death, by region, 1985

Type of attendant	BKK	Central	North	Northesst	South
Medical doctors	63.4	48.0	52.8	49.7	37.3
Paramedical personnel	2.7	3.7	4.2	6.4	4.2
Unqualified personnel*	0.9	8.9	13.3	18.5	25.0
Death was instant or no treatment	33.0	39.4	29.7	25.5	33.5
Total	100	100	100	100	100
No. of deaths	112	269	360	298	260

* includes traditional healer, Moh pra, relatives and friends.

Table 4.28

Number of health personnel and health service outlets, 1960-1985

	1960	1971	1981	1984	1985
No. of Physicians	2,481	4,092	6,931	8,058	-
Population:physician	10,655	8,642	6,851	6,254	-
Bangkok	-	-	1,362	1,512	-
Other provinces	-	-	14,027	10,740	-
No. of Nurses	3,426	9,760	19,599	31,827	-
Population:Nurse	7,716	3,623	2,495	1,554	-
Bangkok	-	-	494	501	-
Other provinces	-	-	4,803	2,224	-
No. of Hospitals*	161	209	402	551	615
No. of Hospital beds	19,500	40,905	58,602	67,952	70,000
No. of Health centres	147	290	4,728	7,043	7,340

Source : Division of Health Planning, Ministry of Public Health, Thailand.

* Hospitals under the jurisdiction of MOPH.

CHAPTER V
DISCUSSION ON SALIENT FINDINGS

5.1 MORTALITY

The mortality transition in Thailand began around 1950 when crude death rates dropped from 27 in 1948 to 18 in 1955. During the first phase of the transition (1947 to 1960), a gain in life expectancy at birth of 11 years was observed. Mortality continued to fall steadily after 1960 although, in more recent years, the decline has started to level off at a relatively low level. It was found that, during these periods, infant mortality has declined substantially. Based on direct and indirect measures of the level and trend of infant mortality, this study has made an "estimated trend" for the current infant mortality rate. The rate of 45 per thousand in 1984 seemed to be the most reasonable given other direct measures and careful interpretation of the indirect indicators.

The Mortality Survey confirms the downward trend of mortality in Thailand. The SPC 1985 Round I shows the crude death rate of 5.8 per 1,000 population which reflects the steady decline in mortality as is expected.

A dramatic difference in infant mortality, indirectly estimated, was also found between rural and urban places and among the four regions in Thailand. The declining trend was observed in all of these places especially the North and the Northeast.

Socio-economic differentials in infant mortality are also apparent. Education appears to have a strong influence on mortality. The environmental condition represented by rural-urban residence and personal factors such as educational attainment both reinforce each other in their impact on mortality. Lastly, those with high status occupations are found to have greater survivorship of their children. Religion in the South is also found to be somewhat related to mortality.

In general, the analysis of infant and child mortality by the use of the child survivorship technique reveals significant socio-economic differentials in mortality. The mortality situation is found to be more favorable for the urban population and for those of the higher educational and occupational strata. Althogh the overall mortality estimates from indirect techniques are somewhat lower than the direct measures obtained from the SPC, the differentials investigated in this study are probably quite reliable. Any under-enumeration of deceased children would, in fact, operate in a direction opposite to the mortality differentials found here. This is because the lower socio-economic strata would tend to under-report their dead children to a

greater extent than their higher socio-economic counterparts. Therefore, mortality differentials revealed are probably a conservative estimate.

In this review, the importance of the indirect estimates of mortality as well as the techniques for data correction is quite clear. Mortality analysis in Thailand in the future will be limited without the development of new and appropriate techniques, and a national survey on mortality which should be closely linked to the existing registration system such as was done in the Survey of Population Change in 1984-85.

Information about the cause of death is an indispensable item in any mortality analysis. These data provide a valuable insight into the network of interactions between a viable human host and a series of environmental, genetic and behavioral factors, the impact of which is mediated through one or more of these morbid conditions leading ultimately to the death of the host.

The results of the analysis of mortality registration data with respect to causes of death, even though faced with the problem of variations in diagnosis of the cause and the relatively large proportion of ill-defined diagnoses, the trends and patterns are probably quite accurate.

For the general population, a changing pattern of leading causes of death has occured since the 1970's and, in the present decade, non-infectious diseases and accidents seem to be increasingly important causes of death and have become an unsolved health problem of the country. Meanwhile, the infectious diseases and accidents seem to be increasingly important causes of death and have become an unsolved health problem of the country. Meanwhile, the infectious diseases, e.g., pneumonia, diarrhoea, diseases of the digestive system and viral disease, remain as major health problems among the under one and under five population.

Infectious diseases still prevail among the Thai population, though the death rates are low with respect to these diseases among the younger population. Tuberculosis of the respiratory system and pneumonia are still the major health hazard among the aged population. Malaria is still endemic in Thailand.

The leading causes of death found in the 1985 Mortality Survey are similar to the data of the death certificates analyzed earlier. In addition, it is found in the survey that "senility without psychosis" when studied more closely is ranked first, while in the study of the death certificates, this is only treated under "ill-defined symtoms" or "unknown" cause of death. From the survey, accidents, suicide and homicide, when grouped together, appear as the second rank and next are malignancy and heart diseases. The data shows that some of infectious diseases, ie., pneumonia, tuberculosis and diarrheal diseases, are still among the 10 leading causes even though on the lower rankings. And hence, diseases of pregnancy, delivery and peurperium are

still an important cause of death among the Thai population. It is thus observed that cirrhosis of liver and hepatitis have become one of the leading killer among our population.

Findings from the secondary data analysis revealed that the regional differences of the diseases leading to deaths among the general population seem to correlate well with the degree of social and health development of each region. The Central and the North are more advanced than the South. The Northeast is the lowest ranked in terms of development and most of the poverty-stricken areas stated in the 5th National Social and Economic Development Plan are located in this region. As causes of death, diseases of the heart, accidents and malignancy seem to be on an increasing trend in the central and the northern regions, whereas infectious diseases such as tuberculosis, diarrhoea and pneumonia largely prevail in the Northeast and the South. The national policy to accelerate rural development in the poverty-stricken areas tends to reduce the deaths caused by diarrhoea and other infectious diseases in the northeastern region.

Our mortality survey yielded the results on the rural-urban differentials in the pattern of causes of death which cannot be studied by the secondary data. The differences are found to be significant. In the urban areas, the leading causes of death are the degenerative diseases and accident. On the contrary, in the rural places senility and infectious diseases namely tuberculosis, diarrheal diseases and obstetrics and perinatal causes are still predominant.

The proportion of ill-defined and unknown causes of death in the Mortality Survey is much lower, approximately by half, than reported in the registration data.

The regional differentials in the causes of death pattern are found to be similar to the rural-urban pattern according to the level of development in each of the four regions of Thailand. These rural-urban and regional differentials found in the survey is more reliable than the registration data since place of residence of the deceased person is identified.

Causes of death among children under 5 are specifically studied. The infectious diseases which are preventable are found to be the leading causes. The conditions originating during the perinatal period caused half of infant deaths, especially in the Northeast, South and the North. Compared to those under 5, relative low cause-specific-death-rate are apparent among the age-groups 5-14, 15-24 and 25-44 years.

Vaccine preventable diseases are under the epidemiological surveillance of the Ministry of Public Health. However, tuberculosis death rates among the general population dropped in 1975 before the implementation of the EPI programme, and remained relatively unchanged thereafter. It is apparent that only poliomyelitis, which shows a remarkable decrease in the prevalence and death rates among the under 5 population, is the result of the EPI programme.

The leading causes of death are closely investigated from 1985 data. Women died of diarrheal diseases more than men after aged 40. Other causes of death including tuberculosis, pneumonia, malignancy, heart- diseases, accidents and injury are found to be more prevalent among male adults than female adults. The gap is especially large when tuberculosis and accidents and injury are concerned.

Socio-economic differentials including among other things occupation and education are investigated. Three groups of diseases are found to be evidently related to occupation. Infectious diseases are more prevalent among the underprivileged occupation. Transport workers have highest death rate especially from accidents. Homicide is highest among farmers and labourers. Education attainment yields salient association with selected causes of death, however, not without impact of age. Those with lower education had higher death rate by infectious diseases, while the degenerative diseases were predominating causes of death among the higher educated population.

5.2 MORBIDITY

Concerning morbidity, the prevalence illness data from the survey in 1981 seemed to show no sharp regional differences, except that for the Bangkok Metropolis which generally had the lowest morbidity. The urban population tended to have a lower incidence of acute illness than the rural population and the evidence included the incidence of injury and hospitalization. The patterns of socio-economic differentials in morbidity coincided with those in mortality, especially infant and childhood mortality. It is evident that there is an inverse relationship between occupation and education and morbidity; the rural and urban poor population seemed to experience more frequent illness than other groups.

Unlike sex differentials in mortality, females had a higher incidence of illness than males, particularly in the middle age groups. It is suggested that women in the reproductive ages are at a higher risk of morbidity related to their reproductive and sex behaviors.

Regarding causes of illness as reflected by hospital admission patients, analysed from the 1981 hospital records infectious and parasitic diseases were the largest group among other diseases except for complications of the perinatal period and diseases with obstetrical causes. Accidents and suicide comprise about 10 percent of total admissions, with the highest proportion of suicide occuring in the southern region.

The analysis on selected cases with diseases admitted to the hospitals by occupation reveals that persons not in the labour force suffered more from infectious diseases. The

professional and administrative occupations had higher rates of mental disorder. The accident prone persons were those involved in transportation work and students.

It sould be kept in mind when dealing with hospital admission statistics that selection bias is one among other factors to be considered. The interpretations might be misleading since sick persons, especially of the well-to-do class, might seek private health resources. (The source of data used here are the government hospitals of the Ministry of Public Health).

During April - May 1985, the period of the morbidity data collection, the prevalence of illness or injury occurring within one month was 156.4 per 1,000 population. The rural population had the higher rate of 161.5 than that of urban population (134.2). Regional differences among the 4 regions indicate the highest rate in the Central and the lowest in Bangkok Metropolis. The average episode of illness was found to be 2.1 per person per year. Similar patterns were observed for urban-rural population and also the regional difference as the prevalance rate of illness.

When age is concerned, the illness shows a U-shaped pattern with the lower level at aged 10-20. Among the adults, generally women have a higher rate than men in both rural and urban areas.

For hospitalization, the infectious diseases are the major causes especially in the rural areas. Other major causes especially in the rural areas, are diseases of digestive and respiratory system and accidents and violence. Disease of circulatory system is also more prevalent in urban areas.

Regarding the sources of health service, it was found that over half of the ill-persons seek treatment from physician at different types of health outlet which is about 10 percent increased from the findings previously obtained in 1981. The next source is drug store or self treatment which constitutes 29 percent of total ill-persons, out of this proportion only 5 percent said they let it go without any treatment.

If we were to use the proportion of ill persons that treated themselves by traditional healers as an indicator for development, it is worth to note that Thailand has been substantially improved in health development since this rate has decreased to 2.5 percent only.

Moreover, the place of residence, urban or rural also have impact upon the utilization of health services, even when control by educational attainment and occupation of the ill persons.

The association is found between the degree of severity of illness and type of treatment. Modern type of treatment were more often used by the severe cases both among urban and rural

populations. About one-third of rural populations still used government health center when taken ill, explicitly the only health outlets they sought for besides drug store.

CHAPTER VI
CONCLUSION AND RECOMMENDATIONS

The findings from the MMD Project appear to yield very valuable information since these data sets are rich and proved to be more reliable especially on the levels and causes of death and illnesses among the population. Moreover, this study project has been investigating the salient determinants of death and illness among Thai population in great detail as never done before in this country. Therefore, the information and findings obtained from this project are considered very valuable resources for policy formulation and planning in health intervention as well as other development programmes.

In order to maximize the utilization of this study, it is recommended that those involved in the national policy making and planning and the investigators and researchers of this project collaborate with each other in seriously considering the implications of the research findings. This significant recommendation can be achieved through an appropriate mechanism which is based on mutual and sincere understanding among all concerned for the real benefit of people.

6.1 While infant and childhood death rates have been decreasing in the last two decades, the socio-economic differentials have remained almost constant with 1970. It is apparent that the underprivileged group, (i.e., low education, lower scale occupation and working status, and rural residence) experience the highest level of mortality and morbidity. That the Fifth and the current National Development Plan emphasizes the poverty-striken areas of the country to improve environmental and ecological conditions as well as the quality of life of the individual, is a positive step. The success in the implementation of the Plan would reduce the areas as well as the proportion of the population in the under-privileged group and, thus, effect a reduction in infant/childhood mortality and morbidity.

From the socio-economic perspective, improvement in the conditions of life of certain occupation groups may result in morbidity and mortality reduction. Health sevice provision to cover those of lower socio-economic status should be emphasized. Disease-specific admissions as a percent of total hospital admissions could serve well as the indicator for the health service programme. In addition, the variations in morbidity by regions and urban-rural places can serve as indicators of specific areas in which more research should be conducted and also areas in which experimental activities can be launched to effect reductions in illness and death.

6.2 After the successful reduction of mortality from infectious diseases, gains in life expectancy have been observed. The longer the expectation of life, the greater the increase in deaths due to non-infectious, chronic and degenerative diseases. Preventive measures at the present should be planned to reduce the risk of dying from these diseases and conditions.

To cope with the diseases such stroke, hypertention, heart disease and cancer which are relatively prevalent among the urban and high-privileged Thai population, not only treatment and care programmes need to be stressed, but also research and prevention-oriented programmes are undoubtedly required.

Budget for the prevention and control programmes should be allocated for establishing medical institutions, preventive activities, mass screening and research. The programmes could be multiple-diseases oriented and, also, preventive activities through case finding and treatment of cases could be intensified.

Accidents prevail, with the major type being traffic accidents. The activities of the National Board on Prevention and Control over Accidents should be strengthened to reduce the incidence of accidental deaths and injuries. All preventive measures including safety education should be implemented with emphasis on the population in urban centres, notably the Bangkok Metropolis.

Moreover, the emphasis of education and information programmes should stift to identification and reduction of the risk factors of these total conditions.

6.3 Diarrhoeal and infectious diseases of gastro- intestinal origin have remained a major cause of illness and death among the infant and childhood population as well as the conditions related to nutritional and vitamin deficiencies. An assessment of health and nutrition intervention programmes should be seriously taken into consideration. The availability and accessibility of the health services of the under-privileged group is one area for consideration. Another concerns an assessment of the programme in terms of quality rather than quantity of services. A small-scale study is encouraged to investigate those cultural determinants affecting these diseases by means of anthropological approaches. For example on personal illness control, dietary intake and food distribution in the family should be investigated carefully since they are all proximate determinants of illness from the aforementioned diseases.

The identification of such local beliefs and taboos is a precondition for the design of suitable nutritional education programmes which are urgently needed.

Improvement of environmental conditions to reduce the contamination of water and food should be carried out. This will help to reduce the incidence of and death from diarrhoea and other infectious and parasitic diseases.

6.4 The Expanded Immunizaiton Programme (EPI) in Thailand has been implemented since 1977. The basic immunization scheme includes the DPT, BCG vaccination to children under 5 years of age throughout the country. The oral polyvalent polio vaccine was given primarily to children residing in the urban centres and has now been expanded to the rural areas.

Tetanus toxoid is given to pregnant mothers for the prevention of tetanus neonatorum. Measles vaccine was introduced into the programme since 1984.

The management of this programme should be taken into consideration, especially on tetanus toxoid innoculation for pregnant women. The data on the tetanus neonatorum death rate and the reported cases remain at a high level and have even increased in recent years. Careful assessment should be conducted concerning effectiveness of the cold chain system and the vaccine or toxoid potency at peripheral outlets. Most probably a sero-epidemiological study on these vaccine-preventable diseases should be conducted on a sample basis. On the other hand, one might claim that the increase in reported cases and deaths of these diseases is due to the better coverage of the epidemiological surveillance network which reduces underreporting.

In addition, education programmes for mothers and public information for high-risk populations should emphasize the need for preventive action to combat infections, especially those which are endemic in those areas.

6.5 The regional differences of the diseases leading to deaths among the general population seem to correlate well with the degree of social and health development of each region. The national policy to accelerate rural development in the poor regions should help reduce the deaths due to infectious diseases in the long run.

6.6 The leading cause of death in each age category presented in this report should be helpful for planners and implementators of the health development programme of the country. Further plans of action could be made with appropriate and effective management in order to minimize mortality among the Thai population in the hope that the ultimate goal of a better quality of life will be achieved.

6.7 Health facilities and services have maintained a strong urban and regional bias despite efforts to correct the worst excesses of such a bias. Progress towards greater equality in access to basic health services remains slow.

It is recommended that health plans should pay closer attention to trends in population structure and distribution with a view to ensuring equitable coverage and adequate provision of staff and facilities throughout the country.

6.8 A decline in mortality and continuing high levels of fertility has, in many instances constrained attempts to acheive improvements in the quality of life of the people. It has also limited the possibility of further reductions in mortality and in the improvement of health.

Thus, to reduce population growth is still one reason for the continuation and enhancement of family planning programmes. A further reason is that reduction in family size will enhance the possibilities of improvement in quality of life.

6.9 There remians inadequate public understanding of matters of health, population and nutrition and their impact on the individual and the family.

There is a need for increased and better coordinated education of health, nutrition and population in the school curriculum.

6.10 Rapid industrialization in the urban settings of the country has failed to provide adequate information and education to the workforce on the hazards to which people are exposed in the course of their work.

There is a need for not only adequate industrial legislation, but for the enforcement of that legislation by trade unions and other organizations, including consumer organization with government support for such initiatives.

6.11 Women comprise half of the population of the country, children of both sexes below the age of fifteen make up around a third to a half of the population. There is a need to distinguish the health requirements for these groups of the population and to ensure that they receive health resources proportionately.

Moreover there is a need for education and vocational training for women, together with health programmes aimed at redressing this imbalance and providing women with health information for their own needs and those for their children.

6.12 The quality of the data is a major concern which may affect the study results.

Data permit broad generalizations and to identify major currents and differentials. However, for policy guidance, in many instances the weakness of the data raise formidable obstacles, with many specific questions left in abeyance.

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APPENDIX 1

APPENDIX 1

List of Advisory Committee Members

1.	Dr. Pramote Prasartkul, Director : Institute for Population and Social Research, Mahidol University.	Chairman
2.	Mr. Visit Boonyakesanond, Advisor to the Population and Manpower Planning Division : Office of the National Economic and Social Development Board, Office of the Prime Minister	Member
3.	M.R. Chalermsook Boonthai, Director : Family Health Division, Department of Health, Ministry of Public Health	Member
4.	Mr. Peerathep Roongshivin, Director : Population and Manpower Planning Division, Office of the National Economic and Social Development Board, Office of the Prime Minister	Member
5.	Dr. Nibhon Debavalaya, Professor : Institute of Population Studies Chulalongkorn University	Member
6.	Miss Chintana Pejaranonda, Population Survey Division ,The National Statistical Office, Office of the Prime Ministry	Member.
7.	Dr. Aphichat Chamratrithirong, Deputy Director : Institute for Population and Social Research, Mahidol University	Member
8.	Dr. Yawarat Porapakkham, Head : Department of Biostatistics, Faculty of Public Health, Mahidol University	Member
9.	Dr. Santhat Sermsri, Department of Social Sciences, Faculty of Social Sciences and Humanities, Mahidol University	Member
10.	Miss Wathinee Boonchalaksi, Lecturer and Researcher : Institute for Population and Social Research, Mahidol University	Member and Secretary of the Committee

APPENDIX 2

The original work schedule is adopted as follows :

Activity	Period of Duration
Preliminary Activities	
Pre-Project Study	April 1984
Pre-Implementation Meeting*	May 1984
Finalization of Country Project Design	May 1984-Jun. 1984
Phase I Activities	
Preparation of Project Document	Jul. 1984-Aug. 1984
Collections of Secondary Data	Sep. 1984-Dec. 1984
Technical Meeting on Methodology*	Nov. 1984
Finalization of Report	Jan. 1985-Apr. 1985
Phase II Activities	
Preparation of Project Document	Jan. 1985-Mar. 1985
Finalization of Study Instruments	Feb. 1985-Apr. 1985
Listing, Sampling and field Work	May 1985-Oct. 1985
Coding and Data Editing	Oct. 1985-Dec. 1985
Technical Meeting on Coding and Data Analysis *	Nov. 1985
Data Analysis and Interpretation	Jan. 1986-Apr. 1986
Report Writing	May 1986-Oct. 1986
Dissemination Activities	
National Seminar	Nov. 1986
Regional Seminar*	Nov. 1986
Finalization of Project Report (Printing & Distribution)	Dec. 1986-Apr. 1987

Note : * Inter - Country Activities

Appendix 3

List of sample provinces in the SPC and no. of blocks and villages

Central		Northeast		North		South		
	block/village		block/village		block/village		block/village	
Kanchanaburi	8/2	Kalasin	10/4	Kamphaengphet	8/4	Chumpon	0/5	
Chanthaburi	0/6	Khonkaen	8/4	Chiengrai	0/4	Trang	8/4	
Cholburi	7/3	Chaiyaphum	0/4	Chiengmai	9/6	N.Sithammarat	0/10	
Chainat	0/5	Nakhonphanom	0/5	Tak	0/5	Narathiwat	7/2	
Nakhonpathom	6/4	Nakhonratsima	7/9	Nakhonsawan	15/	Pattani	0/3	
Nonthaburi	0/3	Buriram	0.5	Nan	0/8	Phatthalung	6/3	
Prachuabkhirikhan	0/2	Mahasarakham	9/5	Phayao	0/4	Yala	9/3	
Prachinburi	0/4	Roi et	0/4	Phichit	0/5	Songkhla	9/6	
Ayutthaya	8/7	Srisaket	0/8	Phitsanulok	8/3	Suratthani	6/14	
Rayong	11/3	Surin	7/8	Petchabun	8/3			
Ratchaburi	0/4	Udonthani	0/6	Phrae	0/3			
Lopburi	0/5	Ubonratchathani	4/8	Lampang	0/4			
Samutprakan	9/0	Sukhothai	7/3					
Samutsongkhram	0/5	Uttaradit	0/3					
Saraburi	6/4							
Suphanburi	0/3							
Bangkok	45/5							
Total no.of provinces	17		12		14		9	= 52
Total no.of blocks	100		45		55		45	= 245
Total no.of villages	75		70		60		50	= 255

Appendix 4

List of sample provinces in the Morbidity survey and no. of blocks and villages

Central		Northeast		North		South		
	block/village		block/village		block/village		block/village	
Ayutthaya	0/3	Buriram	1/0	Chiengmai	1/3	N.Sithammarat	0/3	
Chainat	1/0	Kalasin	0/4	Lamphun	0/3	Pattani	0/3	
Kanchanaburi	0/3	Khonkaen	0/4	Phitsanulok	1/3	Phatthalung	1/0	
Prachinburi	0/3	Loei	0/4	Uttaradit	0/3	Suratthani	0/4	
Samutsakhon	0.4	Surin	0/4					
Bangkok	7/0							
Total no.of provinces	6		5		4		4	= 19
Total no.of blocks	8		1		2		1	= 12
Total no.of villages	13		16		12		10	= 51

Appendix 5 CAUSE OF DEATH ENQUIRY

TO BE FILLED OUT FOR CASES OF MORTALITY RECORDED IN THE SKP.2 FORM (ROUND 3 OR 4)

PROVINCE ☐☐ DISTRICT ☐☐ COMMUNE ☐☐ SECTOR CODE ☐☐ BLOCK NO. ☐☐ VILLAGE NO. ☐

HOUSEHOLD NO. ☐☐☐☐ CASE NO. ☐☐☐ NAME OF DECEASED.....

A. THE DEATH WAS A DIRECT RESULT OF

1. ILLNESS

1. PREVAILING ILLNESS (Specify) .....
   - 1.1 Place of death .....
   - 1.2 Was there any treatment?
     - ☐ Yes. The practitioners were:
       (Start with last practitioner first)
       1. .....
       2. .....
       3. .....
     - ☐ No
   - 1.3 Duration of illness:.....years ....months....days
   - 1.4 Symptoms prior to death (Start with last symptom first)
     1. .....
     2. .....
     3. .....

2. WERE THERE ANY SECONDARY ILLNESSES RELATED TO THE DEATH?
   - ☐ Yes (Specify) .....
     (Skip to item 2.1)
   - ☐ No (Skip to B)
   - 2.1 Was there any treatment?
     - ☐ Yes. The practitioners were:
       (Start with last practitioners first)
       1. .....
       2. .....
       3. .....
     - ☐ No.
   - 2.2 Duration of illness: ...years ....months.....days.
   - 2.3 What were the symptoms?
     (Start with last symptom first)
     1. .....
     2. .....
     3. .....

(Go to B)

2. ACCIDENT

1. TYPE OF ACCIDENT (Specify).....
   - 1.1 Place of death .....
   - 1.2 Was death instant?
     - ☐ Yes. (Skip to item 2)
     - ☐ No.
     - 1.2.1 The practitioners were:
       (Start with last practitioner first)
       1. .....
       2. .....
       3. .....
     - 1.2.2 Duration of morbidity:
       .....years .....months .....days

2. WAS THERE ANY UNDERLYING ILLNESS THAT LED TO THE ACCIDENTAL DEATH?
   - ☐ Yes (Specify)
     (Skip to item 2.1)
   - ☐ No (Skip to B)
   - 2.1 Was there any treatment?
     - ☐ Yes. The practitioners were:
       (Start with last practitioner first)
       1. .....
       2. .....
       3. .....
     - ☐ No.
   - 2.2 Duration of illness: .....years ....months ....days.
   - 2.3 What were the symptoms?
     (Start with last symtom first)
     1. .....
     2. .....
     3. .....

(Go to B)

3. SUICIDE

1. PLACE OF DEATH .....
   - 1.1 Was death instant?
     - ☐ Yes. (Skip to item 2)
     - ☐ No.
       - 1.1.1 The practitioners were:
         (Start with last practitioner first)
         1. .....
         2. .....
         3. .....
       - 1.1.2 Duration of illness:
         .....years .....months .....days

2. WAS THERE ANY UNDERLYING ILLNESS THAT LED TO THE SUICIDE?
   - ☐ Yes. (Specify) .....
     (Skip to item 2.1)
   - ☐ No. (Skip to B)
   - 2.1 Was there any treatment?
     - ☐ Yes. The practitioners were:
       (Start with last practitioner first)
       1. .....
       2. .....
       3. .....
     - ☐ No.
   - 2.2 Duration of illness: ....years .....months ....days.
   - 2.3 What were the symptoms?
     (Start with last symptom first)
     1. .....
     2. .....
     3. .....

(Skip to B)

4. HOMICIDE

1. PLACE OF DEATH .....
   - 1.1 Was death instant?
     - ☐ Yes. (Skip to B)
     - ☐ No.
       - 1.1.1 The practitioners were:
         (Start with last practitioner first)
         1. .....
         2. .....
         3. .....
       - 1.1.2 Duration of illness:
         .....years .....months .....days.

(Skip to B)

B. WAS THERE A DEATH CERTIFICATE?

☐ Yes. (Copy the following information from the death certificate)

1. Who pronounced the case dead .....
2. Recorded cause of death .....

☐ No. (End of enquiry)

APPENDIX 6

GUIDELINES FOR VERBAL AUTOPSY (CAUSE OF DEATH)

When death occurred at home or outside the hospital without qualified medical attendant, the cause of death is dubious. However, symptoms and signs before death or leading to death might be of helpful in the diagnosis of cause of death. Guidelines for verbal autopsy or a kind of lay-reporting is used for the interviewers to be acquainted to signs and symptoms which may lead to the disease diagnosis.

This guideline is adapted from those of the Division of Health Statistics of Ministry of Public Health. The symptoms are classified into 9 groups.

1) Symptoms due to delivery, pregnancy and abortion

Deaths caused by conditions relating to pregnancies, abortions and deliveries or complications during postpartum period, are the following :

Abortions

Toxemia of pregnancy, : legs edema or overall edema, shock, with or without difficulties in breathing.

Anemia during pregnancy : pregnant with sign and/or symptoms of anemia.

Beri-beri : in general, this disease occurred with numbness of the extremities and rapid breathing. (hyperpnia)

Massive haemorrhage during or after delivery : exessive bleeding through vagina due to delivery process.

Abnormal delivery : difficult delivery due to abnormal position of the foetus in utero, deaths occurred by lack of proper manipulations.

Post-partum infections : Occurred during puerperium with sign and symptoms of high fever, lower abdominal pain, foul lochia, suggestive of infection after delivery.

2) Fever

Fever can be classified into 3 categories.

a) Fever due to malaria signified by repeated high fever with intermittent attack, everyday or every two days.

b) Haemorrhagic fever : Also with high fever, stup or/and vomiting, sometimes with petichial haemorrhage on the skin.

c) Fever with short duration : Such as influenza, usually occurred with high fever, headache and musle ache. Duration of sign & symptoms should not exceed 7 days, if occurred in children, might be one of the cause of death.

Whooping cough : high fever, excessive and continuous coughing which cause difficulty in breathing.

Diphtheria : high fever, cough with stridor, orthopnea, cyanosis with difficulty in breathing that may cause death to occur.

Tetanus : high fever with stiffness of the body, unable to open one's mouth, a history of traumatic or deep wound could be traced. The symptoms also include tetanic convulsion. Tetanus can be the important cause of death in children especially the new born infants.

The last disease in this "fever group" is **Typhoid fever** signified by continously high fever, very weak and sometimes accompanied by diarrhea, death might have occurred during 2-3 weeks of the incidence.

Other **fevers with unknown origin** such as fever with skin rash, stiffness of the body or paralysis.

3) Abnormalities of the Alimentary System

Those who died according to diarrhea, dysentery, abdominal pain, vomiting and emancipations, these conditions, are considered sign and symptoms related to the alimentary system which sometimes were difficult to classify into a clear-cut diagnosis. The simple classification can be made as follows.

- **Diarrhea** : This symptom if occurred in children will be diagnosed by having watery stool not less than 3 times a day, sometimes with mild fever. It is called diarrheal disease or disease of the alimentary system or gastroenteritis. Children will also dehydrate and look

skinny. For dysentery and cholera, they can be differentiated from each other. Dysentery has frequent number of stools per day with bloody mucous and pain during defecation.

- **Cholera** : signified by watery or profused stool without any painful defecation but vomitting. This is more similar to normal diarrhea.

Another disease is food poisoning. It is characterized by abdominal pain with vomitting that occurred after eating in a gathering of people at the same place which could be diagnosed as caused by food poisonint.

The other group in this category is peptic ulcer which can be the cause of death. Peptic ulcer is characterized by frequent epigastric pain which relieved by eating food or antacids. Death occurred if there is a rupture of stomach and signs of bloody vomitus.

If death occurred immediately after acutc abdominal pain, sometimes we merely could diagnose as acute gastrointestinal diseascs. This group of diseases related to organs in alimentary system, the symptoms may be continuous diarrhea for many months with progressive run down of the patients or the children until malnourish mentoccurred, especially in children under 5 years of age.

4) Cough symptoms or abnormality of respiratory system

The more frequent disease relating cough is **pulmonary tuberculosis.** Those who died due to this disease would have chronic cough with dyspnea or orthopnea for more than 2-3 months along with low grade fever and bloody sputum. **Bronchitis,** this disease signified by heavy coughing with thick and sticky sputum, the symptoms last about 1- 2 weeks, sometimes very difficult to differentiate from pulmonary tuberculosis unless by diagnosis from physicians. But these two diseases can be grouped together as the abnormality of respiratory system.

Asthma is known by many people as the chronic cough and dyspnea with frequent asthmatic attack.

Other disease among this group is **pneumonia** with sign and symtoms of coughing, rapid high fever, common cold, and chest pain if treatment was not provided, death could occur especially in children and old aged.

5) Abnormalities of the central nervous system

The disease of the central nervous system including brain and spinal cord. Paralysis is the sign and symptom that occurred immediately or near to death. The conditions of body or extremities paralysis could be considered as paralysis due to brain syndrome.

Other disease is **meningitis** which had sign and symptom of high fever, convulsion, stiff neck and severe headache.

6) Deaths due to heart disease and circulatory system

This signified by sudden death with severe dyspnea, edema at both legs before dying.

If death caused by **acute heart** failure as was reported, it is advised to inquire further about sign and symptoms prior to death such as pain at left side of chest that caused stopping of any activities including breathing, dyspnea, sweating and unconcious, if these were presented, the diagnosis is truly **acute heart failure.**

Heart failure should include dyspnea, orthopnea with unable to lie down, edema of both legs.

7) Other diseases with specific sign & symptoms

Before dying, the person had clear and visible signs such as jaundice of eyes and body, enlarged abdomen with palpable mass inside or jaundice with nausea and vomitting followed by total edema, this could be diagnosed as **liver cirrhosis or Jaundice or infection of the gall bladder.**

The second group of diseases are **Chicken pox, or Measles or Allergies.** If it is Chicken pox, a person may have had high fever with small blister on skin, most of the people will recognize it as chicken pox. If **Measles** occurred, the sign and symptoms will start with fever, coughing and running nose for 2-3 days followed by reddish skin rashes, the fever will subside in about 7 days but the rashes still persist a little after.

German measles had fever and reash for only 3 days and disappeared

Other disease is **allergy** which characterized by reddish rashes spread all over the body, sometimes with exudate. This sign and symptoms were caused mostly by allergic reaction to drugs or substances or food such as shrimps or crabs.

Leprosy is another well-known disease among Thai people of which at the present time is no longer an important cause of death but will leave the patients with the deformities of fingers and toes plus the thick reddish rashes on skin and face.

The other group of diseases comprised of disease with convulsion symptom such as epilepsy, which is a chronic disease, the patients will be suffered with frequent attack of convulsion occurred spontaneously, major sign and symptoms are convulsion and unconciousness which sometimes lead to death due to accident, such as drowning. If this happened the direct cause of death is drowning, and the underlying cause should be labeled as **epilepsy.**

The next disease, that might create a similar situation is **mental illness,** the patient might die directly due to this disease or other causes like in epilepsy.

Poliomyelitis is the next disease which signified by fever, weakness of the legs, unable to walk or even paralysed. If paralysis occurred to respiratory muscles, then this will lead to death. This disease is more common in children up to 15 years of age.

Cancer characterized by tumor mass at any part of the body or organs with progressive enlargement, the later stage will cause foul smell with bleeding and metastasis to other organs.

If the deceased person suffered from cancer, most of the time, the relatives will know about it and history of treatment either by modern or traditional methods could be identified. This disease is more prominent at the present time because the incidence is increasing.

Next disease is **Beri-beri** the patient had history of long term illness with numbness all over extremities, weak and malaise until death occurred.

Other disease with difficulty in classification, except the information about long term illness without any treatment is diabetes mellitus. Most of the time, the patients might not recognize themselves until observed symptoms of frequent urinations with ants contaminated if left it over for a period of time. The disease progressed with sign of losing weight, chronic ulcer or abscesses or even gangrene in some parts of the body, other complications might encounter and the patients will never know unless by physician's diagnosis.

Other disease caused difficulty in urination or cannot urinate at all especially in old aged men with sign of edema before dying, this is caused by enlargement of the prostate gland.

Other disease is the uretheral stones which caused the patients to have frequently intermittent lower abdominal pain with hematuria and occasionally, a piece of stones will be found in urine.

Hernia is also the related disease in this group most of the patients will recognize this disease themselves. The disease occurred more in male than female with the sign and symptoms of painful mass in the testis, with constipation and vomitting which are similar to the sign and symptoms of intestinal obstruction, death could happen if treatment is not provided promptly.

8) Causes of death in infants

Infants mean children less than one year of age, infant death signified the deaths that occurred from the time of live birth up to one year. Many factors related to this group of deaths such as low birth weight, small babies, premature delivery, or twins. Mothers might report of preterm delivery and infant death after that or the infants had low birth weight or being twins.

The other cause of death is malformations especially congenital malformations. In general, mothers could report easily about types of malformation occurred in their infants.

Abnormal delivery can also cause infant death due to difficult and prolonged labor plus the usage of some instrument ot help pulling the foetus out which may contribute to mechanical injuries to the infants, who might survive only for a short period of time and then die.

New born infants are very susceptible to infectious agents, deaths during this period may be due to acute disease infections such as acute respiratory tract diseases of the new born which characterized by high fever, dyspnea, and orthopnea.

Other diseases is infantile diarrhea, the child will have continuously diarrhea and die from dehydration or malnutrition.

Infected umbilicus is another disease of the infants especially new born infants, characterized by having infection at umbilicus, sometimes with discharge and high fever followed by convulsion and death. If there were sign of convulsion with stiffness of the body and unable to open one's month for sucking, these could cause by traumatic delivery, or contaminated by tetanus infection during delivery if accompanied by high fever.

Other disease which had high incidence during the first year of life **is severe malnutrition,** the children will be underweight, irritable, anemic and sometimes followed by other infections.

9) Aging disease

Aging population could die without having definite cause. The reported cause of death may be in terms of ill- defined symptoms. If death occurred during sleep among persons of 65 years or older, the diagnosis might be senility without psychosis, otherwise all symptoms and signs occurred before death should be asked and recorded in the questionnaire thus the diagonsis could be made accordingly.

APPENDIX 7

Weighting procedure

This appendix describes how to obtain the actual weights for the sample in the National Morbidity Survey. The weights for total population, household and children of under five are provided by the sampling experts from the National Statistical Office of Thailand, for urban/rural population by region and for the Whole Kingdom as listed under Table A 7.2.

In order to applied the actual weights to obtain the regional and national estimates, this actual weights have to be derived from the following computation. The actual weights on Table A 7.1 are used in the analysis for all rates and estimates presented in the text where it is applicable.

For urban population

Weight given = 0.190214 = W1
proportion of urban sample = 0.23015 = Ru
no. of urban sample = 8426 = Su
number of weighted urban sample = $\frac{8426}{.23015}$ x .190214
$= \frac{Su}{Ru} \times W1 = 6963$

Actual weight for urban sample $= \frac{6963}{8426}$
$= 0.82642$
$= Wu$

For rural population

weight given = 0.80978 = W2
proportion of rural sample = 0.76985 = RR
no. of rural sample = 28,185 = SR
no. of weighted rural sample = $\frac{SR}{RR} \times W2$
$= \frac{28,185}{.76985} \times 0.80978$
$= 29,648$

Actual weight for rural sample = $\frac{29,648}{28,185}$
$= 1.0519$
$= Wr$

Thus for applying the Wu and Wr, the weighted total sample can be calculated :
(Wu x Su) + (Wr x Sr)
= (0.82642 x 8426) + (1.05189 x 28,185)
= 36,611

Table A 7.1

Actual weight used in the computation of morbidity estimates for total population

Set I

Region		Weight (WA)	Nw
North	urban	0.9665	633
rural		1.2008	6,831
Northeast	urban	1.7555	581
rural		1.1936	12,375
Central	urban	0.7444	610
rural		0.5383	3,914
South	urban	1.8119	774
rural		1.3527	6,570
Bangkok		0.6979	4,323
Whole Kingdom			36,611

Set II

	Weight	
urban	0.82642	
		Whole Kingdom
rural	1.05189	

Table A 7.2

Weight for National Morbidity Survey, 1985. (provided by the NSO)

Set I

Region	Population	Household	Population under five
North	1.0000	1.0000	1.0000
urban	0.0850	0.0869	0.0872
rural	0.9150	0.9131	0.9128
Northeast	1.0000	1.0000	1.0000
urban	0.0447	0.0492	0.0459
rural	0.9553	0.9508	0.9541
South	1.0000	1.0000	1.0000
urban	0.1347	0.1404	0.1380
rural	0.8653	0.8596	0.8620
Central	1.0000	1.0000	1.0000
urban	0.1058	0.1065	0.1085
rural	0.8942	0.8935	0.8915
Bangkok	1.0000	1.0000	1.0000

Set II

urban	0.190214	0.1968	0.1909
rural	0.80979	0.8032	0.8091
Whole Kingdom	1.0000	1.0000	1.0000

APPENDIX 8

ICD Codings Used in this Report
(International Classification of Diseases)

Disease	8th Revision 1978 and the years before 1978	9th Revision 1979 and up to the present
- Diseases of the Heart	393-398	393-398
	410-414	410-414
	420-429	415-429
- Accidents, Poisonings and Violence	E800-E807	E800-E807
	E810-E823	E810-E838
	E825-E827	E840-E848
	E830-E838	E850-E858
	E840-E845	E860-E876
	E850-E877	E878-E888
	E880-E887	E890-E929
	E890-E849	E930-E949
- Malinant Neoplasms (all forms)	140-163	140-165
	170-174	170-175
	180-209	179-208
- Tuberculosis of Respiratory System	010-012	010-012
- Pneumonia	480-486	480-486
- Malaria	084	084
- Diarrhoea	009	009
- Diseases of the Stomach and Duodenum	531-537	531-537
- Nutritional Deficiencies	260-269	260-269
- Diseases of Pregnancy, Childbirth and the Puerperium	630-678	630-676
- Tuberculosis (all forms)	010-019	010-018
- Abortion	640-645	630-639
- Complications of the Puerperium	670-678	670-676
- Complications of Pregnancy and Delivery	630-634	640-648
	635-639	650-659
	650-662	660-669
- Convulsion	780.3	780.3
- Diphtheria	032	032

(Cont.)

Appendix 8 (Cont.)

Disease	8th Revision 1978 and the years before 1978	9th Revision 1979 and up to the present
- Upper Respiratory Infections	460-466	460-466
	470-474	470-478
	490-493	487
	500-508	490-496
	510-519	500-508
		510-519
- Gastro-intestinal Infections		530-537
		566-567
- Infections of Urinary Tract		580-589
and Sex Organs		590-599
		600-608
		610-611
		614-616
		617-629
- Cerebro-vascular Diseases		393-398
		420-429
		430-438
- Ischaemic Heart Disease		410-414
- Diabetes Mellitus		250
- Cirrhosis of the Liver		571
- Violence, Accident, Suicide, Homicide		E800-E999