

**MAURITIUS**

**Ministry of Economic Planning and Development**

**CENTRAL STATISTICAL OFFICE**

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**1983**  
**Housing and Population Census**  
**of**  
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**ANALYSIS REPORT**  
**VOLUME VI — Health, Morbidity**  
**and Mortality**  
**(ISLAND OF MAURITIUS)**

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## FOREWORD

This report is the sixth of a series of analytical reports prepared by the team set up to work on the evaluation and analysis of the 1983 Housing and Population Census data. This team of eight Statisticians and Demographers from this Office and the Ministry of Health started work in 1984 under the supervision and guidance of Dr. K. V. Ramachandran, Regional Adviser at the United Nations Economic Commission for Africa. Dr. Ramachandran has already undertaken several short missions to monitor and co-ordinate the work of the analysts. His sixth and last mission took place during December of last year.

The analytical reports published so far deal with the Evaluation of Age and Sex Data (June 1985); Education (June 1986); Households and Housing Needs (July 1986); Economic Activity (April 1987); and Population Distribution and Migration (September 1987). An analysis report on Nuptiality and Fertility and a final one showing the population profile of the island of Rodrigues will be completed in the next few months.

The present report deals with the evaluation and analysis of Health, Morbidity and Mortality data. A report on the tabulation of census data on mortality had originally been planned to be published separately. However, very few tables have been produced so far and it is not possible therefore to have a separate tabulation report on mortality. The main tables as are now available are included as an Appendix to the present report.

The first part of the present report is about health facilities, personnel and supplies and of the inter-relationship between some socio-economic factors and health. The second part deals with measures and patterns of morbidity while the third and last section studies levels, trends and differentials in mortality. A large part of this latter section is also devoted to in-depth analysis of cause of death statistics. Because of the paucity of tabulated census data, it has not been possible to have the mortality analysis as detailed as possible. Still, it is hoped that this report will be of some help to the public in general and to health planners and policy makers in particular.

I should like to express here once again, my thanks to the analysis team and their staff for all the efforts that were put into the analysis and preparation of this report. My thanks also go to the United Nations Fund for Population Activities and to the United Nations Economic Commission for Africa for financial and technical assistance. Finally, the whole census team and myself are most grateful to Dr. K. V. Ramachandran for his excellent guidance and supervision.

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March 1988

# C O N T E N T S

	<u>Page</u>
<u>CHAPTER I : HEALTH</u>	
1.1	Introduction . 1
1.2	Health facilities, personnel and supplies . 3
1.2.1	Introduction 3
1.2.2	Health facilities . 4
1.2.2.1	In-patient facilities prior to independence 4
1.2.2.2	In-patient facilities after independence 6
1.2.2.3	Out-patient facilities 8
1.2.2.4	Growth of health facilities 9
1.2.3	Health personnel 9
1.2.4	Medical supplies 14
1.2.5	Other medical systems 15
1.3	Socio-economic factors and health 16
1.4	Food and nutrition 20
1.4.1	Introduction 20
1.4.2	Food habits and food supplies 21
1.4.3	Infestation and infections 25
1.4.4	Nutritional status 26
1.5	Housing, environment and hygiene 28
1.5.1	Introduction 28
1.5.2	Housing and living conditions 28
1.5.3	Environment 30
1.5.4	Preventive health services 31
1.5.5	Hygiene 32
1.6	Effect of family planning and maternal and child health services on maternal and child health 33

## CONTENTS (cont'd)

## Page

### CHAPTER II : MORBIDITY

2.1	Introduction	37
2.2	Sources of morbidity statistics in Mauritius	37
2.3	Limitations of data	38
2.4	Morbidity patterns	39
2.4.1	Half a century ago	39
2.4.2	Twenty to twenty five years later:1950-55	41
2.4.3	Prior to independence	42
2.4.4	Post independence period	42
2.4.5	Recent periods	46

### CHAPTER III : MORTALITY

3.1	Need and importance of mortality statistics	53
3.2	Sources and quality of mortality statistics	53
3.3	Mortality data in Mauritius: Sources and Quality	53
3.3.1	The vital registration system	53
3.3.2	Censuses	54
3.3.3	Comparison of vital registration with census data	55
3.3.4	Mortality data from the health system	59
3.4	Mortality levels and trends in Mauritius since 1900	62
3.5	Mortality trends and differentials by age and sex	65
3.6	Cause of death	75
3.6.1	Introduction	75
3.6.2	Sources and limitations of statistics on causes of death	75
3.6.3	Causes of death - all ages	76
3.6.4	Infant mortality	80
3.6.5	Child mortality	83
3.6.6	Maternal mortality	84

CONTENTS (cont'd)

	<u>Page</u>
<u>CHAPTER III (Cont'd)</u>	
3.6.7 Old-age mortality	85
3.6.8 Conclusion	85
3.7 Life Table Mortality Measures	86
3.7.1 Life expectancy at birth by sex	86
3.7.2 Life expectancy at other ages by sex	87
3.8 Mortality differentials	91
3.9 Conclusions	92
Appendix Tables	
References	

## LIST OF TABLES

		<u>Page</u>
1.2.1	Evolution of health facilities, 1967 and 1983	11
1.2.2	Distribution of available hospital beds as at 31st December 1983	12
1.3.1	Some socio-economic indicators, 1966-1987	17
1.4.1	Estimated availability of food supplies in terms of energy, protein and fat, 1964-66 and 1982-84	22
1.4.2	Prevalence and severity of malnutrition, 1985	27
2.4.1	Principal causes of admissions to hospitals, 1930	40
2.4.2	Principal causes of first attendances at out-patient departments of hospitals and dispensaries, 1929	41
2.4.3	Main causes of morbidity, 1955	43
2.4.4	Comparison of major causes of in-patient admissions, 1955 and 1967	44
2.4.5	General hospitals morbidity statistics - Discharges (including deaths) by cause, 1975	45
2.4.6	Attendances by cause at dispensaries (excluding prison <del>dispensaries</del> ), 1975	48
2.4.7	General hospitals discharges (including deaths) by I.C.D. Chapter, 1983 and 1986	49
2.4.8	Principal causes of general hospitals discharges (including deaths), 1983	50
2.4.9	Principal causes of first attendances at dispensary service points, 1983	51
2.4.10	Causes of first attendances at dispensary service points by I.C.D. Chapter, 1983 and 1986	52
3.3.1	Comparison of births of last year and deaths among them with reported births and infant deaths from the vital registration system, 1983	56
3.3.2	Comparison of births of last five years with reported births from vital registration system, 1983	56
3.3.3	Children ever born and children dead by age of woman and sex of child, 1983	57
3.3.4	Comparison of probability of surviving between birth and age $X$ , $l(X)$ , obtained from Trussell's method with life table values, 1983	58
3.3.5	Deaths in government hospitals, 1920-1985	60

LIST OF TABLES (Cont'd)

Page

3.3.6	Deaths in general hospitals by I.C.D. Chapter, 1985	61
3.4.1	Crude birth rate, crude death rate, rate of natural increase, infantile mortality rate and still-birth rate, 1901-1985	62
3.4.2	Comparison between crude and age-adjusted death rates, 1921-1985	64
3.5.1	Trends in age-specific death rates, 1952-1985	65
3.5.2	Trends in percentage declines in age-specific death rates, 1952-1985	69
3.5.3	Age-specific death rates for male population, 1972, 1976, 1980 and 1983	71
3.5.4	Ratio of male death rates to female death rates by age, 1952-1985	73
3.6.1	Main causes of deaths, 1951 and 1960	76
3.6.2	Cause-specific death rates by sex for selected years	78
3.6.3	Deaths and death rates by age groups due to diseases of the circulatory system, 1985-1986	79
3.6.4	Principal causes of infant deaths, 1969 and 1983	80
3.6.5	Principal causes of early neonatal deaths, 1969 and 1983	81
3.6.6	Principal causes of late neonatal deaths, 1969 and 1983	82
3.6.7	Principal causes of post neonatal deaths, 1969 and 1983	83
3.6.8	Principal causes of child deaths, 1969 and 1983	84
3.7.1	Expectation of life at birth by sex, last four census years and year 1985	86
3.7.2	Life expectancy by age and sex, last four census years and year 1985	87
3.7.3	Percentage increase in expectation of life by age, 1952-1985	88
3.7.4	Difference between the female and male expectation of life, last four census years and year 1985	89
3.8.1	Average length of open birth interval by age of mother, sex and survival status of last child, 1983 census	92

# LIST OF FIGURES

	<u>Page</u>
Map      Distribution of Health Facilities in the Island of Mauritius, December 1987	10
3.4.1    Crude birth rate and crude death rate, 1901-1985	63
3.5.1    Age-specific death rates, males, last four census years	67
3.5.2    Age-specific death rates, females, last four census years	68
3.5.3    Ratio of male death rate to female death rate by age, last four census years	74
3.7.1    Difference between the female and male expectation of life by age, last four census years and the year 1985	90



LIST OF APPENDIX TABLES  
=====

- A1      Abridged Life Table by sex, Mauritian population, 1971-73
- A2      Abridged Life Table by sex, Mauritian population, 1982-84
- A3      Abridged Life Table by sex, Mauritian population, 1984-86
- B1      Number of live births of last year and deaths among them,  
         by district, age of mother and sex of child, 1983
- B2      Number of live births of last year and deaths among them,  
         by level of education and age of mother, 1983
- B3      Ever-married women, by sex and survival status of last  
         child, length of open birth interval and present age of  
         mother, 1983
- B4      Ever-married women by age, time since last birth and  
         survival status of last child, 1983
- B5      Ever-married women by parity time since last birth and  
         survival status of last child, 1983

1.1 Introduction

Though death is an inevitable episode in the life of every living being, all the same, every effort is made by the individual, the family, society and the nation to postpone death and prolong life as much as possible. As J.P. Grant, Executive Director of UNICEF put it,

"The central issue for much of the world's population is still life itself - that, is sheer survival. Human survival is, after all, the necessary foundation for all other human development".<sup>1/</sup>

Long life per se is not the only desirable goal - it should be full and fruitful. That is, life should be healthy and happy and enable one to contribute to the well being of not only self but the society and nation at large. A healthy nation is a happy nation. The World Health Organisation (WHO) defines health as a state of complete physical, mental and social well being and not merely the absence of disease or infirmity.

One of the objectives of WHO is the attainment by all people of the highest possible levels of health. Article 25 of the Universal Declaration of Human Rights states,

" Every one has the right to a standard of living adequate for health and well being of himself and of his family, including food, clothes, housing and medical care and necessary social services."

Ill-health and diseases are caused by several factors. These could be sociological, economic, physical, psychological, ecological, biological, etc. An understanding of these various causative factors in any situation will be helpful to the planners and policy makers in their efforts at articulating action programmes accordingly. Naturally, in this drama, both the individual and the state and society play vital roles. Hence their involvement in this joint venture is essential. Without one, the other cannot expect to achieve much. How the cooperation is achieved and the relative roles of each may depend upon circumstances - but all the same, the commitment of both are necessary for success.

The quartet of illiteracy, ignorance, ill-health and poverty normally go hand in hand. An attack on one usually has repercussions on the other. However, it is not easy to get out of the vicious circle. Concerted efforts are therefore required on all fronts to achieve a break-through.

What is the importance of prevention of diseases and prolongation of life to the individual, the family and nation should also be kept in view, as many times, it is not recognised that disease prevention and lengthening of life have economic, social, psychological and other dividends. As a matter of fact, investment in health is a direct effort at human resource development which is one of the most precious resources of a country. Once a life has been brought into the

<sup>1/</sup> Quoted in, "A reduction in IMR from 162 to 24 in 45 years", UNICEF, Mauritius, 1986.

world and some amount of investment is made, it is illogical that it is snatched away leaving not enough scope for it to contribute to society because of premature exit from the scene. This is especially true when it is noticed that when mortality is high as in Mauritius till the 40's, only around half of all births attain the age of entry into economic activities (16 years) or those who enter economic activity are productive only for a short duration and thus their training and experiences are lost.

The human, social, economic and psychological costs of diseases and deaths need no stress. The effect of high mortality on survival of a population is well known. The very slow growth of the Mauritian population at the beginning of this century was precisely because of excessive mortality. What is not well understood is the other implications like high orphanhood, child loss, widowhood, etc. For instance if life expectation ( $e_0$ ) is 20 years, then by age 5 around 13% of the children would be maternal orphans which will increase to 51% by age 20. However if life expectation is 60 years the proportion of maternal orphans at age 5 will be only 2% and even at age 20 it will only be 9%. At  $e_0 = 74$  years, the corresponding values are 0.4% and 3.4% respectively. Similarly the median age at widowhood in a society where female age at marriage is 20 years and life expectation is 35 years will be 45 years but will increase to 62 years if  $e_0 = 60.4$  years. In Mauritius, around 1950, when mortality was relatively high, around a quarter of the children born died by the time the mother attained the age of 45 whereas now with improved life expectations only 5% of children die by that age of mother.

Thus we see that Mauritius has achieved creditable improvements in expectations of life at birth. These macro level indicators do not tell the whole story. One would like to know how the achievements were made and who the beneficiaries are, in other words, which segment of the population made the maximum gain and what are the mechanisms through which these were achieved. One also would like to know what has not been attained and why.

One has to acknowledge that the attack on health had to be on several fronts - public health, environment, food and nutrition, education, improvements in socio economic conditions, housing, individual motivation, etc. How the government tackled the problems and what are the results, form part of the background of this study on health, morbidity and mortality in the island of Mauritius.

In order to achieve some of the goals of improving the living conditions of the people, first of all, there should be a clear understanding of the problems, and methods of attacking them. Only then can plans and programmes be articulated accordingly.

Since independence, the government has been conscious of the problems and of the actions needed to achieve the type of society aspired for. The government was aware that health for all by the year 2000 cannot be achieved by the health sector alone but needed coordinated efforts with other social and economic sectors such as agriculture, food, industry, education, housing and public works, in line with the Alma Ata declaration on primary health stressing education concerning prevailing health problems and methods of preventing and controlling them, promotion of food supply and proper nutrition, adequate supply of safe water and basic sanitation, maternal and child health including family planning, immunisation against the major infectious diseases, prevention and control of locally endemic diseases, appropriate treatment of common

diseases and injuries and provision of essential drugs. Even as far back as the development plan for the years 1975-80 the government policy was explicitly stated as "provide a comprehensive health service to the population". The plan also looked into all the other sectors affecting health and living conditions of the people. In the 1980-82 plan an integrated approach to the health care system was adopted. The latest plan for 1984-86 spelt out the overall policy objectives as:

"to bring about a more equitable distribution of health resources with greater accessibility to primary health care and its supporting services, to shift emphasis from institution based services to the development of a comprehensive health care system; to encourage the involvement of the local community in the shaping of its own socio economic and health future and to review the health services actually provided in order to render them more cost effective . . . ."

Mere statement of policies and programmes without the political and financial commitments may not achieve the desired results. The real concern of the government can be noticed from the financial outlay for the health sector throughout the past several years. Since 1980-81 the health sector has received around 7% of the annual recurrent budget which has increased the actual amount from Rs 182 million in 1980-81 to Rs 285 million in 1984-85. In 1985-86 it was Rs 344 million and the proposed budget for 1986-87 is Rs 386 million.

Thus the concerns and commitments of the government are quite clear. Now, what one will have to assess from the available statistics and information is how far the targets and goals have been achieved, what remains to be done and if possible point out what problems arose on the way and what is the future.

Thus, this study of mortality in the island of Mauritius first looks at the facilities, the services and the way people have taken advantage of them and then take a look at the morbidity and cause of death statistics and then finally consider the mortality statistics in some details.

## 1.2 Health facilities, personnel and supplies

### 1.2.1 Introduction

Even though health is an individual and personal matter, there are at least two important considerations which necessitate institutionalising health care. First of all, in spite of privacy and individual nature of most cases of ill-health, there are instances where the public at large are as concerned as the individual, if not more, regarding a specific existing health condition of an individual, group or area. Secondly individuals may not have the knowledge or at least the wherewithal to deal with particular health conditions necessitating the involvement of specialists, institutions and drugs. Thus health care is both an individual responsibility and a societal concern. Countries therefore attack the problem on both fronts - first by education, information, public health and preventive measures, improving living conditions and secondly by provision of facilities for taking care of those needing attention.

The provision of health care in Mauritius is through the institutional and non institutional facilities, the personnel of various types, the availability of drugs and medicines and the accessibility of these services to the common man. From the pre-dominantly curative orientation of health care perhaps necessitated by the overwhelming occurrence of infectious and parasitic diseases which needed immediate attention, in Mauritius the focus has now been changed to the preventive, protective and promotive aspects through primary health care

In this section we take a look at the situation as regards these facilities, personnel and supplies in the past, especially just before independence and as to how they have evolved during the last 15 - 20 years. This will enable one to interpret the morbidity, cause of death and mortality statistics and situation and perhaps suggest future action programs,

## 1.2.2 Health facilities

Health facilities in Mauritius are provided by both the public and private sectors. The public sector provides facilities for in-patients through regional, district and specialised hospitals, and for out-patients through a network of promotive, preventive and curative institutions. In the private sector, the nursing homes and sugar estate hospitals and dispensaries provide facilities for both in-patients and out-patients. An analysis of the evolution of institutional health facilities in the Island of Mauritius over the period extending from 1967, the year preceding that in which Mauritius became independent, to 1983 is presented in order to show the improvements over time and especially since independence.

### 1.2.2.1 In-patient facilities prior to independence

#### Government Hospitals

As at the end of 1967, there were in the Island of Mauritius, **two regional hospitals, six district hospitals, a psychiatric hospital, a Leprosarium and a tuberculosis hospital.**

A regional hospital is one which provides facilities of a more advanced and sophisticated nature than those that are available in a district hospital. Therefore in addition to providing treatment for the population contained in its own catchment area, it also caters for cases referred to it by district hospitals.

The two regional hospitals in operation were Civil Hospital in Port Louis and Victoria Hospital in Quatre Bornes. In addition to the population of the district of Port Louis, Civil Hospital also served the population of the northern part of Black River district, as well as patients referred to it by hospitals situated in the districts of Pamplémousses, Rivière du Rempart and Flacq. Victoria Hospital served

the population of the district of Plaines Wilhems, as well as that of the Southern part of Black River district, and received patients referred to it by hospitals situated in the districts of Grand Port, Savanne and Moka. Victoria Hospital incorporated the Princess Margaret Orthopaedic Centre, which received patients with bone fractures from all over Mauritius. The bed complements of Civil and Victoria Hospitals were 403 and 584 respectively.

A district hospital, as its name implies, serves the population of the district in which it is situated. There were six district hospitals, one in each of the following districts: Pamplemousses, Rivière du Rempart, Moka, Flacq, Grand Port and Savanne. It will be recalled that a regional hospital also acts as a district hospital for the district in which it is situated. The two regional hospitals were in the districts of Port Louis and Plaines Wilhems, so that Black River was the only district without a hospital. The total bed complement of the six district hospitals was 621.

There were three specialised hospitals in the Island of Mauritius: a psychiatric hospital, a Leprosarium and a tuberculosis hospital.

The Brown Sequard Psychiatric Hospital, situated in Beau Bassin in the district of Plaines Wilhems, was the only institution of its kind in Mauritius, although certain convents and infirmaries were authorised to receive certified mental patients on the recommendations of the Central Board of Lunacy approved by His Excellency the Governor. The Brown Sequard Psychiatric Hospital was the largest hospital in Mauritius with a bed complement of 742.

The Leprosarium was situated at Moulin à Poudre in the district of Pamplemousses. It had a bed complement of 61.

The Tuberculosis Hospital was located in the northern tip of the district of Pamplemousses at Pointe aux Canonnières. It had a bed complement of 86. It should be pointed out here that the Tuberculosis Hospital was not the only institution where tuberculous patients received treatment. A total of 124 beds were also allocated to them in Civil, Victoria and Flacq Hospitals.

#### Private Nursing Homes

There were five private nursing homes in the Island of Mauritius. Four were in the district of Plaines Wilhems and the remaining one in the district of Moka. Their total bed complement was 137.

#### Sugar Estate Hospitals

There were 24 hospitals on sugar estates, catering for the minor ailments of their employees and members of their families. More

serious cases were referred to government hospitals or private clinics. The total bed complement of the sugar estate hospitals was 478

#### 1.2.2.2 In-patient facilities after independence

##### Government Hospitals

The Sir Seewoosagur Ramgoolam National Hospital was inaugurated in August 1969, but, in all fairness, it could not be considered as a regional hospital at the time of the inauguration. Only out-patient services were available then. By November, it started to accommodate in-patients, and it had a bed complement of 52 as at the end of the year. However, by the end of 1970, it had become a full-fledged regional hospital with 214 beds. The total number of beds in the three regional hospitals was then 1,216, that is an increase of 23.2% over the 1967 figure.

By 1975, the total number of beds in the three regional hospitals was 1,350. This represented a net increase of 134 beds (11.0%) over the 1970 figure. It must be pointed out here that the tuberculosis wards in Civil and Victoria Hospitals had been closed down, and all tuberculous patients, whose number had been on the decline, had been transferred to the Tuberculosis Hospital in Pointe aux Canonnières. Also, the Leprosarium had been administratively attached to Sir Seewoosagur Ramgoolam National Hospital.

As at the end of 1983, the total number of beds in the three regional hospitals was 1,495. Therefore, between 1967 and 1983, the number of regional hospitals in the Island of Mauritius had increased from two to three, and their total bed complement had gone up by 51.5%.

In November 1969, Poudre d'Or District Hospital was closed down, and all its patients transferred to Sir Seewoosagur Ramgoolam National Hospital. This left five district hospitals in operation, and the total bed complement of the district hospitals fell to 551, that is a decrease of 11.3% over the 1967 figure.

In February 1972, Long Mountain District Hospital was converted into an annexe of Brown Sequard Psychiatric Hospital, and Moka Hospital was converted into an Ophthalmology hospital. The number of district hospitals had therefore been reduced to three (Flacq, Mahebourg and Souillac), and their total bed complement as at the end of the year 1972 was 340, that is a decrease of 45.2% over the 1967 figure.

In 1979, Long Mountain ceased to be an annexe of Brown Sequard Psychiatric Hospital, and was reconverted into a district hospital. The number of district hospitals was then four, and that number had remained unchanged since then. As at the end of 1983, the total number of beds in district hospitals was 340, that is the same as in 1972.

In 1972, Long Mountain District Hospital was converted into an annexe of the Psychiatric Hospital and their combined bed complement was 846. In 1979, Long Mountain Hospital was reconverted into a district

hospital. As at the end of 1983, Brown Sequard Psychiatric Hospital had 790 beds, that is an increase of 6.5% over the 1967 figure.

Subsequent upon the opening of Sir Seewoosagur Ramgoolam National Hospital, the Leprosarium became administratively attached to that hospital, and came to be known as the Skin Diseases Infirmary. It had 38 beds as at the end of 1983, and this figure is incorporated in the bed complement of Sir Seewoosagur Ramgoolam National Hospital.

In 1972, the Tuberculosis Hospital at Pointe aux Canonnières was closed down, and the former district hospital at Poudre d'Or was converted into a Tuberculosis Hospital. At the same time, the tuberculosis wards in Victoria and Flacq hospitals were closed down. Poudre d'Or Hospital catered for male patients, while females were accommodated in two wards in Civil Hospital.

The total number of beds allocated to tuberculous patients as at the end of 1972 was 147. In 1975, the tuberculosis wards in Civil Hospital were closed down, and all tuberculous patients transferred to Poudre d'Or Hospital, whose bed complement had been increased to 146, and which became then the only institution to provide in-patient treatment to tuberculous patients.

With the decrease in the number of tuberculous patients, the progress in tuberculosis chemotherapy and the current thinking of treatment of patients at their own homes, the number of beds in Poudre d'Or Hospital was gradually reduced, and was 96 as at the end of 1983. In the meantime, the hospital had been renamed Poudre d'Or Chest Hospital, and catered also for patients with chest diseases other than tuberculosis.

In 1972, when Moka District Hospital was converted into a specialised hospital for eye diseases, it had then a bed complement of 65. In addition there were 12 beds reserved for the specialty of Ophthalmology at Sir Seewoosagur Ramgoolam National Hospital. In 1975, the beds at that Hospital were reduced to 6, and these were phased out in 1976. All in-patients with eye problems were treated at Moka Hospital, whose bed complement had itself been reduced to 57. As at the end of 1983, the number of beds at Moka Hospital was 64.

In 1976, the former H M S Mauritius Hospital, in Vacoas, was converted into a Hospital for Ear, Nose and Throat Diseases. Its bed complement of 35 has remained unchanged over time. Prior to the opening of the E N T Hospital, there were 26 beds reserved for E N T patients in the regional hospitals. Administratively, the Ear, Nose and Throat Hospital is known as the E N T Centre, and is attached to Victoria Hospital, although in this report it has been considered as a separate hospital.

#### Private Nursing Homes

By 1970, the number of private nursing homes had increased to 7, the additional ones being located in Port Louis and Plaines Wilhems, and their total number of beds had gone up to 176. In 1974, the number was reduced to six, with the closing down of one situated in the district



of Plaines Wilhems, but in 1980 with the opening of a new one in the district of Plaines Wilhems, the number became again 7. The number remained unchanged since then, and their total bed complement as at the end of 1983 was 192. It should be recalled that five nursing homes are situated in the district of Plaines Wilhems, one in Port Louis, and only one in a rural district, and even then, it is so located that it is within easy reach of both Plaines Wilhems and Port Louis districts.

#### Sugar Estate Hospitals

By 1972, the number of sugar estate hospitals had been reduced to 23, with 414 beds. The decrease continued over the years, and in 1977, there were 18 hospitals with 207 beds. With the passage of time, fewer and fewer sugar estates were admitting patients to their hospitals, and as at the end of 1983, there were only two, with a total of 22 beds, that were admitting patients.

### 1.2.2.3 Out-patient facilities

#### Hospitals

All regional, district and specialised hospitals, with the exception of Poudre d'Or Chest Hospital, have out-patient departments. Out-patient departments of hospitals offer services at two levels: the level of first contact (unsorted), and the referral level (sorted), where patients are seen by specialists. Facilities for out-patients also exist at dispensary service points, maternal and child health and family planning clinics, dental clinics, and a few other institutions.

Facilities for out-patients also exist at the private nursing homes. The sugar estates also provide a network of dispensaries for the benefit of their employees and members of their families.

The term dispensary service point is preferred to that of dispensary because dispensary services are also available in health institutions other than dispensaries, for example, primary health care centres and health centres. A Primary Health Care Centre is one in which dispensary, maternal and child health, and family planning services are available on the same premises. A Health Centre is a little more complex than a Primary Health Care Centre, because in addition to the services provided at the latter place, a Health Centre also provides other services, for example, dental care. As at the end of 1983, there were 3 health Centres and 22 primary health care centres.

In 1967, there were 43 dispensary service points in the Island of Mauritius. In 1972, there were 46, and in 1977 there were 48. By the end of 1983, the number had reached 61.

#### M C H and F P Clinics

In 1967, there were 27 maternal and child health clinics. At that time, family planning services were offered only by non-governmental organizations, namely the Mauritius Family Planning Association and Action Familiale. Family Planning services were integrated into the Ministry of Health in December 1972. In 1973, there were 53 clinics offering maternal and child health and family planning services, and 19 additional ones offering family planning services only. In 1977, the figures were

70 and 15 respectively. As at the end of 1983 there were 76 maternal and child health and family planning clinics, and a further 19 clinics for family planning only.

#### Other Out-patient Services

The Chest Clinic that was in operation in Port Louis in 1967, remained the only institution of its kind in existence in 1983. The number of dental clinics went up from 5 to 13 between 1967 and 1983. A Social Hygiene Clinic was opened in February, 1973, to provide treatment to patients suffering from sexually transmitted diseases.

#### Mobile Out-patient Services

In addition to its network of static units, the Ministry of Health provides mobile services. As at the end of 1983, there were five mobile dispensaries, two mobile dental clinics and a mobile maternal and child health and family planning clinic in operation. The mobile dental clinics serve specific groups of the population, while the mobile dispensaries and M O H and F P clinics serve people in remote and sparsely populated localities, where it would be uneconomical to have static units.

#### 1.2.2.4 Growth of health facilities

Tables 1.2.1 and 1.2.2 give respectively the evolution of facilities (health institutions and beds) over the period 1967-83. It can be noted that in the short period of 16 years there has been a tremendous growth in the health infrastructure. Another important observation is that not only are the infrastructure and facilities physically accessible (see map opposite page showing the locations of facilities) but transportation is cheap, well organised and quite wide spread and there are also no social or economic barriers preventing particular groups from access to the available facilities. As a matter of fact, the government facilities are free and every effort is made to cater to vulnerable sections of society - children, women, the aged, the poor etc.

#### 1.2.3 Health personnel

##### Doctors

As at the end of 1969, there were 165 doctors in the State of Mauritius, that is one doctor for 4,997 persons. Almost 60% of the doctors (98) were in employment in Government Service, and among them there were 36 specialists. By the end of 1975 the number of doctors registered had gone up to 293, and the doctor: population ratio was 1 : 3,083. Of these doctors, 191, that is 65.2%, were employed by the State. The number of doctors registered as at the end of 1980 was 503, corresponding to a doctor: population ratio of 1 : 1946; 67.2% of these

Map: Distribution of Health Facilities in the island of Mauritius, December 1987

- Hospital
- Dispensary Service Point
- Maternal and Child Health Clinic
- Family Planning Clinic
- △ Health Office

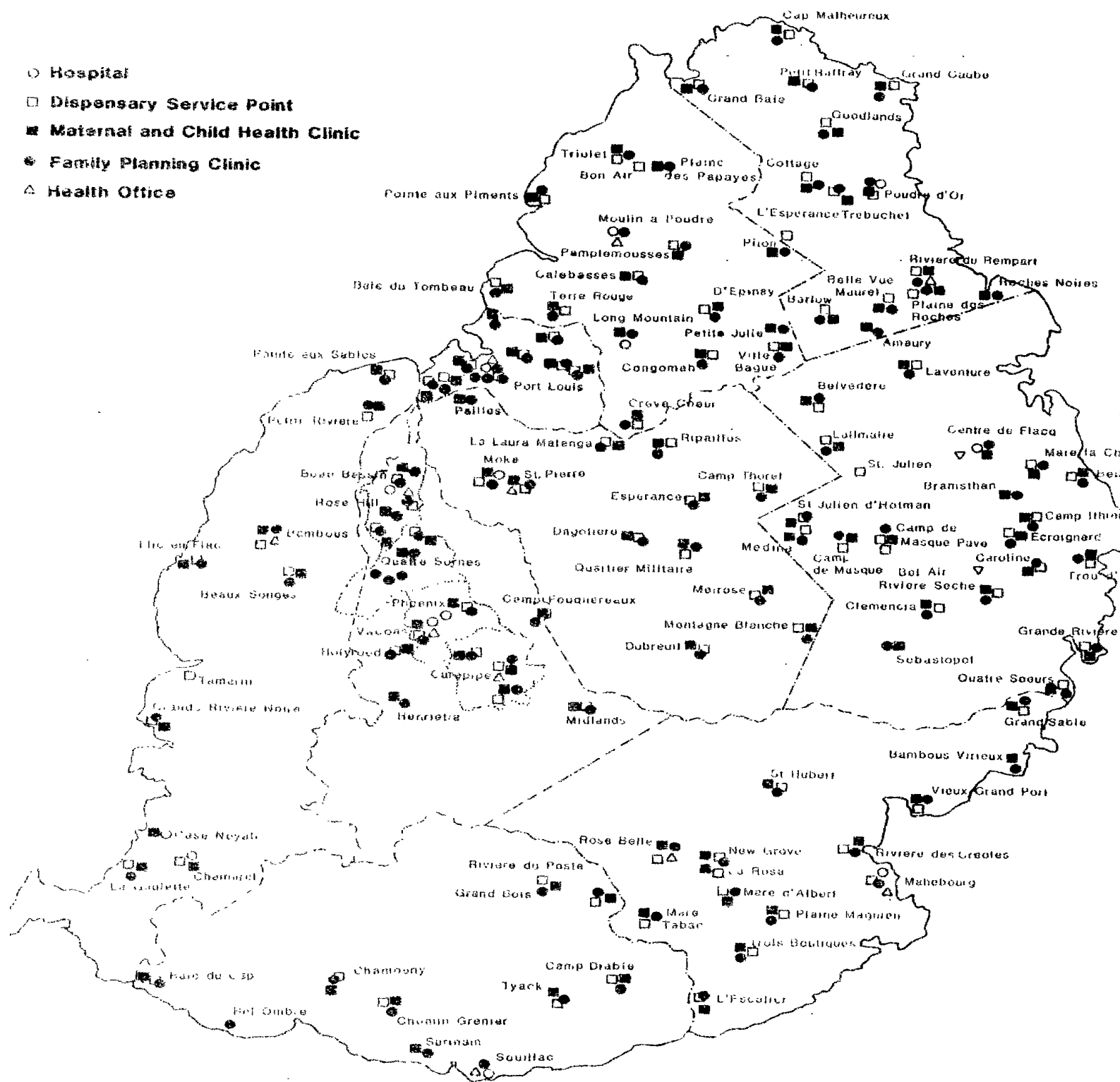


Table 1.2.1 - Evolution of health facilities, Island of Mauritius, 1967 and 1983

Type of facility	1 9 6 7		1 9 8 3	
	Number of units	Number of beds	Number of units	Number of beds
Regional Hospital	2	987	3	1,495
District Hospital	5	621	4	340
Specialised Hospital	3	889	4	985
Dispensary Service Point	43	-	61	-
M C H and F P Clinic	27 <sup>1/</sup>	-	76	-
F P (only) Clinic	-	-	19	-
Dental Clinic	5	-	13	-
Chest Clinic	1	-	1	-
Social Hygiene Clinic	-	-	1	-
<hr/>				
Private Nursing Home	5	137	7	192
Sugar Estate Hospital	24	478	2	22
Sugar Estate Dispensary	24	-	30	-

<sup>1/</sup> In 1967, family planning services were offered by non-governmental organisations only.

Table 1.2.2. - Distribution of available hospital beds as at 31.12.83

Hospital	C A T E G O R Y     O F     B E D S															TOTAL
	General Medicine	General Surgery	Obstetrics	Gynaecology	Phthisiology and Pneumology	Orthopaedics and Traumatology	Pediatrics <sup>1/</sup>	Ophthalmology	E.N.T.	Infective Diseases	Psychiatry	Leprosy and Dermatology	Radiotherapy	Burns	Cardiology	
Civil	98 <sup>2/</sup>	94	62	27	-	29	66	-	-	-	-	-	-	-	-	376
S.S.R.N.	121 <sup>2/</sup>	70	73	33	-	54	53	-	-	-	-	38 <sup>3/</sup>	-	-	-	452
Long Mountain	38	-	-	-	-	-	5	-	-	-	-	-	-	-	-	43
Placq	78	-	13	-	-	-	16	-	-	-	-	-	-	-	-	107
Mahebourg	63	8	17	-	-	-	7	-	-	-	-	-	-	-	-	95
Souillac	65	-	12	-	-	-	18	-	-	-	-	-	-	-	-	95
Victoria & P.M.O.C.	123	89	92	40	-	142	39	-	-	30	-	-	44	45	23	667
Sub-Total (General)	586	269	271	100	-	225	204	-	-	30	-	38	44	45	23	1,835
Brown Séguard	-	-	-	-	-	-	-	-	-	-	790	-	-	-	-	790
Poudre D'Or (Chest)	-	-	-	-	96	-	-	-	-	-	-	-	-	-	-	96
Hoka Eye	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	64
E.N.T. Centre	-	-	-	-	-	-	-	-	35	-	-	-	-	-	-	35
TOTAL	586	269	271	100	96	225	204	64	35	30	790	38	44	45	23	2,820

Note : 129 cots for new borns not requiring special care are excluded from the above figures.

<sup>1/</sup> including cots for newborns requiring special care

<sup>2/</sup> including 4 beds in intensive care unit

<sup>3/</sup> at the Skin Diseases Infirmary

doctors were in the public service. It must be pointed out that up to 1980, it has been the practice for the Ministry of Health to offer employment to all doctors who wanted to join Government Service. However, in view of economic constraints and of the over-increasing number of new doctors, that practice was discontinued. Consequently, the percentage of doctors employed by the State began to go down. In 1981 it was 60.5%, in 1982 58.2%, and in 1983 it was 55.1%. The number of doctors registered in Mauritius as at the end of 1983 was 690 with a doctor : Population ratio of 1 : 1470 (380 in the public sector and 310 in the private sector). Among those employed in the public sector were 120 specialists.

#### Dentists

As at the end of 1969, there were 22 dentists i.e. one dentist for 37,474 persons in the State of Mauritius. Of these, 7 were in Government Service and 15 in private practice. By the end of 1975 the number of dentists registered in Mauritius nearly doubled to reach the figure of 42 (of which 17 were in public service) with one dentist for 21,508 persons. 59 dentists (of whom 22 in the public sector) were registered as at the end of 1980 giving a dentist: population ratio of 1 : 16,594. By end of 1983 there were 82 dentists (23 employed in the public service) corresponding to a dentist: population ratio of 1 : 12,372.

#### Pharmacists

As at the end of 1969 there were 50 pharmacists in Mauritius. However, the distribution was very uneven between the public and private sectors: 4 and 46 respectively. The pharmacist: population ratio was then 1 : 16,489. There was practically no change of the situation in the succeeding years, till in 1975 when in the private sector the number went up by one only. The result of this near stagnation was that the pharmacist: population ratio deteriorated, and stood at 1 : 17,712 at the end of 1975. Over the following five years the situation evolved favourably, the number of pharmacists in the public sector had gone up to 7 and that in the private sector to 62. There was then one pharmacist for 14,189 Mauritians. By the end of 1983, the number of pharmacists in the public sector had been reduced to 5, while that in the private sector had gone up to 74, giving a total of 79 pharmacists, corresponding to a pharmacist:population ratio of 1 : 12,841.

#### Nurses and Midwives

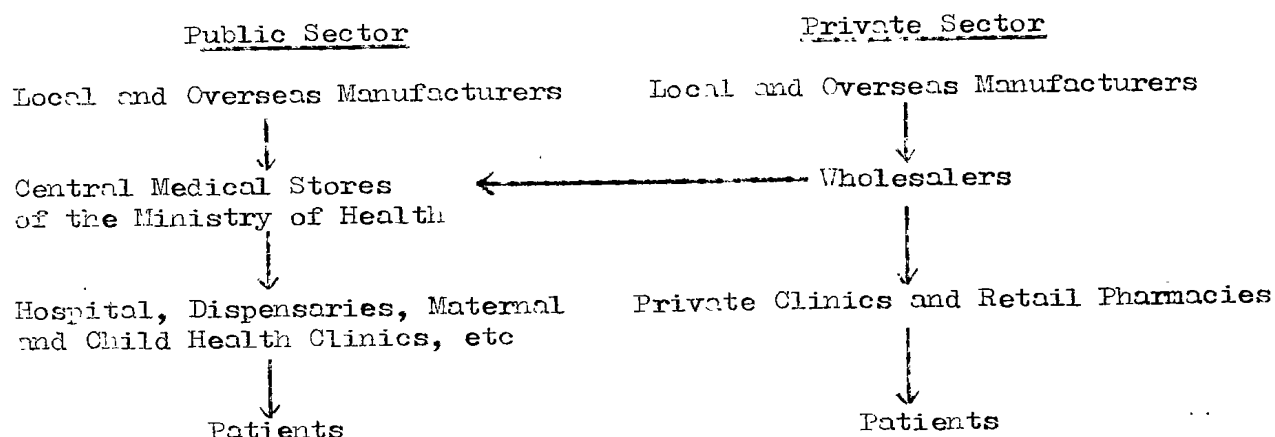
As there is no register of nurses and midwives in Mauritius, little information is available on the number of nurses and midwives engaged in the private sector. As regards the public sector, there were 882 nurses and midwives at the of 1969, that is one for 935 persons. By the end of 1975, the number of nurses and midwives had gone up to 1,430; there was then one for 632 persons. From 1,990 in 1980, the number of nurses and midwives reached 2,268 by 1983 (end-of-year figures for both years). The corresponding nurse/midwife:population ratios were 1 : 492 and 1 : 447.

#### 1.2.4 Medical Supplies

The Ministry of Health purchases its supplies of drugs partly from the (only) local pharmaceutical manufacturer and the remainder from overseas manufacturers through an annual tender. The supplies of drugs in the private sector also come from both local and external sources. There are fifteen wholesalers engaged in the importation of drugs, among which three have a substantial share of the market.

#### Channels of Distribution

The channels of drug distribution are as diagrammatically represented below:



#### Dispensation and availability

In the public sector, drugs are dispensed free of charge to both in-patients and out-patients. The Ministry of Health has established its own list of essential drugs which amount to some 325. The drugs are ordered by their generic names. For long term out-patient treatment, the drugs prescribed are supplied by instalments, on a fortnightly basis. It sometimes happens that a drug prescribed in a public institution is not available from the pharmacy of that institution. In such circumstances the patient has to obtain the drug from a private pharmacy and to foot the bill. The private sector imports some 2000 pharmaceutical products from various parts of the world, mainly from Denmark, France, Germany, Great Britain, Holland, India and Switzerland. Most of the drugs are marketed under their brand names.

#### Relative Costs and Affordability

As stated above drugs are dispensed free of charge in government health institutions: hospitals, health centres, primary health care units, dispensaries, etc. In the private sector, the wholesale and retail prices of drugs incorporate profit mark-ups that are fixed by government regulations. The wholesaler is allowed a mark-up of 20% on the landed cost, and the retailer is allowed a mark-up of 30% on the wholesale. (Recent budgetary measures have reduced the mark-ups to 17 and 27% respectively, and have waived the 17% import levy. As a consequence, the retail prices of drugs have come down by 22%).

### 1.2.5 Other medical systems

#### Non-Allopathic Medicine

Some health care is provided by other systems like Ayurvedic, homeopathy and traditional practices. There are no restrictions on the practice of non-allopathic medicine in Mauritius, and practitioners of non-allopathic medicine are not required to be registered with the authorities. For these reasons, the actual number of such practitioners and the extent of the practice of such medicine are not precisely known. However, practitioners of non-allopathic medicine are not permitted to:

- (i) sign a death certificate;
- (ii) grant sick leave; and
- (iii) prescribe dangerous drugs.

#### Ayurvedic and Unani Medicine

Ayurvedic medicine has been practised in Mauritius since a long time. The practitioners were mainly auto-didacts for whom the practice of Ayurvedic medicine was a part-time and benevolent activity. However, in recent years, a few Mauritians, who have completed formal courses in Ayurvedic medicine in India, have been engaged full-time in the practice of this type of medicine. They themselves dispense the medicine they prescribe. There does not seem to exist practitioners of Unani medicine in Mauritius.

#### Homeopathy

There are only one or two overseas-trained practitioners of homeopathy in Mauritius. In recent years a number of Mauritians have received short intensive training locally, conducted by expatriates, and several "healing centres" have been opened.

#### Traditional Medicine

In the markets situated in densely populated areas of Mauritius there are usually one or two stalls where medicinal herbs (also flowers, grains, roots, bark) are being sold, and some of the vendors appear to have quite a good clientele. Many Mauritians grow a few medicinal plants, for example "ayapana" and "citronelle", in their back gardens.

#### Chinese Traditional Medicine and Acupuncture

Chinese traditional medicine, based on plant and animal products, is also being practised on a limited extent in Mauritius. Acupuncture, which had been performed in the private sector since long, has recently been introduced in the public sector, and is now being practised by a few doctors in government health institutions.



## Health and Faith

Delivery from disease or infirmity through religious observances is at times sought by Mauritians of all origins. Sessions are sometimes discretely and privately arranged, while at other times, specially when expatriates are involved, they are held in public places (cinema halls, football stadiums) and are backed by massive advertising campaigns.

## Witchcraft

There are Mauritians of all walks of life who indulge in witchcraft for health reasons, but because the practice is illegal, it is generally shrouded in a veil of secrecy. There are some who are real addicts of this practice, while others resort to it as a last measure, after having tried every possible non-occult means, and when all hope of recovery seems forlorn.

## 1.3 Socio-economic factors and health

The health of a population is directly related to its economic prosperity, not only because of a psychological feeling of well-being that accompanies such prosperity but also by the buoyancy of all public and private services which are instrumental in promoting the health and wealth of the nation. Economic depression has adverse social implications which directly affect the health of a nation. Thus the mortality rate which had started to decline at the turn of the century did not continue on the downward trend and hovered at a level of around 29 during the depression years of the 1930's and the war period of the early forties. After the war the economy of the island prospered as a result of higher prices for sugar which has been the main export of the country until recently. Consequently the crude death rate dropped to 21 in the late forties and further to 15 in the early fifties. Table 1.3.1 shows that the general improvement in the economic situation has continued over the last two or three decades in spite of temporary short periods of stagnation. The GDP, the level of employment and earnings all show substantial increases. The greater availability of jobs has gone hand in hand with improvement in working conditions. Both the health and labour authorities co-ordinate their efforts in order to ensure that work sites and work conditions are hygienic and that safety standards are maintained. In certain cases employers are required to provide appropriate equipment as well as food, particularly milk. For instance pesticides and herbicides sprayers are provided with masks and gloves and milk. However it is possible that the food or milk is not actually provided but replaced by cash equivalents which are more convenient to handle. To what extent the money is used to buy nourishment as distinct from other things may be interesting to find out.

However it cannot be denied that there has been considerable improvement in economic conditions over the last 2 or 3 decades accompanied by more job availability and better conditions of work which have resulted in improved living conditions and better health, thereby contributing to the more or less continuous fall in the crude death rate which had reached 7 per 1,000 in the eighties.

Table 1.3.1 - Some economic indicators, Island of Mauritius, 1966 - 1987

Year	GDP per capita at market prices (Rs)	Employment level - large establishments		Average monthly earnings (Rs)	
		General	Manufacturing	General	Agriculture
1966	1,232	125	6	219	184
1970	1,480	130	8	241	197
1975	4,386	173	23	483	361
1980	9,273	198	36	1,205	971
1985	16,867	215	63	1,785	1,620
1986	19,359	238	84	1,844	1,773
1987	21,340	259	99	2,744	2,219

But it must be pointed out that economic development has brought with it some of its own evils, and the mid-seventies witnessed a change in the pattern of mortality with infective, parasitic and nutritional diseases giving way to diseases of the non-communicable type. A WHO survey conducted jointly with the Ministry of Health has indicated that in 1987 30% of the adult population was suffering from diabetes or was susceptible to the disease whilst 15% were suffering from hypertension and 50% had an excessively high level of cholesterol. The study also noted that there was at least 1 non-identified case of diabetes for each identified case whilst the ratio for hypertension was 2 unknown cases for every 3 identified. The main causes of hypertension were identified as obesity and alcoholism. It was revealed that 20% of men and 33% of women were obese according to international standards; 58% of men and 7% of women were regular smokers and 19% of Mauritians were moderate consumers of alcohol.

Another point that needs to be brought out is that economic improvements may not have affected the health of all socio-economic groups in the same way or to the same extent. It can be argued that health services are free in the country and that socio-economic differences need not necessarily lead to penalisation of one group with respect to another. This may be true in so far as primary health care is concerned, which uniformly protects everyone from for example infections and parasitic diseases which can overnight become a cause for national concern, but primary health care facilities provided by public health services may not be very effective in those cases where the disease is non-communicable and therefore of more individual concern, in which case the less favoured groups have a handicap in so far as they may not be able to afford the best service that can be had.

Even as regards infective and parasitic diseases some groups are more vulnerable than others. For instance the census mortality data have shown that infant mortality was higher for women in low level occupations. Part of the reason could be that the babies of these working women are not only breastfed for shorter periods of time but have to be left under the care of older children or neighbours who are not generally the best suited to look after babies. Limited economic means however do not permit them to purchase the better facilities which may perhaps be offered by kindergartens. The fact that these women also often have to perform the usual chores of a housewife as well, makes it difficult for them to give proper attention to the children even during the time they are in the home. The nutrition survey showed that chronic malnutrition was more among children of working women. However since the major causes of infant deaths here have been infectious and diarrhoeal diseases and malnutrition which can be readily treated without much individual expense, the higher infant mortality for women in low level occupations may not be due to their relative poverty but to lower education and ignorance. Hence there may be some need for special adult education programmes aimed particularly at women. For instance Kmet and Peerun note that information on radio and television regarding issues such as breastfeeding duration, sterilization techniques or the preparation of formula needs were little utilized. They concluded that emphasis needed to be placed on materials designed to reach informal learning groups such as the family and women's groups, and that radio and television had to be used imaginatively in order to captivate the attention of the target audience.

In spite of the fact that there are still some groups of the population with low levels of education which may be having a negative influence on their health and level of living, generally speaking, however, the progress of education has been considerable, with primary enrolment reaching 95% for males and 94% for females in 1983. Enrolment ratios at the secondary level increased from 40% to 46% for males while for females the increase has been from 28% to 42% between 1972 and 1983. The level of education of the population has also improved with the median level of schooling increasing from standard V in 1972 to standard VI in 1983. It is surmised that at least one person in most households has had primary education and the consequent high receptivity to nutrition and health information must have made significant contribution to the improvement in health of the population. The remarkable success of the immunization campaign is a testimony to this fact although some efforts need to be maintained to stress the importance of the complete vaccination schedule.

/the

Although the census statistics show that infant and child mortality is higher for the group of women working in agriculture and industry it is not immediately obvious that the children of the women working in so called office jobs are necessarily given better health care. Ill-health in the first group has greater risks of death than in the second because of the latter's better means of getting curative services. But the fact that well-to-do working women have to leave their babies, who are often weaned very early or not breastfed at all, with maidservants who are very often not equipped with the basic elements of hygiene and feeding, indicates that the better education and health awareness of parents is not necessarily translated into effective health care of infants when they most need it.

The extended family system provided the opportunity until quite recently to combine the need of younger women to work, with the need of infants and children for attention and care. The slow disruption of this system has resulted in an increasing tendency towards the disintegration of a care-full and psychologically satisfying environment for raising children. The implications of this trend on future delinquency and crime rates and the extent of drugs abuse need careful attention. It may appear for instance that day care facilities at work sites may not be a long term investment as good as flexible hours and/or possibilities of long-term leave of absence without loss of job security. However this may need to be balanced against the needs of industry and productivity, and it can always be argued that in many cases the economic activity of women in fact promotes health by providing the necessary resources for better nutrition and care.

Perhaps one of the nastiest ills which follow in the wake of economic development and affluence is the increased consumption of more and more dangerous drugs. Tobacco and alcohol whose consumption increases with prosperity and which continue to be slow killers in increasing number of cases are eclipsed by the more dramatic and quicker effects of harder drugs. The type of drugs consumed in Mauritius has evolved rapidly during the eighties from the softer ones like "gandia" to the more dangerous killer which is "brown sugar". It was estimated that in the early eighties there were between 30 to 35,000 drug addicts in the country and this figure would go on increasing rapidly unless drastic and urgent measures were taken. A survey by the Joint Child Health and Education Project has shown that 1 out of 6 adolescents in the age-group 16 to 22 years are affected by drugs.

Another survey by a union has indicated that 15% of women working in the Export Processing Zone are drugging themselves. The president of the Select Committee on drugs estimated that 10 - 12% of the population are drugging themselves (1986). Two to three cases are admitted every week for disintoxication at the B. Seuard hospital. Drugs have reached not only private homes and work sites but schools, both private and public as well.

The health implications of the proliferation of drugs cannot be underestimated. Every now and then, the press reports cases of deaths due to suicide related to drugs addiction or to overdose but the extent to which deaths are caused by diseases occasioned by toxicomania is difficult to estimate, since the concealed nature of drug use would hide it in the statistics of death. These include jaundice, septicemia, endocarditis, respiratory diseases, cirrhosis of liver, gangrene and viral hepatitis which are caused either by the drugs themselves or the rudimentary and unsterilised equipment by which they are introduced into the body. It seems that the risk groups are not confined to the poorer regions of the country or the less favoured sections of the population only but the risk of spreading infections is definitely much greater in these cases in view of the poor hygienic conditions and lesser means of acquiring treatment when necessary.

The Government of Mauritius is conscious of the problem and there was last year a crackdown on drug traffickers combined with changes in the law to provide for the death penalty for drug trafficking. Efforts are also being made by both government and non-government organizations to set up appropriate infrastructure and personnel for the rehabilitation and treatment of drug addicts. But information and education both in and out of schools probably remain the best available means for combatting drug addiction whose health problems could cost enormous sums to the nation both in terms of treatment and lost manpower.

#### 1.4 Food and Nutrition

##### 1.4.1 Introduction

Food is one of the basic necessities of life. For the proper functioning of the human organism not only food in sufficient quantity is needed, but certain essential food factors also should be present in adequate amount. Again for optimum ingestion of food for growth and development, a pre-requisite is that the food is wholesome and that the person has no infestation (by worms and other parasites) and is free from infections or other factors which may hamper absorption of the food and nutrients by the body.

Consumption of food is a biologic necessity which if denied for sufficiently long duration will either result in mal functioning or non functioning of the systems bringing in morbid conditions or will even in the extreme instance lead to death itself. It is now generally accepted that good and sufficient nutrition is one of the most important factors for the maintenance and promotion of public health. The best

fed people of the earth live longest, have the greatest physical and mental energy, possess the most vigorous health and the greatest enjoyment in life. Thus sound nutrition is the very essence and basis of national health.

Food consumptions and nutritional status are indicators of levels of living. Economic and social development and progress are unthinkable and meaningless without the elementary and basic necessities of life being provided to the masses.

A hungry man is an angry man. A hungry nation is a potential danger to world peace and harmony. The FAO<sup>1/</sup> aptly puts it by saying, "People are beginning to learn that poverty is not a God given state of life".

Thus the first priority for a health planner should be to ensure that food is available, accessible and affordable and that it is wholesome, balanced and acceptable to the cultural and traditional mores of the people. The second priority is to ensure that vulnerable segments like infants, children, lactating mothers are provided with food rich in nutrients. The third priority is to improve the absorption and ingestion of the food by controlling the environment and eliminating chances of infestation by worms and parasites and spread of infections. The fourth priority is to educate the people and especially the mothers on good food and living habits and try to eliminate harmful habits like smoking, drinking, drug taking etc. as it is known that there are some dietary habits which are not good and lead to a series of problems.

In this section we consider the food and nutrition status of island of Mauritius as an essential background for the study of morbidity, cause of death and mortality.

#### 1.4.2 Food habits and food supplies

The Mauritian staple foods are mainly rice and wheat flour, which are supplemented by animal or leguminous products and vegetables. There are no food taboos which may seriously affect the nutritional status of the different sections of the population. Among animal foods, milk, eggs, fish, poultry and mutton are acceptable to the majority of Mauritians. People from the lower income groups and vegetarians rely mostly on leguminous products to supplement their cereal based diet in terms of protein. There have been some attempts during the past five years to diversify the food habit of the nation with the partial substitution of rice and wheat flour with Irish potato and other locally produced starchy foods.

Mauritius depends mainly on imports, particularly of rice and wheat flour, for its food requirement which account for 20 percent of total imports. About 64 percent of food energy and 84 percent of protein are imported. Of this about 50 percent of energy and protein supplies are

1/ FAO : Millions still go hungry, Rome, 1957

derived from cereals, mainly rice and wheatflour which are sold at government subsidized prices. Rice and flour are heavily subsidised absorbing 18% of government transfer payments. In 1979-81 per capita energy of 2766 k/cal and 61.9 gm of protein were noted of which 52% derived from rice and flour. In addition, during 1984-85 the budget on food subsidy amounted to Rs 72 million, school feeding absorbed another Rs 12 million and feeding of vulnerable groups costed Rs 30 million. In 1983 the per capita consumptions in gms per day of major food items were wheat/flour 157.5, rice 197.4, potatoes 43.5, cane/sugar 97.4, pulses 23.1, groundnuts 5 l, coconuts 6.2, tomatoes 31.1, fresh vegetables 41.1, onion 11.7, bananas 19.2, citrus 4.7, apples 2.7, pineapple 1.2, preserved fruits 1.2, fruit/vegetable juice 2.1, cattle meat 11.2, goat/sheep meat 6 l, offals 6.2, poultry 17.8, eggs 10.4, milk and milk products 50.5, fish 31.1, oils/fats 55.6 and spirits/beer 59.0. In 1986 in most items there was an increase, including an increase of 23% for spirits and beer. The country is 80 to 90% self-sufficient for poultry, eggs, and vegetables, 30 to 50% self-sufficient for fish and fruits, and only 5% for milk and milk products. Table 1.4.1 compares the estimated availability of food supplies in terms of energy and protein during the period 1964-66 and 1982-84.

Table 1.4.1 : Estimated availability of food supplies in terms of energy, protein and fat, Island of Mauritius

		1964-66	1982-84
Energy (kilocalories/cap/day)		2343	2686
Protein (gram/cap/day)	total	48.9	59.4
	animal	13.3	18.8
	vegetal	35.6	40.6
Fat (gram/cap/day)	total	53.3	73.3
	animal	10.9	16.4
	vegetal	42.4	56.9

Over the past twenty years, food energy supplies have increased from 2343 kilocalories to 2685 kilocalories per capita per day. During the period 1982-84, energy supplies provided 112% of the estimated energy requirement against 103% during the period 1964-66. However, the average protein:energy ratio of the Mauritian diet has only increased from 8.3% to 8.8% during the last two decades, although the protein supplies meet the estimated average minimal protein requirement of 42.8 grammes. At the same time, the average income expenditure on food has decreased from 57% in 1962 to 50% in 1975. However, the extent and severity of maldistribution of supplies is not known.

According to Manet and Peerun, statistical indicators of health status are misleading as the high standard of living of some Mauritians masks the statistics for the poor where the lack of income, poor hygiene and malnutrition standards combine to create a problem of infant deaths, maternal depletion, malnutrition and diseases typical of Third World.

However, a survey on the nutritional status of pre-school children conducted in 1985 indicated that 22% of urban households consumed below needs of energy as against 10.1% of rural households. For protein consumption 15.9% of urban households were below requirements as against 10.1% of rural households. Therefore it seems that rural households may not be as bad off as those found in Third World countries.

The effect of household food security cannot yet be properly estimated. Although the per capita food supplies at national level is adequate, a study carried out by the University of Mauritius in 1983 showed that 16% of households may have inadequate food consumption. The Gini coefficient of income distribution improved slightly from 0.44 in 1980-81 to 0.37 in 1986-87, and the total average expenditure on food and non-alcoholic beverages was 43% of total expenditure in 1986-87, as compared to 41% in 1975. Thus there was a slight increase in this item in the family expenditure. The impact of industrialisation and the increasing number of women at work on the nutritional status of children is not yet known. A nutrition survey indicated that employment of mother had significant relation with stunting but not with under weight or wasting. Therefore employment of mothers seem to influence predominantly the longer term nutritional status of children (probably through the general socio economic status of the family) rather than the short term nutritional status (through time available for child care).

A very vital segment of a population for whom the importance of food is well recognised is that of infants and children. It is at these ages that adequate food in quantity and quality has to be ensured because firstly it is at this stage in life that growth and development - mental and physical - takes place and secondly because they are most vulnerable to diseases and death.

Thus the feeding habits of infants and young children call for careful consideration in any programme on health and well being of a nation.

For an infant, the safest and most nutritious food is mother's milk. It not only ensures good nutrition, but is also safer especially when poor habits of hygiene and water shortage are co-existent. From the psychological point of view, breast-feeding is beneficial to the child and to the mother.

In Mauritius surveys have indicated that only around 85% of mothers ever breast fed their babies and that the mean duration of feeding was only 5.6 months with a median duration of just 4 months. A later survey in 1985 indicated that 91% women breastfed at some time (less in urban than rural), one third stopped by first 3 months, 40% by 6 months and average duration was 5.8 months, 75% started supplementary feeding before third month of child. People were aware of the advantages of breastfeeding especially in terms of child nutrition, child health (immunity, protection) and psychological satisfaction. A large proportion of women who said that bottle feeding was advantageous mentioned convenience as an excuse and those who talked of disadvantages of bottle feeding mentioned hygiene. The significant fact emerging from the enquiry was that 28% of those who were queried on the advantages of bottle feeding and 33% of those queried on



disadvantages reported 'not known' which indicates a large segment of population who need education and information on basic child rearing.

The food habits of mothers also were enquired into. There was a wide variety of traditional beliefs and taboos particularly rife in the poor rural communities. Some of them may be harmful.

Foods avoided by mothers during lactation included spices (23.8%), pulses (12.7%), crustaceans (7.2%), other sea food (6.2%), brède songe (21.4%) and aubergines (24.5%). Some of these items are very nutritious and education may have to be done to make people change habits. Similarly mothers excluded certain food items in child feeding like spices (22%), pulses (7%), Brède songe (13%), aubergines (15%) and tinned food (6%). In the sample only 84% of women reported having given protein rich food to children on day prior to interview. 9% of children got one monotone type of food with no variety and hence deficient in balance. 53% of children got inadequate diet. Only 12% of children got fresh fruits and vegetables.

A nutrition survey showed that 87% of children below one year of age were being fed artificial milk, and of these, 74.5% were fed on infant formula and 25.5% on other milk, with no rural/urban difference. It should be noted that only 6% of children below one year of age were being fed on artificial milk alone, while the rest were also receiving breastmilk and/or food. Artificial milk was being fed mostly by bottle (85.9%), followed by cup and spoon (9.5%) and baby mug (4.6%). The predominant method for sterilization of bottle was by boiling (83.2%), followed by washing with boiled water (10.4%), chemical (2.2%), other (2.2%) and no sterilization at all (2.2%).

Solid (or semi-solid) foods were being fed to 93.8% of children under 5 years. The frequency was 49.0% among children below 6 months and rose to 85.5% among children 6-12 months old and increased to more than 99% after one year of age. Under 6 months the predominant type of solid food was commercial weaning food, and from 6-12 months commercial weaning feed and mashed/pureed foods especially prepared for the child accounted for more than 75% of feeding frequencies. From 1-2 years, the family diet (either in mashed or ordinary form) became the predominant type of solid, while after 2 years, more than 90% of children were being fed on ordinary family diet.

Feeding patterns were studied for children below one year of age. The breastmilk only and the breastmilk/other milk groups showed a continuous decline in occurrence over age. The breastmilk/other milk/food groups showed nearly the same frequency trends until 5 months, after which the former pattern declined while the latter continued to grow into the predominant feeding pattern. The predominant feeding pattern at 3-6 months of age was breastmilk/other milk/food and other milk/food.

Infant formula was mostly introduced before four months of age, followed by commercial weaning foods which was introduced by 2/3 of infants before 4 months of age. The next food to be introduced was fruit juice, mostly before 6 months, followed by other milk, vegetable soup and home-made

porridge mostly before 9 months. Mashed/pureed foods especially prepared for the child was mostly introduced between 6-9 months. The family diet was being introduced at 6-12 months in the mashed form and 12-24 months in the ordinary form, about one month earlier in the rural than the urban region.

Regarding food and other habits of adults, very little is known, but from the available statistics a few inferences can be drawn. Firstly, the household expenditure surveys indicate that around 5-6% of budget is spent on alcoholic beverages and tobacco. Even though there is a slight reduction in percentage of expenditure between 1975 and now, it must be remembered that the absolute amounts increased tremendously during the past 12 years since 1975. For instance, in 1975 the monthly expenditure on all items was Rs 716 as against Rs 2,668 in 1986/87. Another observation from the consumption figures is that sugar consumptions at 93 gms per day per capita is too high and has virtually remained steady. So also is consumption of oils and fats. These along with increased stress consequent on the fast socio-economic transformation of the population and the decrease in outdoor exercises and more reliance on motor vehicles could have triggered the problems on the health front now coming to the fore in the country.

There is clear need for adult education not only in child care but also of the mother and male adult.

#### 1.4.3 Infestation and infections

Even though the picture on the food front looks reasonable and certainly has shown signs of improvements, as mentioned earlier, some of the advantages of the availability of quality food may be lost because of poor ingestion brought about by infestation by worms and other parasites and infections.

The growth and development of children depend not only on their food intake, but also on disease pattern (especially infections) and other social, cultural and environmental factors. The general pattern of growth amongst pre-school children in Mauritius is the same as that observed in many other developing countries, with weights of children being very close to those of developed countries during the first few months of life, after which growth faltering starts and continues with varying degree of severity. Exogenous factors seem to play a very important role. Clinic data show that weight-for-age on the island of Mauritius starts faltering at about four months of age, which coincides with the weaning period and continues with varying degree of severity through five years of age.

Samples of stool from a sub-sample of 97 children were analysed for ova and parasite infestation. Hookworm which used to be the most common intestinal parasite was not detected at all. The most common were trichuris and ascaris (17.5%) and 18.6% respectively, followed by giardia (5.2%), E. histolytica (1.0%) and strongyloides (1.0%). 35.1% of children in the sub-sample were infested with at least one parasite. Of these who were infested, it is also reported that 20.6 per cent

were infested with both trichuris and ascaris. No association between worm infestation and nutritional status was found. The prevalence of parasite infestation (especially of ascaris) was higher amongst those using open pit latrines.

The incidence of morbidity during the period of seven days prior to the date of survey was as follows: diarrhoea 4.2%, fever 17.1%, running nose 23.2%, cough 20.7%, sick (i.e. not capable of eating or playing) 7.9% and constipation 4.0%. Scabies was found in 12.7% of children examined.

Surveys from developing countries show that diarrhoea is associated with nutritional status more than most other measures of sickness. This often related to weaning practices, and is therefore age dependant. Diarrhoea was reported in 4.2% of cases over the last week, with a peak incidence of 8.8% during the weaning period (6-12 months) and 6.2% from 1-2 years, then decreasing to around 2 to 3%; the incidence of 5.0% amongst infants below 6 months was rather high. The prevalence of wasting was higher amongst children with diarrhoea compared to those without (23.8% v/s 16.0%) and infants in the age group 5-12 months seem to be most affected. This is because diarrhoea of recent occurring is more likely to affect weight rather than height.

Fever is usually associated with infectious diseases. For example, if the prevalence of malaria is high in a region, then fever, as an indicator of this disease may be a more serious risk factor for nutrition than if it represented a mild infection. However, this is not the case in Mauritius which has very low level of malaria, and fever would be more indicative of mild infection. Hence, underweight was found slightly more prevalent amongst those with fever than those without (28.2% v/s 23.2%).

#### 1.4.4 Nutritional status

Anaemia is a common nutritional problem in many developing countries, and in Mauritius too, iron deficiency anaemia has been identified as a serious problem in the early studies in the 1950's. Marked clinical anaemia was observed amongst 9.4% of children examined, with peak prevalences from 12 to 36 months, but starting to rise at 6-12 months (lowest below 6 months). Prevalence of stunting was higher amongst those with clinical anaemia than those without (30.9% v/s 20.5%).

Haemoglobin analysis on finger prick blood samples was performed in a sub-sample of 104 children. The  $M \pm SD$  for the sample was  $10.67 \pm 1.61g$  haemoglobin per 100 ml, with a minimum value of 6.10g and a maximum value of 14.50g. 51% of children had haemoglobin value less than 11g and 31.7% of children had Hb below 10g. Anaemia (Hb < 10g) was found to be associated with chronic malnutrition. In fact, the prevalence of anaemia was higher amongst the chronically malnourished (stunted) compared to normal children (55.0% and 26.5% respectively). This finding has important health policy implications. A prevalence of 23.9% underweight is high for Mauritius with a low infant mortality rate. WHO target for year 2000 is 10%. The 16.2% 'wasting' is higher than the 2-27% expected for a well nourished population. Stunting was more prevalent than wasting. Growth faltering began around

Table 1.4.2 - Prevalence and severity of malnutrition

Island of Mauritius, 1985

Status	% of Median (Under Weight) <sup>1/</sup>	% of Median (Wasting) <sup>2/</sup>	% of Median (Stunting)
Severe	2.4	1.5	1.3
Moderate	24.7	10.1	11.5
Normal	69.5	82.4	87.2
Urban	20.2 <sup>3/</sup>	13.1 <sup>4/</sup>	-
Rural	26.6 <sup>3/</sup>	18.4 <sup>4/</sup>	-

1/ 3.4% over weight

2/ 6.1% obese

3/ % under weight

4/ % wasting

6 months and worsened during the weaning period, reaching a peak around 18-23 months (Table 1.4.2).

In 1977 it was reported that 24.3% of school children were in 'poor condition' with 16.2% anaemia cases. In 1982 the corresponding figures reduced to 5.3% and 4.0% respectively. It further fell to 4.1% and 3.9% in 1986. Scabies affected 9.6% of children in 1977 as against 4.4% in 1982 and 8.2% in 1986. Abdominal pain (helminthic infestation) was reported by 20.9% in 1977, 13.2% in 1982 and 13.1% in 1986.

Apparently scabies and helminthic infestation are still problems among school children and warrants attention.

Socio economic factors like income, employment and ethnicity were correlated with malnutrition. Household amenities like piped water, toilet and sewage facilities also indicated their influences on nutrition. Finally perhaps through the interaction of infestation and infectious diseases with both socio economic factors and household amenities, one noticed that nutritional status was affected

According to the 1984-86 development plan, 10% of first attendance at dispensaries of health centres was due to avitaminosis and other deficiency diseases. Moderate malnutrition prevailed among the population. Diarrhoea and foetal and childhood malnutrition are still important health problems. 35.2% of post neonatal mortality in 1982 is due to diarrhoeal diseases. Nutritional problems is acute during the first 2 years (wasting) and chronic (stunting) from 2-5 years. Slow foetal growth, foetal malnutrition and immaturity are adduced as causes for the continuing high infant mortality (23.4% of infant deaths in 1982 due to these causes).

In spite of high incidence of morbid conditions only 14% of women reported that they take their children for regular check-up, and another 15% took children for medical check-up occasionally. 42% never took their children for check ups.

Lack of personal hygiene and certain habits and information gaps may also be responsible for some of the observed situations. For instance 6% of mothers reported that they do not bathe their babies with only a third mentioning lack of water as the reason. Also 2.2% of mothers fed their babies from unsterilised vessels.

## 1.5 Housing, environment and Hygiene

### 1.5.1 Introduction

The quality of life is enhanced or marred by the type of environment one lives in. The immediate concern is that of housing - its quality, availability and the amenities and facilities provided. The external environment is as important as housing - the place where one spends most of his time with his family. The protection of the environment requires concerted action for the state and cooperation from the public. The individual plays a vital role in ensuring that there is harmony. Not only the physical environment is of great concern but one is equally required to be careful about pollution from every possible source in order to ensure healthy life for the population.

In this section we consider the housing situation, the environment and protective services and how they have evolved over time and how they have affected living conditions of the people.

### 1 5 2 Housing and living conditions

Although the acquisition of housing accommodation could be regarded as a matter of private and individual concern in a country like Mauritius, both the colonial and independent administrations have viewed the provision of adequate housing as one of their numerous concerns in view of the close relationship between housing conditions on the one hand and morbidity and mortality on the other. However because of limited resources and other issues requiring more immediate attention, it was not always possible to translate such concern into the best possible action to maintain housing construction and housing standards at an acceptable level.

Thus it is noted that in the early fifties the prevailing high mortality levels, with death rate around 15, infantile mortality rate (IMR) at 81 and life expectancy of 51 years, occurred in an environment characterized by poor quality housing both in terms of standards and living conditions. The 1952 Census showed that 80% of dwellings were sub-standard and only 4% could be considered to be of long life. However the conditions of the families living in these dwellings demanded more immediate

attention than the quality of the constructions themselves. Overcrowding, with consequent unsanitary living conditions, was widespread with several families occupying dwellings meant for one family only. The shortage of accommodation made it impossible for the Health Authority to use legal powers to prohibit overcrowding and to condemn houses which were unfit for human habitation. The situation was so alarming that in fact a temporary lowering of constructional standards was allowed, and housing schemes were launched with the professed aim of improving hygienic conditions at the expense of durability of the houses.

The price for the sacrifice of construction standards in the fifties was paid in 1960 when 25,000 housing units were damaged by cyclones Alix and Carol. The result was a qualitative improvement in subsequent housing construction, so much so that the 1972 Census found only 7% of buildings to be constructed with flimsy and non-durable materials like straw, mud and thatch, whilst 40% were of long life. In 1975, cyclone Gervaise destroyed another 8,000 dwelling units thus reinforcing the already felt need for better quality structures in the context of the vulnerability of the island to natural calamities. The strong cyclone phobia in fact resulted in qualitative improvements in housing going beyond the standards to be expected in relation to the exigencies of the climate. The 1983 census showed that less than 2% of units were substandard and more than 60% were of long life.

Although scant resources in the early fifties forced the authorities to improve living conditions at the expense of constructional standards the past 1960 era has witnessed a simultaneous improvement in both building construction and housing amenities. As rightly understood in the early fifties the living conditions within dwellings are most important in safeguarding the health of the occupants, and these living conditions cannot be hygienic without adequate living space, protected water supply, safe waste disposal and adequate toilet facilities.

Improvements in the availability of these amenities have been spectacular. The percentage of dwellings having access to running water increased from 8% in 1952 to 99% in 1972 and 1983. In 1952 about 11% dwellings, mostly in urban townships, were connected to the sewerage system whilst 63% had pit latrines. This implies that 26% of dwellings had toilet facilities worse than the above or no toilet facilities at all. By 1972 there were 34% households with flush toilet and this had increased further to 49% in 1983, whilst households using inferior types of toilets had decreased between the two years. The percentage of households having no toilet was only 2.5% in 1972 and reduced further to 1.2% in 1983. There have been other perceptible improvements in the quality of life as measured by availability of housing amenities and facilities like electricity (93.2% of dwellings in 1983 compared with 70.1% in 1972), bath rooms (from 71.9% in 1972 to 85.4% in 1983) and kitchen (from 91.2% in 1972 to 94.4% in 1983).

But as regards household waste disposal there was a deterioration of the situation even between 1972 and 1983. The proportion of housing units

with some more or less adequate means of refuse disposal declined from 74% to 63% between the two years. The situation was much worse in the fifties when dumping of household and trade refuse on pavements and street gutters was a common sight. The 1951 annual report of the Medical and Health Department cautioned that the anti-rodent operations to reduce the rat population could not be effective so long as the population did not understand that proper disposal of house refuse is essential. Although we are a long way from the situation in the fifties the recent deterioration in the disposal of refuse is cause for concern because carelessness in such matters spoils the environment and increases the incidence of disease by providing breeding grounds for disease carrying agents.

### 1.5.3 Environment

Human existence has been a constant struggle against a hostile environment. It can be said that in Mauritius an upper hand was achieved about two or three decades ago, by which time medical, technological and scientific advances had helped clear the environment of dangerous vectors; acceptable houses had been built to provide shelter from the vagaries of nature; large areas of forest land had been converted to agricultural purposes for economic survival; roads had been built to facilitate communication and transport of medical, food and other supplies between one place and another; and business, trade, commerce and growing industries had been established to meet the more sophisticated needs of a rapidly growing and demanding population. However, if this development process is continued without control, then, what could at one time be regarded as a necessary struggle against nature and environment may gradually and insidiously change into a dangerous process which finally converts a hostile natural environment into a hostile man-made environment whose consequences are unimaginable.

Hence there is need to be vigilant so that the fight against pests does not culminate into pollution of foodcrops and water supplies by chemicals; housing, trade and commerce do not take over more than their due share of land resources; deforestation for agriculture does not lead to soil erosion; industrial development does not create environmental pollution, and the gains from tourism are balanced against the loss of open spaces and recreational opportunities.

The need to plan for a better environment for the population of the country is recognised by the government and the Mauritius 1975-80 Five Year Development Plan specifies the objectives of the national physical strategy as follows: "(a) Preservation of agriculturally productive land through a strict development control policy and by increasing overall density within those parts of Mauritius which are already urbanised (b) Identification of industrial estates in both urban and rural settlements to provide an adequate geographic distribution of job opportunities in relation to place of residence (c) Promotion of better living through the adoption of a national housing policy which would include the planned development of housing estates as well as the replacement of slums on land in private ownership (d) Improvement of

inter urban and intra urban traffic flows through the formulation of long term road schemes and short term traffic management projects (e) Provision of further recreational facilities within the framework of a national policy for outdoor and indoor recreation including plans for development of beaches and inland areas of great landscape value and scenic interest" The growing therapeutic need for such recreational and relaxation facilities cannot be underestimated in view of the stress and strain of modern living which must be responsible, in part at least, for the recent increase in certain types of diseases.

As regards environmental sanitation and hygiene, an environmental health unit was set up in 1972 for preventing contamination and pollution caused by unhealthy environment. However programmes for such prevention were in existence even two to three decades before that. Regular sampling of water from the public water supply system for bacteriological analysis; control of sanitary aspects and enforcement of proper standards for all types of buildings, residential, commercial and industrial; inspection on industrial sites and workplaces aimed at improving working conditions and protecting the health of workers, all these preventive and health promotive activities have been going on at least since the early fifties. Apart from giving advice on the maintenance of sewage treatment plants on housing estates, the Health Authority also provides technical guidance on design and maintenance of sewage and waste disposal in the increasing number of new establishments which have grown in the wake of the expansion of industries and the tourist trade

#### 1.5 4 Preventive health services

In Mauritius, like in all countries, preventive measures have had more spectacular effects on lowering mortality than advances made in curative methods. The great killers of the early part of this century have been successfully controlled by eradication of pests and mosquitoes and by immunization campaigns coupled with simultaneous improvement in housing, water supply and sewage disposal.

The success of the preventive measures is perhaps due to the small size of the country and its population which makes control relatively easy and also the relative isolation resulting from it being surrounded by the sea, which makes the island less vulnerable to non-indigenous causes of ill-health. The late forties marked the beginning of an era of sustained mortality decline as a result of malaria eradication and control of epidemics of whooping cough and polio. Malaria which used to kill by thousands in the early forties was eradicated by 1949 although sporadic cases have been detected in some localities in the past years. These isolated cases, sometimes indigenous and sometimes non-indigenous, have been kept under control through a surveillance programme started in 1960 which involves spraying operations in affected localities, fogging for the treatment of shrubs, undergrowths and other mosquito-breeding places. The introduction of non-indigenous communicable diseases is guarded against by harbour and airport control including disinfection and fumigation of ships and disinfection of aircraft, and



follow-up of all passengers arriving from places where communicable diseases are endemic. The increasing exposure of the country to outside influences as a result of more and more international passenger traffic with the rest of the world makes it imperative not only to maintain surveillance and control but perhaps also to intensify the activities to include routine screening of vulnerable groups of the indigenous population in view of the recently diagnosed case of AIDS in the country.

The campaign of immunizations against some of the deadly or crippling diseases started in the early sixties. Children were immunized against tuberculosis (BCG), smallpox, diphtheria (DPT) and polio. The extended programme of immunization including measles was implemented in 1981. As of now 95% of children up to and including minimum preschool age are vaccinated for protection against tuberculosis, diphtheria, tetanus, whooping cough and poliomyelitis. Government proposes to take necessary measures "to expand the immunization programme to provide coverage of the entire child population. Health cards will also be introduced for children aged 0-8 years in order to facilitate the monitoring of their health, nutritional status, growth and development and help in cutting further the infant mortality rate" 1/.

#### 1.5.5 Hygiene

The consumption of contaminated or otherwise unclean food is a major cause of disease and possible death. Hence the inspection of food establishments has been one of the main preventive measures of the health authorities since a long time. As far back as 1951 the Legislative Council passed an ordinance to regulate trades and industries affecting public health. The new powers of the health department aimed at ensuring that dirty habits of owners and employees did not make premises and equipment potential sources of disease. These powers were to be applied initially in the more densely populated townships and progressively extended to other parts of the country. Currently the Food Hygiene Division of the Ministry of Health is responsible for the quality control of food commodities at the points of entry, in the distributive trade and in eating establishments. It also carries out inspections in markets, hotels, catering units of hospitals, factories and clinics.

The general food control programme also has an educational part to it. Talks are given on radio and television and in Social Welfare Centres on food hygiene and preservation of frozen foods, the aim being to help the population attain a good standard of hygiene and to be discriminating in the choice and consumption of foodstuffs.

1.6 Effect of family planning (FP) and maternal and child health (MCH) services on maternal and child health

In Mauritius, like in most less developed countries where declining mortality was not accompanied by declining fertility, the main purpose of FP was to reduce population growth which was assuming alarming proportions in the fifties and sixties and adversely affecting economic growth and development. Improvement in maternal and child health came as a by-product whose importance was soon recognised and consolidated by the integration of FP services with the Maternal and Child Health Services of the Ministry of Health in 1972.

The principal aim of FP is to reduce births. Fewer births mean fewer pregnancies and therefore fewer maternal deaths because of pregnancy and related complications. FP services also make pregnancy less risky when associated with maternal and child care services which help prevent or diagnose and treat health problems such as haemorrhage, infection and toxæmia which generally account for the majority of maternal deaths. Furthermore FP services provide a cheaper and safer alternative to illegal abortion which is often carried out under high risk conditions with consequent complications involving either prohibitive hospital costs for treatment or leading to frequent deaths. Tietze and Lewit have estimated that abortion - related deaths contribute 42.2% of maternal mortality in Mauritius in the early 80's.

Maternal health has also benefitted from fewer births which mean that a woman has to spend less time in tending and caring for children. More resources can be devoted to each member of the family, including the mother who, when resources are scarce, generally sacrifices her own needs for food, clothing and health care in favour of the children, particularly boys. The spacing of births gives the mother sufficient time to recoup her depleted resources after a birth, which is particularly relevant in Mauritius where the health and nutrition status of many mothers is still wanting in many respects. Spacing also leads to reduction in high parity births which are particularly risky both to health and life.

Late age at marriage and planning of pregnancies to occur at those ages where risks to mother and child are the lowest have also contributed to improvements in health and mortality. Within the socio-cultural context of Mauritius, early marriage of children was a common practice during the first half of this century. The proportion of currently married female population in the 15-19 age-group had reached a peak of about 40% in the 1950's. The economic development in the last 30 years has completely changed the face of this country in terms of employment opportunities, educational facilities, health services, the role of women in society and in social norms. Marriage patterns among the youth has changed too. From 39.9% of the women recorded as currently married at the time of the 1952 census. The level dropped to 27.8% in 1962, 12.4% in 1972 and to 2.9% in 1983.

Simultaneously, the age-specific fertility rate of the 15-19 age-group dropped from 107.3 in 1962 to an estimated level of 37.0 in 1984. A similar picture of a drop in fertility is seen among the group aged 35 and over both in terms of age as well as in birth order. That child-bearing is being condensed in the years where the procreative-risk is the minimum is a clear indication of the impact of planned pregnancy on health of both the mother and the child.

However whilst it is true that FP services have helped tremendously towards safeguarding women from traditional causes of ill-health and death it is still not known to what extent the use of contraception itself, particularly of the hormonal type, hinders the health and well-being of a woman. It is only a few decades since currently available methods of family planning have been in use and it is only now that some of their side-effects are coming under scrutiny. Hormonal contraceptives such as the pill and injectables are associated with some endocrinological disorders as well as having an effect on the circulatory system. The UK based Medical Research Council study on the effect of long-term pill use on the cardiovascular system points to the do's and don'ts in contraceptive technology. Sacho and others point out that pregnancy prevention in the USA is the cause of as many deaths as pregnancy itself. Tietze and others have found that in developed countries "a total of 1.5 deaths per 100,000 oral contraceptive users aged 25-29 could be expected from the side effects and the pregnancies associated with method failure" whilst "the lowest risks are associated with barrier methods of contraception and early abortion as a back-up for method failure." Mauritius may be very different from the developed countries in many respects including levels of education, fertility, mortality and contraceptive use, but it is significant to note that a recent contraceptive prevalence survey conducted by the Ministry of Health in 1985 showed that better educated women were drifting towards more "natural" methods of birth control in spite of their lesser efficiency.

It is perhaps significant that this shift is mainly among educated women who may be in a better position to be aware of and appreciate the risks involved. This more educated group is exactly the one which more readily accepted FP when it became available. Hence education is a factor which better equips women not only to seek and use methods of controlling their fertility but also to reject such methods when there is any indication that they could be a threat to health. With the population and health problems under better control and health awareness more acute as a result of better education it is to be expected that users of FP will be more discriminating in the methods they adopt. Emphasis may have to shift from the pill to other more "natural" methods and resources may need to be devoted towards improving the efficiency of the latter methods or developing new methods. The population having already accepted FP and succeeded in using it for achieving certain desirable goals is unlikely to abandon it, but ignoring the indicated need for methods which are "safe" from the health point of view may increase the gap between desired and completed family size.

There is still in Mauritius a high risk group of women with poor education and health status coupled with high fertility for whom the

trade off from the FP services in terms of better health and lower mortality outweighs the risks involved in using currently available methods of contraception. It cannot be denied that FP services coupled with MCH services must have played an important role in the faster female mortality decline, as compared to males between 1972 and 1983. But there still remains much to be done in the way of improving the services offered by the FP and MCH services. Although these services are often provided in the same building the structures and precise scope of action of the different services are not well defined, which leads to lack of co-ordination between the personnel of the different services and inefficient use of the personnel, with highly qualified personnel engaged in activities which could well be performed by para medical persons thus leaving more time for doctors to devote their attention to problems that need their attention. Also family welfare has not kept pace with family planning and health services.

Maternal and child health services are also an important element in the fight against infant mortality. These services were started in the late fifties and consolidated in the subsequent years. However they were not as efficient as could be expected because of lack of co-ordination in the health services and lack of efficiency of services actually available. Thus in the early seventies curative services were provided in hospitals and dispensaries, preventive services at health offices and only promotive services in the maternal and child health centres. Furthermore midwifery services could not cope with their main objective of domiciliary confinement with the result that 40% of home deliveries were still performed by unqualified persons leading to a high neonatal death rate, almost 50% of total infant deaths. By the middle of the 1980's maternal and child health services had been improved and were available at health centres, primary care units and MCH/FP clinics.

In 1984 only 14% of all births were delivered at home by traditional midwives whilst 3% were delivered at home but attended by qualified midwives. These figures compare favourably with the 1964 situation when only 26% of all births occurred in hospitals.

In spite of these improvements slow foetal growth, foetal malnutrition and immaturity still accounted for 28.3% of deaths under one year of age in 1986. It is therefore necessary not only to extend maternal and child health services to as wide a population as possible but also to devote more attention to the nutritional status of the mother, skilled assistance at the time of birth and adequate infant care.

Health education programmes go some extent towards this aim and it is to be welcomed that the maternal and child health services have been integrated with the family planning services available in health centres, primary care units and FP clinics. The Mauritius College of the Air is currently engaged in the preparation of education and information programmes aimed at improving the nutritional and health status not only of mothers and babies but the population at large. One of the principal subjects covered is the need and necessity of breastfeeding babies as an insurance against disease and premature death.

Child care which starts in the maternal and child health centres is continued in the school system through the school health service which includes routine activities such as vaccination (poliomyelitis, diphtheria, smallpox, tetanus); screening of new entrants for the detection of defects and their treatment; follow-up and review of school children with defects; surveys to detect and treat cases of scabies; cleanliness surveys; and vision tests and referral to specialists when necessary

Although originally it was improvement in mortality, and child mortality in particular, that led populations towards family planning services as a means to control fertility, the positive effects of FP services on child health and infant mortality soon became evident especially when associated with MCH. This positive interaction between services and improved child survival is now well documented. Before birth, regular visits to the FP and MCH clinics ensure that the mother is given the necessary facilities and care to optimise the chances of the child being born healthy and surviving the first few years of life. It is known that these chances are increased considerably if the children in the family are not large in number, are not born close together in time, and if the birth occurs when the mother is between 20 and 35 years of age. FP and MCH services have given women in this country not only the necessary antenatal care facilities but also the possibility of realising all three conditions of smaller families, spaced births and pregnancies at most favourable ages of the reproductive period. Whether these services are utilised for promoting the health of children to be born is another matter since a survey carried out in 1981 by the Mauritius College of the Air showed that only 35% of a sample of 2,200 mothers who had registered a birth in 1980 had ante-natal check-ups before the third month of pregnancy and that this figure rose to 57% only by the fourth month.

It cannot be denied however that FP services have in fact helped towards reducing the incidence of infant and child mortality and promoting child health.

## 2. MORBIDITY

### 2.1 Introduction

The types and incidence of ill health and diseases in a community or area is a measure of their living conditions and the way they manage their lives. If a large segment of a population is affected by conditions which make it difficult for them to enjoy a healthy life, then this has implication not only on the individuals through the inconveniences and sufferings they have to undergo, but it has also repercussions on the family, the society, the economy and the nation. Again ill health and diseases will debilitate the individual and make him an easy candidate for death.

Every organised society wishes the pinkest of health for its members and efforts are made to ensure this. In order to understand the phenomenon so that appropriate actions can be taken, statistics are collected on the incidence, prevalence and types of morbid conditions. Such statistics are therefore appropriately called 'Morbidity Statistics'. Unlike mortality statistics which has some definiteness in regard to whom to include or exclude, the problem in morbidity statistics is immense not only from the definition point of view but also from the fact that the perceptions may vary from one group to another as to when a person has a 'morbid condition'. Thus even in advanced societies 'morbidity statistics' are comparatively weak. In developing societies the problem is even worse.

Morbidity statistics are an important complement to mortality statistics in the study of the health status of a country and its evolution over time. Useful as mortality statistics are, they do not provide an adequate indicator of health and do not reveal the burden of ill-health in a country. There are diseases which are responsible for a lot of human suffering and which absorb a large amount of health resources and yet do not occupy a prominent place in mortality statistics because they do not often lead to death. Fatality rates vary considerably from one disease to another, and even for a given disease, they may vary considerably over time as better cures are found. A study of morbidity in addition to mortality therefore provides a much more comprehensive picture of the health scene than the study of mortality alone.

### 2.2 Sources of morbidity statistics in Mauritius

The main sources of morbidity statistics in Mauritius are, as in many other countries, hospital in-patient data and records of attendances at dispensaries. Another important source is the notification of communicable diseases to the sanitary authorities. There are other less comprehensive sources but pertaining to specific population groups or areas of concern such as the statistics of the school medical services, occupational health unit, epidemiological surveillance, etc.

### 2.3 Limitations of data

The statistics compiled from hospital in-patient data have their limitations. First of all, they are not complete as they exclude persons admitted as in-patients to private nursing homes. Secondly the possibility of double counts cannot be excluded since a patient transferred from one hospital to another may be counted twice as a new case.

Statistics compiled from attendances at dispensaries suffer from similar weaknesses since they exclude cases seen by private medical practitioners and are subject to double counts as well.

The practice in the compilation of out-patient statistics has changed over time. Whereas formerly both the distribution of first attendances (i.e. new cases) and of total attendances by cause used to be compiled, for a number of years, only the distribution of total attendances by cause is available, and for more recent years, only the distribution of first attendances by cause is available. First attendances and total attendances tell different stories. Whilst first attendances relate to the number of distinct spells of a disease and can be used as a measure of incidence, total attendances provide an indication of the extent to which different causes require different amounts of follow up care. It must also be pointed out that for a number of years now, it has not been possible to obtain the distribution of out-patient attendances at out-patient departments of hospitals by cause, and only their total number has been available.

Over and above these weaknesses, the more universal shortcomings of morbidity statistics are: comparability over time through improvements in diagnostic means (e.g. laboratories, X-ray facilities) and changes in classification brought about by improved diagnoses. It must also be noted that attendance at a service point does not depend only on the incidence of diseases but also on the proximity and accessibility of the service point to the patient and the patient's perceptions. Both these have improved over time: accessibility of the service point with the increase in the number of service points and patients' perceptions with improved education. Finally, a source of difficulty in attempting comparisons over time, is the periodic revision in the international classification of diseases.

In spite of these difficulties, valuable information on the evolution of morbidity patterns can be gathered from an examination of data from the sources just discussed. In-patient data from Government hospitals, despite non coverage of private clinics, cover the gross majority of in-patients. In recent years in-patient data from private clinics have become available as well. The 1986 figures show that a total of 12,591 cases were treated as in-patients in private nursing homes against 98,916 in Government General Hospitals. Since in-patient data from private clinics are only available from the recent past, it is not proposed to discuss them in the following analysis. As regards data on attendances at dispensary service points, they are worth examining since they are considered to cover the majority of cases seen as out-patients although excluding cases seen by private practitioners.

## 2.4 Morbidity patterns

### 2.4.1 Half a Century Ago

The Annual Report of the Medical and Health Department for the year 1930 made mention of an epidemic of enteric (typhoid) fever which affected the Island of Mauritius, more particularly the capital city, Port Louis, that year. The cause of the epidemic was the wrecking of the intake of the Municipal water supply by the floods of December 1929. The flood wrecked the dyke and destroyed the rising mains over a considerable length of their course in the stream bed, with the result that a large number of premises in Port Louis were deprived of their normal water supply at a time when the streams coursing through the town were in full flood. An equally serious concomitant was the lack of water in water closets. In the same year 39 cases of diphtheria and 44 of erysipelas were notified to the sanitary authorities. Mention was also made of the fact that the last notification of human plague in the (then) Colony was in 1927, and that no cases of smallpox had been registered since 1913.

The last case of human plague occurred in 1927 and was very legitimately, cause for a certain satisfaction for the health authorities in 1930. Around the turn of the century plague struck real terror among the Mauritian population. The number of cases registered between 1899 and 1903 were : 1,116 in 1899; 796 in 1900; 1,093 in 1901; 506 in 1902 and 1,395 in 1903. This gives an average of over a thousand cases a year over the five-year period considered. And plague had a fatality rate of around 75%! As rodents play a prominent part in the spread of plague, rodent control was a public health priority. In the Annual Report on the Medical and Health Department for the year 1925, it was reported that the number of rodents caught during that year amounted to 105,680, of which more than half was in Port Louis. The number of admissions to hospitals due to malaria in 1930 was 3,918 and the number of first attendances at dispensaries and out-patients departments of hospitals was 57,427. The latter figure no doubt includes persons who have had two or more spells of the disease, and some who had been referred for admission to hospitals. It is therefore not possible to deduce the incidence of the disease from these figures.

The other morbid condition that was cause for grave concern in the thirties was helminthiasis, more particularly ankylostomiasis (hookworm disease). Every member of the labouring classes harboured at least two kinds of intestinal parasite (hookworm and another one). Infestation with Ascaris was particularly heavy, especially in children.

In the list of "Causes of admission to hospitals", Ankylostomiasis ranks second, causing a higher percentage of deaths than Malaria, as can be noted from the figures for the year 1930 below:

<u>Disease</u>	<u>Admissions</u>	<u>Deaths</u>	<u>Percentage</u>
Malaria	2,775	56	2.02
Ankylostomiasis	1,939	60	3.09



On Dysentery - Diarrhoea and Enteritis, the Sanitary Warden South reporting on districts of Moka, Grand Port and Savanne, stated:

"Although no epidemic focus existed, the prevalence of the complaint cannot but be attributed to the defective water supply..... To this should be added the dependence of most sugar estates and many a hamlet on either open canal supplies, or surface streams and wells."

The principal causes of admissions to hospitals and attendances at out-patient departments of hospitals and at dispensaries are given in Tables 2.4.1 and 2.4.2. Changes in the principal causes of morbidity come along slowly, except of course when perturbed by epidemics, so that the tabulations, although referring to a single year, characterised the morbid conditions prevailing around half a century prior to the 1983 population census.

The striking feature shown by Table 2.4.1 is the predominance of exogenous causes - malaria, ankylostomiasis, Tuberculosis, Diarrhoea, Colitis and enteritis, dysentery which can all probably be ascribed to difficult living conditions and poor sanitation. Table 2.4.2 confirms the predominance of such causes around that period by the large percentage of first attendances among infectious and parasitic diseases.

Table 2.4.1 - Principal causes of admissions to hospitals - 1930

<u>Causes</u>	<u>Admissions</u>	
	<u>Number</u>	<u>% of Total</u>
1. Malaria	3,918	14.6
2. Ankylostomiasis	2,482	9.3
3. Abscess and cellulitis	1,755	6.6
4. Tuberculosis	906	3.4
5. Diarrhoea, Colitis and enteritis	860	3.2
6. Influenza	763	2.9
7. Bronchitis	758	2.8
8. Wounds by blunt instruments	700	2.6
9. Dysentery	618	2.3
10. Normal delivery	596	2.2
All other causes	13,417	50.1
T O T A L	26,773	100.0

Table 2.4.2 - Principal causes of first attendances at out-patient departments of hospitals and dispensaries - 1929

<u>Causes</u>	<u>First attendances</u>	
	<u>Number</u>	<u>% of Total</u>
1. Malaria	30,894	24.2
2. Influenza	24,563	19.3
3. Ankylostomiasis	12,018	9.4
4. Bronchitis	6,819	5.3
5. Ascariasis	5,300	4.2
6. Diarrhoea, colitis and enteritis	3,631	2.8
7. Rheumatism	3,523	2.8
8. Dyspepsia	3,425	2.7
9. Dysentery	2,989	2.3
10. Diseases of teeth or gums	2,897	2.3
11. Anaemia	2,687	2.1
12. Scabies	2,294	1.8
All other causes	26,567	20.8
T O T A L	127,607	100.0
	=====	=====

2.4.2 Twenty to twenty five years later : 1950-55

In spite of public health measures there were some outbreaks of infectious and parasitic diseases in the late 40's and early 50's. For instance in 1945, 1948-49, 1952 and 1959 there were outbreaks of poliomyelitis which left a total of over a thousand cripples - majority of them children.

In the Annual Report of the Medical and Health Department for the year 1953, one can read the following:

"One of the greatest achievements of the public health service in the history of Mauritius is represented by the reduction to such negligible proportions of the disease malaria that it has ceased to be an economic problem to the island. Malaria, which until a few

years ago, caused the death of from 5 to 6 per thousand of the population each year, now accounts for about 1 per 3,000, while admissions to hospital because of that disease which used to average 3,000 per annum was nil in 1953 as compared with 3 in 1952, 98 in 1951, 209 in 1950 and 804 in 1949".

Table 2.4.3 shows that, by 1955, to a large extent malaria had been checked and infectious and parasitic diseases like Ankylostomiasis, Tuberculosis and dysentery were much less prominent causes; a sign of progress in sanitation and living conditions. On the other hand the rise of anemias as a cause of both admissions to hospitals and of first attendances at dispensaries is remarkable. From only 2.1% of first attendances in 1929, it rose to 10.0% in 1955. As for admissions for anemia, while they did not even qualify as a principal cause in 1930, in 1955 they were responsible for 8.0% of admissions. However, one must be wary of drawing hasty conclusions. The cause may not necessarily be deteriorating nutritional status. It could be that as causes demanding urgent attention were in recession, the health authorities had the time and resources to devote to less lethal diseases. The increase in importance of "Accidents, poisonings and violence" to 13.9% of admissions and 16.3% of first attendances at O.P.D of hospitals and dispensaries deserves to be noted also.

#### 2.4.3 Prior to independence

The hospital in-patient statistics by broad causes for 1967 as compared with 1955 in Table 2.4.4 suggest that progress in combatting diseases arising out of environmental conditions was continuing. From the detailed data available it was noted that there were no admissions in 1967 for malaria and only 22 for ankylostomiasis. Tuberculosis accounted for 345 (0.8%) of admissions compared to 422 (1.7%) in 1955; Anaemia, accounted for 3,067 (6.7%) of total admissions in 1967 as against 2,014 (8.0%) in 1955.

#### 2.4.4 Post independence period

The strident efforts made on the public health front especially in the eradication of malaria paid dividends and in 1973 Mauritius was granted the Certificate of Malaria eradication by the WHO. However, 2 years later, in the wake of cyclone Gervaise, there was an upsurge in the number of malaria cases reported. The peak was reached in 1982 with 668 cases reported. Since then, as a result of general mobilisation of national and international resources, the situation greatly improved. In the first 6 months of 1986, only 17 cases of malaria (of which 8 imported) have been reported.

The General Hospitals morbidity statistics for 1975 (Table 2.4.5) bear witness to some fairly important transformations. The newly acquired preeminence of "Accidents, poisonings and violence" derives partly from the regression of other causes but it probably indicates a genuine rise in the incidence of this modern plague of developed societies. The same seems to hold for heart diseases, hypertensive diseases and in general for diseases of the circulatory system, the number of admissions rising from 2,658 for about 770,000 inhabitants in 1967 to 6,030 for about 870,000 inhabitants in 1975. Anemias as a cause of admission had receded considerably by 1975 although it remained a prime cause of attendances at dispensaries.

Table 2.4.3 - Main causes of morbidity 1955

D i s e a s e s	In-patients of hospitals		Out-patients at hospitals and dispensaries	
	Number	%	Number	%
Tuberculosis (all forms)	422	1.7	12	0.0
Syphillis and its sequelae	138	0.6	489	0.2
Dysentery(all forms)	164	0.7	3,456	1.2
Schistosomiasis vesical	35	0.1	324	0.1
Filariasis	21	0.1	53	
Ankylostomiasis	206	0.8	6,960	2.3
Ascariasis	68	0.3	14,504	4.9
Scabies	30	0.1	5,522	1.8
Avitaminosis and other deficiency states	389	1.5	3,844	1.3
Anaemias	2,014	8.0	29,753	10.0
Asthma	436	1.7	4,027	1.3
Inflammatory disease of eye	80	0.3	3,807	1.3
Influenza	640	2.5	27,877	9.3
Pneumonia	222	0.9	33	
Bronchitis	419	1.7	4,043	1.4
Diseases of teeth and supporting structures	102	0.4	11,819	4.0
Gastro-enteritis and colitis (between 4 weeks & 2 years)	171	0.7	4,042	1.4
Gastro-enteritis and colitis (between 2 years and over)	234	0.9	3,969	1.3
Complications of pregnancy, child- birth and puerperium	1,867 <sup>1/</sup>	7.4	6,415	2.1
Infections of skin and subcutaneous tissue	962	3.8	18,575	6.2
Muscular rheumatism and rheumatism unspecified	293	1.2	11,894	4.0
Accidents, poisonings and violence	3,499	13.9	48,753	16.3
All other causes	12,776	50.7	88,246	29.6
T O T A L	25,188	100.0	298,417	100.0

<sup>1/</sup>Excluding 2,492 normal deliveries

Table 2.4.4 - Comparison of major causes of in-patient admissions, 1955 and 1967

C a u s e s	1 9 5 5 In-patients		1 9 6 7 In-patients	
	Number	%	Number	%
Infective and Parasitic Diseases	1,437	5.7	1,800	3.9
Allergic, Endocrine System, Metabolic and Nutritional Diseases	1,084	4.3	2,149	4.7
Diseases of the blood and blood-forming organs	2,014	8.0	3,067	6.7
Diseases of the nervous system and sense-organs	1,244	4.9	1,531	3.3
Diseases of the circulatory system	1,186	4.7	2,658	5.8
Diseases of the respiratory system	1,627	6.5	2,128	4.7
Diseases of the digestive system	2,781	11.0	5,351	11.7
Diseases of the Genito-Urinary system	1,198	4.8	2,848	6.2
Deliveries and complications of pregnancy, childbirth and the puerperium	4,358	17.3	11,789	25.8
Symptoms, sensility and ill-defined conditions	1,954	7.8	3,887	8.5
Accidents, Poisonings, and violence	3,499	13.9	4,086	8.9
Other causes	2,806	11.1	4,481	9.8
ALL CAUSES	25,188	100.0	45,775	100.0

Table 2.4.5 - General hospitals <sup>1/</sup> morbidity statistics - Discharges  
(including deaths) by cause <sup>2/</sup>, 1975

<u>Cause</u>	<u>Discharges</u>	<u>% of total</u>
1. Delivery without mention of complication	9,489	16.4
2. Accidents, poisonings, and violence	6,673	11.5
3. Complications of pregnancy, childbirth and the puerperium (excluding abortions)	3,932	6.8
4. Enteritis and other diarrhoeal diseases	3,708	6.4
5. Heart diseases <sup>3/</sup>	2,816	4.8
6. Bronchitis, emphysema and asthma	2,612	4.5
7. Abortions	2,479	4.3
8. Hypertensive disease	1,599	2.8
9. Acute respiratory infections	1,379	2.4
10. Peptic ulcer	1,231	2.1
11. Diabetes mellitus	1,104	1.9
12. Neoplasms	982	1.7
13. Diseases of the skin and subcutaneous tissue	956	1.6
14. Anaemias	866	1.5
15. Other diseases	18,154	31.3
T O T A L	57,980	100.0

<sup>1/</sup> excluding prisons hospitals

<sup>2/</sup> based on the A List of I.C.D. 1965 Revision

<sup>3/</sup> excluding "Hypertensive disease" and "Active rheumatic fever"

Peptic ulcer, on the other hand, was on the rise, the number of admissions from that cause rising from 658 in 1967 to 1,231 in 1975. The same was true of Diabetes Mellitus for which the number of admissions was 490 in 1967 against 1,104 in 1975. Enteritis and other diarrheal diseases remained an important cause of admission indicating that, that cause was still fairly resistant to improvements in sanitation at the national level.

The distribution of first attendances by cause is not available for 1975. The distribution of total attendances (i.e. including subsequent attendances) is available instead. The main causes of total attendances at dispensaries are presented in Table 2.4.6.

The dispensaries generally are depictive of the conditions of rural populations. The major problems highlighted by the statistics are nutritional, environmental and those pertaining to personal hygiene and knowledge and information regarding cleanliness.

#### 2.4.5 Recent periods

The principal causes of general hospitals discharges for the years 1983 and 1986 are given in Table 2.4.7. (Morbidity statistics relating to specialised hospitals are generally not available). As stated earlier, patterns of morbidity, barring any epidemic, change very slowly, so that although referring to a few years, they are indicative of the situation prevailing in the early eighties.

A large proportion of cases were complications of pregnancy, child birth and puerperium. Diseases of circulatory, respiratory and digestive system contributed also a sizeable proportion. Injury and poisoning were not only large but showed an increase.

Women who delivered normally constituted 13.0% of all cases treated as in-patients in (government) general hospitals in 1983. 2.9% of cases treated were for complication of abortion, and a further 9.1% for other complications of pregnancy, childbirth, and the puerperium, so that in all, a quarter of all cases treated in general hospitals were in connection with pregnancy, childbirth, and the puerperium. Ill-defined intestinal infections (colitis, enteritis, gastro-enteritis, diarrhoea) were responsible for 5.3% of cases treated, while bronchitis (chronic and unspecified), emphysema and asthma were responsible for 4.6%. Table 2.4.8 gives further details.

Statistics by cause of attendance are not available for those attending out-patient departments of hospitals, but are available only for dispensary service points (health centres, primary health care units, static and mobile dispensaries). These statistics therefore do not provide a true picture of the situation. Table 2.4.9 reveals that influenza topped the list with 7.7% of the attendances. In second place was superficial injury, contusion and crushing with intact skin surface, with 6.3%. In third place was scabies with 6.1%, followed by abdominal pain and colic with 5.2%, and symptoms involving head and neck with 5.1%. The distribution of first attendances at dispensary service points by Chapter of the International Classification is given in Table 2.4.10.

The evolution of morbidity patterns as revealed by statistics of admissions to Government Hospitals and attendances at dispensary service points is characteristic of a country on the path of development. The regression of diseases of exogenous origin and the rising importance of the ills of modern society : cardiovascular diseases, accidents, poisonings and violence, diabetes are the consequences of transformed conditions of living. Increasingly, health care will have to be directed at reducing the toll of these latter causes. At the same time new challenges to health such as AIDS and other sexually transmitted diseases will have to be faced. The vulnerability of Mauritius to the common ailments of the past, as evidenced by the recrudescence of malaria in the late seventies and early eighties should however be borne in mind. The upsurge of infective hepatitis in 1980 which abated immediately afterwards only to return with renewed vigour four years later culminating in 1629 notified cases in 1985, is another reminder of the fragility of progress in the field of health.



Table 2.4.6 - Attendances by cause<sup>1/</sup> at dispensaries (excluding Prisons  
Dispensaries) - 1975

<u>Causes</u>	<u>Attendances</u>	<u>% of total</u>
1. Anaemias	168,551	11.2
2. Scabies	110,879	7.3
3. Diabetes Mellitus	107,326	7.1
4. Influenza	105,332	7.0
5. Diseases of the skin and subcutaneous tissue	103,980	6.9
6. Avitaminoses and other nutritional deficiency	85,767	5.7
7. Bronchitis, emphysema and asthma	76,692	5.1
8. Diseases due to helminths	48,730	3.2
9. Gastritis and duodenitis	47,640	3.2
10. Non-articular rheumatism and rheumatism unspecified	46,280	3.1
11. Otitis media and mastoiditis	37,042	2.4
12. Enteritis and other diarrhoeal diseases	36,339	2.4
13. Tuberculosis (all types)	31,019	2.1
Other diseases (including 259,749 attendances (17.2 %) for "Accidents, Poisonings, and Violence")	502,750	33.3
T O T A L	1,508,327	100.00

<sup>1/</sup>Based on the A List of I.C.D. 1965 Revision.

Table 2.4.7 - General hospitals discharges (including deaths) by I.C.D.  
Chapter - 1983 and 1986

<u>I.C.D. Chapter. (1975 Revision)</u>	<u>Discharges % of total</u>	
	<u>1983</u>	<u>1986</u>
1. Infectious and Parasitic Diseases	6.1	5.1
2. Neoplasms	1.4	1.5
3. Endocrine, Nutritional and Metabolic Diseases, and Immunity Disorders	2.6	3.2
4. Diseases of the Blood and Blood-forming organs	0.8	0.8
5. Mental Disorders	0.7	0.9
6. Diseases of the Nervous system and Sense Organs	1.1	1.1
7. Diseases of the Circulatory System	8.3	9.2
8. Diseases of the Respiratory System	6.8	7.4
9. Diseases of the Digestive System	6.7	7.5
10. Diseases of the Genitourinary System	6.6	6.5
11. Complications of Pregnancy, Childbirth and the Puerperium	25.0	23.9
12. Diseases of the Skin and Subcutaneous Tissue	3.7	3.7
13. Diseases of the Musculoskeletal system and Connective Tissue	3.3	3.2
14. Congenital Anomalies	0.5	0.6
15. Certain conditions originating in the perinatal period	1.8	2.5
16. Symptoms, Signs and Ill-defined conditions	12.8	9.6
17. Injury and Poisoning	11.8	13.3
	<hr/>	
T O T A L	100.0	100.0
	<hr/>	
TOTAL CASES	96,353	98,916

Table 2.4.8 - Principal causes of general hospitals discharges (including deaths) - 1983

<u>Cause</u>	<u>Discharges</u>	
	Number	% of total
Normal delivery	12,528	13.0
Complications of pregnancy, childbirth and the puerperium (excluding abortion)	8,711	9.1
Ill-defined intestinal infections (colitis, enteritis, gastro-enteritis, diarrhoea)	5,093	5.3
Bronchitis (chronic and unspecified), emphysema and asthma	4,457	4.6
Abdominal pain	3,376	3.5
Heart diseases (excluding hypertensive disease and acute rheumatic fever)	3,048	3.2
Complications of abortion	2,819	2.9
Hypertensive disease	2,815	2.9
Fractures	2,267	2.4
Poisonings and toxic effects	2,231	2.3
Diabetes mellitus	2,056	2.1
Open wound and injury to blood vessels	1,671	1.7
All other causes	45,248	47.0
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T O T A L	96,353	100.0
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Table 2.4.9 - Principal causes of first attendances at dispensary service  
points - 1983

<u>Causes</u>	<u>First attendances</u>	
	<u>Number</u>	<u>% of total</u>
Influenza	56,713	7.7
1. Superficial injury, contusion and crushing with intact skin surface	46,552	6.3
2. Scabies	44,758	6.1
3. Abdominal pain and colic	38,748	5.2
4. Symptoms involving head and neck	37,351	5.1
5. Laceration and open wound	33,483	4.5
6. Gastritis and duodenitis	33,213	4.5
7. Diseases due to helminths	27,079	3.7
8. Avitaminoses and other nutritional deficiencies	26,883	3.6
9. Symptoms involving respiratory system and other chest symptoms	26,726	3.6
10. Infectious colitis, enteritis, gastro-enteritis, diarrhoea	25,286	3.4
11. Anaemias	22,588	3.1
12. Diseases of the ear and mastoid process	20,650	2.8
13. Pyrexia of unknown origin	19,802	2.7
14. Diseases of the eye and adnexa	18,560	2.5
All other causes	259,776	35.2
T O T A L	738,168	100.0

Table 2.4.10 - Causes of first attendances at dispensary service points  
by I.C.D. Chapter, 1983 and 1986

<u>I.C.D. Chapter (1975 Revision)</u>	<u>First attendances (% of total)</u>	
	<u>1983</u>	<u>1986</u>
1. Infectious and Parasitic Diseases	13.4	15.1
2. Neoplasms	0.0	0.0
3. Endocrine, Nutritional and Metabolic Diseases, and Immunity Disorders	5.0	5.2
4. Diseases of the Blood and Blood-forming Organs	3.1	3.4
5. Mental Disorders	0.0	0.0
6. Diseases of the Nervous system and Sense Organs	5.4	4.6
7. Diseases of the Circulatory System	2.1	2.4
8. Diseases of the Respiratory System	18.1	20.5
9. Diseases of the Digestive System	6.4	6.5
10. Diseases of the Genitourinary System	0.9	0.9
11. Complications of Pregnancy, child-birth and the Puerperium	0.2	0.3
12. Diseases of the Skin and Subcutaneous Tissue	5.1	4.0
13. Diseases of the Musculoskeletal System and Connective Tissue	5.7	5.3
14. Congenital Anomalies	0.0	0.0
15. Certain conditions originating in the perinatal period	0.0	0.2
16. Symptoms, Signs and Ill-defined Conditions	21.8	19.9
17. Injury and Poisoning	12.8	11.7
Total	100.0	100.0
Total cases	738,168	780,191

### 3. MORTALITY

#### 3.1 Need and importance of mortality statistics

Mortality is one of the three factors of population change, the other two being fertility and migration. Mortality is usually considered to be the second factor, after fertility, to influence the size, distribution and composition of the population. Mortality statistics allow a complete analysis of a country's demographic situation. Past and present levels and patterns of mortality help to determine its future role on population growth, thus providing vital inputs for population projections required for proper economic and social planning. Mortality statistics are used by public health authorities for implementing and monitoring of public health programs. They are also used in medical research where a wide variety of questions concerning disease patterns, mortality differentials and cause of death have to be answered. Mortality statistics are used for the computation of life tables which find extensive applications in demographic analysis and are used by insurance companies for managing insurance policies.

#### 3.2 Sources and quality of mortality statistics

The consequences of mortality trends and levels on a country's demographic conditions can be comprehensively analysed if the mortality statistics available are of a sufficiently good and accurate quality. Mortality statistics are usually obtained from the vital registration system, censuses and sample surveys.

The vital registration system, which involves the recording, for administrative and statistical purposes, of all vital events occurring in a country, has traditionally been the most important method for collecting mortality statistics. But, in countries where the vital registration system is either non-existent, or suffers from problems of incompleteness and inaccurate reporting, mortality statistics have to be collected through other sources. These alternative sources of mortality information are the censuses and sample surveys. Censuses, have not been successful in collecting direct mortality data, although the age-sex enumerations of one or more censuses can indirectly provide some estimates of death rates. When censuses or surveys are used to collect data on deaths, the questions usually asked concern:

- (a) birth histories (dates of births and deaths) of all children born to women in the population;
- (b) deaths of household members during a specific period prior to the census or survey;
- (c) the survival status of all ever born children, and
- (d) the survival status of parents, first spouse or siblings.

The problems most encountered when using these census/survey questions are omissions of events, misdating of events, misperception of the reference periods, selectivity of respondents and misstatement of associated demographic and social characteristics. However, in the absence of a reliable vital registration system, these methods are the only sources for making reasonable assessment of mortality conditions in many developing countries.

#### 3.3 Mortality data in Mauritius : Sources and quality

##### 3.3.1 The vital registration system

The principal method of collecting mortality data in Mauritius has been through the vital registration system, whose establishment dates back to the 18th century when the island was under French rule. The completeness and accuracy of vital statistics are now well established in Mauritius. The main factor that has contributed

to the completeness of death registration is that people are compelled to register within 24 hours all deaths before burial or crematory permission is given. Although completeness of death reporting has now been accomplished, nevertheless, it seems that there is still enough scope for further improvement of the data. In particular, reporting and recording of some of the associated demographic characteristics of the decedent and of the cause of death on the death certificates need to be further improved.

At present, registration of vital events in Mauritius is through the administrative structures of the Registrar of Civil Status of the Prime Minister's Office. The Central Statistical Office is responsible for compiling, analysing, evaluating and publishing these data. The events registered at the 45 civil status (registration) offices throughout the island are live births, still births, marriages and deaths. For the study of mortality from the vital registration system, the events that are of interest are still births (foetal deaths) and deaths.

The information collected from the registration of still births are : date of occurrence, date of registration, place of occurrence, place of registration, type of birth (single or multiple issue), legitimacy status, sex, ethnic group, religion, district of residence, age of mother and father, profession of mother and father, date when marriage/union started, number of previous live births and still births of mother and date of previous live birth.

The death registration card has the following information : date of occurrence, date of registration, place of occurrence, place of registration, cause of death, certification of cause of death, name, sex, ethnic group, marital status, religion, profession, age at death, place of birth and number of live births (for women only).

### 3.3.2 Censuses

Mauritius has a long tradition of census taking, the first census being carried out in 1846. Prior to 1952, it appears that census questionnaires were not used to collect mortality data. For the first time in the 1952 census, a question was put to all ever-married women about the total number of children born alive to them and the number of children still alive at the time of enumeration. The question was also asked of all unmarried women to whom a child or children had been born. From this question, it was possible to tabulate data on the proportion dead among the children ever born by age group of mother, thus allowing the use of indirect methods for the estimation of child mortality. In the 1962 census also, ever-married women were requested to state the number of children born alive to them but no information was secured on the number of children dead, so that the technique of mortality estimation based on proportion of children dead by age of mother was not possible. The question that was used in the 1972 and 1983 censuses to estimate fertility and mortality was similar. Each ever-married woman under 55 years of age was asked to list in chronological order, all children born alive to her (including those living elsewhere and those born from every marriage or union) whether these children were then alive or dead. Information was also obtained on the sex, date of birth and survival status at the time of enumeration of each child listed. Since information on age at death was not collected, only indirect methods of mortality estimation were possible.

Even though both systems, namely, vital registration and census have their strong and weak points, it should be clearly understood that vital statistics cover only the 'event makers' who are by their very nature selective. Also for study of differentials, vital statistics cannot be very useful because the larger population consisting of the 'non-event makers' are not known in the vital regis-

tration system especially by their socio-economic characteristics. On the other hand, the census may not be able to net all the events, especially deaths of infants. Further analysis will clearly show that this concern is true inspite of the otherwise good quality of censuses in Mauritius.

Yet another lacuna of the existing vital statistics data is that, although information on some interesting aspects like occupation of parents, etc. are collected, they are not tabulated and naturally no analysis has been attempted. This can easily be taken care of by planning for appropriate tabulations. Even the census data on fertility and mortality are not fully exploited because of inadequate data processing facilities.

### 3.3.3 Comparison of vital registration with census data

The census collected information on births during the past one year and the survival status of the child (Table 3.3.1).

A total of 19,581 children (9,903 males and 9,678 females) were reported in the census as against 20,229 births (10,268 males and 9,961 females) registered in the same period, that is, 96.8 per cent of births seem to have been netted by the census.

The sex ratio of the births was 102.3 in census versus 103.1 in vital registration. On the whole it can be considered that only a few male children could have been omitted in the census, knowing that vital registration is more or less complete.

Out of these births, it was reported that 9,702 male and 9,502 female babies were still alive at the time of census, that is, 201 male and 176 female babies had died, giving a sex ratio at death of 114.2. Even though it is high, it does not look suspicious because it is known that male infant mortality is higher than female.

The infant mortality for the period cannot be calculated based only on these information as the births of the last one year could contribute to infant mortality even after the census date. Thus the 377 infant deaths represent only a part of all infant deaths expected from the cohort born during the last one year. The total number of infant deaths can be estimated through the use of what is known as 'separation factor'.

In Mauritius, it is noticed that around 80-85% of infant deaths from children born in a given year occur within that year and about 15-20% occur in the following year. Assuming that the reported infant deaths among births of the last one year represent only 80% of all infant deaths, then the total number of infant deaths expected from the cohort will be 471. The number of infant deaths reported in vital statistics for that year was 587, which is strictly not comparable with 471 because the reported infant deaths of the year contain babies born in a different year. However, if fertility and mortality conditions may be assumed not to have undergone drastic changes in the last one or two years, these figures could be compared. Accordingly the estimated infant deaths represent only 80% of expected. Apparently there is omission of at least 116 infant deaths in census. Considering the fact noted earlier that around 1000 children also were not reported, it seems that dead children are more often not reported. Based on the census figures the infant mortality rate comes to 24.1 as against the vital statistics figure of 29.0.

There was another question on births of past five years and survival status of these children (Table 3.3.2). A total of 55,830 male and 54,199 female (total 110,029) babies were reported in census as against 59,008 male and 57,293 female births reported in vital



statistics. The proportions of census to vital events come out as 0.946 for male, female and both sexes. It looks that there has been more omission as one goes further back in time. However the omissions do not look to be biased towards a particular sex. The sex ratio from both systems come out as 103.

The survival ratios for the 5 year period were respectively 0.9738 for male and 0.9776 for females. The corresponding survival ratios from the 1982-84 life table are : 0.9721 for males and 0.9770 for females - quite close to the observed census results.

Yet another set of mortality estimates from the census is obtained from the child survival ratios. Table 3.3.3 gives the number of women by number of children ever born (sex-wise) and number of children dead (sex-wise) by five year age-group. From the proportion of dead children using the Trussell method, one can calculate the probability of survival of children to various ages.

Comparison of these probabilities with the life table (Table 3.3.4) provides a check on the census reported mortality of children. Even though one cannot assume that all the conditions necessary for the validity of the method is existing in the country, still it is surprising to see that the  $l(x)$  values do fall very close to corresponding life table values based on vital statistics. This gives confidence in the census reporting on children.

Table 3.3.1- Comparison of births of last year and deaths among them with reported births and infant deaths from vital registration system, Island of Mauritius, 1983

	Male	Female	Both sexes	Sex Ratio
(a) Births during last year	9,903	9,678	19,581	102.3
(b) Deaths among them	201	176	377	114.2
(c) Still alive at census	9,702	9,502	19,204	102.1
(d) Expected infant deaths $\frac{(b)}{1 - 0.2}$			471	
(e) Infant mortality rate $\frac{(d)}{(a)} \times 1,000$			24.1	
(f) Births (vital registration)	10,268	9,961	20,229	103.1
(g) Infant deaths (vital registration)	336	251	587	133.9
(h) Infant mortality rate $\frac{(g)}{(f)} \times 1,000$			29.0	

Table 3.3.2- Comparison of births of the last 5 years with reported births from vital registration system, Island of Mauritius, 1983

	Male	Female	Both sexes	Sex Ratio
(a) Births during past 5 years	55,830	54,199	110,029	103.0
(b) Deaths among them	1,464	1,213	2,677	120.7
(c) Still alive at census	54,366	52,986	107,352	102.6
(d) Survival ratio $\frac{(c)}{(a)}$	0.9738	0.9776	0.9757	
(e) Births (vital registration)	59,008	57,293	116,301	103.0
(f) Births (census)	0.946	0.946	0.946	
Births (vital registration)				

Table 3.3.3 - Children everborn and children dead by age of woman and sex of child, Island of Mauritius, 1983

Age of woman	Number of 1/ women	Children ever born			Children dead			Proportion dead		
		Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes
Total	258,583	237,183	227,644	464,827	11,521	9,994	21,515	.0486	.0439	.0463
15 - 19	56,193	2,258	2,179	4,437	56	55	111	.0248	.0252	.0250
20 - 24	52,069	17,606	16,970	34,576	491	398	889	.0279	.0235	.0257
25 - 29	44,450	34,494	33,425	67,919	1,047	877	1,924	.0304	.0262	.0283
30 - 34	38,456	46,538	44,895	91,433	1,909	1,627	3,536	.0410	.0362	.0387
35 - 39	27,624	46,818	45,144	91,962	2,346	2,009	4,355	.0501	.0445	.0474
40 - 44	20,352	42,518	40,796	83,314	2,506	2,222	4,728	.0589	.0545	.0567
45 - 49	19,439	46,951	44,235	91,186	3,166	2,806	5,972	.0674	.0634	.0655

1/ Total number of women, irrespective of marital status

Table 3.3.4 - Comparison of probability of surviving between birth and age  $x$ ,  $l(x)$ , from Trussell's method with life table values, Island of Mauritius, 1983

Parameter Estimate	Trussell's method						Life Table			
	Probability of surviving		West model level		Reference period <sup>1/</sup>		Probability of surviving		West model level	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
$l(1)$	.97139	.97099	22.2	21.2	0.89	0.89	.97300	.97830	22.4	22.1
$l(2)$	.96994	.97467	22.3	21.9	2.10	2.10	.97030	.97577	22.3	22.1
$l(3)$	.96928	.97350	22.4	21.9	3.97	3.96	.96921	.97426	22.4	22.0
$l(5)$	.95844	.96327	21.6	21.1	6.25	6.23	.96788	.97319	22.4	22.0
$l(10)$	.94844	.95416	21.2	20.7	8.81	8.77	.96522	.97101	22.4	22.0
$l(15)$	.94014	.94455	20.9	20.3	11.57	11.52	.96301	.96883	22.4	22.0
$l(20)$	.93202	.93599	20.8	20.2	14.56	14.51	.95830	.96443	22.4	21.9

<sup>1/</sup> Estimates refer to number of years prior to the census

### 3.3.4 Mortality data from the health system

Mortality data from the health system are restricted to deaths occurring in government hospitals. Data on deaths in private clinics are available only for recent years, and even then as a total figure, that is, no information on the actual causes of death is available. In view of the small number of deaths involved, deaths in private clinics represented less than 3 percent of all deaths in 1985 - it is not important in the further discussions. Also, in accordance with the recommendations of the World Health Organisation, deaths occurring in penitentiary health institutions which, in Mauritius are very few, have been excluded from the figures relating to deaths in hospitals. It must be mentioned that mortality data from the health system are not a separate source of data because they are already reported in the vital registration system. It is only included here to point out the quality of such information versus other data.

Data on deaths since 1920, by five-yearly intervals, are given in table 3.3.5 which also contains the percentage that deaths in hospitals represent of the total number of deaths registered during each of the years considered. They were low but steadily increased. After 1950, the percentage of deaths occurring in hospitals increased rapidly to exceed 20 percent in 1960 and 30 percent in 1965. After that, there has been some slight fluctuations, but no notable change, so that it can be said that the proportion of deaths occurring in hospitals is now just under one-third.

Hospital deaths by cause are available in full details for general hospitals only, representing 98 percent of all hospital deaths (Table 3.3.6).

In 1981, 88 percent of all deaths were medically certified. The Civil Status Act of 1981, which came into force on the first day of the year 1982, made it compulsory for all deaths occurring in the island of Mauritius to be medically certified. This was certainly a definite step towards the improvement of the quality of causes of death statistics. However, a still not uncommon practice in Mauritius is for a doctor to be asked to certify the death of someone who was not his patient, by an examination of the body, supplemented by information gathered from relatives, and without the recourse of autopsy, which, in Mauritius, is performed only in cases of police involvement. Under such circumstances, it is not always an easy task for the doctor to arrive at an accurate cause of death. Doctors certifying deaths occurring in hospitals are usually in a better position because, often, the certifying doctor is the one who had provided treatment to the patient before he passed away, and even when this is not the case, the patient's file, with all the clinical notes, is available for examination, and in the majority of cases provide valuable clues for the determination of an accurate cause of death.

Table 3.3.5 - Deaths in Government hospitals, Island of Mauritius,  
1920 - 1985

Year	Total deaths registered	Deaths in hospitals	
		Number	Percentage of Total Deaths
1920	11,773	1,059	9.0
1925	9,327	841	9.0
1930	14,341	1,557	10.9
1935	10,445	1,449	13.9
1940	10,373	1,266	12.2
1945	15,277	2,082	13.6
1950	6,453	1,130	17.5
1955	7,088	1,157	16.3
1960	7,248	1,560	21.5
1965	6,337	1,955	30.9
1970	6,309	2,069	32.8
1975	6,967	1,995	28.6
1980	6,685	2,128	31.8
1985	6,691	2,099	31.4

Table 3.3.6 -Deaths in General Hospitals by I.C.D. chapter, Island of Mauritius, 1985

I.C.D. <sup>1/</sup> Chapter (1975 Revision)	Total Deaths	Deaths outside hospitals	Deaths in hospitals	
			No.	% of total deaths
1. Infectious and Parasitic Diseases	192	82	110	57.3
2. Neoplasms	515	404	111	21.6
3. Endocrine, Nutritional and Metabolic Diseases and Immunity Disorders	373	276	97	26.0
4. Diseases of the Blood and Blood- forming Organs	40	27	13	32.5
5. Mental Disorders	14	4	10	71.4
6. Diseases of the Nervous System and Sense Organs	78	52	26	33.3
7. Diseases of the Circulatory System	3,083	2,288	795	25.8
8. Diseases of the Respiratory System	781	650	131	16.8
9. Diseases of the Digestive System	321	157	164	51.1
10. Diseases of the Genitourinary System	200	96	104	52.0
11. Complications of Pregnancy, Childbirth, and the Puerperium	19	10	9	47.4
12. Diseases of the Skin and Subcutaneous Tissue	6	4	2	33.3
13. Diseases of the Musculoskeletal System and Connective Tissue	12	10	2	16.7
14. Congenital Anomalies	55	27	28	50.9
15. Certain Conditions originating in the Perinatal Period	294	111	183	62.2
16. Symptoms, Signs and Ill-defined Conditions	252	169	83	32.9
17. Injury and Poisoning	456	268	188	41.2
T O T A L	6,691	4,635	2,056	30.7

<sup>1/</sup> International Statistical Classification of Diseases, Injuries and Causes of Death

### 3.4 Mortality levels and trends in Mauritius since 1900

The evolution of mortality since the beginning of this century to the present date can be discerned from Table 3.4.1 which presents, for each five-year period starting with 1901, some vital statistics for the island of Mauritius. The crude birth rate and the crude death rate by single year since 1901 is graphically pictured in Figure 3.4.1.

Table 3.4.1 - Crude birth rate, crude death rate, rate of natural increase, infantile mortality rate and still birth rate, Island of Mauritius, 1901 - 1985

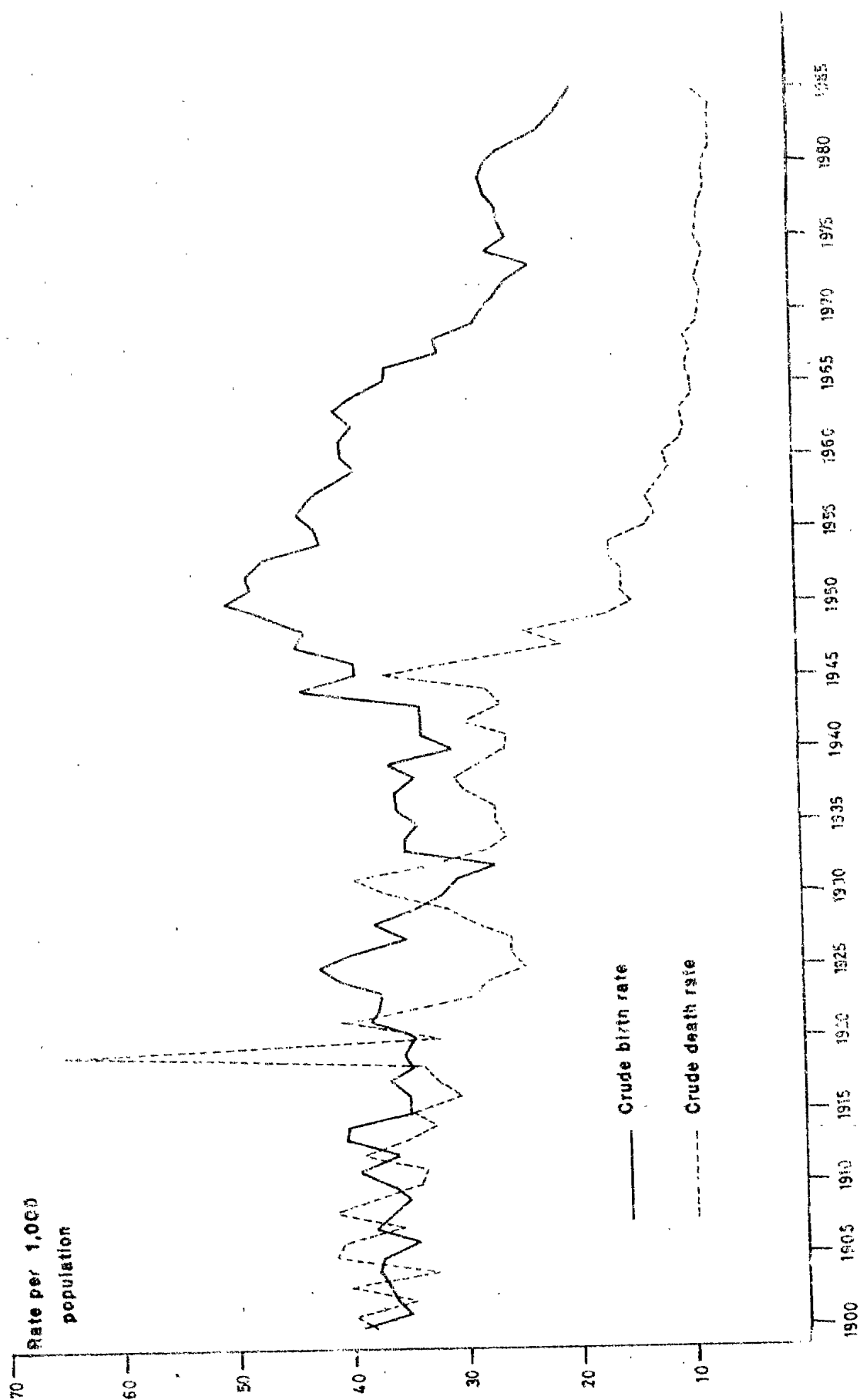
Period	Crude Birth Rate	Crude Death Rate	Rate of Natural Increase	Infantile Mortality Rate	Still birth rate
1901 - 1905	36.5	37.6	- 1.1	169.6	75.6
1906 - 1910	35.8	37.4	- 1.6	169.2	79.8
1911 - 1915	38.3	34.9	3.4	155.6	87.5
1916 - 1920	35.1	38.6 <sup>1/</sup>	- 3.5	167.0	98.6
1921 - 1925	39.1	31.0	8.1	141.8	96.3
1926 - 1930	35.2	28.8	6.4	140.9	81.2
1931 - 1935	31.3	29.8	1.5	140.3	88.7
1936 - 1940	33.1	27.1	6.0	155.6	83.4
1941 - 1945	36.0	28.5	7.5	154.3 <sup>2/</sup>	76.2
1946 - 1950	44.7	20.8	23.9	119.6 <sup>3/</sup>	64.4
1951 - 1955	44.3	14.7	29.6	81.3	59.7
1956 - 1960	40.7	11.6	29.1	68.2	66.5
1961 - 1965	38.6	9.2	29.4	60.4	59.5
1966 - 1970	30.2	8.5	21.7	66.3	43.5
1971 - 1975	24.8	7.7	17.1	54.2	36.7
1976 - 1980	26.3	7.4	18.9	36.7	27.9
1981 - 1985	21.2	6.7	14.5	27.4	20.3

1/ the rate reached 64.3 in 1919 when there was an influenza epidemic

2/ the rate reached 188.0 in 1945 when there were poliomyelitis and dysentery epidemics

3/ the rate reached 186.2 in 1948 when there was an epidemic of whooping cough

Figure 3.4.1 - Crude birth rate, crude death rate, 1901 - 1985





During the first two decades of this century, the country experienced extremely high death rates, varying between 34 and 39 deaths per 1,000 population. For some years during this period, the crude death rate was even higher than the crude birth rate and in the absence of compensating immigration contributed to a negative growth (or decline) of the population.

High death rates during the early periods of this century were most probably due to severe malnutrition, poor sanitary and health conditions and occasional epidemics. Dr. Balfour, who was asked in 1920 by the Colonial office to visit Mauritius with a view to investigating the sanitary condition of the island, said that "..... despite the many natural advantages of the Colony, its general unhealthiness had reached a degree unparalleled in any similar tropical dependency of the Empire....." According to Kuczynski, "Malnutrition is prevalent in Mauritius and the very close relationship between chronic malnutrition and malaria has been shown in detail in the Nutritional Investigations in Mauritius, 1942-1955". The first case of plague was apparently discovered towards the end of 1898 and was responsible for the deaths of about 4,500 persons during the first decade of this century. Likewise, the influenza epidemic of 1919, caused more than 12,000 deaths during a short period of 3 - 4 months and caused the death rate to shoot up to 64 deaths per 1,000, almost twice the rate for 1918. Following successful health campaigns against malaria and hookworms after the 1920's, mortality started to decline and a slight growth of the population was registered for the next 25 years. Again epidemics such as those caused by poliomyelitis and dysentery in 1945 or by whooping cough in 1948 resulted in high death tolls, especially among infants and young children, with the infantile mortality rate reaching almost 200. During the period since the end of World War II and up to the mid 1960's, the island of Mauritius witnessed an unprecedented period of accelerated population growth; increasing the population from 425,000 as at the beginning of 1946 to 750,000 as at the end of 1965. This sudden upsurge in population was caused by both a temporarily slight increase in fertility but most importantly by a remarkably rapid fall in mortality. Continuing its secular decline, mortality had dropped to an average of 21 deaths per 1,000 population during the period 1946 - 50 and further to an average of 9 per 1,000 during the period 1961 - 65. Since then, a continuous improvement of economic conditions, further intensive eradication programmes against prevailing epidemics and other killer diseases, education and easier access to more modern methods of health treatment, have reduced the death rate to an average all-time low of about 7 deaths per 1,000 during the period 1981 - 85.

The trend in mortality as depicted by crude death rates may not show the real situation as the age-sex composition of the population affects this measure. To eliminate the effects of population age composition, age-standardized deaths rates are presented in Table 3.4.2, using the estimated 1985 mauritian population as standard.

Table 3.4.2 - Comparison between Crude and Age-adjusted death rates, Island of Mauritius, 1921 - 1985

Year	Crude Death Rate		Age-adjusted Death Rate		Median age of population (years)
	Rate	Difference from 1985 rate (%)	Rate	Difference from 1985 rate (%)	
1921	35.33	426.5	37.01	451.6	21.87
1931	36.16	438.9	37.78	463.0	21.14
1944	29.45	338.9	29.96	346.5	21.76
1952	15.26	127.4	14.60	117.6	20.32
1962	9.56	42.5	9.79	45.9	17.57
1972	7.72	15.1	8.29	23.5	19.04
1983	6.62	-1.3	6.94	3.4	22.80
1985	6.71	Not applicable	6.71	Not applicable	23.59

The trend depicted is more or less similar to that shown by the crude death rate but only some idea of the ageing of the population in recent years is emerging from the standardised rates.

### 3.5 Mortality Trends and Differentials by Age and Sex

Age and sex are two of the most important factors that have to be considered when analysing mortality. Mortality conditions between males and females are different due to biological, socio-economic and other factors. So also is mortality at various ages, being high at very young and old ages and extremely low at young adult ages. Mortality trends and differentials with respect to age and sex since the early fifties to the present date can be studied by means of Table 3.5.1 below. This table presents the age specific death rates for each sex for the last four census years and for the year 1985. The data (except for 1985) are graphically pictured in Figures 3.5.1 and 3.5.2. As can be seen, mortality is particularly high at age zero for both males and females. There is an abrupt fall in the death rate at ages 1-4 years, followed by further declines until age group 10-14 is reached. This age group seems to be, in most cases, the one with the lowest death rate. After age 14, the age specific death rates increase gradually up to around age 50 and more steeply thereafter.

Table 3.5.1 - Trends in Age Specific Death Rates<sup>1/</sup>, Island of Mauritius, 1952 - 1985

#### M a l e s

<u>Age group</u> <u>(years)</u>	<u>1952</u>	<u>1962</u>	<u>1972</u>	<u>1983</u>	<u>1985</u>
Under 1	128.02	77.46	69.21	29.19	28.06
1 - 4	14.22	7.55	5.61	1.35	1.28
5 - 9	2.16	1.43	0.91	0.55	0.48
10 - 14	1.32	1.05	0.92	0.46	0.43
15 - 19	2.66	1.29	1.18	0.98	0.99
20 - 24	4.25	1.95	1.24	1.30	1.25
25 - 29	4.73	2.07	1.70	1.71	1.69
30 - 34	5.97	2.93	2.25	2.38	2.43
35 - 39	8.56	4.24	3.45	3.85	3.72
40 - 44	12.29	6.57	5.55	6.06	6.04
45 - 49	18.79	9.90	8.84	9.86	9.76
50 - 54	27.45	17.95	14.59	14.89	15.78
55 - 59	38.38	28.08	22.63	22.31	22.11
60 - 64	49.00	40.62	39.59	35.44	37.34
65 - 69	77.31	60.13	54.84	50.97	52.84
70 - 74	129.92	79.75	84.15	81.68	77.55
75 - 79	140.50	117.96	120.90	115.05	119.50
80 - 84	146.22	170.18	151.55	177.94	162.39
85 +	148.89	182.15	193.33	284.40	310.84
All ages	15.74	9.81	8.29	7.60	7.71

1/ Rate per 1,000 population computed by taking the average number of deaths for three years divided by the mid-period population

Table 3.5.1 - Trends in Age Specific Death Rates , Island of Mauritius,  
1952 - 1985

F e m a l e s

Age-group (years)		1952	1962	1972	1983	1985
Under	1	104.97	60.42	53.98	23.31	21.32
1	- 4	16.77	8.69	6.44	1.34	1.07
5	- 9	2.64	1.75	1.05	0.45	0.37
10	- 14	2.22	0.92	0.61	0.45	0.46
15	- 19	3.84	1.97	1.15	0.91	0.97
20	- 24	5.74	3.57	1.83	1.06	0.94
25	- 29	6.73	3.07	2.01	1.10	1.12
30	- 34	8.27	4.15	2.85	1.27	1.50
35	- 39	7.40	4.89	2.82	1.81	2.01
40	- 44	8.34	5.14	3.99	2.90	2.87
45	- 49	11.03	6.04	4.99	4.06	3.90
50	- 54	14.68	10.32	8.14	6.20	6.25
55	- 59	23.09	14.63	12.35	10.77	10.51
60	- 64	33.25	27.08	20.29	17.33	18.40
65	- 69	43.21	37.44	28.81	27.04	27.64
70	- 74	78.47	62.76	52.66	47.78	48.19
75	- 79	111.92	88.86	78.46	71.43	75.78
80	- 84	127.64	127.88	116.12	105.86	99.62
85	+	154.98	171.05	178.08	196.60	190.33
All ages		14.78	9.30	7.15	5.63	5.71

The pattern and momentum of mortality decline which occurred since the early fifties can be closely examined by looking at table 3.5.2. It shows the percentage declines in death rates for each age group for each of the three intercensal periods from 1952 to 1983, for the post-censal period 1983-85 and for the longer period from 1952 to 1985.

Figure 3.5.1 - Age specific death rates, males, Island of Mauritius, last four census years

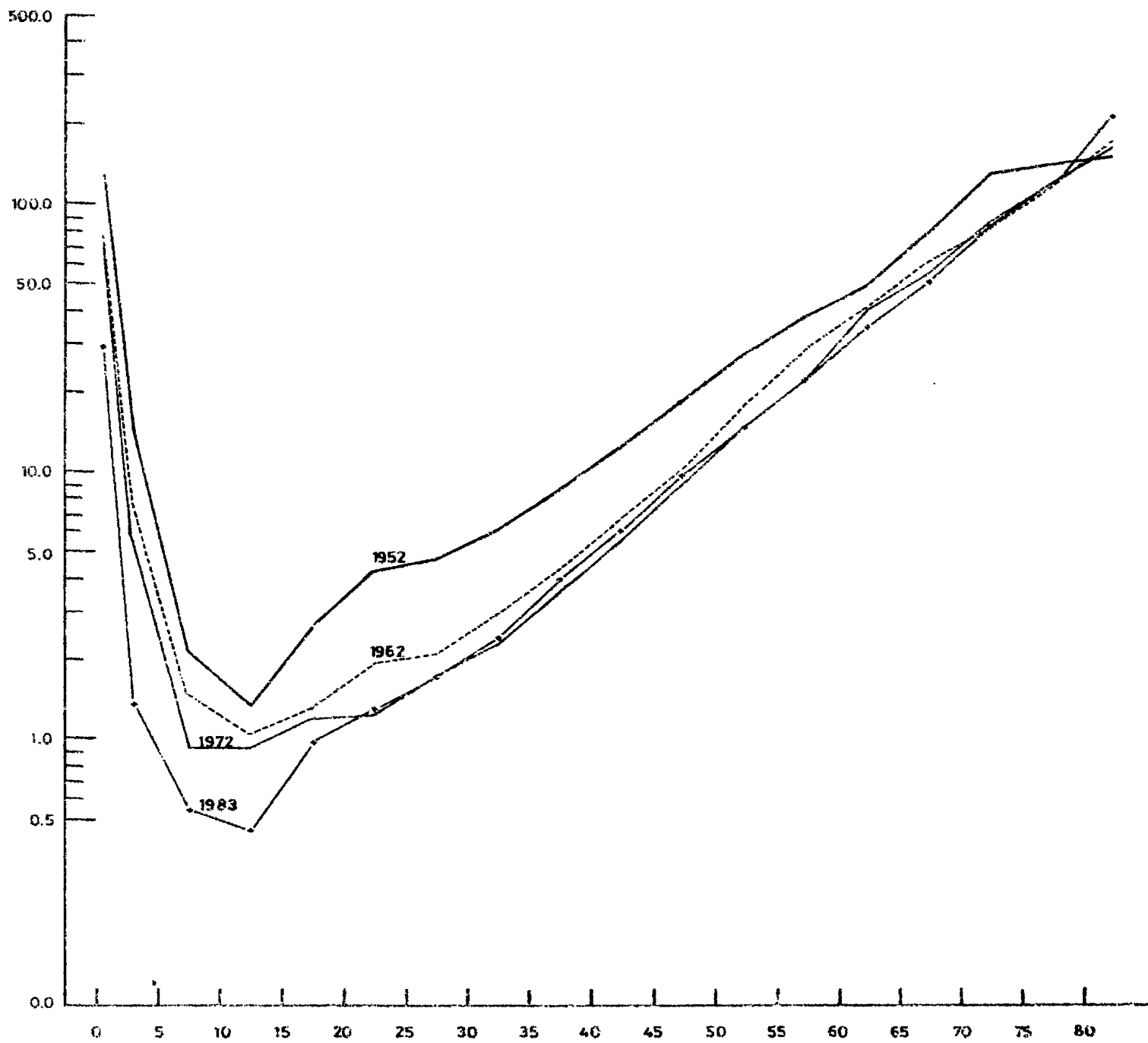


Figure 3.5.2 - Age specific death rates, females, Island of Mauritius, last four census years

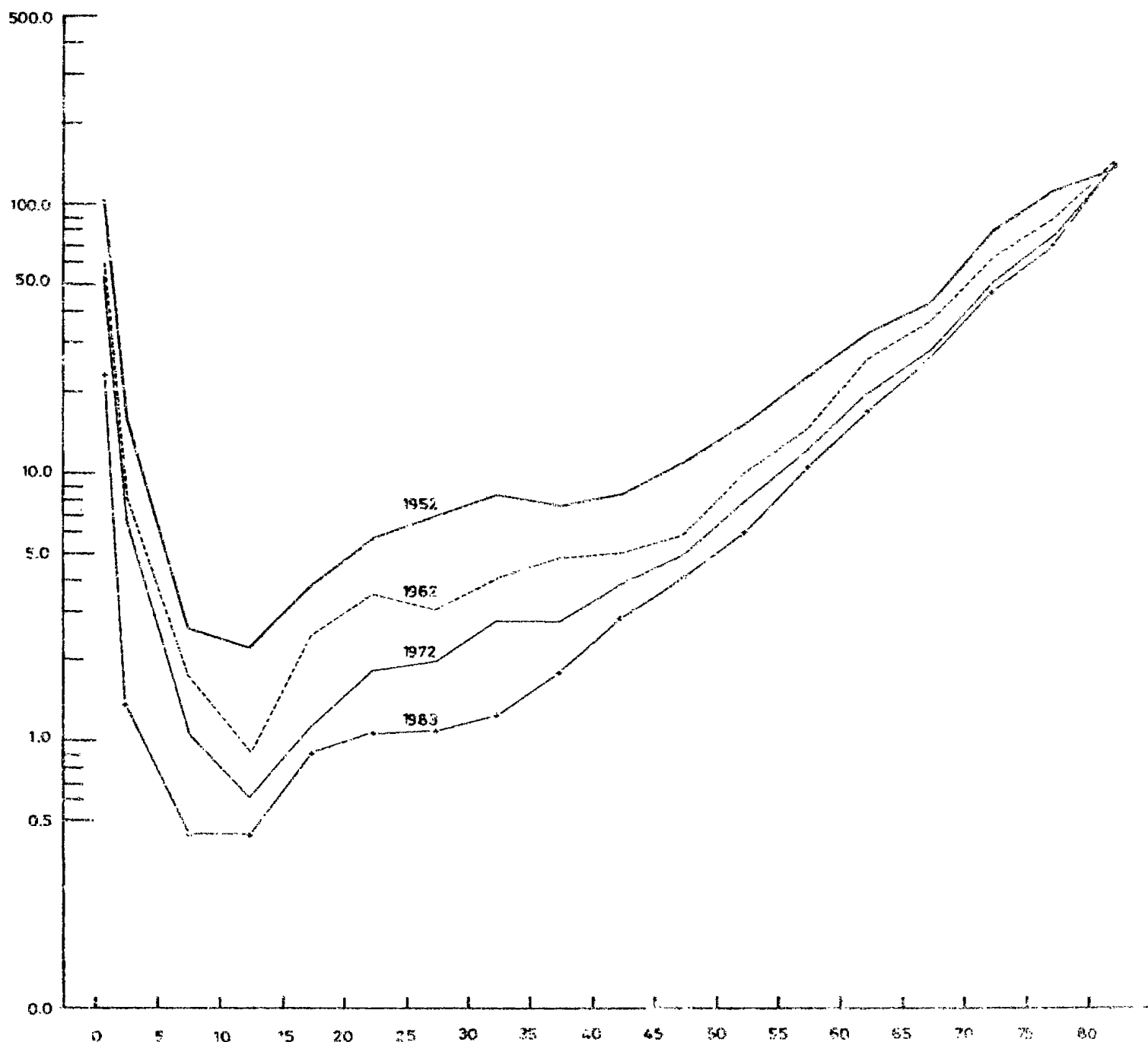


Table 3.5.2 - Trends of Percentage Declines in Age Specific Death Rates,  
Island of Mauritius, 1952 - 1985

M a l e s

<u>Age group</u> <u>(years)</u>		<u>Percentage Decline from :</u>				
		<u>1952 - 1962</u>	<u>1962 - 1972</u>	<u>1972 - 1983</u>	<u>1983 - 1985</u>	<u>1952 - 1985</u>
Under	1	39.5	10.7	57.8	3.9	78.1
1	- 4	46.9	25.7	75.9	5.2	91.0
5	- 9	33.8	36.4	39.6	12.7	77.8
10	- 14	20.5	12.4	50.0	6.5	67.4
15	- 19	51.5	8.5	16.9	+ 1.0	62.8
20	- 24	54.1	36.4	+ 4.8	3.8	70.9
25	- 29	56.2	17.9	+ 0.6	1.2	64.3
30	- 34	50.9	23.2	+ 5.8	+ 2.1	59.3
35	- 39	50.5	18.6	+ 11.6	3.4	56.5
40	- 44	46.5	15.5	+ 9.2	0.3	50.9
45	- 49	47.3	10.7	+ 11.5	1.0	48.1
50	- 54	34.6	18.7	+ 2.1	+ 6.0	42.5
55	- 59	26.8	19.4	1.4	0.9	42.4
60	- 64	17.1	2.5	10.5	+ 5.4	23.8
65	- 69	22.2	8.8	7.1	+ 3.7	31.7
70	- 74	38.6	+ 5.5	2.9	5.1	40.3
75	- 79	16.0	+ 2.5	4.8	+ 3.9	14.9
80	- 84	+ 16.4	10.9	17.4	8.7	+ 11.1
85	+	+ 22.3	+ 6.1	+ 47.1	+ 9.3	+ 108.8
All Ages		37.7	15.5	8.3	+ 1.4	51.0

The percentage decline between any two periods is obtained by dividing the absolute difference by the death rate in the earlier period, and multiplied by 100

A plus sign indicates an increase of the percentage between the two periods being compared.

Table 3.5.2 - Trends of Percentage Declines in Age Specific Death Rates,  
Island of Mauritius, 1952 - 1985

F e m a l e s

Age group (years)		Percentage Decline from :				
		1952 - 1962	1962 - 1972	1972 - 1983	1983 - 1985	1952 - 1985
Under	1	42.4	10.7	56.8	8.5	79.7
	1 - 4	48.2	25.9	79.2	20.1	93.6
	5 - 9	33.7	40.0	57.1	17.8	86.0
	10 - 14	58.6	33.7	26.2	+ 2.2	79.3
	15 - 19	48.7	41.6	20.9	+ 6.6	74.7
	20 - 24	37.8	48.7	42.1	11.3	83.6
	25 - 29	54.4	34.5	45.3	+ 1.8	83.4
	30 - 34	49.8	31.3	55.4	+ 18.1	81.9
	35 - 39	33.9	42.3	35.8	+ 11.0	72.8
	40 - 44	38.4	22.4	27.3	1.0	65.6
	45 - 49	45.2	17.4	18.6	3.9	64.6
	50 - 54	29.7	21.1	23.8	+ 0.8	57.4
	55 - 59	36.6	15.6	12.8	2.4	54.5
	60 - 64	18.6	25.1	14.6	+ 6.2	44.7
	65 - 69	13.4	23.1	6.1	+ 2.2	36.0
	70 - 74	20.0	16.1	9.3	+ 0.9	38.6
	75 - 79	20.6	11.7	9.0	+ 6.1	32.3
	80 - 84	+ 0.2	+ 9.2	8.8	5.9	22.0
	85 +	+ 10.4	+ 4.1	+ 10.4	3.2	+ 22.8
All Ages		37.1	23.1	21.3	+ 1.4	61.4

The percentage decline between any two periods is obtained by dividing the absolute difference by the death rate in the earlier period, and multiplied by 100

A plus sign indicates an increase of the percentage between the two periods being compared

For males and females, it is found that from 1952 to 1985, there have been large declines in mortality for almost all age groups (excepting very old ages where several types of errors and small population sizes could vitiate the rates). However, the magnitudes of the declines have not been the same between the two sexes or between the ages. In general, the declines have been faster for females than for males, greatest for the youngest age groups, slightly less for the adult age groups and progressively less for older age groups. The largest declines occurred for age group 1 - 4 with a 91 percent decline in death rate for males and 93.6 percent for females. The faster decline in mortality from 1952 to 1985 for females is very noticeable between ages 25 and 64 where the percentage declines exceed those for males by about 20 points. The declines for females at ages under 1 and 1 - 4 have been only 1.6 and 2.6 points higher than the corresponding declines for males.

Comparisons of changes between the three intercensal periods from 1952 to 1983 show that, apart from age groups under 20 for males and under 10 for females, the pace of mortality decline has been faster during the period from 1952 to 1962 and progressively less during the next two intercensal periods. This slowdown in mortality decline has been more marked in the case of males. It is also evident that, if the oldest age groups are excluded, there has been a continuous improvement in mortality during each of the three intercensal periods for women while for males there has been improvement during the periods 1952-62 and 1962-72 followed by a deterioration of mortality conditions during the period 1972 - 83. This reversal of trends for males during this latter period is particularly visible between the ages 20 and 55. Investigating further, age specific death rates for the male population were calculated for several years during the period between 1972 and 1983. According to Table 3.5.3 which presents the death rates for the male population for selected years during that period, it was found that, while mortality for persons aged under 20 has continued its historical decline during the period 1972-83, that for persons aged 20 and above was interrupted by a temporary upward shift between 1972 and 1976. The expectation of life at birth for males even declined during this period, from 60.8 years in 1972 to 60.6 years in 1974 and further to 60.1 years in 1976.

Table 3.5.3 - Age specific death rates for male population, Island of Mauritius, selected years

<u>Age-group</u>	<u>1972</u>	<u>1976</u>	<u>1980</u>	<u>1983</u>
Under 1	69.21	53.32	35.69	29.19
1 - 4	5.61	3.42	2.15	1.35
5 - 9	0.91	0.69	0.58	0.55
10 - 14	0.92	0.61	0.61	0.46
15 - 19	1.18	1.01	0.96	0.98
20 - 24	1.24	1.50	1.44	1.30
25 - 29	1.70	2.16	1.81	1.71
30 - 34	2.25	3.16	2.86	2.38
35 - 39	3.45	4.67	3.94	3.85
40 - 44	5.55	7.81	6.97	6.06
45 - 49	8.84	12.57	10.79	9.86
50 - 54	14.59	17.73	15.46	14.89
55 - 59	22.63	28.66	23.82	22.31
60 - 64	39.59	44.09	40.24	35.44
65 - 69	54.84	63.61	53.44	50.97
70 - 74	84.15	90.35	86.82	81.68
75 - 79	120.90	141.63	108.92	115.05
80 +	162.90	217.24	249.03	201.26



After 1976, mortality for males above age 20 started to improve gradually. By 1983, however, the death rates for the seven quinquennial age groups between the ages 20 and 55 were still higher than in 1972. This means that the improvement in mortality for males aged between 20 and 55 during the period 1976 - 83 had not yet offset the deterioration which occurred during the period from 1972 to 1976. In general, mortality for males in the age group 20 - 54 deteriorated at an average annual rate of much more than 5 per cent during the period 1972 - 76 but improved at an average annual rate of only around 3 percent during the period 1976-83.

According to studies made recently in some industrialised countries, it was reported that, "In respect of adult mortality, on the other hand (and particularly male mortality) the progress previously observed seems to have come to a standstill in the 1960's, ..... The risk of death at certain ages has become higher and in some cases, expectations of life at birth has even decreased"<sup>1/</sup>, <sup>2/</sup>. Similar rise in mortality are now coming out.<sup>3/</sup>,<sup>4/</sup>.

Another way of analysing sex differential in mortality by age is by calculating the ratio of male death rates to female death rates (Table 3.5.4 and also Figure 3.5.3). It has been observed that, in countries which have attained a relatively low level of mortality, the death rates for females are normally lower than for males at almost all ages. For Mauritius, this pattern of excess male mortality at all ages is also present for the years 1983 and 1985 when there was a relatively high expectation of life of around 68 years, for both sexes combined. The data for earlier years, however, show the existence of a pattern of excess female mortality, especially at the ages between early childhood and young reproductive ages. In 1952 this excess female mortality ranged between age one and thirty five and although mortality continued its historical downward movement after this date, mortality for females at these ages were still higher than for males in 1962 and 1972. In 1972, however, this excess female mortality had disappeared for age groups 10 - 14 and 15 - 19.

Thus, one characteristic feature of the historical mortality data for the island of Mauritius has been the existence until 1972 of a pattern of higher female mortality, approximately between age one and forty. This does not seem to be an unusual pattern though, since it is also found in India, and in some countries where socio-cultural practices favour a male and where fertility is high.

<sup>1/</sup> G. Casselli and V. Egidi

<sup>2/</sup> J. Vallin and J. C. Chesnais

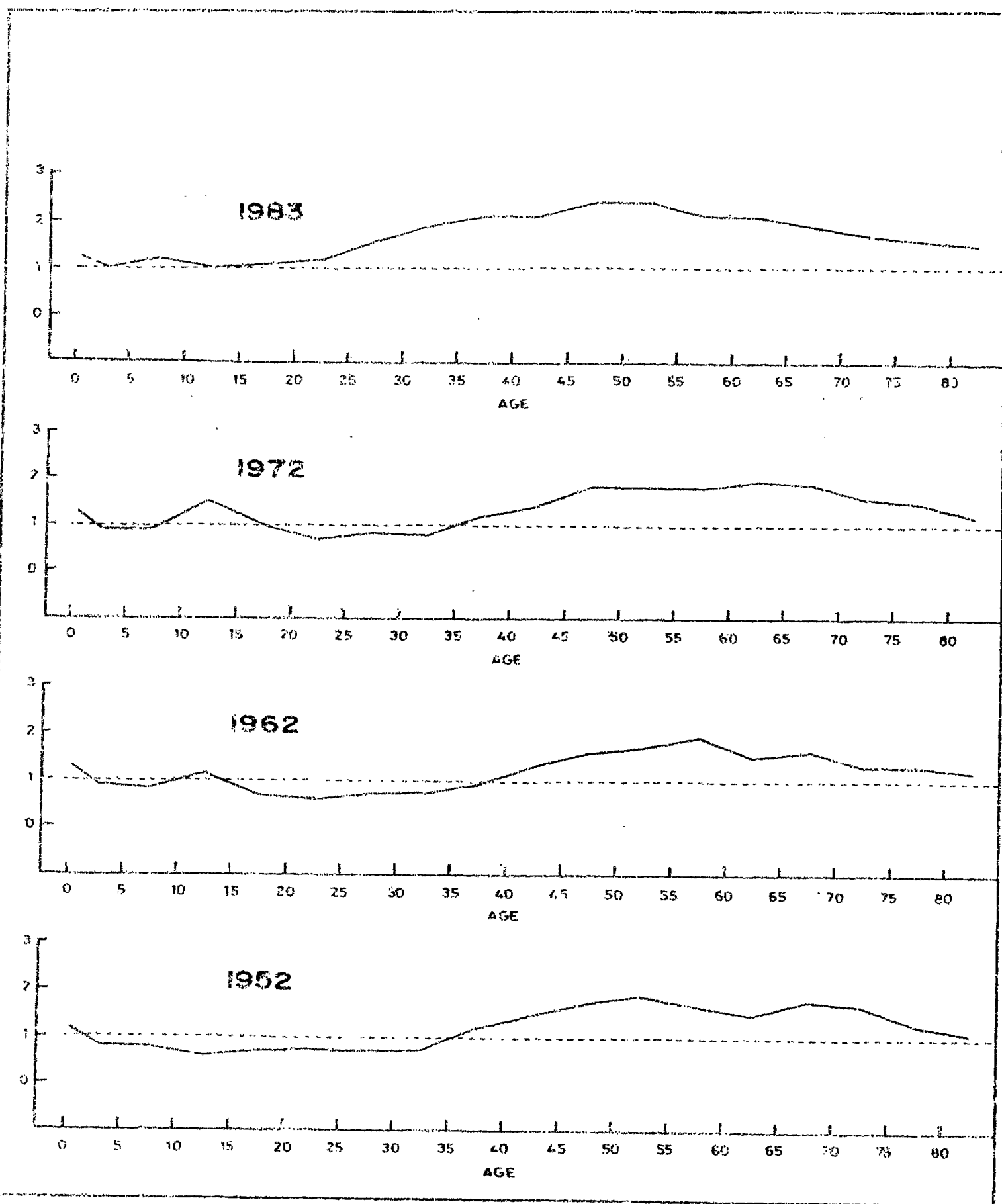
<sup>3/</sup> P. A. Campten

<sup>4/</sup> R. H. Dinkel

Table 3.5.4 - Ratio of Male Death Rates to Female Death Rates by Age, Island of Mauritius, 1952 - 1985

<u>Age group</u>	<u>1952</u>	<u>1962</u>	<u>1972</u>	<u>1983</u>	<u>1985</u>
Under 1	1.22	1.28	1.28	1.25	1.32
1 - 4	0.85	0.87	0.87	1.01	1.20
5 - 9	0.82	0.82	0.87	1.22	1.30
10 - 14	0.59	1.14	1.51	1.02	0.93
15 - 19	0.69	0.65	1.03	1.08	1.02
20 - 24	0.75	0.55	0.68	1.23	1.33
25 - 29	0.70	0.67	0.85	1.55	1.51
30 - 34	0.72	0.71	0.79	1.87	1.62
35 - 39	1.16	0.87	1.22	2.13	1.85
40 - 44	1.47	1.28	1.39	2.09	2.10
45 - 49	1.70	1.64	1.77	2.43	2.50
50 - 54	1.87	1.74	1.79	2.40	2.52
55 - 59	1.66	1.92	1.83	2.07	2.10
60 - 64	1.47	1.50	1.95	2.05	2.03
65 - 69	1.79	1.61	1.90	1.88	1.91
70 - 74	1.66	1.27	1.60	1.71	1.61
75 - 79	1.26	1.33	1.54	1.61	1.58
80 - 84	1.14	1.33	1.31	1.68	1.63
85 +	0.96	1.06	1.09	1.45	1.63
All ages	1.06	1.05	1.16	1.35	1.35

Figure 3.5.3 - Ratio of male death rate to female death rate by age, Island of Mauritius, last four census years



### 3.6 Cause of Death

#### 3.6.1. Introduction

In population accounting, mortality plays an important role as it depletes a population. The intensity and importance depend on the relative role of mortality in population change and this will depend upon the particular time one is considering. In Mauritius, for instance, when immigration stopped, mortality became the most important component in determining population change, mainly by the large depletion through deaths and the suppression of fertility, perhaps due to morbidity and poor health conditions. After World War II when malaria eradication and other public health programs were implemented, there was a drastic fall in mortality and some increase in fertility with a consequent spurt in population growth rates. Later, when the public health measures had had their impact slowly reduced because most of the easily manageable environmental problems had been tackled, the impact of mortality became less important. However, other types of situations have arisen as regards mortality which necessitates different types of strategies. For instance, the emergence of cardio-vascular diseases in recent past, claiming a large proportion of deaths, requires investigation and remedial actions being taken, especially since the problems are now more individualised.

Thus we can conclude that in addition to data on the quantitative aspects of mortality there is equally need for information on causes of death in order to enable the planner and policy maker to formulate and take appropriate actions.

The evolution of the pattern of deaths in Mauritius has been that of a poor developing country with a high mortality brought about by infectious and parasitic causes into one where the basic needs of people have been met and mortality considerably reduced but with patterns characterised more and more by diseases of the degenerative type and those brought about by ways of life.

#### 3.6.2. Sources and limitations of statistics on causes of death

In Mauritius, as in many other countries, mortality statistics are compiled from death registration cards. Local data are usually considered as being complete. However, the quality of causes of death reporting over the years is uneven. Generally, the further one goes back in time, the less reliable are the causes of death statistics, and this, for several reasons:

- (a) the limited availability of adequate diagnostic means in the past, such as x-ray facilities, laboratories etc., made accurate diagnoses difficult in many cases;
- (b) the fact that prior to 1982, medical certification of cause of death was not compulsory outside the districts of Port Louis and Plaines Wilhems save in exceptional cases (suicide, homicide, accidents or body to be disposed of by cremation or immersion at sea) allowed for a substantial amount of lay reporting of cause of death;
- (c) the codification of cause of death and especially the identification of the underlying cause from among a series of causes has not always been with the same office.

Further, the periodic revisions in the International Classification of Diseases bring in problems of comparability over time. Thus, gastro-enteritis which used to account for a large number of deaths was classified before the eighth revision with diseases of the digestive system. From the eighth revision, which was used for the first time in Mauritius in 1969, it counted as one of the infective and parasitic diseases. Another important change relates to the condition known as "unspecified heart failure" which was transferred, between the eighth and ninth revision from the broad group of "Symptoms, Signs and Ill-defined conditions" (Chapter 16) to "Diseases of the Circulatory System" (Chapter 7).

In the analysis which follows, it is not proposed to go very far back into the past, partly because of the problems described above and partly because the immediate past is of more direct interest to the development of strategies for the future. However, a broad indication of mortality patterns that prevailed around 1950 and 1960 will be given. More detailed analysis will be restricted to the period starting with the year 1969. The choice is motivated by the fact that, as mentioned before, 1969 is the first year in which the eighth revision was used and also almost coincides with the independence of Mauritius, and hence a study of trends from that year would indicate post-independence achievements and problems. The year 1969 is also the first year for which a detailed breakdown of the causes of infant deaths is available.

### 3.6.3 Causes of death (all ages)

The following table gives the main causes of deaths in 1951 and 1960.

Table 3.6.1 - Main causes of deaths in the island of Mauritius, 1951 and 1960

Group	No. of deaths		% of total deaths		Death rate per 10,000 mid-year population	
	1951	1960	1951	1960	1951	1960
Infective and parasitic diseases	863	403	12.0	5.6	17.8	6.3
Diseases of the blood and blood forming organs	483	413	6.7	5.7	10.0	6.5
Diseases of the nervous system and sense organs	437	429	6.1	5.9	9.0	6.7
Diseases of the circulatory system	399	800	5.5	11.0	8.2	12.5
Diseases of the respiratory system	1,072	798	14.9	11.0	22.2	12.5
Diseases of the digestive system	1,335	1,035 <sup>1/</sup>	18.5	14.3	27.6	16.2
Diseases peculiar to the first year of life	793	725	11.0	10.0	16.4	11.4
Allergic, endocrine system, metabolic and nutritional diseases	*	308	*	4.3	*	4.8
All other causes	1,826	2,337	25.3	32.2	37.7	36.6
Total	7,208	7,248	100.0	100.0	14.9	11.3

1/ 834 of these deaths are due to gastro-enteritis and colitis

\* included with "All other causes"

The predominance of deaths from infective and parasitic causes is not fully reflected in the above table as deaths due to gastro-enteritis which were common in those days have been reported under "Diseases of the digestive system". This accounts for the unexpectedly large share of deaths due to disorders of the digestive system. The relatively high death rate from respiratory causes is probably, to a certain extent, a reflection of insalubrious conditions prevalent at the time although it may also hide some faulty reporting. Deaths from diseases of the blood and blood forming organs which are mainly anemias could be due to the consequences of poverty, although reporting errors here also may be playing an important role. The relatively low mortality rate from diseases of the circulatory system in 1951 and the large increase in 1960 is noteworthy. Although undoubtedly some deaths from such diseases have been reported as "ill-defined conditions" or "unspecified heart failure" and are lumped in the residual category "All other causes", it is certain that the mortality rate from circulatory disorders at that time is nowhere near the currently prevailing high mortality rates from the same causes. The changes in the mortality rates associated with the four broad categories of infective and parasitic diseases, diseases of the digestive system, diseases of the respiratory system and diseases of the blood and blood forming organs, indicate that substantial progress had been accomplished on the health front between 1951 and 1960, as is reflected by the drop in the crude death rate from 14.9 in 1951 to 11.3 in 1960 and the still more remarkable rise in life expectancy at birth which increased by about 10 years from around 50 years to near 60 years during that period. Possible changes in classification between the two years may have had a bearing on changes observed and should be borne in mind. The emergence of the category "Allergic, endocrine system, metabolic and nutritional diseases" as a significant cause of death in 1960 probably derives, in part, from changes in classification. This category included 68 deaths due to diabetes mellitus and 156 deaths due to asthma. The infant mortality rate which was 84.5 per 1,000 births in 1951 had dropped to 69.5 per 1,000 births in 1960. Among "diseases peculiar to early infancy", post-natal asphyxia and atelectasis took 69 lives in 1960, diarrhoea of newborn another 19 lives and "all ill-defined diseases peculiar to early infancy and immaturity unqualified" 586 lives.

Preston and others calculated for Mauritius around 1960 that the elimination of infectious and parasitic diseases would increase the life expectation by about 5 years. This compares with the 3-year gain in life expectation between 1962-72 and a further 4.5 years between 1972-83 during which period there has been almost an elimination of infectious and parasitic diseases from the high levels existing in the past.

Table 3.6.2 shows the evolution of cause specific mortality rates from 1969 onwards. Deaths due to "unspecified heart failure" which were classified prior to 1981 under chapter 16 (in accordance with the eighth revision of the ICD) have been transferred from that chapter to chapter 7 so as to ensure comparability with data for 1981 onwards.

The selection of years for analysis has not been fortuitous. The choice of 1969 has already been discussed. That of 1973 and 1975 has been dictated by the indication of some fairly abrupt changes between these two years. 1981 was the year in which the ninth revision of the ICD was used for the first time for the compilation of cause of death statistics and 1982 was the year in which medical certification of cause of death became compulsory for all districts.

Table 3.6.2 - Cause specific death rates<sup>1/</sup> by sex for selected years, Island of Mauritius

Cause	Male						Female					
	1969	1973	1975	1980	1981	1982	1969	1973	1975	1980	1981	1982
I. Infectious and parasitic diseases	17.4	12.3	8.8	5.6	4.8	3.4	16.0	11.6	6.6	4.6	3.4	3.0
II. Neoplasms	4.2	4.8	4.7	4.9	6.1	5.4	4.7	4.2	4.1	4.1	5.1	5.2
III. Endocrine nutritional and metabolic diseases and immunity disorders	2.0	1.7	3.0	2.2	1.5	2.0	2.4	2.7	3.3	2.4	1.8	1.8
IV. Diseases of the blood and blood forming organs	1.6	1.8	2.0	0.5	0.3	0.5	2.7	2.3	2.2	0.6	0.4	0.6
V. Mental disorders	0.1	0.1	0.5	0.4	0.4	0.3	0.0	0.0	0.1	0.1	0.0	0.0
VI. Diseases of the nervous system and sense organs	1.3	1.2	1.4	1.0	0.8	0.9	0.9	0.8	1.0	0.6	0.6	0.7
VII. Diseases of the circulatory system	18.1	23.4	33.2	36.4	32.0	35.0	15.6	18.6	21.8	29.1	23.4	25.8
VIII. Diseases of the respiratory system	10.1	11.9	11.8	8.0	8.3	8.6	9.8	9.0	8.7	5.9	5.9	6.8
IX. Diseases of the digestive system	2.7	3.6	4.8	4.4	4.0	5.2	2.1	1.6	1.4	1.1	1.5	1.8
X. Diseases of the genito urinary system	0.8	1.0	1.0	1.4	2.0	1.8	0.9	0.8	0.7	0.8	1.4	1.4
XI. Complications of pregnancy, childbirth and the puerperium	-	-	-	-	-	-	0.8	0.7	0.6	0.6	0.3	0.4
XII. Diseases of the skin and subcutaneous tissue	0.1	0.1	0.1	0.0	-	0.0	0.0	0.0	0.1	0.1	0.1	0.1
XIII. Diseases of the musculoskeletal system and connective tissue	0.1	0.1	0.1	0.1	0.0	0.0	0.2	0.3	0.1	0.1	0.1	0.1
XIV. Congenital anomalies	0.6	0.6	0.5	0.9	0.8	0.6	0.3	0.2	0.3	0.4	0.4	0.6
XV. Certain conditions originating in the perinatal period	6.3	5.4	4.5	3.4	5.1	4.6	4.6	3.4	3.4	3.0	3.4	2.9
XVI. Symptoms, signs and ill-defined conditions	13.1	10.8	10.7	7.5	6.9	3.7	13.8	11.9	11.8	7.9	6.7	3.2
XVII. Injury and poisoning	5.2	6.9	7.6	7.3	6.5	6.5	2.2	3.0	2.7	3.0	2.7	2.2

<sup>1/</sup> rate per 10,000 total population

The most noticeable feature of the table is the steady decline of mortality due to infections and parasitic diseases accompanied by a marked rise in mortality due to diseases of the circulatory system. The second most noticeable feature is probably the rather abrupt change in mortality due to these two causes between 1973 and 1975. This change, however, is in the same direction as the change during the whole period and raises the question as to what actually caused the sudden change between 1973 and 1975. Could it be that the economic boom which started around 1974 led to enhanced conditions of living that reduced the toll of infectious and parasitic diseases? And could it be that at the same time, increased stress, increased smoking and alcohol consumption led to a sharp increase in the incidence of mortality due to circulatory causes, and so suddenly?

It may be noted that the increase in mortality from diseases of the circulatory system has affected males much more than females. On the other hand, where there has been improvement, as for example, in mortality from diseases of the respiratory system, females have benefitted more than males. This could account for the widening gap in life expectancies between male and female causing such important social implications like increased widowhood and its attendant problems.

The steady decrease in mortality from "Symptoms, signs and ill-defined conditions" is an indication of improving quality of cause of death statistics. The rather marked dip between 1981 and 1982 is ascribable to the extension of compulsory medical certification of cause of death to all districts in 1982.

The category "Diseases of the circulatory system" warrants special attention because of its current prominence as a cause of mortality. Such diseases are known to strike hard in late adult life. With the ageing of the mauritian population, the toll of diseases of the circulatory system is likely to prove even heavier in the years to come. The table below presents the mortality rate from diseases of the circulatory system for 1985 and 1986 by broad age groups.

Table 3.6.3 - Deaths and death rates by age groups due to diseases of the circulatory system, Island of Mauritius, 1985 & 1986

<u>Age group (years)</u>	<u>Deaths</u>		<u>Rate per 10,000 population</u>	
	<u>1985</u>	<u>1986</u>	<u>1985</u>	<u>1986</u>
Under 25	65	47	1.25	0.91
25 - 39	115	143	4.86	5.80
40 - 49	203	181	24.43	21.43
50 - 59	489	447	73.08	67.06
60 - 69	825	794	180.07	165.83
70 +	1,386	1,335	516.05	487.58
Total	3,083	2,947	31.44	29.83



### 3.6.4 Infant mortality

Because availability, utilisation, and effectiveness of health care and condition of mothers and the environment all impinge directly on the health of infants, the infant mortality rate is very often taken as a useful indicator of the level of development of a country. Mauritius has made significant progress in the reduction of infant mortality from its high level of the early fifties with an average of 81.3 infant deaths per 1,000 live births during the period 1951-55 to 27.4 during the period 1981-85.

A study of the causes of infant deaths in recent years will show the evolving patterns of infantile mortality and perhaps also indicate the path for future actions. Table 3.6.4 below gives the principal causes of infant deaths for 1969 and 1983.

Table 3.6.4 - Principal causes of infant deaths, Island of Mauritius, 1969 and 1983

<u>C a u s e</u>	<u>1 9 6 9</u> =====		<u>Rate per thousand live births</u>
	<u>Deaths</u> Number	% of Total	
Enteritis and other diarrhoeal diseases	590	38.6	27.17
Immaturity	308	20.2	14.18
Asphyxia, anoxia and hypoxia	106	6.9	4.88
Pneumonia	88	5.8	4.05
Asthenia, marasmus, debility, cachexia and athrepsia	86	5.6	3.96
Bronchitis	58	3.8	2.67
Pyrexia of unknown origin	46	3.0	2.12
Avitaminoses and other nutritional deficiencies	33	2.2	1.52
Congenital anomalies	29	1.9	1.34
Tetanus neonatorum	20	1.3	0.92
All other causes	164	10.7	7.55
T o t a l	1,528	100.0	70.36
	=====	=====	=====
	<u>1 9 8 3</u> =====		
Slow fetal growth, fetal malnutrition and immaturity	155	30.3	7.77
Hypoxia, birth asphyxia and other respiratory conditions	114	22.3	5.71
Ill-defined intestinal infections (colitis, enteritis, gastro-enteritis, diarrhoea)	42	8.2	2.11
Pneumonia	36	7.0	1.80
Septicaemia and infections specific to the perinatal period (excluding tetanus)	32	6.3	1.60
Congenital anomalies	24	4.7	1.20
Bronchitis	10	2.0	0.50
Haemolytic disease of newborn due to isoimmu- nization and other perinatal jaundice	6	1.2	0.30
Meningitis	6	1.2	0.30
Birth trauma	4	0.8	0.20
All other causes	82	16.0	4.11
T o t a l	511	100.0	25.6
	===	=====	=====

The table shows a major shift between 1969 and 1983 from a pre-dominance of exogenous causes to one of endogenous causes. Thus, whereas enteritis and other diarrhoeal diseases, pneumonia and bronchitis, the main exogenous causes, represented between them 48.2% of total infant deaths and contributed 33.9 points to the Infant Mortality Rate, by 1983, these figures had considerably dropped to 17.2% and 4.4 points respectively. Of the total drop of 44.8 points in the infantile mortality rate from 70.4 infant deaths per thousand livebirths in 1969 to 25.6 in 1983, 35.5 points are attributable to regression of exogenous causes and the rest 9.3 points to endogenous causes.

While there is certainly scope for further reductions of infant mortality from ill-defined intestinal infections, pneumonia and bronchitis, it appears that the main thrust in the coming years, should be the reduction of infant mortality from the current two prime causes which are: (i) slow fetal growth, fetal malnutrition and immaturity and (ii) hypoxia, birth asphyxia and other respiratory conditions. In 1983 the two causes accounted for respectively 30.3% and 22.3% of total infant deaths. These causes, while not directly exogenous, are related to the health and conditions of mothers which in turn depend on exogenous factors. Health education is likely to prove a valuable tool in the fight against these two causes.

An analysis of the components of infant mortality (early neonatal, late neonatal and post neonatal mortality) will shed more light on the changes that have taken place between 1969 and 1983. Table 3.6.5 below gives the principal causes of early neonatal deaths in 1969 and 1983.

Table 3.6.5 - Principal causes of early neonatal deaths, Island of Mauritius, 1969 and 1983

<u>C a u s e</u>	<u>1 9 6 9</u>	
	<u>N u m b e r</u>	<u>% o f T o t a l</u>
Immaturity	226	45.2
Asphyxia, anoxia and hypoxia	100	20.0
Asthenia, marasmus, debility, cachexia and athrepsia	45	9.0
Enteritis and other diarrhoeal diseases	20	4.0
Congenital anomalies	17	3.4
Pneumonia	12	2.4
Infantile colic and abdominal pain	11	2.2
Pyrexia of unknown origin	11	2.2
All other causes	58	11.6
Total	500	100.0
	===	=====
	<u>1 9 8 3</u>	
Slow fetal growth, fetal malnutrition and immaturity	134	47.0
Hypoxia, birth asphyxia and other respiratory conditions	93	32.6
Congenital anomalies	11	3.9
Septicaemia and infections specific to the perinatal period (excluding tetanus)	10	3.5
Ill-defined intestinal infections (colitis, enteritis, gastro-enteritis, diarrhoea)	5	1.8
Haemolytic disease of newborn due to isoimmunization and other perinatal jaundice	4	1.4
Birth trauma	3	1.0
Haemorrhagic disease of newborn	2	0.7
All other causes	23	8.1
Total	285	100.0
	===	=====

Causes of early neonatal deaths are predominantly endogenous and therefore it is not surprising that both in 1969 and 1983, such causes were prominent. However it may be seen that the incidence of death due to such causes has been reduced between these two years, probably as a result of improvement in maternal health and conditions.

The principal causes of late neonatal deaths for 1969 and 1983 given in table 3.6.6 below show the relative importance of endogenous causes during the neonatal period. However it is worth noting that while enteritis and other diarrhoeal diseases accounted for 15.7% of late neonatal deaths in 1969, that share had dropped to 2.7% by 1983. While the general trend has been one of progress, two observations are particularly disturbing: the emergence of septicaemia and infections specific to the perinatal period as a prime cause of late neonatal deaths and the increase in mortality due to hypoxia, birth asphyxia and other respiratory conditions.

Table 3.6.6- Principal causes of late neonatal deaths, Island of Mauritius, 1969 and 1983

<u>C a u s e</u>	<u>1 9 6 9</u>	
	<u>Number</u>	<u>D e a t h s</u> <u>% of Total</u>
Immaturity	66	37.1
Enteritis and other diarrhoeal diseases	28	15.7
Tetanus	14	7.9
Asthenia, marasmus, debility, cachexia and athrepsia	11	6.2
Pneumonia	10	5.6
Congenital anomalies	8	4.5
Pyrexia of unknown origin	5	2.8
Asphyxia, anoxia and hypoxia	4	2.2
All other causes	<u>32</u>	<u>18.0</u>
Total	<u>178</u> ===	<u>100.0</u> =====
<u>1 9 8 3</u>		
Slow fetal growth, fetal malnutrition and immaturity	19	26.0
Septicaemia and infections specific to the perinatal period (excluding tetanus)	14	19.2
Hypoxia, birth asphyxia and other respiratory conditions	13	17.8
Congenital anomalies	5	6.9
Pneumonia	4	5.5
Tetanus	2	2.7
Meningitis	2	2.7
Ill-defined intestinal infections (colitis, enteritis, gastro-enteritis, diarrhoea)	2	2.7
All other causes	<u>12</u>	<u>16.5</u>
Total	<u>73</u> ==	<u>100.0</u> =====

Among the components of infant mortality, the post-neonatal mortality rate registered the biggest drop between 1969 and 1983. From 39.1 in 1969 down to 7.7 in 1983, the fall was of the order of 80.3%. The explanation for the greater success in reducing post-neonatal deaths lies in the fact that causes of post-neonatal mortality are mainly exogenous and these are the causes which have been controlled more effectively in recent years. The principal causes of post-neonatal deaths are still mainly exogenous and there is surely scope for further reduction of deaths from such causes. The principal causes of post-neonatal deaths for 1969 and 1983 are given below in table 3.6.7.

Table 3.6.7 - Principal causes of post-neonatal deaths, Island of Mauritius, 1969 and 1983

<u>C a u s e</u>	<u>1 9 6 9</u> D e a t h s	
	Number	% of Total
Enteritis and other diarrhoeal diseases	542	63.8
Pneumonia	66	7.8
Bronchitis	48	5.6
Avitaminoses and other nutritional deficiencies	33	3.9
Asthenia, marasmus, debility, cachexia and athrepsia	30	3.5
Pyrexia of unknown origin	30	3.5
All other causes	101	11.9
Total	850	100.0
	===	=====
<u>1 9 8 3</u>		
Ill-defined intestinal infections (colitis, enteritis, gastro-enteritis, diarrhoea)	35	22.9
Pneumonia	31	20.3
Bronchitis	10	6.5
Congenital anomalies	8	5.2
Septicaemia and infections specific to the perinatal period (excluding tetanus)	7	4.6
Nutritional deficiencies	5	3.3
All Other causes	57	37.2
Total	153	100.0
	===	=====

### 3.6.5 Child mortality

Mortality among children aged 1 - 4 stems mainly from environmental factors such as nutrition, sanitation, communicable diseases of childhood and security in and around the home. The child mortality rate is therefore a sensitive indicator of the quality of the environment, which in turn is determined by socio-economic conditions. Table 3.6.8 gives the principal causes of child deaths for 1969 and 1983.

Table 3.6.8 - Principal causes of child deaths<sup>1/</sup>, Island of Mauritius, 1969 & 1983

C a u s e	D e a t h s	
	Number	% of Total
Enteritis and other diarrhoeal diseases	385	52.4
Pneumonia	50	6.8
Bronchitis	45	6.1
Accidents, poisoning and violence	41	5.6
Avitaminoses and other nutritional deficiencies	38	5.2
Pyrexia of unknown origin	32	4.4
Asthma	19	2.6
All other causes	124	16.9
Total	734	100.0
	===	=====
1 9 8 3		
Bronchitis (chronic and unspecified), emphysema and asthma	23	18.0
Injury and poisoning	18	14.1
Pneumonia	15	11.7
Neoplasms	6	4.7
Congenital anomalies	5	3.9
Septicaemia	4	3.1
Acute bronchitis and bronchiolitis	3	2.3
Epilepsy	3	2.3
Ill-defined intestinal infections (colitis, enteritis, gastro-enteritis, diarrhoea)	3	2.3
All other causes	48	37.6
Total	128	100.0
	===	=====

1/ children aged from one year to under five years

It is found that significant progress has been achieved between 1969 and 1983 in controlling the main causes of child mortality that were prevalent in 1969. However three of the causes still accounted for 56 child deaths (44 percent) in 1983. They are bronchitis (chronic and unspecified), emphysema and asthma, injury and poisoning and pneumonia. Deaths among young children due to injury and poisoning which amounts to 14 percent in 1983 can certainly be avoided through extra care by parents, and education and information can probably help in this context.

### 3.6.6 Maternal mortality

Maternal mortality has fallen to low levels by 1983. It was 1.4 per 1000 live births in 1969 and in 1983 it was only 0.55. In 1969, 11 out of 30 maternal deaths (37%) were from complications of abortion, while in 1983, the figures are 6 out of 11 (55%). The number of abortion cases treated in government hospitals was 2,711 in 1969 while in 1983 it was 2,819. According to Mamet and Peerun, "a large number of clandestine

abortions do occur and the maternal mortality rate is thought to be a dramatic index of illegal induced abortion. In 1977 there were 2,841 abortion-related hospital admissions representing the fifth highest cause of hospitalisation of that year. It has been speculated that as many illegal abortions occur as live births. Brain damage and other mutilations are often the sad result of failed abortion attempts".

#### 3.6.7 Old age mortality

Out of the 6,428 deaths in 1969 more than a third occurred to persons 60 years and over. In 1983, inspite of a fall in the mortality rate and even in the absolute number of deaths, the old age deaths increased and out of the 6,322 deaths more than half were for old persons. Diseases of circulatory and respiratory systems contributed 55% and 71% of all deaths in 1969 and 1983 respectively.

#### 3.6.8 Conclusions

Mortality patterns by cause have undergone drastic changes in the span of two decades or so. The toll of exogenous causes of mortality has been greatly reduced, no doubt, through improvement in living conditions and the action of health authorities. However, the emergence of diseases of the circulatory system as a prime cause of mortality is disturbing. Health strategies will have to evolve and involve actions such that the vulnerable groups are covered. Better health education and specialised health care may be needed. Since smoking, drinking, improper dietary habits and the stress of modern living conditions play an important role in some of the changing patterns of mortality, appropriate actions directed towards these are called for.

Still there is scope for further reductions of infant mortality in the late - and post-neonatal periods. Education of mothers directed towards identified groups of people, say, in districts like Black River with high infant mortality will be fruitful.

The alarming rate of abortion cases call for increased attention by the health authorities.

### 3.7 Life Table Mortality Measures

Life tables are primarily constructed for the study of mortality, although they can be used in a wide variety of ways. A life table is a better summary measure of the level of mortality than other standard measures such as the crude death rate or standardized death rate.

The existence of good mortality data from the vital registration system and population data from periodic censuses has made possible the computation of a series of abridged life tables for the island of Mauritius. The most recent life tables for the years 1972, 1983 and 1985 are presented as Appendix Tables A1, A2, and A3 respectively.

#### 3.7.1 Life expectancy at birth by sex

A glance at Table 3.7.1 reveals that mortality has evolved very rapidly since the early fifties. The expectation of life at birth increased tremendously from an average of 49.8 years for males and 52.3 years for females in 1952 to 64.5 years and 71.9 years for males and females respectively in 1985. During this 33-year period therefore, the average yearly increase in the expectation of life at birth for females has been higher than for males 0.6 year for females compared with 0.4 year for males. Nevertheless there was considerable variations in the rate of increase.

Table 3.7.1 - Expectation of life at birth by sex, Island of Mauritius

Year	Expectation of life at birth (in years)		
	Male	Female	Female - Male
1952	49.8	52.3	2.5
1962	58.7	61.9	3.2
1972	60.8	65.9	5.1
1983	64.4	71.2	6.8
1985	64.5	71.9	7.4

The expectation of life at birth increased to 58.7 years for males and 61.9 years for females in 1962. The average yearly increase during 1952 - 1962 was thus 0.9 year for males and slightly higher for females, 1.0 year. This relatively short period of time has been the one during which the greatest improvement in mortality was made. Both males and females having reached a moderately high level of life expectancy by then, the increases during subsequent periods were obviously modest. The average yearly increase in  $e_0$  during the period 1962-1972 slowed down to 0.2 year for males and 0.4 year for females, bringing the life expectancy at birth to 60.8 years for males and 65.9 years for females in 1972. Although the pace of mortality decline was considerably reduced during this period, it should be pointed out that the average yearly increase in  $e_0$  for females was twice that for males and the female advantage of around 0.2 year per year continued into the period 1972-83. As a result, the difference in the expectation of life at birth between males and females has continued to increase over time. This gap which was about 2.5 years in 1952, widened to 3.2 years in 1962, to 5.1 years in 1972, to 6.8 years in 1983 and further to 7.4 years in 1985.

### 3.7.2 Life expectancy at other ages by sex

Besides the tremendous increase in life expectancy at birth since 1952, there were significant gains in longevity at all the other ages, as shown in Tables 3.7.2 and 3.7.3. Table 3.7.2 shows the expectation of life by age and sex for the last four census years and the year 1985 while Table 3.7.3 shows the percentage increase in expectation of life by age for each sex, for the period between 1952 and 1985 and for the four sub-periods. The increase in expectation of life between 1952 and 1985 for all ages have been substantial. Life expectancy, however, has increased faster for females than for males. The increase for females exceeded 20 percent for all age groups while for males, there were increases of more than 20 percent only at ages above 35.

Table 3.7.2 - Life expectancy by age and sex, Island of Mauritius, 1952 - 1985

Age	Males					Females				
	1952	1962	1972	1983	1985	1952	1962	1972	1983	1985
0	49.79	58.66	60.83	64.38	64.45	52.29	61.86	65.89	71.23	71.88
1	54.71	61.92	63.82	65.15	65.16	56.74	64.38	68.25	71.81	72.33
5	53.67	59.70	61.17	61.49	61.48	56.52	62.52	65.93	68.18	68.63
10	49.23	55.11	56.43	56.65	56.62	52.22	58.05	61.27	63.32	63.75
15	44.56	50.39	51.68	51.78	51.74	47.78	53.36	56.45	58.46	58.90
20	40.11	45.70	46.97	47.02	46.99	43.67	48.86	51.76	53.72	54.17
25	35.83	41.12	42.25	42.31	42.26	39.84	44.54	47.21	48.99	49.41
30	31.64	36.53	37.59	37.65	37.60	36.17	40.26	42.66	44.24	44.68
35	27.52	32.03	32.99	33.07	33.03	32.51	36.05	38.24	39.51	39.99
40	23.58	27.66	28.52	28.66	28.60	28.75	31.88	33.75	34.84	35.37
45	19.94	23.50	24.25	24.46	24.41	24.92	27.64	29.38	30.31	30.85
50	16.69	19.57	20.24	20.56	20.50	21.17	23.42	25.06	25.88	26.41
55	13.78	16.17	16.58	16.95	16.99	17.69	19.52	21.00	21.61	22.17
60	11.18	13.24	13.28	13.65	13.69	14.59	15.82	17.18	17.66	18.23
65	8.75	10.67	10.66	10.81	11.00	11.71	12.57	13.77	14.03	14.75
70	6.72	8.56	8.26	8.23	8.61	9.10	9.72	10.51	10.68	11.58
75	5.41	6.58	6.34	6.18	6.55	7.05	7.34	7.95	7.89	9.08
80	4.29	4.58	4.64	4.20	4.97	5.33	5.13	5.62	5.23	7.17



Table 3.7.3 - Percentage increase in Expectation of life by age, island of Mauritius, 1952 - 1985

Exact age	Males					Females				
	Percentage increase from :					Percentage increase from :				
	1952-1962	1962-1972	1972-1983	1983-1985	1952-1985	1952-1962	1962-1972	1972-1983	1983-1985	1952-1985
0	17.8	3.7	5.8	0.1	29.4	18.3	6.5	8.1	0.9	37.5
1	13.2	3.1	2.1	0.0	19.1	13.5	6.0	5.2	0.7	27.5
5	11.2	2.5	0.5	- 0.0	14.6	10.6	5.5	3.4	0.7	21.4
10	11.9	2.4	0.4	- 0.1	15.0	11.2	5.5	3.3	0.7	22.1
15	13.1	2.6	0.2	- 0.1	16.1	11.7	5.8	3.6	0.8	23.3
20	13.9	2.8	0.1	- 0.1	17.2	11.9	5.9	3.8	0.8	24.0
25	14.8	2.7	0.1	- 0.1	17.9	11.8	6.0	3.8	0.9	24.0
30	15.5	2.9	0.2	- 0.1	18.8	11.3	6.0	3.7	1.0	23.5
35	16.4	3.0	0.2	- 0.1	20.0	10.9	6.1	3.3	1.2	23.0
40	17.3	3.1	0.5	- 0.2	21.3	10.9	5.9	3.2	1.5	23.0
45	17.9	3.2	0.9	- 0.2	22.4	10.9	6.3	3.2	1.8	23.8
50	17.3	3.4	1.6	- 0.3	22.8	10.6	7.0	3.3	2.0	24.8
55	17.3	2.5	2.2	0.2	23.3	10.3	7.6	2.9	2.6	25.3
60	18.4	0.3	2.8	0.3	22.5	8.4	8.6	2.8	3.2	24.9
65	21.9	- 0.1	1.4	1.8	25.7	7.3	9.5	1.9	5.1	26.0
70	27.4	- 3.5	- 0.4	4.6	28.1	6.8	8.1	1.6	8.4	27.3
75	21.6	- 3.6	- 2.5	6.0	21.1	4.1	8.3	- 0.8	15.1	28.8
80	6.8	1.3	- 9.5	18.3	15.9	- 3.8	9.6	- 6.9	37.1	34.5

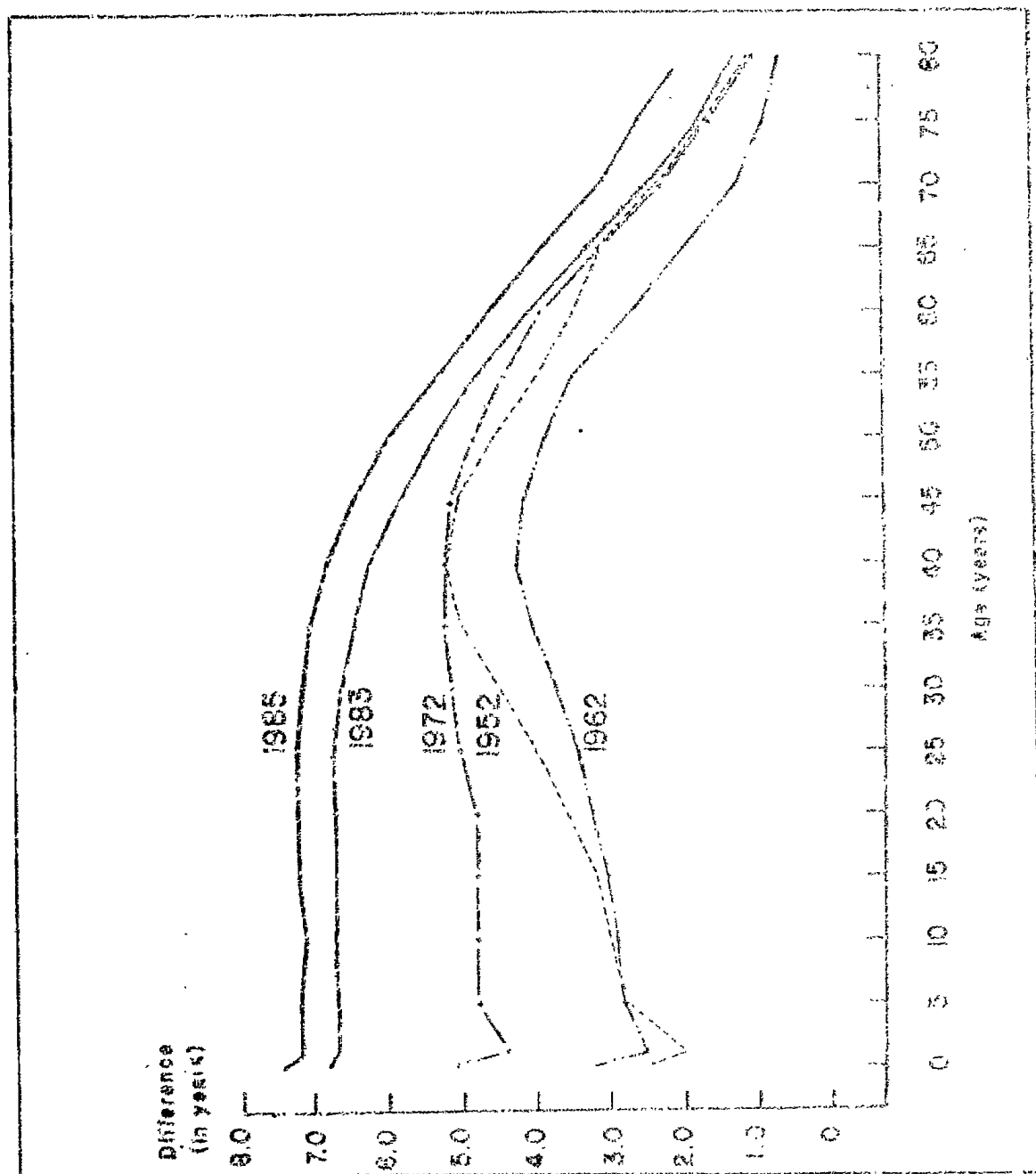
The magnitude of the increase in expectation of life has varied in the course of the time period between 1952 and 1985. Reductions in mortality were much faster during the period 1952-62 than during the periods 1962-72 and 1972-83. Comparison between the two sexes reveals that, in general, the percentage increase in life expectancy has been higher for males during the period 1952-62 but higher for females during the next two intercensal periods.

It was found in the previous section that life expectancy at birth for females is higher than for males, but still, this advantage that females have is not restricted to age zero only. In fact, the expectation of life at any age is higher for females than for males, as evidenced by the positive difference between the female and male expectation of life (Table 3.7.4). These differences are also pictured in Figure 3.7.1 which shows that, apart from 1952 which could be affected by data problems, the difference in life expectancy between male and female at any age has widened in the course of time. Whereas the greatest sex differentials in life expectancy for the years 1952, 1962 and 1972 occurred mainly between ages 25 and 45, those for the most recent years, 1983 and 1985, were found at the young ages, with the peak at age zero.

Table 3.7.4 - Difference between the female and male expectation of life, Island of Mauritius, 1952 - 1985

<u>Age</u>	<u>1952</u>	<u>1962</u>	<u>1972</u>	<u>1983</u>	<u>1985</u>
0	2.5	3.2	5.1	6.8	7.4
1	2.0	2.5	4.4	6.7	7.2
5	2.8	2.8	4.8	6.7	7.2
10	3.0	2.9	4.8	6.7	7.1
15	3.2	3.0	4.8	6.7	7.2
20	3.6	3.2	4.8	6.7	7.2
25	4.0	3.4	5.0	6.7	7.2
30	4.5	3.7	5.1	6.6	7.1
35	5.0	4.0	5.2	6.4	7.0
40	5.2	4.2	5.2	6.2	6.8
45	5.0	4.1	5.1	5.8	6.4
50	4.5	3.8	4.8	5.3	5.9
55	3.9	3.4	4.4	4.7	5.2
60	3.4	2.6	3.9	4.0	4.5
65	3.0	1.9	3.1	3.2	3.8
70	2.4	1.2	2.2	2.4	3.0
75	1.6	0.8	1.6	1.7	2.5
80	1.0	0.6	1.0	1.2	2.2

Figure 3.7.1 - Difference between the female and male expectation of life by age.  
Island of Mauritius, last four census years and the year 1965



### 3.8 Mortality differentials

A study of infant mortality in Mauritius between 1975-76 carried out by the Ministry of Health and the World Health Organisation showed that among the districts, Plaines Wilhems had the lowest infantile mortality rate (IMR) and Black River the highest; Port Louis had the highest rate among the 5 towns.

The infant mortality rate was low among white collar occupations of the father (29.0) and highest among those fathers who had agricultural occupations (52.4). Blue-collar group had an intermediate rate of 41.3.

The occupation of the mother also showed some relationships. For instance, agricultural workers had the highest IMR of 70.8 as against 45.6 for the not economically active and 21.3 for others.

Infant mortality rate by age and parity showed a U shaped pattern. with young and old mothers having high rates while the lowest level was shown by mothers aged 20 - 24 years. This was reflected in infant deaths by parity as well, with the first parity and parities 3 and above having high rates and parity 2 showing the lowest rate.

Another interesting observation was the inverse relation between length of last closed birth interval and infant mortality rate. Intervals of less than 12 months had the highest rate of 45.6, fell to 35.9 for the interval of 12 - 17, further declined to 25.6 for the 18 - 23 months interval then on to 23.7 for the interval 24 - 29 months but showed a slight increase to 26.7 for intervals of 30 months and over. The last interval is composed of a heterogeneous group of mothers and therefore may not be very indicative of a pattern.

Some impact of differential mortality shows up in birth intervals. For instance, when a child dies at a very early age, then breast feeding may stop and the woman may resume ovulation. This will result in a higher chance of the next birth. Again, a dead child may be replaced soon thereafter and this will reduce the interval between the dead child and the next birth. The interval between birth of last child and census time also could be considered as an indicator of fertility regulation. This interval may be conditioned by selectivity of the survival status of that child and also perhaps its sex. Sometimes a combination of both factors may be operating.

Table 3.8.1 gives the average length of the open birth interval by age of mother. The open birth interval is the time between the birth of last child and the census. Normally, it would be expected that for females who have not yet completed their desired family size, especially for younger women, the average length of this interval would be smaller when the last child was dead than when the last child was still alive. For males, the data indicate that the average length of the open birth interval was in fact lower when the last child was dead than when it was still alive, except for age groups 35-39 and 45-49. For females, the figures did not quite reveal the expected pattern. When the last child was dead, the interval was smaller only for young mothers in the age groups under 25. Above this age, the interval when the last child was female and dead is greater than when the child was still alive. Interestingly, when the last child was dead, the time taken to replace that child was shorter in the case of a male child than in the case of a female child, thus perhaps reflecting some sort of preference for male children. However when the last born child was alive, the interval was shorter generally when the sex of the child was feminine than when it was masculine. It looks as if women prefer male children and once they get a male child, then some of them may stop further reproduction.

Table 3.8.1 - Average length of open birth interval by age of mother, sex and survival status of last child, Island of Mauritius, 1983 census

Age of mother (in years)	Average length of interval (in months) when :			
	Last child was alive		Last child was dead	
	Male	Female	Male	Female
15 - 19	14.7	14.4	12.8	14.1
20 - 24	23.7	23.9	18.4	21.4
25 - 29	37.3	36.1	35.6	36.6
30 - 34	59.0	57.8	58.6	62.0
35 - 39	89.5	86.5	93.3	89.3
40 - 44	116.0	113.3	115.5	115.9
45 - 49	134.3	132.8	135.8	134.0
50 - 54	145.6	145.7	144.2	144.4
15 - 54	75.6	74.2	95.5	95.2

### 3.9 Conclusions

There has been appreciable improvement in mortality for the past more than 30 years and by 1986 Mauritian mortality evolved into that typical of a developed country. There are however some disturbing trends. Firstly, the improvement has not been similar for the two sexes. Females gained tremendously and considering their earlier hardship, the achievements are creditable. Males not only did not improve very much but there were even reversals at certain ages. As a matter of fact, the improvement in male mortality as depicted by the increase in life expectation at birth between 1972 and 1983 is blurred by the fact that during that period, there was an actual deterioration in male adult mortality which was fortunately compensated by improvements in infant, child and adolescent mortality.

Improvements were brought about by well designed programmes and plans which attacked the problems as they existed. In the 50's and early 60's the predominance of infectious and parasitic diseases necessitated action programmes on public health, environment, housing conditions, education, immunisation, health facilities and particularly maternal and child care facilities, surveillance of food processing and dispensation of protected water supply etc. The tremendous fall in mortality occurred because of the elimination of the major killers like malaria, pneumonia and other parasitic and infectious diseases. By 1973 a turning point had been reached on the mortality scene. Huge increases were occurring to cardio-vascular and other diseases needing different strategies. More individualised attention, education, information and communication are becoming more relevant. In spite

of laudable achievements on infant and child health, yet still births continue to be sizeable and post neo-natal mortality could be reduced much further. Nutrition and infection related deaths still claims a sizeable proportion of infant deaths which could be reduced by simple programmes.

The high mortality of infants born to very young mothers or to women of high parity could be curtailed by appropriate family planning methods. Abortion is yet another area demanding attention as the complications arising from abortions need a disproportionately high share of medical and hospital resources.

The health programme needs orientation towards meeting some of these challenges as otherwise the gains made may not be sustainable.

Table A1 - Abridged Life Table by sex, Island of Mauritius, 1971 - 1973

## Male Mauritian Population

A g e	m n x	q n x	l x	L n x	T x	e x	P r x	Level <sup>4/</sup>
0	.06921	.061414	100,000	95,886	6,083,575	60.83	.93194 <sup>1/</sup>	19
1 - 4	.00561	.021508	93,859	370,086	5,987,689	63.82	.98323 <sup>2/</sup>	19
5 - 9	.00091	.004540	91,840	458,157	5,617,603	61.17	.99543	21
10 - 14	.00092	.004590	91,423	456,065	5,159,446	56.43	.99467	21
15 - 19	.00118	.005884	91,003	453,677	4,703,381	51.68	.99397	22
20 - 24	.00124	.006182	90,468	450,942	4,249,704	46.97	.99268	22
25 - 29	.00170	.008467	89,909	447,640	3,798,762	42.25	.99017	21
30 - 34	.00225	.011192	89,147	443,242	3,351,122	37.59	.98587	20
35 - 39	.00345	.017114	88,150	436,977	2,907,880	32.99	.97779	20
40 - 44	.00555	.027398	86,641	427,270	2,470,903	28.52	.96475	19
45 - 49	.00884	.043312	84,267	412,210	2,043,633	24.25	.94337	18
50 - 54	.01459	.070551	80,617	388,867	1,631,423	20.24	.91168	16
55 - 59	.02263	.107441	74,930	354,522	1,242,556	16.58	.85792	14
60 - 64	.03959	.180874	66,879	304,152	888,034	13.28	.79155	13
65 - 69	.05484	.242103	54,782	240,752	583,882	10.66	.71221	12
70 - 74	.08415	.348079	41,519	171,465	343,130	8.26	.60713	13
75 - 79	.12090	.461580	27,067	104,102	171,665	6.34	.39357 <sup>3/</sup>	15
80 & over	.16290	1.000000	14,574	67,563	67,563	4.64		

<sup>1/</sup> Survival ratio (S.R.) from birth to age (0 - 4)<sup>2/</sup> Survival ratio (S.R.) from age (0 - 4) to age (5 - 9)<sup>3/</sup> S.R. from age 75+ to age 80+<sup>4/</sup> From COALE-DEMEY West Model Life Tables

Table A1 (cont'd) - Abridged Life Table by sex, Island of Mauritius, 1971 - 1973

Female Mauritian Population

A g e	$n_x^m$	$n_x^q$	$l_x$	$l_x^L$	$\pi_x$	$e_x$	$P_x$	Level 14/
0	.05398	.048662	100,000	96,837	6,589,473	65.89	.942391/	19
1 - 4	.00644	.024608	95,134	374,356	6,492,636	68.25	.982082/	18
5 - 9	.00105	.005237	92,793	462,750	6,118,280	65.93	.99585	20
10 - 14	.00061	.003046	92,307	460,832	5,655,530	61.27	.99561	20
15 - 19	.00115	.005735	92,026	458,810	5,194,698	56.45	.99258	20
20 - 24	.00183	.009112	91,498	455,405	4,735,888	51.76	.99044	20
25 - 29	.00201	.010004	90,664	451,052	4,280,483	47.21	.98783	20
30 - 34	.00285	.014157	89,757	445,562	3,829,431	42.66	.98602	20
35 - 39	.00282	.014009	88,486	439,332	3,383,869	38.24	.98313	20
40 - 44	.00399	.019768	87,247	431,922	2,944,537	33.75	.97781	20
45 - 49	.00499	.024666	85,522	422,337	2,512,615	29.38	.96779	20
50 - 54	.00814	.039946	83,413	408,735	2,090,278	25.06	.95022	19
55 - 59	.01235	.060025	80,081	388,387	1,681,543	21.00	.92213	19
60 - 64	.02029	.096846	75,274	358,145	1,293,156	17.18	.88511	19
65 - 69	.02881	.134874	67,984	316,997	935,011	13.77	.81932	19
70 - 74	.05266	.233617	58,815	259,722	618,014	10.51	.72515	20
75 - 79	.07846	.328644	45,074	188,337	358,292	7.95	.474352/	20
80 & over	.1415	1.000000	30,261	169,955	169,955	5.62		

1/ Survival ratio (S.R.) from birth to age (0 - 4)

2/ Survival ratio (S.R.) from age (0 - 4) to age (5 - 9)

3/ S.R. from age 75+ to age 80+

4/ From COALE-DEMENTY West Model Life Tables



Table A2 - Abridged Life Table by sex, Island of Mauritius, 1982 - 1984

## Male Mauritian Population

A g e	m n x	q n x	l x	L n x	T x	e x	P n x	Level <sup>4/</sup>
0	.02919	.027003	100,000	98,191	6,437,583	64.38	.97212 <sup>1/</sup>	22
1 - 4	.00135	.005262	97,300	387,867	6,339,392	65.15	.99411 <sup>2/</sup>	22
5 - 9	.00055	.002744	96,788	483,196	5,951,525	61.49	.99773	23
10 - 14	.00046	.002295	96,522	482,101	5,468,329	56.65	.99649	22
15 - 19	.00098	.004889	96,301	480,410	4,986,228	51.78	.99429	22
20 - 24	.00130	.006479	95,830	477,669	4,505,818	47.02	.99258	22
25 - 29	.00171	.008514	95,209	474,123	4,028,149	42.31	.99004	21
30 - 34	.00238	.011832	94,399	469,402	3,554,026	37.65	.98486	20
35 - 39	.00385	.019079	93,281	462,294	3,084,624	33.07	.97599	19
40 - 44	.00606	.029881	91,502	451,196	2,622,330	28.66	.96153	18
45 - 49	.00986	.048196	88,768	433,839	2,171,134	24.46	.94064	17
50 - 54	.01489	.071951	84,489	408,088	1,737,295	20.56	.91253	16
55 - 59	.02231	.105996	78,410	372,393	1,329,207	16.95	.86708	15
60 - 64	.03544	.163437	70,099	322,894	956,814	13.65	.80756	15
65 - 69	.05097	.226977	58,642	260,756	633,920	10.81	.72160	13
70 - 74	.08168	.339705	45,332	188,161	373,164	8.23	.61251	13
75 - 79	.11505	.444833	29,932	115,251	185,003	6.18	.37703 <sup>3/</sup>	19
80 - 84	.17794	.602024	16,618	46,500	69,752	4.20		
85 & over	.28440	1.000000	6,613	23,252	23,252	3.52		

<sup>1/</sup> Survival ratio (S.R.) from birth to age (0 - 4)<sup>2/</sup> Survival ratio (S.R.) from age (0 - 4) to age (5 - 9)<sup>3/</sup> S.R. from age 75+ to age 80+<sup>4/</sup> From COALE-DEMNEY West Model Life Tables

Table A2 (cont'd) - Abridged Life Table by sex, Island of Mauritius, 1982 - 1984

## Female Mauritian Population

A g e	m n x	q n x	l x	L n x	T x	e x	P n x	level <sup>4/</sup>
0	.02331	.021697	100,000	98,546	7,123,420	71.23	.97704 <sup>1/</sup>	22
1 - 4	.00134	.005224	97,830	389,972	7,024,874	71.81	.99481 <sup>2/</sup>	21
5 - 9	.00045	.002245	97,319	485,985	6,634,902	68.18	.99799	22
10 - 14	.00045	.002245	97,101	485,007	6,148,917	63.32	.99663	21
15 - 19	.00091	.004540	96,883	483,375	5,663,910	58.46	.99500	21
20 - 24	.00106	.005287	96,443	480,958	5,180,535	53.72	.99462	22
25 - 29	.00110	.005486	95,933	478,370	4,699,577	48.99	.99419	22
30 - 34	.00127	.006330	95,407	475,593	4,221,207	44.24	.99252	22
35 - 39	.00181	.009011	94,803	472,036	3,745,614	39.51	.98842	22
40 - 44	.00290	.014403	93,949	466,570	3,273,578	34.84	.98295	22
45 - 49	.00406	.020111	92,595	458,616	2,807,008	30.31	.97534	22
50 - 54	.00620	.030560	90,733	447,307	2,348,392	25.88	.95933	21
55 - 59	.01077	.052534	87,960	429,116	1,901,085	21.61	.93309	21
60 - 64	.01733	.083275	83,339	400,405	1,471,969	17.66	.89722	21
65 - 69	.02704	.127097	76,399	359,252	1,071,564	14.03	.83231	21
70 - 74	.04778	.214300	66,689	299,011	712,312	10.68	.74706	21
75 - 79	.07143	.303891	52,398	222,379	413,301	7.89	.46194 <sup>3/</sup>	24
80 - 84	.10586	.417546	36,475	82,860	190,922	5.23		
85 & over	.19660	1.000000	21,245	108,062	108,062	5.09		

<sup>1/</sup> Survival ratio (S.R.) from birth to age (0 - 4)<sup>2/</sup> Survival ratio (S.R.) from age (0 - 4) to age (5 - 9)<sup>3/</sup> S.R. from age 75+ to age 80+<sup>4/</sup> From COALE-DEMEY West Model Life Tables

Table A3 - Abridged Life Table by sex, Island of Mauritius, 1984 - 1986

## Male Mauritian Population

A g e	m n x	q n x	l x	d n x	L n x	T x	e x	P n x	Level <sup>4/</sup>
0	.02806	.02599	100,000	2,599	98,311	6,445,177	64.45	.97326 <sup>1/</sup>	23
1 - 4	.00128	.00499	97,401	486	388,321	6,346,866	65.16	.99457 <sup>2/</sup>	22
5 - 9	.00048	.00240	96,915	233	483,992	5,958,545	61.48	.99772	23
10 - 14	.00043	.00215	96,682	208	482,890	5,474,553	56.62	.99645	22
15 - 19	.00099	.00494	96,474	477	481,178	4,991,663	51.74	.99441	22
20 - 24	.00125	.00623	95,997	598	478,490	4,510,485	46.99	.99268	22
25 - 29	.00169	.00842	95,399	803	474,988	4,031,995	42.26	.98976	21
30 - 34	.00243	.01208	94,596	1,143	470,122	3,557,007	37.60	.98476	20
35 - 39	.00372	.01844	93,453	1,723	462,958	3,086,885	33.03	.97594	19
40 - 44	.00604	.02978	91,730	2,732	451,820	2,623,927	28.60	.96138	18
45 - 49	.00976	.04772	88,998	4,247	434,372	2,172,107	24.41	.93844	17
50 - 54	.01578	.07610	84,751	6,450	407,630	1,737,735	20.50	.90997	16
55 - 59	.02211	.10510	78,301	8,229	370,932	1,330,105	16.99	.86356	15
60 - 64	.03734	.17146	70,072	12,015	320,322	959,173	13.69	.80005	14
65 - 69	.05284	.23432	58,057	13,604	256,275	638,851	11.00	.72614	14
70 - 74	.07755	.32549	44,453	14,469	186,092	382,576	8.61	.62129	14
75 - 79	.11950	.45762	29,984	13,721	115,618	196,484	6.55	.41157 <sup>3/</sup>	17
80 - 84	.16239	.56756	16,263	9,230	58,240	80,866	4.97		
85 & over	.31084	1.00000	7,033	7,033	22,626	22,626	3.22		

1/ Survival ratio from birth to age (0 - 4)

2/ Survival ratio from age (0 - 4) to age (5 - 9)

3/ Survival ratio from age 75+ to age 80+

4/ From COALE-DEMEY West Model Life Tables

Table A3 (cont'd) - Abridged Life Table by sex, Island of Mauritius, 1984 - 1986

Female Mauritian Population

A g e	m n x	q n x	l x	d n x	L n x	T x	e x	P n x	Level <sup>4/</sup>
0	.02132	.01989	100,000	1,989	98,707	7,188,205	71.88	.97934 <sup>1/</sup>	22
1 - 4	.00107	.00418	98,011	410	390,962	7,089,498	72.33	.99568 <sup>2/</sup>	22
5 - 9	.00037	.00185	97,601	181	487,552	6,698,536	68.63	.99792	22
10 - 14	.00046	.00230	97,420	224	486,540	6,210,984	63.75	.99643	21
15 - 19	.00097	.00484	97,196	470	484,805	5,724,444	58.90	.99524	21
20 - 24	.00094	.00469	96,726	454	482,495	5,239,639	54.17	.99486	22
25 - 29	.00112	.00559	96,272	538	480,015	4,757,144	49.41	.99347	22
30 - 34	.00150	.00747	95,734	715	476,882	4,277,129	44.68	.99127	22
35 - 39	.00201	.01000	95,019	950	472,720	3,800,247	39.99	.98788	21
40 - 44	.00287	.01426	94,069	1,341	466,992	3,327,527	35.37	.98323	22
45 - 49	.00390	.01933	92,728	1,792	459,160	2,860,535	30.85	.97499	22
50 - 54	.00625	.03080	90,936	2,801	447,678	2,401,375	26.41	.95911	21
55 - 59	.01051	.05130	88,135	4,521	429,372	1,953,697	22.17	.93074	20
60 - 64	.01840	.08820	83,614	7,375	399,632	1,524,325	18.23	.89199	20
65 - 69	.02764	.12974	76,239	9,891	356,468	1,124,693	14.75	.83015	20
70 - 74	.04819	.21594	66,348	14,327	295,922	768,225	11.58	.73863	21
75 - 79	.07578	.31931	52,021	16,611	218,578	472,303	9.08	.53721 <sup>3/</sup>	24
80 - 84	.09962	.39832	35,410	14,105	141,788	253,725	7.17		
85 & over	.19033	1.00000	21,305	21,305	111,937	111,937	5.25		

1/ Survival ratio from birth to age (0 - 4)

2/ Survival ratio from age (0 - 4) to age (5 - 9)

3/ Survival ratio from age 75+ to age 80+

4/ From COALE-DEMEY West Model Life Tables

Table B1 - Number of live births (B) of last year and deaths (D) among them, by district, age of mother and sex of child -  
Island of Mauritius, 1983

Male

Age of mother	District	All districts	Port Louis	Pample- mousses	Rivière du Rempart	Flacq	Grand Port	Savanne	Plaines Wilhems	Moka	Black River
Total	B D	9,903 201	1,301 22	1,002 19	878 16	1,144 28	955 26	589 9	2,914 55	659 16	461 10
15 - 19	B D	964 16	109 1	100 2	95 1	147 3	91 4	76 1	207 1	74 1	65 2
20 - 24	B D	3,422 68	424 9	352 6	323 5	418 8	370 12	202 2	961 16	229 9	143 1
25 - 29	B D	2,914 47	390 4	297 5	258 4	320 8	264 2	146 2	913 16	183 2	143 4
30 - 34	B D	1,173 46	253 4	177 3	138 2	193 8	154 5	104 2	570 18	111 2	73 2
35 - 39	B D	635 16	91 2	60 2	52 3	50 1	59 2	47 1	208 2	46 2	22 1
40 - 44	B D	159 7	26 1	12 1	12 1	15 -	14 1	13 1	43 2	11 -	13 -
45 - 49	B D	28 1	7 1	4 -	- -	1 -	2 -	- -	9 -	3 -	2 -
50 - 54	B D	8 -	1 -	- -	- -	- -	1 -	1 -	3 -	2 -	- -

Table B1 (cont'd) - Number of live births (B) of last year and deaths (D) among them by district, age of mother and sex of child -  
Island of Mauritius, 1983

Female

Age of mother	District	All districts	Port Louis	Pample-mousses	Rivière du Rempart	Flacq	Grand Port	Savanne	Plaines Wilhems	Moka	Black River
Total	B D	9,678 176	1,221 12	1,058 22	813 22	1,159 16	1,007 28	557 13	2,756 42	639 8	468 13
15 - 19	B D	931 23	107 1	113 3	104 3	129 2	119 4	56 3	192 4	61 -	50 3
20 - 24	B D	3,236 51	392 4	354 6	298 8	431 5	357 10	183 3	853 11	229 1	139 3
25 - 29	B D	2,951 40	372 3	319 2	224 4	332 6	280 7	168 1	937 12	190 3	129 2
30 - 34	B D	1,712 39	242 2	181 9	127 5	178 2	157 5	98 3	523 8	103 3	103 2
35 - 39	B D	645 13	80 1	69 1	48 1	69 1	70 -	40 2	194 4	41 1	34 2
40 - 44	B D	156 6	19 -	17 1	8 -	17 -	18 2	8 -	46 2	11 -	12 1
45 - 49	B D	37 3	7 1	4 -	4 1	3 -	4 -	3 -	8 1	3 -	1 -
50 - 54	B D	10 1	2 2	1 -	- -	- -	2 -	1 1	3 -	1 -	- -

Table B1 (cont'd) - Number of live births (B) of last year and deaths (D) among them, by district, age of mother and sex of child -  
Island of Mauritius, 1983

Both sexes

Age of mother	District	All districts	Port Louis	Pample-mousses	Rivière du Rempart	Flacq	Grand Port	Savanne	Plaines Wilhems	Moka	Black River
Total	B D	19,581 377	2,522 34	2,060 41	1,691 38	2,303 44	1,962 54	1,146 22	5,670 97	1,298 24	929 23
15 - 19	B D	1,895 39	216 2	213 5	199 4	276 5	210 8	132 4	399 5	135 1	115 5
20 - 24	B D	6,658 119	816 13	706 12	621 13	849 13	727 22	385 5	1,814 27	458 10	282 4
25 - 29	B D	5,865 87	762 7	616 7	482 8	652 14	544 9	314 3	1,850 28	373 5	272 6
30 - 34	B D	3,485 85	495 6	358 12	265 7	371 10	311 10	202 5	1,093 26	214 5	176 4
35 - 39	B D	1,280 29	171 3	129 3	100 4	119 2	129 2	87 3	402 6	87 3	56 3
40 - 44	B D	315 13	45 1	29 2	20 1	32 -	32 3	21 1	89 4	22 -	25 1
45 - 49	B D	65 4	14 2	8 -	4 1	4 -	6 -	3 -	17 1	6 -	3 -
50 - 54	B D	18 1	3 -	1 -	- -	- -	3 -	2 1	6 -	3 -	- -

Table B2 - No. of live births (B) of last year and deaths (D) among them by level of education and age of mother, Island of Mauritius, 1983

Level of education of mother	Age group (in years)								
	Total	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54
Total									
B	19,581	1,895	6,658	5,865	3,485	1,280	315	65	18
D	377	39	119	87	85	29	13	4	1
No Education and Not stated									
B	2,140	124	416	510	566	365	127	21	11
D	63	3	14	14	19	9	4	0	0
Primary									
B	11,039	1,213	3,758	3,253	1,977	652	141	38	7
D	236	32	71	54	49	17	9	3	1
Secondary									
B	5,110	558	2,455	1,961	851	237	42	6	0
D	75	4	34	18	16	2	0	1	0
Tertiary									
B	292	0	29	141	91	26	5	0	0
D	3	0	0	1	1	1	0	0	0



Table B7 - Ever-married women, by sex and survival status of last child, length of open birth interval and present age of mother, 1983

Last child - Male and alive

Last Birth Interval (Months)	Age-group of mother (years)									Total
	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54		
/ 12	874	3,051	2,601	1,545	551	132	25	11	8,790	
12 - 17	350	1,548	1,506	904	384	90	12	5	4,799	
18 - 23	234	1,469	1,505	978	448	118	22	4	4,778	
24 - 29	143	1,184	1,453	990	422	120	36	5	4,353	
30 - 35	100	907	1,381	1,010	400	175	45	8	4,026	
36 - 41	34	747	1,292	1,012	475	149	45	4	3,758	
42 - 47	31	544	1,142	984	449	186	69	9	3,414	
48 - 53	11	335	896	887	497	200	65	10	2,901	
54 - 59	3	218	821	840	483	218	89	10	2,682	
60 - 71	4	241	1,100	1,410	901	432	185	24	4,297	
72 - 83	-	92	663	1,138	812	439	242	41	3,427	
84 - 95	-	20	412	957	798	457	336	83	3,063	
96 - 119	-	17	376	1,445	1,576	1,161	835	275	5,685	
120 +	3	15	125	1,407	3,864	5,010	6,464	6,162	23,050	
Not Stated	7	24	29	17	8	3	2	-	90	
Total	1,794	10,412	15,302	15,524	12,068	8,890	8,472	6,651	79,113	

Table B3 (cont'd) - Ever-married women by sex and survival status of last child, length of open birth interval and present age of mother, 1983

Last child - Male and dead

Last Birth Interval (Month)	Age-group of mother (years)										Total
	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54			
/ 12	13	61	38	39	16	6	3	-		176	
12 - 17	9	20	28	15	9	7	1	1		90	
18 - 23	1	19	20	20	7	4	2	-		73	
24 - 29	1	19	25	15	15	3	-	-		78	
30 - 35	1	11	16	18	8	6	2	1		63	
36 - 41	1	10	19	18	9	6	2	-		65	
42 - 47	-	5	12	10	13	8	4	1		53	
48 - 53	-	2	12	11	8	9	2	-		44	
54 - 59	-	-	4	9	9	4	4	1		31	
60 - 71	-	1	10	19	22	17	5	2		76	
72 - 83	-	-	10	12	17	15	5	3		62	
84 - 95	-	-	1	7	13	18	9	7		55	
96 - 119	-	-	8	26	33	27	28	16		138	
120 +	-	-	4	34	111	186	268	300		903	
Not Stated	-	-	1	-	-	-	-	-		1	
Total	26	148	208	253	290	316	335	332		1,908	

Table B3 (cont'd) - Ever-married women by sex and survival status of last child, length of open birth interval and present age of mother, 1985

Last child - Female and alive

Last Birth Interval (Months)	Age group of mother (years)										Total
	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 55			
/ 12	832	2,893	2,608	1,493	566	140	32	7	8,571		
12 - 17	348	1,527	1,498	839	412	102	19	9	4,754		
18 - 23	243	1,349	1,421	929	390	121	37	4	4,494		
24 - 29	125	1,155	1,392	962	410	150	38	6	4,238		
30 - 35	88	883	1,328	962	430	154	37	4	3,886		
36 - 41	36	718	1,214	950	466	177	47	10	3,618		
42 - 47	12	513	1,048	967	484	179	70	7	3,280		
48 - 53	4	296	866	833	465	239	65	5	2,773		
54 - 59	3	219	738	811	430	192	76	13	2,482		
60 - 71	1	221	925	1,344	838	432	192	17	3,970		
72 - 83	2	94	591	1,017	793	479	280	32	3,288		
84 - 95	3	35	363	861	758	511	318	64	2,913		
96 - 119	1	7	314	1,332	1,456	1,033	828	290	5,261		
120 +	4	26	109	1,211	3,303	4,556	5,914	5,918	21,041		
Not Stated	6	19	24	9	6	2	1	1	68		
Total	1,708	9,955	14,439	14,520	11,207	8,467	7,954	6,387	74,637		

Table B3 (cont'd) - Ever-married women by sex and survival status of last child, length of open birth interval and present age of mother, 1983

Last child - Female and dead

Last Birth Interval (Months)	Age-group of mother (years)										Total
	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	Total		
/ 12	20	45	38	30	9	5	4	-	151		
12 - 17	7	25	10	24	10	8	-	1	85		
18 - 23	6	25	18	13	11	1	-	2	76		
24 - 29	-	16	18	20	10	4	1	-	69		
30 - 35	1	11	13	11	5	4	1	1	47		
36 - 41	1	8	14	12	4	6	1	-	46		
42 - 47	-	3	10	11	10	6	5	-	45		
48 - 53	2	2	10	12	12	4	2	-	44		
54 - 59	-	-	4	8	10	4	2	-	28		
60 - 71	-	2	9	17	16	10	6	3	63		
72 - 83	-	1	6	15	15	13	7	3	60		
84 - 95	-	-	3	7	8	13	19	1	51		
96 - 119	-	1	6	23	20	21	23	16	110		
120 +	-	1	4	39	78	147	238	281	788		
Not Stated	-	1	-	-	-	-	-	-	1		
Total	37	141	163	242	218	246	309	308	1,664		



Table B5 - Ever-married women by parity, time since last birth and survival status of last child - Island of Mauritius, 1983

Parity	Interval since last birth (in months)															
	Total		/ 12		12 - 17		18 - 35		36 - 71		72 - 119		120 +		Not Stated	
	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead
Total	213,395	3,564	75,080	269	10,942	209	21,757	317	28,743	366	22,503	427	28,631	836	25,739	1,140
Parity 1	30,313	414	5,758	86	3,071	46	7,527	69	6,813	36	2,695	24	4,400	153	49	-
Parity 2	35,454	525	5,193	89	2,823	31	7,522	98	9,275	92	4,990	51	5,620	163	31	1
Parity 3	27,501	520	3,013	54	1,655	34	4,706	86	6,640	85	4,378	70	7,071	190	38	1
Parity 4 and above	120,127	2,105	61,116	40	3,393	98	2,002	64	6,015	153	10,440	282	11,540	330	25,621	1,138

# R E F E R E N C E S =====

1. Behm H. and J. Vallin, Mortality differentials among human groups, Biological and social aspects of mortality and the length of life, S. Preston eds., Ordina editions, Liège, 1982.
2. Callikan S., An overview of nutritional status in Mauritius.
3. Campton P.A., Rising mortality in Hungary, Population studies 39, 1985.
4. Casselli G. and V. Egidi, La géographie de la Mortalité Italienne : différences territoriales et milieu, Genus XXXV nos. 1-2, 1979.
5. Casselli G. and V. Egidi, Nouvelles tendances de la mortalité en Europe, Council of Europe, Strasbourg, 1980.
6. Central Statistical Office, Mauritius, Annual Digest of Statistics (various years).
7. Central Statistical Office, Mauritius, Digest of Agricultural Statistics, 1985.
8. Central Statistical Office, Mauritius, Digest of Demographic Statistics, 1985.
9. Coale A.J. and P. Demeny, Regional Model Life Tables and Stable Populations, Princeton University Press, New Jersey, 1966.
10. Dinkel R.H., The seeming paradox of increasing mortality in a highly industrialised nation : The example of the Soviet Union, Population studies 39, 1985.
11. Dustagheer A.G., A basis for the establishment of a nutrition information system for Mauritius, MSc. Thesis (1982), London School of Hygiene and Tropical Medicine.
12. Dustagheer A.G. and P.C. Wong, Survey on the nutritional status of pre-school children in Mauritius, 1985, MOH/UNICEF Project.
13. Dutton J. Change in Soviet Mortality Patterns, 1959-77, Population and Development Review, Vol. 5 no. 2, June 1979.
14. Food and Agricultural Organisation, Million still go hungry, Rome, 1957.

15. Kuczynski R.R., Demographic survey of the British Colonial - Empire, Volume II, Oxford University Press, 1949
16. Mamet L. and B. Peerun, Mother and child health in Mauritius, Mauritius College of the Air, 1984.
17. Mansoor M. and A.G. Dustagheer, Socio-economic and nutritional implications of rice and flour substitution in Mauritius, University of Mauritius/UNDP/FAO Project, 1983.
18. Ministry of Health and UNICEF, Mauritius Nutrition Survey, 1985.
19. Ministry of Health and WHO, Infant mortality in Mauritius, 1975-1976, (1981).
20. Ministry of Health, Breast-feeding and infant health in Mauritius, 1986.
21. Ministry of Health, Annual report (various years).
22. Ministry of Health, Contraceptive Prevalence Survey, 1985.
23. Ministry of Health, Survey of breast-feeding and infant death, Island of Mauritius, 1985.
24. Ministry of Health, UNICEF and WHO, Report on a joint mission to evaluate primary health care in Mauritius, 1985.
25. Ministry of Economic Planning and Development, 1984-1986, Development Plan, 1985.
26. Ministry of Economic Planning and Development, 1975-80 Five-year plan for Social and Economic Development, 1976.
27. Ministry of Economic Planning and Development, 1980-82 Two-year plan for Economic and Social Development, 1980.
28. Ministry of Economic Planning and Development, University of Mauritius and Mauritius Institute of Education, Recommendations of Workshop on Food Habits, 25 Nov.-10 Dec. 1982.
29. N'Cho Sombo and D. Tabutin, Tendances et causes de la mortalité à Maurice depuis 1940, Département de Démographie, Université Catholique de Louvain, 1983.



30. Preston S., N. Keyfitz and R. Schoen, Causes of death-Life tables for national populations, Seminar Press, New York and London, 1972.
31. Ramnauth V., La drogue : descente aux enfers.
32. Szereday Z., A. manual of health workers, Ministry of Health, Mauritius, 1973.
33. Tietze C. and S. Lewit, Abortion related mortality in the less developed regions, unpublished W.H.O. paper.
34. Vallin J., Facteurs socio-economiques de la mortalité dans les pays développés, in proceedings of the meetings on socio-economic determinants and consequences of mortality, Mexico City, June 1979, UN/WHO, 1980.
35. Vallin J. and J.C. Chesnais, Evolution récente de la mortalité en Europe dans les pays Anglo saxons et en Union Soviétique, 1960-70, Population Vol. 29 Nos 4 - 5, 1974.
36. Von Poppel, Regional differences in mortality in Western and Northern Europe, a review of the situation in the seventies, NIDI working paper no. 13, Voorburg, Netherlands, 1979.
37. Wong P.C. and R. Phillips, A reduction in infantile mortality rate from 162 to 24 (per thousand) in 45 years : The Mauritius Story, UNICEF Mauritius, 1986.
38. Yeearoo M.A., Morbidité et Mortalité infantile à l'Ile Maurice, Thèse pour le Doctorat d'Etat en Médecine, Université de Bordeaux II, 1980.