THE DESIGN OF A SYSTEM FOR THE EVALUATION OF
COMPREHENSIVE PRIMARY HEALTH CARE IN
RURAL SIERRA LEONE

by

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ABSTRACT

The purpose of this thesis is to describe a research design for evaluating the effectiveness of comprehensive primary health care in rural areas of Sierra Leone.

Comprehensive primary health care, which is based on community participation within the framework of a policy of self-reliance and self-development is seen by many as the answer to solving the health problems of developing countries.

In setting the scene for evaluating the effectiveness of comprehensive primary health care in rural Sierra Leone, a description of the background of the country is given, highlighting the major geographical, demographical and socioeconomical features. The state of health in the developing countries as a whole is also reviewed (Chapter 3).

Chapter 4 explores the concept of comprehensive primary health care and reviews the operational aspects in the African context.

In an attempt to establish some basis for the design of an effectiveness evaluation of comprehensive primary health care, the main methodologic issues in the presented setting are explored (Chapter 5).

Having identified the main methodologic issues specific solutions and their justifications are proposed (Chapters 5,8,9).

Finally, a specific protocol of the proposed research design is presented.
ACKNOWLEDGEMENTS

I wish to express my sincere thanks and appreciation to Dr. Dave Sackett for his inspiring instruction and stimulating guidance, to Drs. Larry Chambers and George Lynch for their help and constructive criticism, during the writing of this thesis, to Drs. Andrew Harper, Jack Sibley and other members of the Clinical Epidemiology & Biostatistics Department who helped me in various ways during my stay in Hamilton.

To Wendy Virtue; who so willingly and skillfully typed and organized the manuscript, I am very grateful.
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- SIERRA LEONE IN AFRICA
- DISTRICT BOUNDARIES
  - SIERRA LEONE
- CHIEFDOM BOUNDARIES
  - SIERRA LEONE
LIST OF ABBREVIATIONS

I.D. Number = Identification Number
H.I.S. = Health Information System
S.L. = Sierra Leone
P.H.C. = Primary Health Care
C.P.H.C. = Comprehensive Primary Health Care
E.D.C.U. = Endemic Diseases Control Unit
UNICEF = United Nations International Children's Fund
W.H.O. = World Health Organization
H.C. = Health Centre
CHAPTER 1
INTRODUCTION

1.1 Purpose of this Study

In most countries of Africa, Asia and Latin America — the so-called Third World Countries — the government health services have failed to meet the needs of the rural masses. In these countries less than 15% of the rural population and other underprivileged groups have access to health services and many children, in particular, die of preventable illnesses. This is also true of Sierra Leone.

Today it is broadly agreed that poverty and under-development are at the root of the problem. There is also the expression of intent to pay more attention and devote more resources to rural areas but it is rarely translated into action to the extent, for instance, of rural areas receiving the greater part of increases in health services care budgetary allocations. Currently in vogue also is the concept of "community participation" in health activities or "health by the people" also referred to as Comprehensive Primary Health Care. However, what so far has been put into practice in most countries is insignificant beside the weight of advocacy of the approach.

The comprehensive primary health care approach to rural health services should supposedly overcome the failure of conventional health services to meet the real needs of the rural population, by
being based on consultation with rural communities concerning their needs. The approach also supposedly deals with the fact that traditional health services do not have the resources to reach all the villages and by harnessing the willingness of the villages to do things for themselves this spirit of community participation results in exploiting new resources.

But will this approach really solve the health problems of rural communities? The main purpose of the proposed research is addressed to this question: Is the comprehensive primary health care approach effective in improving the health status of rural communities in Sierra Leone?

There is also a secondary purpose of this study, that of developing a Health Information System (HIS).

If administrators are to evaluate the effectiveness of health services, they should be aware of the health status of the community. This involves the collection and reasonably prompt analysis of morbidity and mortality data (i.e., health data), so that information is available while it remains useful. Health data are essential for epidemiologic and preventive medicine reasons (e.g., warning of epidemics and detection of early changes in health). Health data are also necessary for health-planning: examples of such use of health data are: (a) the frequency of diseases that require separate hospitals or services; (b) the frequency of diseases in different age and sex groups. Some such trends must be predicted over a long and some over a short period; in either case, extrapolation from soundly based historical series
is the most efficient method of prediction. Sierra Leone, like most other developing countries, suffers from a gross deficiency of health information. A section of this study will therefore be devoted to the development of procedures for collecting (and validating) data on observed health parameters, within the framework of comprehensive primary health care.

1.2 Plan of the Study

For presentation purposes, this study has been divided into two parts:

Part I sets the scene, by describing in detail the background of Sierra Leone and state of health in the Third World (developing) countries, in general. Also, in this part, the concepts, operational aspects and issues involved in the evaluation of comprehensive primary health care are detailed.

Part II of the study deals with the development of a health information system for Sierra Leone and finally the specific protocol for the effectiveness evaluation (Design) of comprehensive primary health care.
CHAPTER 2

BACKGROUND

SIERRA LEONE

2.1 Geography

Situated on the west coast of tropical Africa, Sierra Leone covers an area of 28,000 square miles (62,000 km). It is bounded on the North-west and North-east by the Republic of Guinea, on the South-east by Liberia and on the South-west by the Atlantic Ocean (Fig. 1).

Sierra Leone has a tropical climate and there are two distinct seasons; the rainy season which starts in May and runs through October and the dry season which extends from November to April.

According to the 1974 census the population by mid 1975 was estimated at 3 million with about 75% of the people living in the rural areas on a pattern of shifting agriculture (56).

2.1.1 Main Demographic Features:

Table 1 summarizes the main demographic features of Sierra Leone.

2.1.2 Education

In 1971, 26% of the children aged 5-14 years were in primary schools and 13% of the children aged 15-19 years were in secondary schools (4). There are several teacher training colleges and two universities and it is estimated that only
TABLE 1
Main Demographic Features of Sierra Leone
(Source: National Development Plan, Sierra Leone 1974/75 - 78/79)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Population</td>
<td>3,000,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>75% rural and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>mostly illiterate</td>
</tr>
<tr>
<td>2</td>
<td>Life Expectancy</td>
<td>Males, 42 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Females, 45 years</td>
</tr>
<tr>
<td>3</td>
<td>Annual Birth Rate</td>
<td>47/1,000</td>
</tr>
<tr>
<td>4</td>
<td>Annual Crude Death Rate</td>
<td>22/1,000</td>
</tr>
<tr>
<td>5</td>
<td>Infant Mortality Rate</td>
<td>Freetown, 130/1,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rural Areas 150-170/1,000</td>
</tr>
<tr>
<td>6</td>
<td>Number of Doctors</td>
<td>250</td>
</tr>
<tr>
<td>7</td>
<td>Doctor-Patient Ratio</td>
<td>1:12,000</td>
</tr>
<tr>
<td>8</td>
<td>Per Capita Income</td>
<td>U.S. - $180 p.a.</td>
</tr>
<tr>
<td>9</td>
<td>Children Under 5 Years</td>
<td>17% of population</td>
</tr>
</tbody>
</table>
20% of the total population is literate (56).

2.1.3 Administration

Government in Sierra Leone is centralized in Freetown, the capital city. For purposes of local government the country is divided administratively into three provinces, (Northern, Southern and Eastern) and the Western Area where the capital city is located.

The provinces are divided into a total of 12 districts. The provinces are unequal in size, the largest being the Northern Province which covers nearly half of the country and has about 42% of the population. The three provincial headquarters are located in the three largest provincial towns: Bo (Southern Province), Kenema (Eastern) and Makeni (Northern).

The average size of a district in Sierra Leone is approximately 2,300 square miles and an average population of 220,000. The range of sizes and populations of districts is not great, the largest being no more than 3 or 4 times the smallest. Districts in the Northern Province tend to be more extensive than elsewhere, particularly Koinadugu, Bombali and Tonkolili, but this province also has the smallest district, Kambia (see Fig. II).

In general, districts are not indigenous groupings but were created for administrative convenience.

Districts are divided into several chiefdoms which in turn consists of several villages. Most districts are named after main towns which are usually the most accessible centres.
Some villages are extremely remote from their district headquarters, but efforts are being made to create feeder roads in isolated chiefdoms.

2.1.4 The Chiefdoms

The traditional basic unit of local government in Sierra Leone is the Chiefdom with the "Paramount Chief" as the traditional ruler. In earlier times the paramount chief exerted considerable power and authority over his subjects and his rule was largely personal. In recent times, however, the chieftaincy has experienced important modifications by the central government and the power of chiefs has been reduced through the control of some native customs and the fragmentation of some chiefdoms which were considered too large and where there was internal disorder. Today, the paramount chief rules with the assistance of elected councillors and section chiefs. Most paramount chiefs are still elected from ruling families and many are still illiterate.

The chiefdoms vary in size and in general the chiefdoms in the Northern province are larger than elsewhere (see Fig. III). The largest chiefdom in Sierra Leone is Tambaklo in the Bombali district (Northern province) with an area of 970 square miles; the smallest is the Panga Krim, in Pujehun district, Southern province with an area of only 20 square miles. Average population of chiefdoms range over 27,000 in the Port Loko district to under 8,000 in Pujehun and Bonth districts.

Chiefdom headquarters are usually situated in places of some local importance and the largest settlements. Some
paramount chiefs however move the chieftain headquarters to places of their personal choices. It is therefore common to find some chieftain headquarters elsewhere than in the largest settlement.

2.1.5. Health Status & Health Facilities

Malaria, gastrointestinal diseases, pneumonia and respiratory diseases, tuberculosis, schistosomiasis, neonatal tetanus, whooping cough, and measles are serious health problems throughout the country (53).

The government together with voluntary missions and mining companies operate a total of 31 hospitals, 30 health centres, 37 maternal and child health centres and 109 other treatment centres and dispensaries. There is a hospital operated by the government in each provincial and district headquarters and a district may be served by a second hospital built and operated by either a mission (eg. Catholic) or a mining company.

In the National Development Plan 1974-75/1978-79 the Sierra Leone government has stated its intention to provide at least one appropriate health unit to serve the inhabitants of a chieftain on the basis of 1 Health Centre per 10-20,000 and 1 Dispensary or treatment centre to serve 5000-10,000 population.

However, in spite of the concern of government, about 30 Chiefdoms (out of about 145) are still without any medical unit whatsoever. Moreover, even in chiefdoms with medical units, a sizeable proportion of the population is still not served by the units primarily because of the considerable distances people
have to travel to reach the units. In general the medical facilities are unevenly distributed throughout the country, with the great majority being located in large towns. Vast areas of the rural sector comprising about 75% of the population remain either unserved or under-served.

Information on health data is very deficient especially for the rural areas of the country. However, the available data from Freetown and the Western area with its better health facilities and administration indicate that communicable and parasitic diseases and malnutrition present the leading causes of death in children 1-4 years old (53).

Table 2 lists the following diseases as leading causes of morbidity among children in the Western area for 1975/76 (53).

The statistics for 1969-75 shows that 20% of all registered deaths in the Western Area occurred during the first year of life (56). Corresponding figures for U.S.A. and Canada are 2.5 and 1.5% respectively (90).

There are indications that the situation in the other provinces with less health facilities and lower standards of environmental and personal hygiene, is significantly worse than in the Western area.
Table 2

Leading Causes of Mortality Among Children in the Western Area of Sierra Leone, 1975/76

(Source: Ministry of Health, Freetown)

<table>
<thead>
<tr>
<th>Disease</th>
<th>% Mortality</th>
</tr>
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<tbody>
<tr>
<td>1 Measles</td>
<td>21.0</td>
</tr>
<tr>
<td>2 Enteritis and other diarrhoeal diseases</td>
<td>14.0</td>
</tr>
<tr>
<td>3 Avitaminosis and other nutritional deficiency</td>
<td>9.4</td>
</tr>
<tr>
<td>4 Malaria</td>
<td>4.3</td>
</tr>
<tr>
<td>5 Whooping Cough</td>
<td>15.0</td>
</tr>
<tr>
<td>6 Anaemia</td>
<td>9.3</td>
</tr>
<tr>
<td>7 Others</td>
<td>27.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>
CHAPTER 3
THE STATE OF HEALTH IN THE DEVELOPING COUNTRIES:
COMPReHENSIVE PRIMARY HEALTH CARE IN SIERRA LEONE
IN THIS CONTEXT

Sierra Leone belongs to the group of countries referred to as either developing, least developed countries (L.D.C.) or Third World Countries. These countries are not in one developing world, but many countries in different stages of development. The differences are of degree and not of substance. Together they exhibit common factors (indices of under development) which makes it possible to write in terms of common problems and common solutions.

The common factors, with which health care among other social services, has to cope in this context are:
- extremely limited financial resources
- a paucity of trained health manpower at all levels
- a high level of illiteracy
- high fertility, high mortality
- an entrenched and strongly traditional society
- a predominantly rural population subsisting on low levels of farming
- poor communications
- vast distances
- a common epidemiologic pattern of disease consisting of malnutrition, undernutrition and communicable diseases (9, 24, 44).
The disease pattern predominantly affects the young, resulting in high childhood morbidity and mortality. Because of this high child mortality, parents customarily produce several children as a means of ensuring that there would be a surviving child.

Table 3 summarizes some of the most striking differences between the developing and the developed world by major continents. The trend is that the gap between the developing and developed countries is widening.

The rapid increase in the world's population and its effects in defeating the efforts of developing countries to raise their standards of living have been emphasized often enough (80, 81, 86). In some developing countries increasing population has more than cancelled out the increase in the gross domestic product, so that per capita output has actually fallen (9).

The principal causes of morbidity in the developing world are:

- malnutrition
- vectorborne diseases
- gastrointestinal diseases and
- respiratory diseases

These diseases are themselves the result of poverty, squalor and ignorance. To them must be added the diseases of mothers related to deprivation (e.g. lack of adequate nutrition), unregulated fertility, and exhaustion with their effects on the unborn and newborn child. These conditions are linked with social
<table>
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<th>Category</th>
<th>U.S. Income/L. Capita Per Capita</th>
<th>Literacy Rate</th>
<th>Years Expected Life</th>
<th>% Rate of Population Growth</th>
<th>Population 1,000 Birth Rate</th>
<th>Population 1,000 Per 1,000</th>
<th>Years Under 15 Population 1,000</th>
<th>Years Under 5 Population 1,000</th>
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<tr>
<td>World Average</td>
<td>400</td>
<td>50</td>
<td>7.3</td>
<td>3.2</td>
<td>15</td>
<td>2.5</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>North America</td>
<td>450</td>
<td>55</td>
<td>7.5</td>
<td>3.5</td>
<td>16</td>
<td>2.6</td>
<td>6.5</td>
<td>9.5</td>
</tr>
<tr>
<td>Europe</td>
<td>400</td>
<td>50</td>
<td>7.3</td>
<td>3.2</td>
<td>15</td>
<td>2.5</td>
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<td>9</td>
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<td>Developed Asia</td>
<td>320</td>
<td>40</td>
<td>7.0</td>
<td>2.8</td>
<td>14</td>
<td>2.3</td>
<td>5.5</td>
<td>9.0</td>
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<td>Latin America</td>
<td>250</td>
<td>30</td>
<td>6.5</td>
<td>2.2</td>
<td>13</td>
<td>2.0</td>
<td>5.0</td>
<td>8.5</td>
</tr>
</tbody>
</table>

Source: Pendlar (24)

Summary of Vital Statistics in Underdeveloped and Developed Areas (1971)

Table 3
problems such as overwork among women, unemployment among the young, population growth and urbanization; and their solution calls for an integrated effort in which the health services have a major role to play.

There is also ample evidence that at least 60% of the morbidity in rural areas of developing countries is due to communicable diseases, parasitic diseases and malnutrition. These conditions can be prevented by immunization and environmental hygiene or treated by relatively simple means for which highly qualified medical personnel are not required (9,80). In the following discussion it is therefore proposed to treat in some detail, two factors - pattern of diseases and scarcity of manpower - which are common to developing countries. The rationale for this is that these two factors could form the basis from which a more just and equitable health care system could be developed.

3.1 Pattern of Diseases

Tables 4 and 5 show the pattern of disease presenting in health institutions in Jamaica (1962/63) and in Bombali district (S.L.). Although these are based on only partial returns they do reflect the pattern of diseases in developing countries in general.

These disease patterns lead to patterns of health care wants and needs. The "want" or "expected" services of the people of developing countries especially those living in rural areas are for simple cure when sick (especially for children), relief
### TABLE 4

Diagnosis at a Health Centre and Dispensary in Jamaica from 1962-1963

*Source: Fendall*

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Number of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veneral disease</td>
<td>13</td>
</tr>
<tr>
<td>Infectious diseases</td>
<td>12</td>
</tr>
<tr>
<td>Yaws</td>
<td>3</td>
</tr>
<tr>
<td>Gastroenteritis</td>
<td>11</td>
</tr>
<tr>
<td>Dyspepsia and/or constipation</td>
<td>16</td>
</tr>
<tr>
<td>Headache</td>
<td>7</td>
</tr>
<tr>
<td>Upper respiratory infections</td>
<td>84</td>
</tr>
<tr>
<td>Debility</td>
<td>11</td>
</tr>
<tr>
<td>Worms</td>
<td>20</td>
</tr>
<tr>
<td>Tropical ulcer</td>
<td>267</td>
</tr>
<tr>
<td>Lame foot</td>
<td>8</td>
</tr>
<tr>
<td>Wounds and lacerations</td>
<td>92</td>
</tr>
<tr>
<td>Infected wounds</td>
<td>65</td>
</tr>
<tr>
<td>Minor operations</td>
<td>6</td>
</tr>
<tr>
<td>Eczema and dermatitis</td>
<td>23</td>
</tr>
<tr>
<td>Rheumatism</td>
<td>2</td>
</tr>
<tr>
<td>Burns</td>
<td>6</td>
</tr>
<tr>
<td>Malnutrition</td>
<td>4</td>
</tr>
<tr>
<td>Hypertension</td>
<td>7</td>
</tr>
<tr>
<td>Dental disease</td>
<td>11</td>
</tr>
<tr>
<td>Others</td>
<td>128</td>
</tr>
<tr>
<td>Re Attendances</td>
<td>32</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>834</strong></td>
</tr>
</tbody>
</table>

*Note: Sample week equivalent to 2 percent of total patients in 1 year*
TABLE 5
Diagnosis at Health Centres and Dispensaries in the Bombali District of Sierra Leone (1976)

Source: Ministry of Health, Sierra Leone

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>New Cases</th>
<th>%</th>
<th>Old Cases</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory Diseases</td>
<td>10,899</td>
<td>20.9</td>
<td>7,697</td>
<td>15.9</td>
</tr>
<tr>
<td>Malaria</td>
<td>10,826</td>
<td>20.7</td>
<td>18,113</td>
<td>37.5</td>
</tr>
<tr>
<td>Worms</td>
<td>9,939</td>
<td>19.1</td>
<td>1,827</td>
<td>3.8</td>
</tr>
<tr>
<td>Diarrhoea</td>
<td>5,051</td>
<td>9.7</td>
<td>4,621</td>
<td>9.6</td>
</tr>
<tr>
<td>Ulcers</td>
<td>4,017</td>
<td>7.7</td>
<td>6,254</td>
<td>13.0</td>
</tr>
<tr>
<td>Skin Diseases</td>
<td>3,047</td>
<td>5.8</td>
<td>1,777</td>
<td>3.7</td>
</tr>
<tr>
<td>Anemia</td>
<td>2,803</td>
<td>5.4</td>
<td>2,701</td>
<td>5.6</td>
</tr>
<tr>
<td>Rheumatism</td>
<td>2,224</td>
<td>4.3</td>
<td>1,926</td>
<td>2.7</td>
</tr>
<tr>
<td>Dysentery</td>
<td>1,751</td>
<td>3.3</td>
<td>1,648</td>
<td>3.4</td>
</tr>
<tr>
<td>Measles</td>
<td>1,599</td>
<td>3.1</td>
<td>2,297</td>
<td>4.8</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>52,156</strong></td>
<td><strong>100</strong></td>
<td><strong>48,861</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

**NOTE:** % relates to total of all cases seen during the period (1976). Approximate population of the district in 1976 was 200,000.
from pain and assurances and help during maternity. The "need" or "ought to be" services as seen by health administrators and planners are for the major causes of morbidity and mortality, namely: communicable diseases, malnutrition and stabilized fertility trends as illustrated from the presented data (Tables 4 and 5).

The model of medical care (33) involves certain steps (see below):

```
Family        Self Care
-------------
P.H.C.        First Contact Care
-------------
General Specialist  Referral Specialist Care
-------------
Super Specialist    Super Specialist Care
```

The first step when symptoms of disease arise is for some attempt at self-care or cure within a family group. White and his colleagues (78) in the World Health Organization's collaborative study of medical care utilization in the United Kingdom, the United States and five other countries (34) showed that if self-care is encouraged and supported and if there are facilities for obtaining simple and safe self-remedies from pharmacies, more than two-thirds of all symptoms are cared for without seeking professional advice. One-third consulted a physician.

In a developing country with a largely illiterate and unsophisticated people, the types of remedies sought are much simpler. Moreover, there is generally no well-developed pharmacy system with qualified pharmacists available. At most, outside of the main towns there are general retail stores which
sell some proprietary brands of medicine. The health unit (hospital, treatment centre or health centre) consequently must provide drugs to the bulk of the community. Over 90 percent of the demand for drugs could be provided by lay persons with special training working without sophisticated diagnostic and treatment facilities. According to Fendall's study of health care services in Kenya and some other developing countries (24), approximately 5-10 percent of rural community residents require more skilled attention and only a small portion of these need hospitalization.

It is however, necessary to keep in mind a changing pattern of disease in relation to time. This change will be more gradual for some communities than for others depending on, among other things, perhaps primarily, the socio-economic development. One might expect the change to be gradual from first a high incidence and prevalence of parasitosis, gastro-enteritis, respiratory disease, malnutrition, undernutrition; then measles, whooping cough and other bacterial diseases; to then only chronic diseases such as cardiovascular diseases, diabetes and cancer.

The summary table (6) shows the great differences in levels of childhood mortality that exist between the developed and less developed regions of the world. The estimates of child mortality in tropical Africa is over forty times as great as some of the rates registered in the low mortality countries. In the developing countries it is mostly small, often island populations
TABLE 6
Child Mortality Rates


<table>
<thead>
<tr>
<th>Region</th>
<th>Child Mortality Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern Europe</td>
<td>0.7</td>
</tr>
<tr>
<td>Southern Europe</td>
<td>1.0</td>
</tr>
<tr>
<td>Eastern Europe</td>
<td>1.1</td>
</tr>
<tr>
<td>Western Europe</td>
<td>0.8</td>
</tr>
<tr>
<td>North America</td>
<td>0.8</td>
</tr>
<tr>
<td>Australia and New Zealand</td>
<td>0.9</td>
</tr>
<tr>
<td>Japan</td>
<td>1.0</td>
</tr>
<tr>
<td>North Africa</td>
<td>26</td>
</tr>
<tr>
<td>Tropical Africa</td>
<td>40</td>
</tr>
<tr>
<td>Middle America</td>
<td>9</td>
</tr>
<tr>
<td>Caribbean</td>
<td>7</td>
</tr>
<tr>
<td>Tropical South America</td>
<td>10</td>
</tr>
<tr>
<td>Temperate South America</td>
<td>4</td>
</tr>
<tr>
<td>East Asia</td>
<td>7</td>
</tr>
<tr>
<td>Eastern South Asia</td>
<td>18</td>
</tr>
<tr>
<td>Middle South Asia</td>
<td>25</td>
</tr>
<tr>
<td>Western South Asia</td>
<td>22</td>
</tr>
</tbody>
</table>
(eg. Mauritius and the Caribbean) which have succeeded in reducing childhood mortality to moderately low levels.

Although there is little information on how child mortality varies according to socioeconomic factors, most studies however, suggest that mortality at ages 1 to under 5 is higher in rural areas than in urban areas (90).

Mortality statistics are available for less than a third of the world population. But while for the developed countries, around 75% of all deaths are so covered, mortality information is available for only 13% of the population of less developed countries and those are often complicated by varying definitions. However, for countries with available information (these countries are comparatively more developed) the following Table 7 shows the three most important causes of death (90).

However, the common respiratory and gastroenteric diseases, malnutrition and other common communicable diseases will persist for as long as families continue to live in unsanitary and unhygienic domestic environments with poor housing, bad sanitation and unsafe water supplies. Expressed in another way, the socio-economic trend in the developing countries point to the present state of affairs being maintained or even getting worse unless a radical change by some means is brought about.

3.2 Health Manpower

One of the major obstacles to the development of health services in rural areas has been the absence of clear thinking about the kind of health personnel required to provide the
Table 7

Three Most Important Causes of Death in Children 1-5 Years Old


<table>
<thead>
<tr>
<th></th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developing Countries</td>
<td>Influenza/ and pneumonia</td>
<td>Gastritis and enteritis</td>
<td>Accidents</td>
</tr>
<tr>
<td>Developed Countries</td>
<td>Accidents</td>
<td>Influenza and pneumonia</td>
<td>Congenital Malformation</td>
</tr>
</tbody>
</table>
necessary services at the rural level.

Tables 8 and 9 show the number of health personnel in a few developed and developing countries and in Sierra Leone respectively.

It could be seen that there is a great scarcity of trained health professionals at all levels in the developing countries. In the industrialized countries of Austria, Sweden and Canada for example, the doctor-population ratio is 1:479, 1:619 and 1:584 respectively. The corresponding ratios for the developing countries of Burundi, Nigeria and Burma are 1:45,432, 1:14,814 and 1:5,629 respectively. This considerable disparity is not only evident for physicians but also for midwives, nurses, pharmacies and other professional health personnel. Furthermore, when one takes a closer look at the number of health professional manpower in the developing countries, it is to be seen that there is not only a scarcity of health personnel but that there is also considerable maldistribution. Outside of the capital cities and other main cities and towns there are to be found very few health personnel who work in either public, mission or voluntary services (Table 10). Consequently it is not uncommon to find sectors of population of from 50,000 to 500,000 served by one physician. Complicating this unsatisfactory situation is the high population growth rate in the developing countries. The increase in the number of physicians and other health personnel normally lags behind that of the population growth. In Latin America, for example, it is estimated that the physician to population ratio increased by 0.8
<table>
<thead>
<tr>
<th>Country</th>
<th>Population 000</th>
<th>Physicians</th>
<th>Medical Assistants</th>
<th>Dentists</th>
<th>Pharmacists</th>
<th>Midwives</th>
<th>Nurses</th>
<th>Ratio Phys:Pop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burundi</td>
<td>3,680</td>
<td>81</td>
<td>—</td>
<td>6</td>
<td>11</td>
<td>38</td>
<td>224</td>
<td>1:45432</td>
</tr>
<tr>
<td>C.A.E.</td>
<td>2,600</td>
<td>96</td>
<td>27</td>
<td>3</td>
<td>14</td>
<td>56</td>
<td>293</td>
<td>1:27083</td>
</tr>
<tr>
<td>Congo</td>
<td>1,350</td>
<td>213</td>
<td>58</td>
<td>—</td>
<td>—</td>
<td>25</td>
<td>152</td>
<td>1:6338</td>
</tr>
<tr>
<td>Liberia</td>
<td>1,710</td>
<td>170</td>
<td>76</td>
<td>19</td>
<td>25</td>
<td>299</td>
<td>415</td>
<td>1:10058</td>
</tr>
<tr>
<td>Nigeria</td>
<td>62,930</td>
<td>4,248</td>
<td>—</td>
<td>168</td>
<td>1,482</td>
<td>18,965</td>
<td>17,904</td>
<td>1:14814</td>
</tr>
<tr>
<td>Haiti</td>
<td>4,580</td>
<td>394</td>
<td>—</td>
<td>41</td>
<td>10</td>
<td>20</td>
<td>413</td>
<td>1:11624</td>
</tr>
<tr>
<td>Nigeria</td>
<td>2,160</td>
<td>1,357</td>
<td>—</td>
<td>350</td>
<td>481</td>
<td>—</td>
<td>108</td>
<td>1:1592</td>
</tr>
<tr>
<td>Venezuela</td>
<td>11,990</td>
<td>13,608</td>
<td>—</td>
<td>3,497</td>
<td>—</td>
<td>—</td>
<td>9,733</td>
<td>1:881</td>
</tr>
<tr>
<td>Ecuador</td>
<td>6,730</td>
<td>3,199</td>
<td>—</td>
<td>579</td>
<td>146</td>
<td>166</td>
<td>766</td>
<td>1:2165</td>
</tr>
<tr>
<td>Burma</td>
<td>31,240</td>
<td>5,550</td>
<td>1,061</td>
<td>596</td>
<td>68</td>
<td>804</td>
<td>4,816</td>
<td>1:5629</td>
</tr>
<tr>
<td>Austria</td>
<td>7,520</td>
<td>15,702</td>
<td>—</td>
<td>1,464</td>
<td>2,892</td>
<td>1,148</td>
<td>18,198</td>
<td>1:479</td>
</tr>
<tr>
<td>Sweden</td>
<td>8,200</td>
<td>13,260</td>
<td>—</td>
<td>7,180</td>
<td>2,900</td>
<td>620</td>
<td>47,800</td>
<td>1:619</td>
</tr>
<tr>
<td>Canada</td>
<td>22,830</td>
<td>39,104</td>
<td>—</td>
<td>8,922</td>
<td>—</td>
<td>132,000</td>
<td>—</td>
<td>1:584</td>
</tr>
</tbody>
</table>

C.A.E. = Central Africa Empire
<table>
<thead>
<tr>
<th>No.</th>
<th>Districts</th>
<th>Doctors</th>
<th>Dentists</th>
<th>Dispensers</th>
<th>Sanitarian</th>
<th>EDCU Assistant</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Western area (including Freetown)</td>
<td>95</td>
<td>6</td>
<td>54</td>
<td>23</td>
<td>9</td>
</tr>
<tr>
<td>2</td>
<td>Bo</td>
<td>10</td>
<td>1</td>
<td>12</td>
<td></td>
<td>132</td>
</tr>
<tr>
<td>3</td>
<td>Bonthe</td>
<td>1</td>
<td>-</td>
<td>5</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>Moyamba</td>
<td>15**</td>
<td>-</td>
<td>11</td>
<td>19</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Pujehun</td>
<td>2</td>
<td>-</td>
<td>5</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>6</td>
<td>Kailahun</td>
<td>1</td>
<td>-</td>
<td>8</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>7</td>
<td>Kenema</td>
<td>6</td>
<td>1</td>
<td>8</td>
<td>18</td>
<td>15</td>
</tr>
<tr>
<td>8</td>
<td>Kono</td>
<td>2</td>
<td>-</td>
<td>6</td>
<td></td>
<td>19</td>
</tr>
<tr>
<td>9</td>
<td>Bombali</td>
<td>4</td>
<td>1</td>
<td>6</td>
<td></td>
<td>19</td>
</tr>
<tr>
<td>10</td>
<td>Kambia</td>
<td>1</td>
<td>-</td>
<td>5</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>11</td>
<td>Koinadugu</td>
<td>2</td>
<td>-</td>
<td>6</td>
<td>18</td>
<td>9</td>
</tr>
<tr>
<td>12</td>
<td>Port Loko</td>
<td>3</td>
<td>-</td>
<td>6</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>13</td>
<td>Tonkolili</td>
<td>5***</td>
<td>1</td>
<td>10</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>**</td>
<td>TOTAL SIERRA LEONE</td>
<td>147</td>
<td>10</td>
<td>142</td>
<td>78</td>
<td>224</td>
</tr>
</tbody>
</table>

* Number of nurses, midwives and auxiliary nurses (midwives were not readily available)
** Includes 11 Chinese physicians
*** Includes 3 Russian physicians
TABLE 10

Distribution of Physicians in Some Developing Countries in 1964

Source: Fendall, 1972

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Jamaica</td>
<td>70</td>
<td>26</td>
<td>30</td>
<td>74</td>
</tr>
<tr>
<td>Guatemala</td>
<td>82</td>
<td>15</td>
<td>18</td>
<td>85</td>
</tr>
<tr>
<td>Senegal</td>
<td>63</td>
<td>15</td>
<td>37</td>
<td>85</td>
</tr>
<tr>
<td>Thailand</td>
<td>60</td>
<td>8</td>
<td>40</td>
<td>92</td>
</tr>
<tr>
<td>Kenya</td>
<td>54</td>
<td>5</td>
<td>46</td>
<td>95</td>
</tr>
</tbody>
</table>
physician per 10,000 of population over a ten year period. For the developing countries in general, it is also estimated that one physician graduates for every 3600 babies born.

Another factor which affects the manpower in developing countries is that of migration. A significant proportion of physicians on the completion of their basic medical and postgraduate studies could not find sufficient inducement for them to remain in their home countries and work in smaller towns. These doctors could not be provided with a work and social environment they have come to adopt during their studies away from their home countries. In developing countries, the work loads in ambulatory care are such that the traditional style of so-called "quality of care" is impossible. Buildings are inadequate and diagnostic support deficient. Hospitals are usually overcrowded with bed occupancy rates several times the optimum.

Health professionals therefore confronted with the above situations are forced to migrate to the more developed countries with better facilities and considerably higher salaries.

It should be evident at this stage that as long as the described situation exists, scarcity of manpower and materials, populations in developing countries in general and rural populations in particular, will be deprived of medical and health care.

The main need today is to develop systems through which effective health care can be made both accessible and acceptable to the people.
Despite great efforts by governments and international organizations like W.H.O. and UNICEF, the basic health needs of vast numbers of people in the developing countries remain unsatisfied.

In the past, in order to meet the major health needs of the underprivileged who make up the vast majority of the population, the developing countries have hitherto, in the main, adopted strategies modelled on that of the industrialized countries. These strategies have failed to meet the health needs of the people. The tendency has been to create relatively sophisticated health services staffed by highly qualified personnel, in the hope of expanding them progressively as resources increased until the entire population was covered. The outcome has, of course, been quite different. The services have become centred largely on cities and main towns, are predominantly curative in nature, and are accessible mainly to a small and privileged section which make up not more than 10-15% of the population (5,9,44).

History and experience would seem to show, therefore, that conventional health services organized along "Western" or centralized lines, are unlikely to expand to meet the basic health needs of all of the people in the developing countries, given the present social and economic factors.

It would therefore appear that the time has come for Third World Countries to take a fresh look at priority health problems and alternative approaches to their solutions.
The basic concept it would seem is to achieve total health care coverage, to distinguish between major and minor illnesses and establish a referral process. Scarce professionals must be reserved for major illnesses and consultation and advisory roles and new professional health workers must be introduced in large numbers to provide simple but adequate health care at the rural level. Above all, an understanding of the fundamental social processes operating at the grass roots level is highly relevant for the development of a health strategy. As Hendratta (37) pointed out, at the grass roots level "Health is a matrix of an inextricably interwoven set of dimensions embracing every aspect of the day-to-day life of the community".

3.3 **Comprehensive Primary Health Care and Development**

In "The Future of Academic Community Medicine in Developing Countries" (37), Lukas Hendratta, illustrated the interrelationship between the various manifestations of poverty: ill health, malnutrition, unemployment, illiteracy and low productivity. The nature is such that one factor influences all others in both positive and negative synergistic effects. This he described as the poverty spiral. Development which can be seen as an upward spiral movement of all of the elements could be achieved if all of the elements generate a certain momentum of speed. Failure in one or more elements in generating the movement will result in slowing down of the total movement and without enough speed there will only be circular movement on a certain plane. Further deterioration, Hendratta explained will
only cause the circular movement to come to a complete stop and will eventually set in motion a downward spiral movement in the reverse directions.

The implication of Hendratta's explanation on the development of health programs should be clear. The distinction between health and socio-economic development is no longer tenable. Socio-economic factors are the driving force behind total development but only when people have an acceptable level of health can they enjoy the benefits of life. The healthier people are, the more likely they are to be able to contribute to social and economic development, and such development in turn provides the additional resource and social energy that can facilitate health development. In other words, health development is essential for socio-economic development and the means of attaining them are intimately linked.
CHAPTER 4

COMPREHENSIVE PRIMARY HEALTH CARE

4.1 Concept

In the previous chapter, attention has been drawn to the poor distribution of health services and the unsatisfactory coverage of the population in the developing countries. Communicable and parasitic diseases and malnutrition continue to exact a heavy toll on human lives, particularly among infants and children. Large sections of the populations in these countries have either no access or very limited access to any form of health service. Usually in rural areas, where 70-80% of the people live, when health services are available they often work in isolation and other welfare, factors such as education, agriculture, social organization, community motivation and participation, and communications are often neglected. As a result, the health status of the people has not seen much improvement.

Today, there is a new dynamism evident in the planning of health care for developing countries. In many developing countries, this new dynamism is taking place under various names such as Comprehensive Primary Health Care, Primary Health Care or Basic Health Care. Whatever name is used, the concept implies a practical approach to making essential health care universally accessible to individuals and families in the community in an acceptable and affordable way and with their full participation (79,80). Comprehensive
Primary Health Care seeks to meet the total health needs of the community and not simply the care of individual patients.

In this presentation, the terms Comprehensive Primary Health Care, Primary Health Care and Basic Health Care will be used interchangeably.

Universally, it has come to be recognized by health professionals and other experts that health status is influenced not only by the provision of health service but also by numerous other factors of which poverty and underdevelopment are at the root of the problem.

The following are the 10 general principles adopted for Primary Health Care approach in the Africa Region of the World Health Organization (AFRO) (80):

1. to meet the real health needs of the community
2. to form an integral part of the national health system
3. to be integrated into the other sectors of community development (agriculture, education, public works, housing, communications)
4. to result from continuous interchange between populations and providers of services
5. to be delivered at the most peripheral level of health services by the workers best trained for it
6. to rely primarily on local resources
7. to consist in an integrated complex of prevention health promotion, curative medicine and rehabilitation services
8. to result from a firm national resolve and decision
9. to adopt an original approach in each country since
   it is not advisable to adopt a standard model for
   all, or to act in a uniform way in every case.
10. to cooperate with the traditional system and make
    positive efforts to ensure integration and/or
    collaboration.

Primary Health Care can be delivered by community health
workers who will be trained so as to equip them with the skills
they require. The skills of the community workers will vary from
country to country depending on the duties they perform. Whatever
their level of skill, it is essential that they understand the real
health needs of the communities they serve and that they gain the
confidence of the people. Preferably they should be chosen by the
communities themselves and should also reside in them.

Primary Health Care has to be an integral part of the
national health system and the support of other levels of health
system is necessary to ensure that people enjoy the benefits of
valid and useful technical knowledge that is too complex or costly
to apply routinely through primary health care. Moreover, community
health workers must be able to rely on more skilled people for
guidance and training, that is to say, there should be an effective
referral system and consultative services.

4.2 Coordination with Other Sections

As indicated earlier, health cannot be attained by the
health sector alone. In developing countries in particular, economic
development, anti-poverty measures, food production, water, sanitation, housing, environmental protection and education all contribute to health and the general human development. Comprehensive primary health care, as an integral part of the health system and of overall socio-economic development will of necessity therefore rest on proper coordination at all levels between the health and other sectors concerned.

4.3 Political and Financial Implications

Political commitment by governments is a cornerstone to the success of primary health care. It requires a firm commitment and the re-orientation of ideas and of national health development strategies. In general, this would imply the transfer of a greater share of health and health-related resources to the underserved majority of the population.

4.4 Operational Aspects of Comprehensive Primary Health Care

The primary health care approach of providing an acceptable level of health accessible to all the people would seem to be a major contributing factor to their social and economic development.

An effective primary health care program should contribute to general development by improving the health status of the people and also by stimulating action and organization in other areas of the general development process. A few examples of the interrelationship could be cited, for instance:

- the control of communicable diseases, eg, schistosomiasis onchocerciasis, could open up new areas to settlement and economic development.
- proper and adequate nutrition could lead to the reduction of sickness and increase productivity.

- reduction in infant mortality could eventually lead to reduction in family size because the continued existence and health of the first two or three children provide families with the security they need.

The above examples illustrate the considerable potential of effective comprehensive primary health care. In addition, by drawing on untapped human and other local community resources, comprehensive primary health care can contribute to the awakening of the social interest that is so important for mobilizing community effort for development.

Primary health care as already mentioned should be an integral part of the national health system which is subdivided into various levels. P.H.C. constitute the first level of contact between the individuals and the health system. P.H.C. components should therefore be made up of components from the health and other sections whose interrelated actions contribute to health.

Although the services provided by primary health care will vary according to the country and the community it should include at least (80):

- promotion of proper nutrition and an adequate supply of safe water
- basic sanitation
- maternal and child care, including family planning
- immunisation against the major infectious disease
- prevention and control of locally endemic diseases
- health education
- appropriate curative care for common diseases and injuries

List of P.H.C. activities are provided in Appendix 1.

Primary health care activities should be supported at the other levels of the health system through a process of referral.

Primary health care is seen as the hub of the health system around which are arranged the other levels of the national health system whose actions converge on primary health care in order to support it and to permit it to provide essential health care on a continuing basis. It is the national health system operating at the peripheral level (i.e. first contact care). Immediately above the primary health care level is the intermediate level which handles more complex problems and provides logistics and consultative support and training for primary health care workers. At the top or central level, highly specialized care is provided. The central level also provides planning and managerial expertise, specialist staff and logistic and financial support.

In a joint report by WHO and UNICEF (79) (the rest of this section leans heavily on this report) on the First International Conference on Primary Health Care held in Alma-Ata, U.S.S.R. in 1978, the way in which the national health system is organized to
develop, operate and support primary health care was outlined and is summarized below:

4.5 Planning

Planning for primary health care has to be carried out in communities as well as at the other levels. Health ministries, as well as other national health agencies that may be involved in the planning of health care need to make planning a function of the highest level of decision-making. This is essential to ensure the appropriate delegation of responsibility and authority, the preferential allocation of resources to primary health care and its supporting services, and the proper location of supporting services so that they are accessible to the communities they are to serve. The report states further, that since the planning of primary health care involves political, social and economic factors, multidisciplinary planning teams are needed, especially at the central level, including among others, people with a knowledge of economics, political science and other social sciences. An important aim of central planning is to enable communities to plan their own P.H.C. activities and to provide any essential information that is not available in the community.

The importance is stressed of the participation of those responsible for implementing programs in the planning process, where possible.

4.6 Organization of Primary Health Care in a Community

During the planning process of comprehensive primary health care, full account has to be taken of the technologies to be used,
the resources to be employed, the support needed at other levels and the way to organize these into a coherent system. It will also be necessary to reach agreement on responsibilities — for example, to decide who carries ultimate responsibility for the program and whether the same individual, or committee as the case may be, is also responsible for its detailed planning and management. Ways to ensure coordination with other sectors will have to be considered.

In order to ensure community participation the whole community should participate in determining priorities, and the methods and techniques to be employed. These have to be acceptable both to those who use them and to those on whom they are used. There should be defined work norms (manuals, standardized drug regimens, etc.).

4.7 Coverage and Accessibility

Primary health care aims at providing the whole population with essential health care. For primary health care to be accessible to all a good support system — both administrative and technical, eg. supplies, transport, staff with regular inservice training and supervision is essential. The accessibility of primary health care has to be measured not only by its use at the community level but also by the degree to which more complex problems can be solved, and people requiring more complex care treated, at the other levels of the health system.

4.8 Information

In order to plan and manage primary health care the right kind of information is essential, but the collection of information has to be kept to the minimum required. There should be an efficient
system of record keeping which provides accurate information on morbidity and mortality, coverage and achievement, which is used by staff and supervisors as a guide to decision making and which facilitates high quality and continuity of patient care.

4.9 Community Health Workers

Community health workers are now regarded as the main force in the area of basic health development strategy. The type of health worker will vary by country and community according to needs and the sources available for satisfying them. These workers are local community people who have received some basic training from health professionals to enable them to perform as "frontline" health workers. In most areas they are referred to as village health workers (V.H.W.). The village health worker could be a unpaid volunteer or could be paid a nominal fee.

Traditional medical practitioners and birth attendants found in most societies could become important allies in organizing efforts to improve the health of the community. It would be worth while selecting and training some of these traditional medical practitioners and engaging them in primary health care as they usually command great respect and could exert considerable influence on local health practices.

4.10 Evaluation

In order to find out whether primary health care is functioning properly a process of evaluation has to be built in.

At the local level it would be important to know the extent and use of the facilities, for example. At the regional
level, performance should be evaluated. Mortality and morbidity rates should be used to reorientate health action and determine retraining methods. At the national or central level, a system of evaluation should be set up to identify repercussions of comprehensive primary health care on overall functioning of health services.
CHAPTER 5

ISSUES IN EVALUATION OF C.P.H.C. IN THIS SETTING

At this stage the evaluation of C.P.H.C. presents several problems.

5.1 Multiplicity of Different Forces

The first problem involves the multiplicity of different forces in the community influencing the health and behaviour of its members, especially since most of them lie outside the health system. C.P.H.C. is an integrated effort of the agriculture, public works, education, communications as well as the health sector. Health, however, it is defined and measured, is therefore the outcome of complex interactions in the biological and social network of which health care systems and their programs are themselves a part.

5.2 Suitability of Health Indicators

Because of this comprehensive and complex nature of C.P.H.C. another problem in the evaluation is that of finding suitable and practical indices of accomplishment, or outcome. Most attempts in the evaluation of health care programs have been in terms of effort and process rather than accomplishment (19,35,66). As a result these evaluation attempts have come to rely "upon unsubstantiated health professional opinion as the major tool and criterion" (Sackett, 66).
This approach is thus based upon little "hard" facts but set of value judgements with considerable room for differences of opinion. Indices wherever possible, should therefore be observable and objective. A review of the medical literature shows that a good many of the "norms" in diagnostic and treatment procedures which have been set up by professional "experts" have been found to be either useless or in fact harmful to their recipients. The voice of the health professionals has long been the dominant force in deciding what was necessary and right for the community. Unfortunately these criteria became generally accepted by "providers" of community health and the result was that many health programs were implemented, and remained in effect for decades without any benefit to the community.

In response to the new dynamism evident in health care for developing countries (see Chapter I), typified by the expression "health by the people", the first approach towards evaluation would seem to seek methods of determining the effectiveness of the programs in meeting the defined needs of the community. The classical method is of course, to compare mortality and morbidity statistics. These, however, become increasingly less useful as the health standard of the community increases (54). Outcome measures, more comprehensive, will therefore be developed (see Chapter 8) for use in addition to morbidity and mortality indices in the evaluation of CPHC.
5.3 Deficiency in Health Data

In order to demonstrate improvement in health status by reduction in disease burdens, etc. it is essential to have health data generated over time. For Sierra Leone and almost all developing countries baseline health data are either non-existent or very deficient. Adequate records would need to be maintained in order to monitor the accomplishments of CPHC programs. To facilitate this, a Health Information System (HIS) will be designed in this thesis (Chapter 9).

Sierra Leone, like most of the developing countries, suffers from a deficiency in health information. The numerous factors which account for defective data could be categorized in two groups:

1. Factors outside the notification and data collecting system. These factors are those which depend upon the social and economic conditions of the country and for which prospect of improvement lies in general socioeconomic development and are outside the health information system itself; for example, general education, overall shortage of trained manpower.
2. Factors inherent in the notification and data collecting system. These factors are susceptible to improvement by administrative action within the health service; for example.

(a) the qualification of the person collecting and handling the data. In some countries health professionals (eg. doctor, nurse) are sometimes charged with the responsibility for the collection and reporting of health data. Often non-health workers (eg. school teachers, priest, village leaders, policeman) are responsible for the collection and reporting of health data. This latter situation understandably can create considerable variation in the quality and quantity of the data.

(b) Classification

Usually considerable differences in the classification of diseases exist because the instruments used for data collection and reporting are not standardized. Often the forms are too complex for lay persons to understand and fill out accurately.

(c) Attitude of Personnel

Often health data are not collected and reported because those responsible fail to see the need for this.

In the final analysis, the reason for the society's development of health services is to meet both individual and community needs for health care. In order to accomplish this
function therefore there should be an in-built mechanism to collect and process the relevant data. Such a health information system designed to guide a health service should therefore operate from the grass roots level to the central level with regular feedback taking place at all levels of the health establishment.

Below is a schematic representation of the present health information system in Sierra Leone. A brief description of the present structure and functioning of this HIS, it is hoped would demonstrate some of the deficiencies in the health information system.

**Births and Deaths Notification**

Native Administration Clerk (chiefdom clerk) sends information to

District Registrar (at district headquarters)

Senior Registrar (at provincial headquarters)

Chief Registrar (Ministry of Health, Med. Stat. Unit)

**Notification of Infectious Diseases**

Peripheral Health Units & Hospitals

Medical Officer of Health (District)

General Practitioners & Others

Ministry of Health (Medical Statistics Unit)

In the Sierra Leone HIS, presented in the above schema, the Native Administration clerk (N.A. clerk) is as a rule employed by the chiefdom and is therefore only answerable to the chiefdom
authority and not to the central government. He is required to
send his data (births & deaths) quarterly to the District Registrar,
(DR) at the district headquarters, whose responsibility it is to
compile data from all chiefdoms in the district and forward these
to the Senior District Registrar (SDR) at the provincial head-
quartes, also at 3-monthly intervals. The duty of the SDR is to
summarize data from all districts in his province and then forward
these to the Chief Registrar (CR) at the Ministry of Health in
Freetown. Returns from all SDR's should be forwarded to the
CR at least 1 week before the end of year, December 31.

Because of the non-central government status of the NA
clerk who undoubtedly, is the key figure in the HIS chain, this
person as a rule, feels that he owes no allegiance to government
and government officials and in general chiefdom administration
is extremely weak or disinterested to ensure that the N.A. clerk
performs this duty of data collecting. Consequently, health data
collecting and reporting by the NA is very irregular and incomplete.

Under a Public Health Ordinance (1960) there are 26 disease
notifiable by law in Sierra Leone (see Appendix 3). Some of these
diseases (eg. small pox, plague) have since become either eradicated
or very rare indeed. One or two other diseases have since 1960
(eg. lassa fever) become major public health concern and are thus
notifiable although they have never been added to the list of
notifiable disease since no efficient mechanism exists for updating
the list.

Notification of infectious diseases is the responsibility
of all public health inspectors, hospital and rural health unit
staff, environmental health workers, like the chiefdom health
overseer and private medical practitioners. In practice, however,
only a few officials comply with the notification law. Of those
who do comply their reports are often incomplete and inaccurate.
Various reasons are cited for this, among which are lack of
incentives, postal charges for sending in returns and lack of
appreciation of the need for notification. A view commonly
expressed even by doctors is that they can see no virtue in
notification merely for the purposes of compiling statistics.

Transportation and communication, that is, the lack of
these, present another major problem in data reporting. Diseases,
requiring quarantine, such as small pox, yellow fever plague,
cholera and epidemics must be reported by the fastest possible
means of communication available. In large towns and cities this
can be done by either telephone or by telegram. In the rural
areas, however, there is usually considerable time lapse between
the outbreak of a disease and the time the report gets to the
responsible health authorities.

As a result of the problems mentioned above, the situation
in Sierra Leone, described earlier is one in which there is
considerable deficiency in whatever health data is available.
This situation is, however, not unique for Sierra Leone as more
or less of the same situation is to be found in most of the
developing countries.

Bearing in mind, therefore, the key role the peripheral
health worker could play in a HIS, CPHC would seem to offer an ideal opportunity for the development of a simple but practical HIS with manageable costs.

5.4 Evaluation Design

The methodologic issues raised in the design of a system for the evaluation of comprehensive primary health care have been illustrated above. In summary these are:

(1) Need for appropriate indices and
(2) Need for health data

To these should be added the study design itself.

A randomized control trial would be the favoured approach to study the effectiveness of health programs since it would control for most variables, both known and unknown. The main benefit of a randomized control trial is, however, only assured when a large number of experimental units are available for allocation into experimental and control groups.

In the case of a new health care program, however, the number of experimental units is usually small since the programs are usually tried out in only a few geographic areas with also a few control areas to be used.

Specifically, because of limited resources constraints, the C.P.H.C. programs are to be tried out in one area in Sierra Leone with one or two other areas to be used as controls. With this small number of experimental units, therefore, there would be very little benefit in using a randomized allocation. For this reason another design architecture - a before-after comparison...
will be considered (see Chapter 6).
CHAPTER 6
THE STUDY DESIGN BASED ON THE
PRESENT SETTING

6.1 Reasons not to Randomize

The ideal or classical design for the evaluation would be a randomized control trial (RCT). The benefits of an RCT are, however, only fully realized in instances where the numbers of experimental units are fairly large to permit the allocation into experimental and control groups. In the present study, however, available resources dictate that the new health program can be introduced in only one geographic area (MAPAKI Chiefdom) and it is anticipated that we can study only two other areas as controls. Because of this small number of experimental units available, RCT is therefore considered inappropriate as the study design.

Other reasons why a randomized control trial is not feasible or desirable are:

(a) Unacceptability to Authorities
Because of various reasons (e.g. political pressure) to have the program in some areas before other, authorities might not permit a random assignment.

(b) Non-feasibility
Scarce financial and manpower resources in the country could allow implementation of the program in only
one area at a time.

(c) Ethics

Since the distribution of scarce resources should normally be done on the basis of need and merit it is therefore considered unethical to identify areas or groups of people who desperately need care and yet do nothing for them.

Although random assignment is not perfect it does take care of many threats to internal validity of an experiment. Campbell and Stanley (10) list 8 major threats to internal validity. These are: history, maturation, testing, instrumentation, statistical regression, selection, experimental mortality and selection-maturation interactions. For a detailed discussion see Campbell and Stanley.

6.2 Proposed Design

Before-versus-After Comparison with Non-Equivalent Control Groups

When a randomized control trial is not feasible as a result of one or more of the reasons given earlier, the before versus after design with some refinements (see below) offers probably the most useful alternative. Unlike the RCT, however, which rules out most of the threats to internal validity, the potential threats to the internal validity have to be separately taken care of.

6.3 Before vs. After Design Constraints

With this proposed design the main threats to internal
validity that will be discussed are selection-maturation, instrumentation and (local) history.

(a) Selection-maturation

This occurs when the study subjects in one group are growing more mature with time than study subjects of other groups. If, for example, the study subjects of the experimental group had a higher educational standard or enjoyed a more developed agricultural standard, differences in improved health status may be due to differences in intellectual maturation and nutritional standards, rather than to health care. The experimental group may be using their initially higher educational and nutritional background to gain new knowledge at a faster rate than the control.

(b) Instrumentation

Study subjects must be tested using identical standardized instruments. Results from similar but not identical tests must be interpreted with caution. It is also important that identical instruments are applied at the same time; if testing times are different, not only could maturation effects be present the management of tested material could also change.

(c) Local History

Extrinsic local events other than the intervention (eg. CPHC) may affect the experimental group but not
the control group or vice versa. For example, if some individuals or groups of persons in the control areas decide to implement some community program, eg. irrigation canals, this could positively influence the health status of the people in the area. Again, a disaster like an earthquake or an epidemic in one group and not in the other will affect the study subjects in the affected area and hence the measurements. Those events which are beyond the control of the researcher should be documented and accounted for in interpreting the final results.

6.4 Controlling for Selection-Maturation, Instrumentation and Local History

To improve the before-versus-after design, non-equivalent control groups will be used. The control groups like the experimental groups will also consist of naturally assembled subjects which have similar characteristics (eg. socio-economic level, ethnicity, population size and structure) but yet not so similar that the pre-test (before) measurements could be dispensed with.

All events taking place in both the experimental and control areas will be closely monitored and events which might affect the health status of the study subjects in one direction or the other will be documented and where possible controlled.

For measurement, identical instruments will be used in testing both the experimental and control subjects. The same set of observers will be used and tests will be carried out
in experimental and control areas at the same time period. These refinements to the basic before-versus-after design will control for the main effects of selection-maturation, instrumentation and local history and thereby considerably improve the strength of the study design.
CHAPTER

MANOEUVRE OF C.P.H.C. IN SIERRA LEONE

The objective of C.P.H.C. is in accordance with the country's National Development Plan 1974/75 - 1978/79 which broadly speaking is to raise the level of health of all the people by providing a network of sound health facilities capable of reducing diseases, protecting life, increasing productivity and ultimately promoting well being in the shortest possible time. Within the framework of the above stated objectives, the Ministry of Health has assigned a high priority to the implementation of C.P.H.C. approach which is to provide integrated health services at the peripheral level. The use of the term "peripheral level" in this context includes both the village level and all remote areas where health services are not delivered on a regular basis or where the accessibility of the services does not permit the population to make proper use of them.

7.1 Strategy

The main strategy for the delivery of primary health care will be an integrated approach involving:

- **The Ministry of Health** which will be responsible for the training and overall supervision of the primary health care program. Drugs and other simple materials required for patients care will also be provided by the Ministry of Health.
7.2 Other Sectors of Government

Ministries of Agriculture, Public Works, Education, Social Welfare, etc. will be coordinated in such a way that they are geared towards an overall improvement in the health and socio-economic welfare of the community. To facilitate this coordination regular meetings will be held between representatives of all the sectors involved in the community C.H.C. activities. Programs will be drawn up, presented and discussed at such meetings and if approved it will be the responsibility of the community to see that such programs are implemented.

The agricultural sector efforts will be directed towards the production and consumption of more food by the community. The ministry of works will participate and encourage the construction of feeder roads which will not only connect the farmer to the market but also make it easier for people to reach villages, bringing new ideas together with supplies needed for health and other sectors.

Projects to provide plentiful supplies of potable water (such as the digging of wells) and basic sanitation measures, such as latrines and waste disposal will also be undertaken and encouraged by the ministries of works and education.

7.3 Voluntary Agencies

Voluntary agencies such as religious missions and international organizations e.g. CARE, UNICEF, that are already working in the area will be made to coordinate their activities with those of the government ministries so as to avoid unnecessary duplication and waste of scarce resources.
7.4 **The Community**

Since the concept of C.P.H.C. is based on community participation (see Chapter 2) it is essential that the community demonstrate social awareness and the desire for self-reliance. Community participation can be described as the process by which individuals and families assume responsibility for their own health and welfare and for those of the community, and develop the capacity to contribute to their own as well as the community's development. This enables them to become agents of their own development instead of passive beneficiaries of development aid.

Three components of community participation are indicated below:

(a) **Decision Making:** The community leaders of a village committee bear the full responsibility and representatives of various government ministries will participate, and interpret the government's general policy to these decision-makers. Usually this dialogue takes place at the village meeting place.

(b) **Implementation:** The regional health team has a major part to play in bridging the gap between the wishes of the community, available resources and the country's health policy. However, decision for action will be made by the community itself. Activities such as tracing of immunization and tuberculosis and leprosy patient defaulters will be carried out by the village health committee.
(c) **Integration:** This will be done at sub-committee level and through discussions in plenary meetings.

### 7.5 Activities

For each group of activities emphasis will be placed on promotion, prevention and early diagnosis in order to avoid costly treatment and rehabilitation methods. According to plans prepared by the Ministry of Health (61) the following group of activities will be carried out.

(a) **Curative Health Care:** Treatment of common endemic diseases such as malaria, leprosy. Treatment of common symptoms in the community such as fever, diarrhea, cough and common cold, carrying out of simple procedures such as wound dressing.

For the above procedures there are standardized drugs and methods which will be followed by those responsible.

(b) **Preventive Health Care:** Immunization against the common childhood disease, tetanus, whooping cough, poliomyelitis, dipheria, tuberculosis. Conducting ante-natal clinic and home deliveries. Case detection of tuberculosis and leprosy. Environmental sanitation. Notification of epidemics.

(c) **Promotive Health Care:** Undertaking health education activities. Conducting family planning and nutrition counselling. Detailed activities are to be found in Appendix 1.
7.6 **Staffing**

The peripheral unit is either a sub-chiefdom or a single village depending on the population, size and accessibility factors. When a number of villages in a given chiefdom section are easily accessible and of moderate area and population, this chiefdom section could for practical purposes constitute a C.P.H.C. unit. On the other hand a very large village both in area and population could alone constitute a peripheral C.P.H.C. unit.

Local persons with at least six years of primary school education will be selected by the community and trained to perform the tasks listed in 7.5 above. At present the local health worker also referred to as village health worker (V.H.W.), performs service on voluntary basis.

The following VHWs will provide services for the community:

(a) A male V.H.W. to perform curative health care 7.5(a) above. This V.H.W. who will be given the appropriate training before he takes up his duties will be provided regularly with drugs and other supplies required for his duties.

(b) A female V.H.W. is responsible for material and child health duties. This V.H.W. has also been given the appropriate training for her work.

Both V.H.W.s carry out preventive as well as health care promotions activities in addition to their specific duties. Specifically, environmental sanitation duties, tuberculosis and leprosy case finding and notification of epidemics are the
responsibilities of the male V.H.W. while family and nutrition
counselling are done by the female V.H.W. in addition to general
maternal and child health duties.

These V.H.W.s will be immediately supported in the performance
of their duties by the staff of the Health Centre which is
(normally) located at the Chiefdom headquarters. Cases beyond the
skills of the V.H.W.s are referred to the health centre staffed by
a Dispenser (or medical assistant) a Midwife and a Public
Health Inspector. The staff at the H.C. possess higher educational
background and their professional training are of much higher
levels. Cases beyond the competence of the H.C. staff are
referred to the next level, the district hospital. Above the
level of the district hospital is the provincial hospital.

As already mentioned, a standard list of drugs and
equipment has been prepared and supplied (see Appendix 2) and
in addition a note book has been provided so that V.H.W.s will keep
records of all drugs and supplies they receive and distribute to
patients. Similarly, V.H.W. will keep patient records on a day-to-day
basis and makes regular reports of vital events, such as births and
deaths to the dispenser at the health centre.

7.7 Facilities

The type of facilities at the disposal of the PHC staff
will vary from one community to another. In some communities
a brick or mud house will be built for the V.H.W.s, in some
communities part of a public building eg, the court barrie or
school will be used as the health post and still in some others,
the VHWC has set aside a room in his home for use as the dispensary.

7.8 **Supervision**

Supervision of primary health care staff is at present done by the district and health centre staff. With the extension of PHC to more areas however, greater responsibility for supervision will have to be transferred to the health centre staff.
CHAPTER 8

THE DEVELOPMENT AND JUSTIFICATION OF OUTCOME MEASURES

8.1 Outcome Measures

Having isolated all the relevant factors of CPHC, attention will now be directed to indicators that would help the study to state whether CPHC "does work" (useful) in areas where it is implemented. To do this a set of health status indicators against which CPHC areas will be compared against controls will be developed.

Health status refers in general to the level of healthfulness of a population but this is a concept which cannot be measured directly. The alternative usually adopted is to take certain parameters of ill health which can be measured and use them to describe the health status of the population.

The parameters chosen to indicate the health status of a population relate to:

(a) The need for health services, resources and standards; put in another way, the general socio-economic development of the population is a major determinant of health parameters (e.g. indicators such as infant mortality and communicable diseases prevalence rates would reflect on the socio-economic level of a country.
(b) Administrative level at which the health parameters are required. If health parameters are required for planning at the local village level the information values are different from those that are required if planning is done at the national level.

(c) Specificity of purpose. The appropriateness and relevance of health parameters depend on whether the information is required for e.g. assessing service needs, deployment of resources or assessing the effectiveness of a health program.

For this study attention will be focused on those outcomes that are considered relevant and appropriate to the assessment of the effectiveness of CPHC in rural Sierra Leone.

8.2 Problems with Health Status Indicators

Apart from purposes listed above, other problems faced with health status indicators are validity, reliability, data sources, and cost.

(a) **Validity:** The validity of a measurement means that what is actually being measured is what is purportedly being measured for example, an instrument developed for measuring blood sugar levels must actually measure blood sugar.

(b) **Reliability:** of a measurement is concerned with the precision of the measuring instrument, that is, does the instrument consistently give the same reading when measuring the same phenomenon? For an instrument
to be reliable it is essential that extraneous factors which influence the measurement be eliminated or controlled.

(c) Data Sources: This is a major constraint in developing health status indicators especially in developing countries, where as already pointed out in Chapter I, health statistics are either non existent or very deficient. For this reason, it has been decided to develop a data collecting system within the frame-work of C.P.H.C. in Sierra Leone (see Chapter 9).

For the proposed study, a special health survey will however be carried out.

(d) Cost: This is always a major constraint. For this reason, the proposed HIS will be relying greatly on local manpower and resources already in place. The special health survey team will be kept to a minimal size.

8.3 Proposed Health Status Indicators

Mortality and morbidity have long since been the traditional measures of health. In the highly industrialized countries like the United States the value of mortality and morbidity as health status indicators has declined because of a change in the pattern of health. In Sierra Leone and the developing countries, mortality and morbidity statistics are still sensitive as health status indicators because of the continuing high (mainly) infectious disease burden resulting in
high annual incidences, mortality and morbidity rates.

While mortality is well defined and unambiguous, morbidity is conceptually and pragmatically more difficult to use as a health status indicator. The difficulty centres on definition and classification. The main question concerning morbidity is that of agreeing on when a person is sick. There is evidently need for agreement on the definition on morbidity and morbidity levels. To facilitate this agreement it will be necessary to incorporate in the health information system and other data system standardized techniques and measurement scales. Standardized techniques and measurements would help in minimizing both the observer and instrument variation.

The following outcome measures in Table 11 are proposed to be used in the study.

8.3.1 Malaria Parasite Rate

The malaria parasite rate is the rate of those persons in whose blood malaria parasites are found on examination related to the total number of persons examined. It gives the endemic index of malaria. Since the parasite rate depends on the amount of blood examined, the standard technique is to examine a thick blood smear for 5 minutes or a thin blood film for at least 15 minutes.

Although the parasite rate can be determined for any population, age and sex group, the parasite rate among infants less than 1 year old has come into much increased use especially in areas where control programmes are in operation. The main
<table>
<thead>
<tr>
<th>Health Problem</th>
<th>Health Programme</th>
<th>Indicator</th>
<th>Population Group</th>
<th>Measurement Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Malaria</td>
<td>Spraying with insecticides, Treatment of symptomatic cases, prophylaxis with chloroquin</td>
<td>1. Malaria parasite rate 2. Malaria spleen rate</td>
<td>1. Male and female infant under 1 year old. 2. Young boys and girls 2-9 years old</td>
<td>Malaria survey teams</td>
</tr>
<tr>
<td>2. Tuberculosis</td>
<td>Tuberculosis control programme: case-finding and treatment</td>
<td>Tuberculosis prevalence rate</td>
<td>Young males and females 10-14 years old</td>
<td>Endemic Diseases Control Unit</td>
</tr>
<tr>
<td>3. Leprosy</td>
<td>Leprosy control programme: case-finding and treatment</td>
<td>Active leprosy cases (rate) under treatment</td>
<td>Total population</td>
<td>Endemic Diseases Control Unit</td>
</tr>
<tr>
<td>4. Infant Mortality</td>
<td>Maternal &amp; Child Health services Comprehensive Primary Health Care</td>
<td>Infant Mortality Rate</td>
<td>Male and female infants 1 day to 1 year old</td>
<td>Village Health Worker</td>
</tr>
<tr>
<td>5. Helminthic Infections</td>
<td>Construction of wells, latrines, disposal of sewage</td>
<td>Stool egg counts</td>
<td>Young males and females 2-14 years old</td>
<td>Special health survey teams</td>
</tr>
<tr>
<td>6. Protein Calorie Malnutrition</td>
<td>Improved agriculture Nutrition education</td>
<td>1. Weight-for height index 2. Height-for age index</td>
<td>Young male and female children aged 1-5 years</td>
<td>Special health survey teams</td>
</tr>
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TABLE 11
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<th>Health Problem</th>
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<th>Indicator</th>
<th>Population Group</th>
<th>Measurement Group</th>
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</thead>
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<tr>
<td>7. Major Communicable Diseases</td>
<td>Specific Immunizations</td>
<td>Immunization coverage against measles,</td>
<td>Infants and young children 1 day-2 years</td>
<td>Village Health Worker</td>
</tr>
<tr>
<td></td>
<td></td>
<td>tetanus, polio, pertussis, tuberculosis</td>
<td>old</td>
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reason for this is that the infant parasite rate is much more sensitive to changes in the amount of malaria transmission than is the rate among older children which may persist at some value long after transmission has ended. The rate among infants increases and decreases in a much more sensitive manner.

The rate in infants should be zero when control is very effective. During the early stage of a programme appraisal, the infant rate can be used to give an approximate idea of the innoculation rate (64,91.).

8.3.2 Malaria Spleen Rate

Hypertrophy and hyperplasia of the spleen are characteristics of malaria (64) and immune factors have the least effect on the spleen size during the years 2–9 (91). In malaria spleen surveys this age group is therefore separated in the analysis. Spleen rate in malaria surveys is thus restricted to the 2–9 year age group of children.

In a malario metric survey carried out in the experimental chiefdom of Mapaki and in some other areas of the country in 1979 (51) the following results were obtained.

Average infant parasite rate 77%
Average spleen rate (2–9 years) 64%

These results reveal that malaria is holoendemic in the rural areas of Sierra Leone. An effective programme will be expected to bring about a significant decrease in both the infant parasite and spleen rates within a reasonable short period of time.
8.3.3 Tuberculosis Prevalence Rate

Since the introduction of effective chemotherapy, mortality data have very little value as an index of the magnitude of the tuberculosis problem. However, a high prevalence rate is an indication of an inadequate control programme. Estimates based on hospital and other sources indicate that the prevalence of active tuberculosis in children 10–14 years old in Sierra Leone, is in the order of 2%.

Currently the two epidemiological indices most relevant to measurement of tuberculosis problem in the community and to a control programme strategy are:

(a) the prevalence of tuberculosis patients excreting bacilli demonstrable by direct smear examination in such patients are mainly responsible for transmission of infection and disease in the community (69).

(b) the age-specific prevalence of tuberculosis infection as demonstrated by tuberculosis testing (71, 89).

A comprehensive prevalence survey based on smear positive sputum should give reliable information on the magnitude of the pool of infectious sources in the community.

8.3.4 Active Leprosy Cases Under Treatment

A national leprosy survey conducted in Sierra Leone in 1977 (53) revealed a prevalence rate of active leprosy of 6/1000. Based on a population of approximately 3 million, this would mean that there are 18,000 active leprosy cases in the country. The report also revealed that over 50% of the estimated leprosy cases
were not under treatment. Because of the long duration of the disease, there is usually great difficulty in keeping all patients under treatment and surveillance for many years. The long duration of the disease, especially lepromatous cases, the frequency and persistence of disabilities, the high cost of reconstructive surgery and the age-old prejudice against the disease give leprosy a unique position among diseases. In human and social consequences, perhaps, no other disease causes so much distress and unhappiness to patients and their families. Although the situation is gradually changing, prejudice still persists to a degree that is not found with any other disease.

In its third technical report on leprosy, the W.H.O. (87) proposed that in order to obtain a significant reduction in the incidence of leprosy, a control programme should treat regularly 75% of the estimated lepromatous and borderline cases.

In C.P.H.C. the objective of the leprosy control programme is directed towards seeking out and maintaining under control all leprosy cases in the community. With the full cooperation and participation of community leaders, the prejudices against leprosy will continue to disappear.

8.3.5 Infant Mortality Rate

The infant mortality rate has long been regarded as one of the more sensitive indicators of general socio-economic level of a nation (26,54). The most important evidence linking rates of infant mortality with low socio-economic level has been derived from observations of long-term trends. These trends have shown
that the infant mortality rate is inversely related to socio-economic levels (8). A strong inverse relationship between economic development and mortality rates has been found in countries emerging from non-industrialized status: as these countries progress to a mechanized agricultural and other industrialized economy which result in higher standards of living, remarkable decreases in the infant mortality rates are observed (72). The infant mortality rate could therefore be regarded as a valid indicator of the general socioeconomic status of a country.

Numerous studies have also documented that the level of health is positively related to socio-economic status and infant mortality — higher socio-economic level is associated with a higher health status and lower infant mortality rates (69, 72, 83).

The infant mortality rate therefore reflects the health status and general socio-economic level especially of developing countries.

CPHC activities are geared towards an overall improvement of the socio-economic level of rural communities. This improvement of living standard of the people should therefore reflect on the infant mortality rate. Infant mortality accounts for 28% of all registered deaths in rural Sierra Leone (56).

8.3.6 Stool Egg Counts

Helminthic infection prevalence in general, reflect the environmental and basic sanitation levels of communities. In rural communities of Sierra Leone infections with intestinal teamiasis, schistosomiasis, roundworms and hookworms constitute
a major area of morbidity in young children. Grounds are too commonly polluted with faeces containing ova of these common worms and because the people, especially children, work and play in these environments, infection rates with these parasites are usually high. In addition, water sources are easily contaminated by excretion and other wastes due to lack of adequate sewage disposal methods. The estimated prevalence of helminthic infections in rural Sierra Leone is about 50% of young children (53).

Provision and satisfactory utilization of basic sanitary needs such as good water supply (eg. protected wells), latrines and adequate refuse disposal system have been seen to be effective in significantly reducing the incidence and prevalence rates of helminthic infections (70).

8.3.7. **Protein Calorie Malnutrition (PCM)**

Anthropometric indices will be used to identify the extent of malnutrition in young children. Protein calorie malnutrition or undernutrition is a nutritional condition which results from a deficiency in protein and/or calories utilized by the body. Children with PCM have a low weight or height for their age and thus anthropometric measurements can be used to indicate the presence and severity of undernutrition. Anthropometry is proposed because it is quantifiable, objective and rapid and is a relatively simple method of nutritional assessment when compared with other methods, such as biochemical and clinical (47, 48, 70).

It is proposed to use two indices:

(a) **Weight-for-Height**: Weight is the body mass, whereas
height measures the body skeleton's length. During an acute period of nutritional deficiency, there is a reduction of muscles and fat. This results in weight reduction, but height is not affected. The relationship between weight and height therefore alters so that weight-for-height ratio is reduced. After a recovery period when weight is restored, the weight-for-height ratio returns to "normal" (75,76). This index is independent of precise age so it is particularly useful when exact ages are difficult to determine (43). A child weighing less than 80% of the reference weight-for-height (see later) will be classed as being acutely undernourished.

(b) Height-for-Age: As a result of frequent episodes or a prolonged period of undernutrition, the height of a child will fail to increase in the normal way. Short stature can be the end result which may be considered an indication of chronic PCM (43). The height-for-age index compares the height of the child with that expected for a normal or reference child of the same age. This index, unlike weight-for-height, requires a precise estimate of age, particularly for very young children. A child measuring less than 90% of his expected height-for-age will be classified as suffering from chronic undernutrition or chronic PCM. Thus the proportion of short children in a population gives
an estimate of the prevalence of chronic undernutrition. The highest prevalence occurs with a long time deficit of food, often combined with persistent or recurrent ill health (43).

Reference Values for Anthropometric Indices

An optimal weight or height is represented by the median values in a population where there is little or no PCM. Unlike adults, young children with different ethnic origins but similar socio-economic backgrounds have similar body measures (28).

For a reference group children from an industrialized country (e.g., U.K.) or an "elite" African group will be used in the proposed study (42,70).

A nutrition survey conducted in Sierra Leone in 1978 (70) recorded the prevalence of undernutrition in 1-5 year old children as follows: chronic undernutrition - 24% and acute undernutrition - 30%.

Undernutrition in young children have been shown to be related to poor maternal nutrition and unsatisfactory pattern of breast feeding (75). In addition after 6 months of age the child becomes exposed to a more adverse environment which includes poor sanitation, with subsequent diarrheal conditions, other infections, and a more inadequate diet (75,91).

Comprehensive programmes in nutrition education, environmental health, agriculture and child health care could significantly bring about a reduction in the prevalence of PCM.
8.3.8 Immunization Coverage Against Major Childhood Diseases

Communicable diseases contribute a major share of morbidity and mortality especially in rural areas of Sierra Leone. Together, measles, neonatal tetanus, and whooping cough alone account for over half of all mortality in children 1 day to 5 years old (53). These diseases are therefore preventable and thousands of young children need not die of these diseases every year.

An effective programme on immunization with vaccination against measles, tetanus, whooping cough, tuberculosis, diptheria and polio as carried out by the VHWs and the MOH services would significantly reduce the incidence of these common communicable diseases (22). Assessment of the immunization programme would be made on the basis of proportion of eligible young children in the population vaccinated against the major communicable diseases.
CHAPTER 9

DEVELOPMENT OF HEALTH INFORMATION SYSTEM

The objective of this chapter is to develop procedures for collecting and validating data on observed health parameters within the framework of comprehensive primary health care.

9.1 Objective of Health Information System

The purpose of collecting health information is twofold:

1. for epidemiology and prevention; to alert the health authorities to the emergence of a health problem - for example, an increase in the number of cases of an infectious disease may indicate the start of an epidemic.

2. to facilitate the management of primary health care (planning, operating and evaluation).

The development of the proposed health information system would provide systems of continual reporting (e.g., notification of certain diseases and statistics from peripheral health units).

9.2 Limitations of Continual Reporting

Although such systems of continual reporting constitute the main source of morbidity statistics in most countries, however, the limitation to their usefulness is that they are related less to morbidity than to the use of medical care, since they cover only morbidity in patients who seek medical care from reporting
agencies (85). As a result, the interpretation of such statistics may be difficult, since the probability that a person will seek medical care depends on many factors apart from the severity of his illness (29).

9.3 The Site and Population

Paki Masabong Chiefdom has been chosen as the pilot area for the CPHC implementation. This chiefdom is one of twelve comprising the Bombali district of the Northern Province.

The chiefdom headquarters is Mapaki Town with a population of about 800 and is located seven miles from the Makeni-Magburaka highway. It is 18 miles from Makeni (headquarter, Bombali district) and 11 miles from Magburaka (headquarters Tonkolioli district). Paki Masabong chiefdom is divided into six sections (subchiefdom) with each section having a section chief.

The main occupation is subsistence rice farming although other crops, like palm kernels, groundnuts, and potatoes are produced on a small scale. The chiefdom has a total population of about 11,000 mostly illiterate living in an area of about 80 square miles. There are a total of about 1200 households in 84 localities (villages). There is a chiefdom committee consisting of the paramount chief and section chiefs. This committee under the chairmanship of the paramount chief meets regularly to discuss problems relating to the general welfare of the chiefdom, including health matters. In each of the six sections of the chiefdom health committee has been set up to plan and manage the health activities of the sections. This committee comprises the section
chief, one or two male village health workers and one or two female
village health workers, together with 2 or 3 other prominent people
in the community. All members of the health community are elected
by the people of the community.

Below is a summary of the present CPHC organization and
activities in the chiefdom.

1. Agriculture

The chiefdom is one of the 10 chiefdoms included
in an Integrated Agriculture Development Project of the Northern
Province. Located in the Chiefdom are the following:

(a) An agriculture farm demonstrator, who has been
organizing nursery of palm trees, organes and other
fruits and vegetables.

(b) A field assistant from the Agricultural Development
Bank who is responsible for awarding loans to farmers.

2. Public Works

This Ministry together with voluntary agencies like
CARE are undertaking the construction of feeder roads and the
digging of wells and latrines.

3. Social Welfare and Education

At present there are three primary schools with a
total of about 350 pupils enrolled in the chiefdom. A community
development officer works closely with the Ministry of Education
and other ministries to motivate social development activities in
the chiefdom.
4. **Health**

A health centre has been built at Mapaki Town, the chiefdom headquarters and with its staff of 1 dispenser, 1 MCH Aide and Health Inspector provide medical care and supervision for the chiefdom.

In each section, health care services are provided by a male and female V.H.W.

The district staff of the Ministry of Health is responsible for overall supervision of the C.P.H.C. activities of the chiefdom.

9.4. **Manoeuvre**

9.4.1 **Data to be Collected**

For evaluative purposes data in the following categories will be collected by means of standardized forms (see Appendix 5):

1. Births and still births
2. Deaths
3. Infectious Disease notification
4. Encounter or contact for the purpose of receiving information according to:
   (a) Descriptive and demographic data of patient
   (b) Type of encounter or contact
   (c) Location of encounter or contact
   (d) Who was contacted
   (e) Presenting complaints, symptoms and signs
   (f) Actions taken by provider of service

5. **Immunizations**
9.4.2 Data Collection Procedures

Data will be collected by V.H.W.s using specially designed forms which will be supplied with instruction manuals for completion.

9.4.3 Data Collecting System - Design

Considering the health and general social and economic conditions of Sierra Leone already fully presented in Chapter 1, it is proposed to design a health information system that is simple, practical and with manageable costs for rural areas. Such a design will take into consideration the following three factors.

1. Health Services Structure

The development of the H.I.S. will be carried out within the framework of C.P.H.C. The C.P.H.C. operational aspects and manoeuvre have been described in Chapters 1 and 7, respectively.

It is essential in CPHC that the key fundamental factors of motivation and community participation be fully exploited if desired benefits are to be experienced. Community participation is however not always easy to mobilize within an overall development, though people generally are known to cooperate extensively for single short term projects such as farming.

With the political support, however and a sound framework whereby the community is given the opportunity to state its needs and priorities and to participate in both the planning and implementation of programmes, community motivation and participation have been known to function excellently.

2. Lack of Finance
Any health information system carries an appreciable financial burden and most developing countries could in the light of present economic situations hardly afford large financial outlay in a H.I.S. It is therefore essential that a health data collecting and processing system devised for Sierra Leone apart from being practical and simple, carry a relatively low financial burden. In CPHC most of the cost involved (i.e. financial renumeration for personnel) will be borne by the community itself. The HIS developed in this setting therefore would utilize local resources and thus result in considerable savings to the government.

3. Trained Manpower Shortage

Manpower is crucial in any HIS and no matter how a HIS is planned, it is certainly faced with a long process of development. Continuous evaluations will have to be carried out and corrective steps will also have to be taken along the system. Success of the system will depend upon the skill and dedication of the people selected and trained for the task of data collection.

Lack of trained manpower in developing countries is a major constraint and it strongly re-inforces the choice of the use of non-professional health workers, an area until lately largely untapped in developing countries.

4.4 Lay-Reporting of Health Information

The shortage and maldistribution of health professionals in the developing countries have already been pointed out in preceding chapters; in most developing countries, therefore, health care for rural communities is provided by lay or paramedical
personnel. In C.P.H.C. the contribution of this category of health workers will be considerably increased; in fact lay or paramedical workers constitute the key elements in C.P.H.C. and their activities will be based on elementary medical training. The use of these category of workers in providing the health information needed to indicate the health problems of the people they serve, as well as for administrative and research purposes is referred to as lay-reporting (81).

In the design of a HIS for Sierra Leone which follows, it is proposed to make extensive use of lay-reporting by utilizing VHWS who will be providing health care to rural communities.

To be competent in performing the task of data collecting and reporting the following criteria are proposed for VHWW, or those responsible for lay reporting.

1. Must have the ability to read and write easily.
2. Must show sufficient maturity to accomplish the assigned task.
3. Must be accepted and preferably selected by the community they serve.
4. Must have sufficient practical experience (including clinical training) in health services to recognize and identify and treat symptoms and diseases from the list of endemic and other common diseases given in the categories used for recording and reporting (see Appendix 41).
5. Must be resident in the community.
9.4.5 The Health Information System

In designing the HIS for rural Sierra Leone the following procedures will be taken:

1. Identification of minimal output required from the system

A set of short data forms will be developed to provide information in the categories listed under (Data to be collected).

Please see Appendix 5. Efforts will be made to keep the number of forms small and simple to handle.

2. Identification of the individual

The unit upon which the reporting system will be based is the individual and each individual within the system will be given an identification number on first contact with the system — for generation of I.D. number see under record linkage —.

The individual's I.D. number is to be retained by the patient and used on all subsequent utilization of health facilities. A method whereby the VHW will ascertain whether an individual has been previously assigned a number will be applied — see also under record linkage.

Apart from the individual I.D. number, a household I.D. number will be assigned to every housing unit in the community. Thus, apart from the individual I.D. number, a person will also be identified by a housing unit number. As an illustration, in 102/025, 102 represents the individual I.D. number and 025 is the housing unit number. For this purpose, a housing unit means, either a single dwelling standing separately or two or more
house, which are attached to form a separate block of dwellings.

It is considered more practical to assign numbers to households rather than to families because in a village in Sierra Leone, it is commonly the case for all the inhabitants to claim family relationship. This "extended family" relationship so often creates considerable problems in the field setting. Whenever possible however, parents of children will be recorded on birth records of the children.

3. The Medical Record

The medical record or encounter form provides the means for collecting and recording information concerned with the management of the individual patient. Since the medical record is the main reporting link between the individual and person concerned with his health management, it is envisaged that the medical record would form the basis, eventually for meaningful quality of care evaluation of the rural health system.

4. Record Linkage

A major use of a system of linked records is to provide summaries of the morbidity experience of individuals from time to time. The dominant purpose of record linkage however is that of integration: that is, to put together items of data about individuals, families and communities. The need for record linkage becomes more urgent as the span of disease lengthens and specialization and population movement grow. Record linkage would also facilitate the attainment of accurate knowledge of the whereabouts of patients with various needs.
In the local setting, if an individual has cause to seek medical care outside his own community, he will be given a copy of his medical records to take with him and this is to be returned to his community. A master file bearing all descriptive and demographic data of each individual will be kept in the district headquarters. This record is to be updated whenever additional information is received.

9.4.6 Generation of I.D. Number

As a rule, people in villages do not frequently move from one village to the other. Whenever movement takes place this is from a village to a large town. The population in most villages of Sierra Leone is however very stable with very little movement occurring in either direction.

Acheson (1) lists 5 characteristics which an identifying information should have in ideal circumstances. These characteristics are:

1. The identifying characteristic should be unique to the person concerned so as to distinguish him from all other individuals in the community.

2. It should be permanent, i.e. either derived from attributes present at birth and remaining unchanged throughout life, or in the case of a given number, be allocated at birth and remain constant throughout life. Permanence also implies freedom from changes due to error, so far as this is humanly possible.
3. It should be **universal**; that is, the same system should exist for the entire population and not applicable to only a section of the population, for example, a numbering system based only on those in possession of driving licenses.

4. It should be **available**. It must be present on each of any pair of records to be linked and known to the patient.

5. It should be **economical**, i.e., it should consist of no more characters of information than necessary. For example, in a population of say 500, a serial number of three digits (001-500) will discriminate between any two persons provided characteristics 2, 3, & 4 above are satisfied.

It is pointed out however that no known system has been devised which satisfies the above characteristics to perfection.

The allocation of I.D. numbers in Sierra Leone will be guided by the above characteristics put forward by Acheson (1,2).

The choice of I.D. numbers over names and other characteristics is governed by the following reasons:

1. In a largely illiterate population to obtain information could at times be difficult.

2. Some names are very common in certain areas and it is easily possible for as much as about 80 percent of the people in a community to share 2 or 3 common names. This would render identification
according to names extremely difficult.

3. The use of allocated numbers makes it easier to operate a filing system than names would.

9.4.7 Allocation of Individual I.D. Numbers

With each set of identification numbers, the province, the district, the chiefdom, the villages and the household and individual will be identified by the use of alphabetical letters and numbers as illustrated in the following example:

NB/PM/MA225/008

The B in NB indicates Bombali district in the Northern province (N).

PM indicates the Pali Masabong chiefdom and MA attached to the first set of numbers represents the village Mapaki. The second set of numbers, 008, is the household number.

Thus, if any set of identifying information on the province will be represented by the first letter, the district by the second letter and the next two sets of letters will represent the chiefdom. The letter prefixing the numbers indicates the village and this is followed first by the individual I.D. number and by the household I.D. number.

For every child born and for every individual who makes use of the health facilities, an I.D. number will be drawn from a printed book of numbers from 1-500, 1,000, 2,000 or 5,000) depending on the size of the community's population. This book of printed numbers, each number with a duplicate counterfoil, will be issued to the V.H.W, whose responsibility it is to assign numbers to
individuals. In communities where there are two or more V.H.W.
only one will be charged with this responsibility. Births and
other cases seen and managed by other V.H.W.s will be recorded
and brought to the notice of the responsible V.H.W. (the team
leader) who will allocate an I.D. number in serial according to the
above scheme. To ensure that no individual who has previously
been allocated a number, receives a second number, the name and
other descriptive data of every individual issued with a number
is recorded on a register. A registration card with the I.D.
numbers is issued to each patient. This registration card
will be enclosed in a small plastic jacket for protection and
given to the patient for safe keeping. This number will be
produced by the patient on each contact with the system and in
the event of a loss or denial, the patient's name and demographic
data will be cross-checked with the register kept by the V.H.W.
Every individual will retain the original numbers allocated to him.

In the event of an individual moving from one village to
another, whether the I.D. number would change or not depends on
the health care coverage in the area. If the new resident village
is served by the same V.H.W.s the patient retains the I.D. number
from the first village since services are provided by the same
unit. On the other hand, movement from his original village of
residence to another village served by another set of VHWs, in
other words, a different peripheral unit, a new set of I.D.
numbers will be given. The same would apply if the individual goes
to another chiefdom, district or province. However, efforts will
be made to acquire a copy of his medical records, details of which will be entered on his new record file. Change in household will result in new household number.

It will be the responsibility of the District Officer (District Administration) with the assistance of the chiefdom to identify and allocate a number to every house in a chiefdom. This task is already being done for the purpose of local tax collection.

As stated earlier in this section, because of the difficulty often experienced with the "extended family" relationship it is not easy to allocate family I.D. numbers, for this reason mainly, household numbers are proposed. However, for family record linkage, the I.D. numbers of both the mother and father of a child will be recorded on the birth record of the child, whenever possible.

A summary of birth record of each child will be made on a mother's medical record.

9.4.8 Data Collection: By Whom and Where*

At L1 the VHW will care for the health needs of the community – a task for which he has been selected and trained. He will be permanently resident in the community. At present VHWs perform services on a voluntary basis and therefore do not receive salaries. In most communities however the VHWs receive free housing and regular gifts. The VHW will manage presenting cases and clinical symptoms to the best of his ability and those that he cannot handle will be referred to higher levels. In addition to his health care practice the VHW will carry out

* Please refer to flow chart on page 89
FLOW OF PROPOSED HEALTH INFORMATION SYSTEM

The following diagram represents the collection and flow of health information of the proposed HIS. The arrow indicates direction of flow:

- **Levels of Reporting**
  - Level 5 (L5)
  - Level 4 (L4)
  - Level 3 (L3)
  - Level 2 (L2)
  - Level 1 (L1)

- **Administrative Division**
  - Central Medical Statistics
  - Provincial Headquarters
  - District Headquarters
  - Chiefdom Headquarters
  - Village (Peripheral Health Unit)

- **Staff Personnel**
  - Director of Medical Statistics
  - 1. Prov. Med. Officer
  - 2. Senior Registrar
  - 1. Dist. Med. Officer
  - 2. District Registrar
  - Medical Assistant (Dispenser)
  - Village Health Worker (VHW)
surveillance of births and pregnant women in his community to ensure that all births are registered and that in the event of a child's death (as well as other deaths) due registration is made. To amplify this point; for instance, if a VHW observed that a woman is pregnant by continuous observation and by asking discreet questions it should be possible for the VHW to know the outcome of the woman's pregnancy.

At L2, a medical assistant or a dispenser is in charge of the health centre. This personnel usually has received at least 3 years training in basic medical sciences and practical nursing. His standard of performance and competence are usually high and he manages most of the cases that seek his help, and those that he cannot manage are referred to L3 or L4. The Dispenser or Medical Assistant is assisted in his duties by a midwife or MCH Aide and a public health inspector.

The VHW at L1 will complete all the relevant forms in the health care system (Appendix 5). He will send all reports, including infectious disease notification, monthly to the in-charge at L2. There is however a modification to this procedure: In the case of a quarantinable disease outbreak or an epidemic a report will be made to L2 within the same day; L2 will then take steps to notify L3 immediately. The district medical officer (at L3) on receipt of the notice of a quarantinable disease outbreak or an epidemic will set out without delay to investigate and institute appropriate control measures.
All data from L1 will be summarized by the dispenser at L2 (this will also include data from the unit itself at L2) and forwarded to the district medical officer (see Appendix 5). At L3, the district medical officer will be responsible for collecting and reporting of data from all chiefdoms of the district and he will be assisted in this duty by a registration officer (District Registrar).

Data from L3 will be sent at 3 monthly intervals to L4 where the Principal Medical Officer of Health (PMOH) assisted by the Senior Registrar will be responsible for the collection and processing of data from all districts in the provinces. The P.M.O.(H) will forward his report to L5, the Medical Statistical Division of the Ministry of Health. Data from L4 will include statistics from provincial hospitals.

9.4.9 Training of Staff

VHWs and other personnel who will be handling data forms will be given a short training course of 1 or 2 days. The training will consist of a short lecture and explanation of the purposes and designs of the forms and the rest of the period will be spent practicing how to complete the forms in the proper way.

9.4.10 Pretesting to Develop Forms

The data collecting forms will be validated in a pre-test, in which those who will eventually be responsible for completing the forms (village health workers), dispensers and physicians will obtain data from direct observation on small groups of the same patients. Agreement above 80% will be accepted. If agreement
is less than 80\% on any item the corresponding criteria and form will be modified, further training done and re-tested until this level of agreement is achieved.

9.4.11 Validation of Data

In a special type of vital statistics registration consisting of house visitors to collect health information during fortnightly visits to all houses in a rural town in Nigeria, Ayerle and Olayinka (67) showed that this system of house to house visit achieved much better results than the conventional system which it replaced and which was still being used in other parts of Nigeria. In the conventional system, the residents had to come forward to the registration official to register events as they occurred in their vicinity. This system is, in its operative mode, similar to the present reporting system in Sierra Leone. Indeed, the deficiencies of this system have been elucidated in Chapter 3 – Deficiency in vital and health statistics. Results of the Nigerian study showed that the special house to house visit achieved about 95 percent registration of all births while that of deaths was about 87\%. The worst achievement was that of infant deaths (aged under 1 year) being only 49 percent complete. However, there was the suggestion that this new system had done much better than the conventional one in achieving the stated results in only 10 years of being implemented.

The evaluation of the special house to house visit system of registration trialed out in a rural town in Nigeria was done as follows:
(a) Total population survey of the area was carried out for women aged above 14 years. The total number of children ever born and those alive. The identification cards issued at birth was requested by the enumerators. In this way, the number of births was verified and a proportion of those births actually registered was also ascertained.

(b) For death registration, age specific death rates for both sexes were combined and appropriate life table functions calculated from them. The survivorship ratios were compared with those of the Brass's General African Standard (3) on the logit scale.

In view of the fact that the present system of data collection and reporting has not done well in Sierra Leone and in most developing countries, the achievements and lessons that could be learnt from the Nigerian house to house system are indeed very encouraging.

In the following section, the main problems of routine data collection will be listed and suggestions to correct these will be given briefly.

9.4.12 Completeness of Data

Deficient records create serious bias as well as an under-estimation of the work load. For example: a patient's record may not indicate an outcome of interest or follow-up actions. As a check against this, all forms sent from L1 to L2 will be scrutinized at L2 to see that every information item eg, descriptive and demo-
graphic data is given and for those items or set of items not given the corresponding forms will be returned to the VHW for corrective action. A training program at the onset and regular visits by the dispenser at L2 to the peripheral unit would also help to minimize against the submitting of incomplete data.

9.4.13 **Accuracy of Data**

More has perhaps been written and spoken about this problem more than any other aspect. Before investing effort in the analysis and interpretation of the data collected, it is important to make periodic check upon its accuracy.

The following procedures will be used to check the accuracy of the data collected at L1. This accuracy check will include administrative, demographic and diagnostic information.

(a) **Regular Spot Checks:** Regular, unannounced spot checks will be made on the VHWs and other service providers during working sessions. All sets of relevant observations will be collected by the supervisor and his findings will be compared with those of the VHW. Randomized spot checks will also be made to verify the completeness of birth registration by requesting parents to produce the birth registration certificates of infants. In the case of death registration, the problem is expected to be considerably less since according to national and local law, permission for burial can only be granted on presenting an authentic death registration certificate.
(b) **Specific Illnesses and Symptoms**: A few common illnesses and symptoms will be selected and the treatment and actions taken by the VHWs will be observed. A check will be made for agreement in the type of drug and drug dose between what is prescribed by the VHW and the standardized manual. As an example, a patient who complains of high intermittent fever with chills, according to the manual should be treated as for malaria, with 4 (600 mg) tablets chloroquin as a single dose. A patient in prolonged labour (more than 24 hrs) should be referred immediately to the hospital.

(c) **Trends**: Data being sent from L1 on a monthly basis will be observed for trends. If for instance, only one set of data from a unit shows a deviation, eg, increase, this will call for immediate investigation by L2, for confirmation (or repudiation) and necessary explanation.

(d) **Prescriptions**: A check on prescription in relation to the quantity of drugs prescribed and also on the total number of prescriptions issued by the VHWs would give some indication on the quality of treatment and the prevalence of illnesses and symptoms. More than the expected number of expected illnesses and symptoms, or quantity of drugs used for the period under
observation would call for prompt investigative action.

Although the verification procedures will be carried out mainly on L1, there will be corresponding verification procedures on L2, L3 and L4. Effects will however by concentrated on L1 since it is the main source of information.

9.4.14 Validation - By Whom and When

Validation of data from L1 will be done regularly by the Dispenser at L2. The district medical officer at L3 will also from time to time carry out field visits and spot checks on the VHVs. The dispenser will ensure that data are punctually sent in from L1 every month, and each set of data will be checked before compilation for onward transmission to L3. The Dispenser will also be required to visit each peripheral unit to observe and supervise a VHW at least once every month. Because of other hospital duties the district medical officer will not be able to make supervisory and consultative visits to peripheral units too often. However, he will be expected to visit every peripheral unit in his district at least once in the year.

The use of house visitors to collect health information in a rural town in Nigeria has shown that the system could achieve very satisfactory results. The CPHC approach in Sierra Leone which is based on full community motivation and participation also offers the opportunity for the application of this system. VHVs by residing in the communities will facilitate close contact with the people and being an offspring of the community itself and thus so
accepted will be able to make regular house to house visits and maintain surveillance of vital events, such as births and deaths. His role as a health educator has also been underlined.

It is not expected that the information produced will be perfectly accurate within a limited time. A health information system is always faced with a long period of development and the above design it is hoped should offer a reasonable start to obtaining useful data. As Greenwood (25) suggested: "The scientific purist, who will wait for medical statistics until they are nosologically exact, is no wiser than Horace's rustic waiting for the river to flow away".

9.5 Measurement

9.5.1 General Procedures

Recording and tabulation of relevant information will be done by VHWS on daily basis or on the occurrence of events. Copies of the recording and tabulation forms are found in the Appendix section of this protocol. Also in recording information, the reason for contact with the health service should be recorded as expressed by the patient himself or as elicited by questioning. It will be stressed that this information should not be distorted to fit into some other defined category.

For a patient seeking medical care, the statement as volunteered by the patient as reason for contact, and as recorded, will then later be coded by the dispenser or M.A. at L2 (as a separate operation), using the list provided (see Appendix 4).
If the patient's statement indicates that one or more different morbid conditions are present the one to be coded will be the most severe or dominant one. In instances where severity or dominance cannot be ascertained, the first reason mentioned by the patient will be coded.

9.6 Basic Sanitary Items

The V.H.W. will be required to keep a record of the number of additional sanitary items such as wells, latrines and compost pits constructed every month.
CHAPTER 10

SPECIFIC-PROTOCOL -
THE DESIGN OF CPHC-EVALUATION

This chapter contains the proposed design of a study of the effectiveness of CPHC in rural Sierra Leone.

10.1 Research Question

Is CPHC approach effective in improving the health status of the people in rural communities in Sierra Leone?

10.2 Research Design

The research design is a before vs. after comparison with non-equivalent control group.

The reasons and justification for this design have been presented in Chapter 6.

10.3 The Population and Site of the Study

10.3.1 Experimental Group:

The experimental group will comprise of the community of Paki Masabong chiefdom in the Bombali district, northern province of Sierra Leone. This chiefdom has a population of approximately 11,000 mostly farmers and illiterates. (More details of the chiefdom are given in section on Development & Health Information System, Chapter 9)

10.3.2 Control Groups:

Two control groups will be used in the study:
1. **Safroko Limba Chiefdom**: ("Limited health services" control) also in the Bombali District has a population of approximately 12,000. It is one of eight chiefdoms in the district with a dispensary which is run by a dispenser and a MCH aide who provides limited maternal and child care services for the chiefdom's people. Apart from limited health care services provided by the dispenser and MCH aide, no other community projects in the nature of CPHC activities are being undertaken. In most respects the community is similar to the experimental community in socio-economic development, major diseases prevalence and life patterns. Selection of this chiefdom from among the other eight chiefdoms in the district with a dispensary was done by lottery.

2. **Kolifa Chiefdom**: ("No health services" control) is also in the Bombali District, being one of 3 with no health unit whatsoever. Selection was also done by lottery.

   The chiefdom of Kolifa has a population of about 9,000. Again, this community is in major ways similar to Paki Masabong and Safroko chiefdoms in socio-economic and other aspects. The significant difference is that unlike the other two communities, there is neither a health unit (eg. a dispensary) nor CPHC related activities being undertaken in Kolifa chiefdom.
It has been decided to restrict selection of the control
groups to the same district as the experimental group because of
constraints such as transportation of research staff and time
factor.

For this study, pre-test and post-test measurements will
be done on the randomly selected groups of subjects in both the
experimental and control groups of chiefdoms. For the post-test
measurement in the experimental chiefdom, however, a new set of
subjects will in addition be chosen according to the procedure
described above. The post-test only measurement in this second
group would be used to check whether the original group of
subjects in the experimental chiefdom received special attention
in between the surveys and hence, made bigger gains, than the
rest of the population, in the outcome measures. Although a
separate post-test sample in each of the two control chiefdoms
would increase the statistical significance of test, again because
of limited resources constraints this will not be done.

10.4 Sample Size Determination

Some of the key factors which determine sample size in a
survey, include:

1. Available financial, personnel and physical resources.
2. Constraints such as time and logistics problems
   affecting the survey in the field, particularly
   transport.
3. Nature of the sample distribution assumed applicable.
4. The extent and depth of information desired for statistical estimates and the confidence level to be associated with them (45).

The following section will address the last two of the above four points and the first two items shall be considered in section 10.5.1.2.

Sample size determination given simple random assignment.

The following formula can be used for estimating the required sample size per group for independent samples in comparison of two proportions (Colton, 17).

\[
 n = \left[ \frac{Z_\alpha \sqrt{\pi(1-\pi) - Z_\beta \sqrt{\pi_2(1-\pi_2T) + \pi_2C(1-\pi_2C)}}}{\delta} \right]^2
\]

Definition of Terms:

\(\alpha\) = risk of concluding that there is a difference between the experimental and the control group when in fact there is no difference i.e. it is the chance of rejecting the null hypothesis when it is true. The \(\alpha\)-level for this study is set at 5%. The test to be made concerns whether CPHC is more effective than no-CPHC. Hence \(\alpha\) is one-tailed.

\(\beta\) = risk of not achieving statistical significance when there is in fact a difference in benefit of predetermined magnitudes between comprehensive primary health care and no-comprehensive primary health care. For this study \(\beta\) has been set also at 5% and is one-tailed.
\( \delta \) = statistically detectable difference between groups for given \( \alpha \), \( \beta \) and \( \gamma \). If a preset \( \delta \) is used to calculate the sample size required, differences smaller than \( \delta \) will not be statistically significant.

Let \( \pi_{1C} \) = pretest outcome measure in control group

\( \pi_{2C} \) = posttest outcome measure in control group

\( \pi_{1T} \) = pretest outcome measure in experimental group

\( \pi_{2T} \) = posttest outcome measure in experimental group

It is assumed in the determination of the required sample size that the post-test values for the control groups will remain unchanged from the pretest values over the period of the intervention (2 years) (i.e. \( \pi_{1C} = \pi_{2C} \)). This assumption is based on strictly ensuring the maintenance of control variables as discussed in and from the observation of past trends which show the relative stability in the level of the outcome measures.

for the control groups, then

\( \pi_{1C} = \pi_{2C} = \pi \) (by dropping the first subscripts)

Initially, \( \pi_{1C} = \pi_{1T} \) (present value)

Null hypothesis, \( H_0: \delta = (\pi_{2T} - \pi_{1T}) - (\pi_{2C} - \pi_{1C}) = 0 \)

If \( \pi \) denotes the common population then using the previously defined values for malaria parasite rate

\[
n = \left[ \frac{1.65 \sqrt{2(.23)(.77)} - 1.65 \sqrt{(.5)(.5) + (.23)(.77)}}{.27} \right]^2
\]

\( = 59 \) persons per group

Estimated sample sizes for the outcome measures are
given in the following table 12.

10.4.1 **Estimating the Sample Size Available**

According to the Sierra Leone National Development plan and the medical statistics report (53, 56) the birth rate in rural Sierra Leone is estimated at 47 per 1000 population per annum. Thus in a single year in the experimental chiefdoms, Mapaki, Safroko-Limba and Kolifa 517, 564 and 423 children will be born each year. Considering an infant mortality rate of 160 per 1000 per year, this would leave the chiefdoms with 434, 473 and 355 infants survivors at the end of each year - more than 5 times the required number of infants for the study.

According to the National census (14) 10-14 year olds represent about 8.7% (9%) of the rural population. Every year therefore approximately 950, 1040 and 780 children between 10-14 years old will be found in Paski Masabong, Safroko and Kolifa chiefdoms. This would represent more than twice the 10-14 year old children required for the survey.

10.5 **Procedures**

10.5.1 **Special Health Survey**

For the evaluation of comprehensive primary health care and its components a special health survey will be undertaken.

The aim of the survey will be

1. To draw a statistically representative sample of the population with the individual as the sample unit.

2. To investigate all individuals included in the sample with regard to their state of health with reference
<table>
<thead>
<tr>
<th>INDICATOR</th>
<th>PRE TEST VALUE C(%)</th>
<th>CRITERIA FOR SUCCESS (%) (IN 2 YEARS)</th>
<th>POST TEST VALUE T(%)</th>
<th>SAMPLE SIZE n</th>
<th>ADD 10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Malaria parasite rate</td>
<td>77</td>
<td>27</td>
<td>50</td>
<td>59</td>
<td>65</td>
</tr>
<tr>
<td>2. Spleen rate</td>
<td>64</td>
<td>14</td>
<td>50</td>
<td>177</td>
<td>195</td>
</tr>
<tr>
<td>3. Tuberculosis prevalence rate</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>297</td>
<td>327</td>
</tr>
<tr>
<td>4. Helminthic infectious rate</td>
<td>50</td>
<td>20</td>
<td>30</td>
<td>120</td>
<td>132</td>
</tr>
<tr>
<td>5. Protein calorie malnutrition (prevalence rate)</td>
<td>30</td>
<td>15</td>
<td>15</td>
<td>183</td>
<td>202</td>
</tr>
<tr>
<td>6. Leprosy prevalence rate</td>
<td>0.6</td>
<td>0.3</td>
<td>0.3</td>
<td>Total Population</td>
<td></td>
</tr>
<tr>
<td>7. Infant mortality rate</td>
<td></td>
<td></td>
<td></td>
<td>Data to be obtained from continuous evaluation.</td>
<td></td>
</tr>
<tr>
<td>8. Specific immunization coverage</td>
<td></td>
<td></td>
<td></td>
<td>Source: Health Information System</td>
<td></td>
</tr>
</tbody>
</table>
to the outcome measures of interest.

10.5.1.1 Method and Organization

Based on the best available estimates of the outcome measures of interest, sample sizes (Table 12) will be drawn from the population groups by random allocation using a set of random numbers. A special census team will undertake total population census of the experimental and control chiefdoms. Villages and other settlements will be accurately mapped and the corresponding population will be given.

Each chiefdom will be divided into three strata, according to population size, thus:

Stratum I: Large villages and settlements
- population above 100

Stratum II: Medium villages and settlements
- population between 50-99

Stratum III: Small villages and settlements
- population under 50

The above stratification would facilitate the breakdown of the chiefdoms into smaller, fairly homogenous groups, so that a gain in precision over simple random sampling is to be expected. Selection of the subjects will be done on a proportional allocation ("proportionate sample") based on the results of the population census of each chiefdom.

Using the estimate of the sample size required for the outcome measure, helminthic infection (Table 11) the following example illustrates the method (Table 13).
### TABLE 13

Eg: Proportionate Sample (Helminthic Infections)

<table>
<thead>
<tr>
<th>STRATUM</th>
<th>NO. OF UNITS IN STRATUM</th>
<th>TOTAL POPULATION</th>
<th>STRATUM WEIGHT</th>
<th>SAMPLE SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I Large</td>
<td>5</td>
<td>7,000</td>
<td>$\frac{7,000}{10,000} = 0.7$</td>
<td>$0.7 \times 120 = 84$</td>
</tr>
<tr>
<td>II Medium</td>
<td>10</td>
<td>2,000</td>
<td>0.2</td>
<td>24</td>
</tr>
<tr>
<td>III Small</td>
<td>20</td>
<td>1,000</td>
<td>0.1</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
<td>10,000</td>
<td>1.0</td>
<td>120</td>
</tr>
</tbody>
</table>
Thus, from the table, 84 subjects will be randomly selected from the large villages and settlements, 24 and 12 subjects will be selected (randomly) from the medium and small villages and settlements respectively.

Taking into consideration the key factors which determine survey sample size, given in section 10.4, selection of subjects for the study will be restricted to only a few units (villages and settlements) from each set of stratum, the main consideration here being that of limited financial, personnel and physical (e.g. transportation) resources.

10.5.1.2 Composition and Training of Survey Team

The survey team will consist of the following personnel:

(a) A medical officer who will be a public health physician and should have had considerable experience in public health field work, including malaria, tuberculosis and leprosy surveys. He will carry out appropriate physical examination of subjects and serve as the survey team's leader.

(b) Laboratory technicians who will be responsible for the collection and preparation for microscopy of stool, sputum and blood specimens. They will also carry out all microscopic examination of the specimens.

(c) 4 Endemic Diseases Control Unit assistants who will carry out anthropometric measurements and also screening for leprosy and tuberculosis cases.
The team will work as a unit in a locality.

The present cadre of experienced public health physicians in the country will enhance the appointment of a team leader for the survey.

The Endemic Diseases Control Unit has a large staff of experienced field assistants (more than 250) who have taken part in various public health campaigns and surveys, including, malariometric, nutrition and leprosy surveys. Recruitment for the survey team will be made from the ranks of these E.D.C.U. assistants.

In addition to these field assistants, the E.D.C.U. also has a fairly good number (about 30) of laboratory technicians, who received their training from the central laboratory in Freetown and have worked for a number of years in hospital laboratories both in Freetown and in other parts of the country. They have carried out considerable number of routine laboratory work in malariology, tuberculosis and leprosy, under supervision of the resident pathologists.

The 4 laboratory technicians required for the health survey team will be recruited for this cadre of E.D.C.U. assistants.

All the members of the special health survey team will be given a brief refresher training course shortly before the start of the survey. This training course will comprise mainly of the application of field methods and practice in carrying out the prescribed measurement procedures, details of which are to be found in section 10.5.2 (measurement).
10.5.1.3 Administration

Before the start of the health survey, the district officer, who represents the central government, will be notified of the purpose, place and schedule of the survey. The district officer will in turn inform the paramount chiefs of those chiefdoms where the surveys will be undertaken. Purpose and procedures will be explained to the paramount chief and his council of advisors and their full cooperation will be solicited by the D.O. in his capacity as the central government representative. This procedure usually ensures a smooth execution of projects with active cooperation of all those concerned. No parental consent would be required for the enlisting of infants and children in the survey.

10.5.2 Measurement

For the special health survey, it is essential to give usable definitions of conditions that will be investigated. Furthermore, all the personnel in the survey team will be trained by qualified people until a high level of agreement between the personnel is achieved. All data will be carefully scrutinized by the team leader and any doubtful values will be checked for accuracy.

10.5.3 Persons to be Included in the survey

This has been previously discussed under proposed outcome measure and in Table.

10.5.4 Morbidity

Many diseases do not represent simple qualitative departures from "normal" health but involve only the exhibition
of greater or lesser values for some factors that is shown by all people. Definitions used therefore depend on both the purpose of the survey and the technique used, for example, interview and laboratory examination.

For the special health survey therefore only clinical and laboratory techniques will be used. The following definitions will apply:

(a) **Malaria Parasite Rate:** The definition of malaria will be based on the finding of malaria parasite(s) in a thick blood smear microscopically examined for at least 5 minutes or a thin blood film also microscopically examined for at least 15 minutes.

To ensure a high degree of reproducibility of this measurement a number of slides done for malaria parasite - both thick blood smear and thin blood films will be given to the trainees for identification. A number of practice runs will be made with these slides until a very high degree of agreement is attained between all observers (trainees).

(b) **Malaria Spleen Rate:** The spleen of young children will be palpated by the medical doctor, with the children in a standing position and the left hand placed over the head. A palpable spleen will represent an enlarged spleen.
(c) **Active tuberculosis**: Screening for possible tuberculosis cases will first be carried out on only those young people of the study group with history of chronic cough of at least 4 weeks duration and on those who have been close contacts of bacteriological confirmed tuberculosis cases. Young children who fall into these categories will constitute a special risk group for the survey. Identification of this group will take the form of asking simple questions for history of cough and cough duration to children and their parents.

Raj Narain and Nagpaul and Rao and others (57,62) have demonstrated that over 90% of all active cases of tuberculosis could be diagnosed for this special risk group by direct sputum microscopy on three specimen examination.

The presence of a tuberculosis bacillus in a spectrum specimen constitute an active tuberculosis case. Identification of a positive case will be confirmed by the medical officer.

To enhance the reproducibility of this measurement a number of practice runs will be made on some tuberculosis slides during the training of the survey staff until a high degree of agreement is (80-90%) achieved. Personnel will also be trained on the correct procedures for collecting spectrum, especially from
young children.

(d) **Helminthic Infections**: Stool of subjects will be collected in special tabled laboratory receptacles which will be handed out to parents of children in the study. They will be requested to collect a small portion of the first available stool which should be handed in to the survey team without delay. Specimens will be examined by laboratory technicians for ova of intestinal parasites, like, hookworms, roundworms and tapeworms. However, any intestinal parasite found in a stool specimen will be included as a positive finding.

Also during the training of the survey team a number of stool specimens will be prepared and examined together with a number of positive stool slides. The observers will be given sufficient practice until a high degree of agreement (80-90%) is achieved.

(e) **Protein Calorie Malnutrition** (PCM): As already indicated (8.10) anthropometric measurements will be used to determine the prevalence rates of protein calorie malnutrition. Using standard scales and height bars the weight and height of children will be recorded by the E.D.C.U. assistants of the survey team. The weight will be recorded nude, to the nearest ounce (or gram).
For children between 1-3½ years the height will be measured lying down (supine length) as children between these ages are not able to co-operate sufficiently to be measured accurately standing up (42).

For children above 3½ to 5 years, the standing height will be recorded.

The field staff will be given sufficient training and practice in carrying out these procedures for recording height and weight.

For age determination birth records will be used but in cases where birth records are not available the parental declaration of a child's age combined with a calendar of local events will provide the basis for age assessment. This latter method has been found to be reliable in rural areas of Sierra Leone (70).

(d) Active leprosy cases: Because of the relatively low prevalences of leprosy in Sierra Leone (6 per 1000) and because of chronic nature of the disease, a significant decline in the prevalence of active cases is not expected over a short period of time (2 years). For this reason an assessment of the leprosy prevalence will be made 5 years after the start of CPHC. Also because of the low prevalence and the expected small reduction, the total population of the study area will be screened for leprosy.
The E.D.C.U. assistants will identify leprosy cases by defined criteria thus:

Tuberculoid leprosy: pale, anaesthetic patches on skin
Lepromatous leprosy: characteristic large modules on skin.

Suspected cases will be re-examined by the medical doctor and confirmation will be based on the presence of leprosy bacilli in smears from skin patches and modules. The survey staff doing the microscopy will be trained in identifying leprosy cases in the same procedure adopted for tuberculosis microscopy.

(e) Infant mortality: Data on infant mortality assessment will be obtained from death registration. Special forms designed for this purpose (see development of health information system) will be used to record deaths and since all deaths in the country is registrable by law, the infant mortality rate will be assessed on the reported deaths based on the community population.

Village health workers will be responsible for collecting and reporting of data. Analysis will be done on special form (Table 14).
TABLE 14
INFANT MORTALITY RATES BY VILLAGE

PERIOD OF REPORTING

Day Mo. Yr. to Day Mo. Yr.

NAME OF CHIEFDOM

<table>
<thead>
<tr>
<th>NAME OF VILLAGE</th>
<th>NO. OF INFANT DEATHS</th>
<th>NO. OF LIVE BIRTHS</th>
<th>INFANT MORTALITY RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
(f) **Major Communicable Diseases:** Evaluation of immunization coverage in the area will also be done by the reports technique, i.e. immunization data collected and submitted by village health workers (see also under development of Health Information System) will be analysed (Table 15) to determine proportion of those vaccinated in relation to those eligible for the vaccinations.
TABLE 15

EVALUATION OF IMMUNIZATION COVERAGE

NAME OF CHIEFDOM:

PERIOD

<table>
<thead>
<tr>
<th>TYPE OF VACCINATION</th>
<th>NO. OF CHILDREN VACCINATED</th>
<th>TARGET POPULATION</th>
<th>VACCINATION COVERAGE RATE (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCG</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MEASLES</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>POLIO 1</td>
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<td>2</td>
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<td>3</td>
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<td>DPT 1</td>
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<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TETANUS TOT 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
10.6 Analysis

Presentation of data gathered by methods described earlier in this chapter will employ statistical methods such as cross-tabulations, frequency distributions and the calculation of relevant rates.

Significant tests analysis will be done in two stages as follows:

1. t-test of proportions: for each experimental unit (chiefdom) the average gain score for each outcome measure will be calculated (i.e. before/after difference). The t-value will then be calculated between the experimental chiefdom and for each of the control chiefdom.

For multiple comparisons, however, (i.e. series of t-test, one for each pair) the $\alpha$-level will be reduced to reflect the number of paired comparisons (k) which in the present study (i.e. k = 3). Thus, for an overall $\alpha = 0.05$, $k = 3$, $t = 0.05/3 \approx 0.02$.

2. Analysis of Covariance will be done employing as covariates, those outcome measures for which a statistically significant t-value was obtained in step 1.
In cases where there are proportions and the covariates are discrete variables the data will be transformed by means of a logit transformation (Sneden & Cochran, 1967) or by using the log linear model (Gordon, 1971 or Bishop & Feinberg, 1976) to analyse large contingency tables. Alternatively chi-squared ($\chi^2$) analysis may be done.
10.7 Interpretation

The presented evaluation design represents a cohort study to test the hypothesis regarding the effectiveness of C.P.H.C. (Hypothesis: That C.P.H.C. approach is effective in improving the health status of rural communities in Sierra Leone.)

For this study, three cohort groups were identified as follows:

1. An experimental group and
2. Two control groups

The groups were defined as having manifesting similar characteristics (such as a stable population and similar levels of socio-economic status) prior to the study, and these groups were observed over time. In part, selection of the cohorts was based on accessibility of the areas (chiefdoms) to the workers.

In the follow-up of the cohort of the outcomes among the different groups will be determined over time.

A statistical significant value for each outcome measure between the experimental cohort group and a control group would indicate statistical association between that outcome and C.P.H.C. activities. In other words, if improvement in the outcome measure, observed for the experimental cohort are statistically better than for the control groups, this would indicate a causal relationship between an improvement in the outcome measures and C.P.H.C. activities.
10.8 Ethical Considerations

This study is not likely to meet with any major ethical problems since no one group is being denied health care as is the case in a randomized controlled trial.

In the geographical area (chiefdom) where Comprehensive Primary Health Care is being organized and implemented, all the people living within these areas are free to utilize the services offered. The rate and the extent to which other communities get organized and implement C.P.H.C. activities will depend on the outcome in the experimental area. Any minor inconvenience caused therefore will be justified since this study will play an important role in decisions taken by those who decide on policy, those who plan and those who implement C.P.H.C. activities.

A significant outcome, in terms of improved health status of the people will inject considerable enthusiasm and vigour both at the national and local levels, while an insignificant outcome will force all concerned to view C.P.H.C. approach from different perspectives.

As far as confidentiality is concerned in the record linkage system, this is not an ethical issue in rural communities of Sierra Leone. The largely illiterate population actually look upon it as favoured treatment when their conditions and illnesses are made known and handled by many people who are regarded as being in a position to render help. For this reason, no informed consent will be required in the development of a record linkage system.
APPENDIX 1

PRIMARY HEALTH CARE ACTIVITIES

Maternal and Child Health Care

task to be performed by female V.H.W.

(a) Antenatal Care

1. Take a history to identify risk factors

2. Check for anaemia, cure and prevent by clinical
   examination of conjunctive, palms of hands, mouth.

3. Routine administration of oral iron (prevention).

4. Refer severe cases or cases not responding to
   iron therapy.

5. Look for toxaemia of pregnancy by
   examination of ankles and fingers for oedema

6. Give tetanus immunization

7. Give malaria prophylaxis

8. Give advice on the following topics:
   diet in pregnancy, importance of hygiene at
   delivery, minor complaints and danger signs,
   care of the new-born, especially cord care,
   nutrition of older children and family planning.

9. Treat infections and minor conditions arising
   during pregnancy and refer any abnormality or
   serious diseases.
10. Keep register of risk cases for special care and follow up.

11. Keep register of patients referred and reasons for referral.

(b) Delivery Care

1. Look for signs of complications eg. foetal distress, bleeding, obstruction.

2. Ensure aseptic technique during delivery (wash hands, sterilize instruments, keep delivery room clean).

3. Care for newborn: ensure normal respiration, aseptic cutting and care of cord.

(c) Postnatal Care

1. Check condition of mother and child by:
   - examining mother for fever, bleeding, tenderness of abdomen and check size of uterus, breasts and nipples.
   - examining baby: weight, cord, check breathing, ask about feeding problems
   - advising on care of child and family planning.

(d) Family Planning Care

1. Advise community of advantages of family spacing and discuss methods.

2. Refer those in need of contraceptives.
(e) **Child Health Care**

Supervise health of all children under 5 years, involving regular monthly contacts during the first and second year and at least 2 visits annually thereafter.

(a) **Promote nutrition**

1. Give nutrition education to mothers in homes and clinic. Liaise with extension workers in agriculture and community development to encourage appropriate methods of improving food production, animal rearing, farming and vegetable growing:

2. Advise on weaning to include the following:
   - supplementary feeding before 6 months of age
   - meals not less than three times a day
   - promote use of appropriate nutritious local foods which are cheap, rather than imported or expensive foods.

---

**Environmental Health**

tasks to be performed by male V.H.W.

(a) **Motivation Tasks**

1. Give health education through
   - community meetings and discussions
   - home visits

2. Identify problems and suggest appropriate and relevant technical solutions to them
3. Generate and provide assistance to environmental sanitation projects carried out by community.

4. Act as liaison for assistance from other agencies (eg. water-pumps, cement, and other building materials).

(b) Inspect markets, refuse tips, and public latrines regularly. Supervise those responsible for public cleanliness - eg. sanitary workers, communal labour for cleaning weeds, drains, sweeping markets, etc.

(c) Report sanitation hazards to appropriate authority responsible for remedial action, if they cannot be dealt with by people themselves.

(d) Communicable Disease Control:

1. Specific tasks will vary according to whether there is a special control programme in existence - eg. Tuberculosis control programme. This will require screening for probable cases, and regular treatment for confirmed cases.

2. Primary prevention through immunizations and antimalarial.

- give vaccines against tuberculosis, measles, diphtheria, tetanus, polio.

- give regular antimalarial to infants and under fives and pregnant women.

Tasks to be Carried Out by Community and Sanitation Workers

Malaria Control
Malaria Control

Clear breeding places round houses, especially ditches, fill in swamps, ponds, ditches, clear pots, cans, bush and other receptacles.

Spray houses and stagnant water with insecticides.

Tasks to be Carried Out by Ministry of Works

Provision of sanitary facilities, water supplies, sewage and drains, housing, construction of roads, etc.

Tasks to be Carried Out by Agriculture Extension Workers

- Motivate community to grow food crops and vegetables.
- Provide help and advice in setting up farms and nurseries, by granting financial loans and expertise.
- Carry out spraying operations or special actions for insect or pest control.
APPENDIX 2

LIST OF ESSENTIAL DRUGS FOR USE BY VILLAGE HEALTH WORKERS

Vaccines
Sulphadimidine tablets
Chloroquin tablets
Aspirin or Paracetamol tablets
Piperazine (ANTEPAR)
Bephenium (ALCOPAR)
Ferrous sulphate or other iron tablets
Pyrimethamine tablets (DARAPRIM)
Glucose (saline or rehydration diarrhoeal mixture)
Gentian violet
Calamine lotion
Whitfield’s ointment
Benzy1 Benzoate ointment
Antibiotic eye ointments
Multivitamin tablets and mixtures for children
Cough mixtures – for adults and children
Folic acid tablets
TB drugs (INH and Thiacetazol compound tablets)
Nitrothiazole (AMBIHAR) for bilharzia
Methylcarbamazine (BANOCIDE) for onchocerciasis
Antihistamine tablets
Tetracycline or chloramphenicol tablets (small amounts)
APPENDIX 3

NOTIFIABLE DISEASES, SIERRA LEONE

PUBLIC HEALTH ORDINANCE, 1960, SECTION 36 (1) AND (2)

(1) Every medical practitioner attending on, or called in to visit, any patient suffering from a notifiable disease shall as soon as he becomes aware that the patient is suffering from a notifiable disease, send to the Medical Officer of Health of the area in which the patient is ill a certificate stating the full name, and the age and the sex of the patient and the address of the house or place where he is ill, and the notifiable disease from which, in the opinion of that medical practitioner, the patient is suffering, and where the certificate refers to the inmate of a hospital, it shall specify the place from which and the date at which the inmate was brought to the hospital, and it shall be sent to the Medical Officer of Health of the area in which the said place is situated or the provincial Medical Officer of Health of such area.

(2) Any medical practitioner who fails to send a certificate as required by subsection (1) shall be guilty of an offence and liable on summary conviction to a fine not exceeding fifty leones.

Notifiable diseases are:

Cholera, Plague, Relapsing fever, Small Pox, Typhus, Yellow Fever, Anthrax, Chicken Pox, Diphtheria, Dysentery (Amoebic, Bacillary), Hydrophobia (Rabies), Influenza, Leprosy, Measles, Meningococcic, Meningitis, Pneumonia, Acute Poliomyelitis, Polio-encephalitis, Sleeping Sickness, Tetanus, Typhoid and Paratyphoid Fevers, Tuberculosis (Pulmonary and non-Pulmonary), Whooping Cough, Yaws, Severe Diarrhoea.
AP\_\_\_DIX 4

DETAILED LIST OF SYMPTOMS TO BE USED BY
VILLAGE HEALTH WORKERS AND H.C. STAFF

ADAPTED FROM W.H.O. - LAY REPORTING
OF HEALTH INFORMATION

Conditions marked with an asterisk (*) will be used only by health professionals (eg. physicians), having sufficient experience to recognize them, or when the conditions are endemic in the area, or during proven epidemics.

Main Symptoms

Possible Diagnosis

Additional symptom(s) or descriptions

01 Fever with skin manifestations

010 Fever with red rash, disappearing in several days

Measles

011 Fever with vesicular blisters, healing clear

Chicken Pox

012 Fever with pustules, healing with pitting

Smallpox *

013 Fever with yellow skin, yellow whites of eyes, discoloured stools, articular pains

Infectious Jaundice

014 High Fever with skin symptoms of 013

Yellow Fever *

015 Fever with other and unspecified skin manifestations

02 Fever with Neurological Problems

020 Fever with paralysis

Poliomyelitis
<table>
<thead>
<tr>
<th>Additional symptom(s) or descriptions</th>
<th>Possible Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>021 Fever with neck rigidity, vomiting, skin rash.</td>
<td>Meningitis*</td>
</tr>
<tr>
<td>030 High fever, intermittent, with chills, prostration</td>
<td>Malaria</td>
</tr>
<tr>
<td>031 Fever with other associated symptoms</td>
<td></td>
</tr>
<tr>
<td><strong>04 Skin Lesions</strong></td>
<td></td>
</tr>
<tr>
<td>040 Anaesthetic skin lesions (lepromatous) deformities, loss of extremities</td>
<td>Leprosy*</td>
</tr>
<tr>
<td>041 Anaesthetic pale skin lesions (tuberculoid)</td>
<td>Leprosy*</td>
</tr>
<tr>
<td>042 Crusted ulcerations</td>
<td>Yaws*</td>
</tr>
<tr>
<td>043 Fibrous nodules, blindness</td>
<td>Onchocerciasis*</td>
</tr>
<tr>
<td>044 Cord-like nodules, swelling of extremities</td>
<td>Filariasis</td>
</tr>
<tr>
<td>045 Dry skin and mucosa, depressed fontanelles in children</td>
<td>Dehydration</td>
</tr>
<tr>
<td>046 Pale skin and mucosa weakness, fatigue</td>
<td>Anaemia</td>
</tr>
<tr>
<td>047 Yellow skin, yellow whites of eyes</td>
<td>Jaundice</td>
</tr>
<tr>
<td>048 Painless ulcer, raised edges, genital area, history of sexual contact.</td>
<td>Syphilis*</td>
</tr>
<tr>
<td>049 Skin sores and ulcerations, other and unspecified</td>
<td></td>
</tr>
<tr>
<td><strong>05 Diarrhoea and Vomiting</strong></td>
<td></td>
</tr>
<tr>
<td>050 Diarrhoea and vomiting, massive dehydrations, watery stools</td>
<td>Cholera*</td>
</tr>
<tr>
<td>051 Diarrhoea and vomiting, abdominal pain</td>
<td>Food Poisoning*</td>
</tr>
</tbody>
</table>
### Main Symptom(s)

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>052</td>
<td>Diarrhoea and vomiting, fever, spectrum-like stools</td>
</tr>
<tr>
<td>053</td>
<td>Diarrhoea and vomiting, other, and unspecified</td>
</tr>
</tbody>
</table>

### Additional symptom(s) or descriptions

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>060</td>
<td>Diarrhoea, abdominal pain, pus and blood in stools</td>
</tr>
<tr>
<td>061</td>
<td>Diarrhoea, abdominal pain, fever</td>
</tr>
<tr>
<td>062</td>
<td>Diarrhoea, unqualified</td>
</tr>
</tbody>
</table>

### Possible Diagnosis

- Bacillary dysentery
- Amoebic dysentery
- Infectious diarrhoea
- Diarrhoea
- Acute abdomin
- Indigestion
- Tumor, Ascites
- Haemorrhoids
- Intestinal parasites
- Tuberculosis*
- Tuberculosis* confirmed
- Pneumonia
- Influenza
- Whooping Cough

### Other Abdominal Problems

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>070</td>
<td>Abdominal pain, rigidity of abdominal wall</td>
</tr>
<tr>
<td>071</td>
<td>Abdominal pain, vomiting</td>
</tr>
<tr>
<td>072</td>
<td>Abdominal swelling</td>
</tr>
<tr>
<td>073</td>
<td>Rectal pain, blood in stools</td>
</tr>
<tr>
<td>074</td>
<td>Abdominal pain, worms in stool or vomitus</td>
</tr>
</tbody>
</table>

### Cough

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>080</td>
<td>Chronic cough (4 weeks or more), loss of weight, blood in sputum, slight fever, high sweating</td>
</tr>
<tr>
<td>081</td>
<td>As 080, with laboratory confirmation</td>
</tr>
<tr>
<td>082</td>
<td>Acute cough, fever, chest pain, shortness of breath</td>
</tr>
<tr>
<td>083</td>
<td>Acute cough, fever, muscular pain, headache, nose and throat discomfort</td>
</tr>
<tr>
<td>084</td>
<td>Acute cough, fever, typical whoop</td>
</tr>
</tbody>
</table>
Main Symptom(s)

Additional symptom(s) or descriptions

085 Acute cough, fever
086 Cough, other and unspecified

09 Upper Respiratory Infections

090 Nose and throat discomfort, watery discharge, cough, fever

091 Sore throat, fever, difficulty in swallowing

092 Sore throat, false membrane, slight fever

10 Breathing Problems

100 Breathing difficulty, shortness of breath, chest pain, swollen ankles

101 Breathing difficulty, shortness of breath, cough

11 Urogenital Manifestations

110 Sugar in urine, thirst, hunger, frequent urination

111 Blood in urine

112 Burning pain during urination, fever, pus in urine

113 Burning pain during urination, discharge of pus from urethra (male)

114 Cessation of urination, pain, distension

115 Vaginal discharge, fever, low abdominal pain

116 Menstruation disorders

Possible Diagnosis

Acute bronchitis
Common cold, Upper respiratory infection
Sore throat
Diptheria
Heart disease
Asthma, Emphysema, Chronic bronchitis
Diabetes
Schistosomiasis
Renal infection
Conorrhoea
Urinary Obstruction
Genital infection
Menstruation disorders
Main Symptom(s)

**Additional symptom(s) or descriptions**

<table>
<thead>
<tr>
<th>12</th>
<th>Eye Manifestations</th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
<td>Non-transparent patches on eye</td>
</tr>
<tr>
<td>121</td>
<td>Sore eyes, discharge, painful swollen lids</td>
</tr>
<tr>
<td>122</td>
<td>Blindness</td>
</tr>
<tr>
<td>123</td>
<td>Low vision</td>
</tr>
<tr>
<td>124</td>
<td>Other eye complaints</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>13</th>
<th>Other Head and Neck Manifestations</th>
</tr>
</thead>
<tbody>
<tr>
<td>130</td>
<td>Toothache</td>
</tr>
<tr>
<td>131</td>
<td>Bleeding from nose or mouth</td>
</tr>
<tr>
<td>132</td>
<td>Other mouth problems</td>
</tr>
<tr>
<td>133</td>
<td>Swelling of neck, painless, moves or swallowing</td>
</tr>
<tr>
<td>134</td>
<td>Ear pain, discharge</td>
</tr>
<tr>
<td>135</td>
<td>Hearing difficulties</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>14</th>
<th>Neurological Manifestations</th>
</tr>
</thead>
<tbody>
<tr>
<td>140</td>
<td>Fear of drinking water, convulsions, history of animal bites</td>
</tr>
<tr>
<td>141</td>
<td>Locked jaw, muscular spasms, history of open wound or childbirth</td>
</tr>
<tr>
<td>142</td>
<td>Paralysis, sudden, with unconsciousness</td>
</tr>
<tr>
<td>143</td>
<td>Severe headache, dizziness</td>
</tr>
<tr>
<td>144</td>
<td>Abnormal behaviour, confusion</td>
</tr>
<tr>
<td>145</td>
<td>Convulsions, with unconsciousness</td>
</tr>
<tr>
<td>146</td>
<td>Paralysis, unspecified</td>
</tr>
</tbody>
</table>

**Possible Diagnosis**

- Eye opacities
- Eye infections
- Goitre
- Ear infections
- Rabies
- Tetanus
- Stroke
- Hypertension
- Mental disorders
- Epilepsy
**Main Symptom(s)**

<table>
<thead>
<tr>
<th>Additional symptom(s) or descriptions</th>
<th>Possible Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>147 Unconsciousness, coma, unspecified</td>
<td></td>
</tr>
<tr>
<td><strong>15 Maternal Problems</strong></td>
<td></td>
</tr>
<tr>
<td>150 Pregnancy, normal</td>
<td></td>
</tr>
<tr>
<td>151 Pregnancy with problems such as bleeding from genital tract, swelling of legs, urinary infections, fever, anaemia</td>
<td>Complicated pregnancy*</td>
</tr>
<tr>
<td>152 Abortion</td>
<td>Abortion*</td>
</tr>
<tr>
<td>153 Childbirth with problems such as excessive bleeding, difficult birth, exhaustion from long labour, premature ruptures of membranes, laceration of genitals or perineum</td>
<td>Complicated childbirth*</td>
</tr>
<tr>
<td>154 Puerperium with problems such as infection or laceration of genitals, fever prolapse</td>
<td>Complicated puerperium</td>
</tr>
<tr>
<td><strong>16 Newborn Problems</strong></td>
<td></td>
</tr>
<tr>
<td>160 Normal livebirth</td>
<td></td>
</tr>
<tr>
<td>161 Born dead</td>
<td>Still birth</td>
</tr>
<tr>
<td>162 Injured during birth by passage or manipulation</td>
<td>Birth injury</td>
</tr>
<tr>
<td>163 Small or premature baby</td>
<td>Immaturity</td>
</tr>
<tr>
<td>164 Body or limbs misshapen, or functions not working properly</td>
<td>Congenital anomaly</td>
</tr>
<tr>
<td><strong>17 General Problems</strong></td>
<td></td>
</tr>
<tr>
<td>170 Weakness, loss of weight, anaemia, oedema, history of inadequate diet</td>
<td>Malnutrition</td>
</tr>
</tbody>
</table>
### Main Symptom(s)

<table>
<thead>
<tr>
<th>Additional symptom(s) or descriptions</th>
<th>Possible Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>171 As 170, with reddish discolouration of hair or skin</td>
<td>Kwashiokos*</td>
</tr>
<tr>
<td>172 Weakness, pallor, fast and weak pulse, prostration</td>
<td>Shock*</td>
</tr>
<tr>
<td>173 Weakness, tiredness, unspecified</td>
<td></td>
</tr>
<tr>
<td>174 Pain and swelling in joints or muscles</td>
<td>Arthritis, rheumatism</td>
</tr>
</tbody>
</table>

### Serious Injuries (require more than dressing)

180 Fractures
181 Dislocations
182 Traumatic amputations
183 Crushing injuries
184 Foreign bodies in orifice
185 Burns
186 Poisoning (other than food poisoning)
187 Other serious injuries

### Mild Injuries (require cleaning and dressing only)

190 Lacerations
191 Punctures
192 Bruises
193 Sprains
194 Strains
195 Contusions
196 Abrasions
197 Other mild injuries
### Main Symptom(s)

<table>
<thead>
<tr>
<th>Additional symptom(s) or descriptions</th>
<th>Possible Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 Other and Unknown Cause of Morbidity and Mortality</td>
<td></td>
</tr>
<tr>
<td>200 Other specified causes</td>
<td></td>
</tr>
<tr>
<td>201 Sudden death from unknown cause</td>
<td></td>
</tr>
<tr>
<td>202 Unknown cause</td>
<td></td>
</tr>
</tbody>
</table>

### E1 External Causes of Injuries

- E10 Bites or stings of venomous animals
- E11 Accidental burns (e.g. hot water)
- E12 Accidental drowning
- E13 Accidental falls
- E14 Accidental poisoning (other than food poisoning)
- E15 Transport accident
- E16 Other accidents
- E17 Suicide, self-inflicted injury
- E18 Homicides, assault
- E19 Violence, unknown whether accident, self-inflicted or assault

### S1 Health Services Provided

- S10 External applications
- S11 Infection, vaccination
- S12 Oral, medication
- S13 Dressing of wounds
- S14 Normal delivery
- S15 Other procedures
- S16 Maternal and child health consultation
Main Symptom(s)

Additional symptom(s) or descriptions

S17 Family planning consultation
S18 Other consultation
S19 Other services

Possible Diagnosis

Content of Detailed Symptoms List

No attempt has been made to identify all the causes of morbidity likely to be met; instead identification has been limited to conditions that are important because of their frequency, the gravity or their cost to the community. Thus, constipation, though occurring very commonly has not been considered enough to warrant separate identification.

The conditions listed, must also, of course, be able to be recognized by the reporting personnel (especially, personnel responsible for coding). Certain conditions could only be recognized when the personnel have been specially trained with clinical experience or when the conditions are endemic in the area or when a proven epidemic of the condition is in progress.

Structure of the List

The list consists of 19 groups of morbid conditions, plus a twentieth group for unknown causes, a list of external causes of vileness and a list of services.

Each of the nineteen groups is based on the occurrence of "a main or lead symptom or symptoms", common to all the conditions in the group: differentiation within the groups depends on the occurrence of additional symptoms or descriptors. A symptom that
is the "main symptom" for one group (i.e. the most significant symptom for all conditions in that group) may, of course, appear as an "additional symptom" for a condition in another groups, where it plays a subordinate role in the diagnostic pattern. Thus, fever is a main symptom in group 01, 02 and 03 and an additional symptom in group 08, where cough is the main symptom.

The E group for external causes of injuries will be used as an additional code when the main code is from groups 18 or 19 (injuries). The S group for health services will be used when patients without current complaint or sickness attend solely for the purposes listed.

It should be noted that neither the arrangement of morbid conditions nor their code numbers bear any relationship to the International Classification of Diseases.
APPENDIX 5

DATA GATHERING FORMS
HEALTH INFORMATION SYSTEM
APPENDIX 5

Summaries of births and deaths and also number of stillbirths will be recorded on Form P which has identified format for the chiefdom, district and provincial levels.

Similarly, summaries of diseases at the chiefdom, district and provincial levels will be made on Form R with identical format. However, as a distinguishing feature, the following colour schemes will be used:

For the chiefdom level, Forms P and R will be coloured green; for the district level, yellow will be used and for the provincial forms white will be the colour.
FORM A
DEATH REGISTRATION FORM

NAME OF DECEASED ____________________________
First ____________________________ Last

IDENTIFICATION NUMBER [ ] [ ] [ ]
Patient [ ] [ ] [ ]

Household [ ] [ ] [ ]

AGE OR DECEASED [ ] [ ] [ ]
Day Mo Yr

SEX OF DECEASED
[ ] Male
[ ] Female

ADDRESS OF DECEASED:
VILLAGE ____________________________
CHIEFDOM ____________________________
DISTRICT ____________________________
PROVINCE ____________________________

NAME OF PARENTS:
MOTHER ____________________________
First ____________________________ Last
I.D. NO. [ ] [ ] [ ] [ ] [ ]

FATHER ____________________________
First ____________________________ Last
I.D. NO. [ ] [ ] [ ] [ ] [ ]

DATE OF DEATH [ ] [ ] [ ]
Day Mo Yr

PLACE OF DEATH ____________________________
OCCUPATION OF DECEASED

PRESENTING COMPLAINTS, SYMPTOMS AND SIGNS BEFORE DEATH

NAME OF INFORMANT

ADDRESS OF INFORMANT

DATE OF RECORDING

RECORDER'S NAME

RECORDER'S STATUS

VHW, MO. etc.

SIGNATURE

THIS SECTION TO BE COMPLETED ONLY BY AUTHORIZED PERSONS (Medical Officer, Dispenser, Medical Assistant)

PROBABLE CAUSE(S) OF DEATH

IMMEDIATE CAUSE(S)

SECONDARY CAUSE(S)

NAME OF OFFICIAL

STATUS

SIGNATURE

DATE
### Form B
**Medical Register**

TO BE COMPLETED BY V.H.W.

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**TOTAL**

**LIST OF DISEASES**

**NAME OF REPORTING PERSHERAL UNIT**

**FORM II**

**YEARLY FOR DISEASES FOR PERIOD**
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**TOTAL**
FORM D
INFECTION DISEASES NOTIFICATION FORM

I hereby certify that:

NAME OF PATIENT

(a) AGE OF PATIENT

Yr. Mo.

(b) SEX OF PATIENT

Male

Female

OF (ADDRESS)

VILLAGE

CHIEFDOM

DISTRICT

PROVINCE

Is suffering from

diagnosis

This case was

Reported on

Day Mo. Yr.

Seen by me

NAME OF REPORTING OFFICIAL

STATUS

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CODING OF DISEASES

At an appointed day of each month, a VHW will travel to the Health Centre at the chiefdom headquarters with all his books and record forms to meet with the Dispenser or M.A. During this meeting the Dispenser and the VHW will systematically check the medical register (Form II) and the Dispenser will code the symptoms, signs and complaints as given by the patients and as recorded by the VHW — according to the detailed list provided (Appendix 4). After this coding operation, the dispenser with the assistance of the VHW will then summarize the cases on the provided form (Form II). Births and Deaths reports will also be summarized on Form P.

Immunizations and other records (e.g., weight records of children) will similarly be summarized on the appropriate forms.

During the monthly meeting between the Dispenser and each VHW, the Dispenser will carry out careful check of the completeness and accuracy of information submitted by the VHW. Mistakes will be rectified and the Dispenser will provide teaching help for the VHW. General problems relating to the work of the VHW will be discussed and the important issues at these monthly meetings with the VHW will be communicated by the Dispenser to higher levels both for information and necessary action.

Instructions for completion of all forms will be provided.
FIGURE II
DISTRICT BOUNDARIES - SIERRA LEONE
REFERENCES


19. Donabedian, A. Promoting Quality through Evaluating the Process of Patient Care, Medical Care, VI (3), 1968.


38. Hillboe, H.E. Health Planning on a Community Basis. Medical Care, VI (2), 1968.


42. Junes, M.D. Physical Growth of Nigerian Yoruba Children.

43. Jelliffe, D.B. The Assessment of the Nutritional Status
of the Community. W.H.O. Monograph Series, No. 53,

44. King, M. Medical Care in Developing Countries: A
Primer on the Medicine of Poverty and a Symposium
from Makerere, Nairobi, Kenya. Oxford University


46. Knox, E.G. Epidemiology in Health Care Planning
Oxford Medical Publication, Oxford University

47. Lesotho National Nutrition Survey. Agency for International


49. Maciel-Rojas, R.A. Pathology of Protozoal and Helminthic
Diseases. The Williams and Wilkins Company,

50. MacMahon, B., Pugh, T.F. Epidemiology, Principles and

51. Malariometric Survey in Villages in Sierra Leone.
Unpublished document, Ministry of Health,
Freetown, 1979.

52. Mausner, J.S., Bahn, A.K. Epidemiology: An Introductory

53. Medical Statistical Information. Medical Statistics Unit,
Ministry of Health, Sierra Leone, 1978.

54. Moriyama, I.M. Problems in the Measurement of Health Status:
Indicators of Social Change. Russell Sage Foundation,

55. McKeown, T. The Role of Medicine: Dream, Mirage or Nemesis
The Nuffield Provincial Hospitals Trust, 1976.

56. National Development Plan, Sierra Leone, 1974/75 - 1978/79,
published by the Ministry of Development, Sierra Leone, 1974.
68.63, Geneva.

58. Ontario Council of Health, Evaluation of Primary Health Care  

59. Pan American Health Organization, Seminar on Utilization  
of Auxiliaries and Community Leaders in Health  

60. Pratt, L. The Relationship of Socio-economic Status to Health  

61. Primary Health Care in Sierra Leone Published by the Ministry  
of Health, Sierra Leone, 1978.


63. Rural Health Services, Organization, Delivery and Use.  
North-Central Regional Centre for Rural  

Oxford University Press, London.

65. Sackett, D.L., Baskin, M.S. Methods of Health Care  

66. Sackett, D.L. Evaluation of Innovative Community Ambulatory  
Care Programs During Periods of Social Change, published  
by the Canadian Health Association.

67. Sackett, D.L. On the Evaluation of Health Services,  
unpublished document.

68. Schwenger, C.W. Evaluation of Local Health Programs  

69. Shaw, I.B., Wyne-Williams, N. Infectivity of Pulmonary  
Tuberculosis in Relation to Sputum Status.  
Amer. Rev. Tuberc. 69: 724-731

70. Sierra Leone National Nutrition Survey 1978, Office of  
Nutrition Development, Agency for International  
Development, Washington, D.C.

71. Smith, D.T. Diagnostic and Prognostic Significance of  
the Quantitative Tuberculin Test Amer, Int. Med  
67


83. W.H.O. Interrelationships Between Health Programmes and Socioeconomic Development W.H.O. Public Health Papers, No. 49.

84. W.H.O. Measurement of Levels of Health European Series No. 7, 1979, Regional Office for Europe.


88. W.H.O. **Expert Committee on Health Statistics.** W.H.O.  

89. W.H.O. T.B./Tech. information/68.62 **A Tuberculosis**  


91. Wilcocks, C. and Manson-Bahr, P.E.C.  
**Manson's Tropical Diseases** Seventh Edition, Bailliere  
Tindall, London